

**1.3.2 Average percentage of courses that include experiential learning through project work/field work/internship during last five years**

Academic year/Branch	CSE	CIVIL	ECE	EEE	MECH	H&S	TOTAL
2019-20	35	22	28	27	28	10	150
2018-19	35	22	28	27	28	10	150
2017-18	33	23	29	21	26	13	145
2016-17	13	19	27	25	24	7	115
2015-16	31	22	24	26	28	10	141
TOTAL	147	108	136	126	134	50	701



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 Ghanpur (Vi), Ghatkesar (M)  
 Medchal-Malkajgiri Dist-501301 T.S.



## KOMMURI PRATAP REDDY INSTITUTE OF TECHNOLOGY

### B.Tech-COMPUTER SCIENCE AND ENGINEERING

2018-19

1.3.2. Average percentage of courses that include experiential learning through project work/field work/internship during last five years

S.No	Regulations	No.of Course	Year of Study
1	R18	10	I year I & II semester
2	R16	20	II & III Year I & II Semesters
3	R15	5	IV year I & II Semesters

  
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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech. 1<sup>st</sup> Year Syllabus (w.e.f AY 2018-19)****Common for EEE, CSE & IT****I YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics - I	3	1	0	4
2	CH102BS	Chemistry	3	1	0	4
3	EE103ES	Basic Electrical Engineering	3	0	0	3
4	ME105ES	Engineering Workshop	1	0	3	2.5
5	EN105HS	English	2	0	0	2
6	CH106BS	Engineering Chemistry Lab	0	0	3	1.5
7	EN107HS	English Language and Communication Skills Lab	0	0	2	1
8	EE108ES	Basic Electrical Engineering Lab	0	0	2	1
		Induction Programme				
		<b>Total Credits</b>	<b>12</b>	<b>2</b>	<b>10</b>	<b>19</b>

**I YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA201BS	Mathematics - II	3	1	0	4
2	AP202BS	Applied Physics	3	1	0	4
3	CS203ES	Programming for Problem Solving	3	1	0	4
4	ME204ES	Engineering Graphics	1	0	4	3
5	AP205BS	Applied Physics Lab	0	0	3	1.5
6	CS206ES	Programming for Problem Solving Lab	0	0	3	1.5
7	*MC209ES	Environmental Science	3	0	0	0
		<b>Total Credits</b>	<b>13</b>	<b>3</b>	<b>10</b>	<b>18</b>

\*MC – Satisfied/Unsatisfied

**MA101BS: MATHEMATICS - I****B.Tech. I Year I Sem.**

L	T	P	C
3	1	0	4

**Course Objectives:** To learn

- Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form.
- Concept of Sequence.
- Concept of nature of the series.
- Geometrical approach to the mean value theorems and their application to the mathematical problems
- Evaluation of surface areas and volumes of revolutions of curves.
- Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative
- Finding maxima and minima of function of two and three variables.

**Course Outcomes:** After learning the contents of this paper the student must be able to

- Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations
- Find the Eigen values and Eigen vectors
- Reduce the quadratic form to canonical form using orthogonal transformations.
- Analyse the nature of sequence and series.
- Solve the applications on the mean value theorems.
- Evaluate the improper integrals using Beta and Gamma functions
- Find the extreme values of functions of two variables with/ without constraints.

**UNIT-I: Matrices**

Matrices: Types of Matrices, Symmetric; Hermitian; Skew-symmetric; Skew-Hermitian; orthogonal matrices; Unitary Matrices; rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; solving system of Homogeneous and Non-Homogeneous equations. Gauss elimination method; Gauss Seidel Iteration Method.

**UNIT-II: Eigen values and Eigen vectors**

Linear Transformation and Orthogonal Transformation: Eigen values and Eigenvectors and their properties: Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); finding inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and

Nature of the Quadratic Forms; Reduction of Quadratic form to canonical forms by Orthogonal Transformation

### **UNIT-III: Sequences & Series**

Sequence: Definition of a Sequence, limit; Convergent, Divergent and Oscillatory sequences. Series: Convergent, Divergent and Oscillatory Series; Series of positive terms; Comparison test, p-test, D-Alembert's ratio test; Raabe's test; Cauchy's Integral test; Cauchy's root test; logarithmic test. Alternating series: Leibnitz test; Alternating Convergent series: Absolute and Conditionally Convergence.

### **UNIT-IV: Calculus**

Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series. Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

### **UNIT-V: Multivariable calculus (Partial Differentiation and applications)**

Definitions of Limit and continuity.

Partial Differentiation; Euler's Theorem; Total derivative; Jacobian; Functional dependence & independence, Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

### **TEXTBOOKS:**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36<sup>th</sup> Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9<sup>th</sup> Edition, John Wiley & Sons, 2006.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9<sup>th</sup> Edition, Pearson, Reprint, 2002.

### **REFERENCES:**

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11<sup>th</sup> Reprint, 2010.

**CH102BS/CH202BS: CHEMISTRY****B.Tech. I Year I Sem.**

L	T	P	C
3	1	0	4

**Course Objectives:**

- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
- To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.
- To acquire the knowledge of electrochemistry, corrosion and water treatment which are essential for the Engineers and in industry.
- To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.
- To impart the knowledge of stereochemistry and synthetic aspects useful for understanding reaction pathways

**Course Outcomes:** The basic concepts included in this course will help the student to gain:

- The knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
- The required principles and concepts of electrochemistry, corrosion and in understanding the problem of water and its treatments.
- The required skills to get clear concepts on basic spectroscopy and application to medical and other fields.
- The knowledge of configurational and conformational analysis of molecules and reaction mechanisms.

**Unit - I:**

**Molecular structure and Theories of Bonding:** Atomic and Molecular orbitals. Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N<sub>2</sub>, O<sub>2</sub> and F<sub>2</sub> molecules.  $\pi$  molecular orbitals of butadiene and benzene.

Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d- orbitals in Tetrahedral, Octahedral and square planar geometries. Band structure of solids and effect of doping on conductance.

**Unit - II:**

**Water and its treatment:** Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Potable water and its specifications. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization. Boiler feed water and its treatment – Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water – Ion exchange process. Desalination of water – Reverse osmosis. Numerical problems.

**Unit - III:**

**Electrochemistry and corrosion:** Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – calomel, Quinhydrone and glass electrode. Nernst equation Determination of pH of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications. Numerical problems. Potentiometric titrations. Batteries – Primary (Lithium cell) and secondary batteries (Lead – acid storage battery and Lithium ion battery).

Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application. Electroless plating of Nickel.

**Unit - IV:**

**Stereochemistry, Reaction Mechanism and synthesis of drug molecules:** Introduction to representation of 3-dimensional structures, Structural and stereoisomers, configurations, symmetry and chirality. Enantiomers, diastereomers, optical activity and Absolute configuration. Conformation analysis of n-butane.

Substitution reactions: Nucleophilic substitution reactions: Mechanism of  $S_N1$ ,  $S_N2$  reactions. Electrophilic and nucleophilic addition reactions: Addition of HBr to propene. Markownikoff and anti Markownikoff's additions. Grignard additions on carbonyl compounds. Elimination reactions: Dehydro halogenation of alkylhalides. Saytzeff rule. Oxidation reactions: Oxidation of alcohols using  $KMnO_4$  and chromic acid.

Reduction reactions: reduction of carbonyl compounds using  $LiAlH_4$  &  $NaBH_4$ . Hydroboration of olefins. Structure, synthesis and pharmaceutical applications of Paracetamol and Aspirin.

**Unit - V:**

**Spectroscopic techniques and applications:** Principles of spectroscopy, selection rules and applications of electronic spectroscopy. vibrational and rotational spectroscopy. Basic concepts of Nuclear magnetic resonance Spectroscopy, chemical shift. Introduction to Magnetic resonance imaging.

**Suggested Text Books:**

1. Physical Chemistry, by P.W. Atkins
2. Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
3. Fundamentals of Molecular Spectroscopy, by C.N. Banwell
4. Organic Chemistry: Structure and Function by K.P.C. Volhardt and N.E.Schore, 5<sup>th</sup> Edition.
5. University Chemistry, by B.M. Mahan, Pearson IV Edition.
6. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan

**EE103ES/EE203ES: BASIC ELECTRICAL ENGINEERING****B.Tech. I Year I Sem.**

L	T	P	C
3	0	0	3

**Course Objectives:**

- To introduce the concepts of electrical circuits and its components
- To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
- To study and understand the different types of DC/AC machines and Transformers.
- To impart the knowledge of various electrical installations.
- To introduce the concept of power, power factor and its improvement.

**Course Outcomes:**

- To analyze and solve electrical circuits using network laws and theorems.
- To understand and analyze basic Electric and Magnetic circuits
- To study the working principles of Electrical Machines
- To introduce components of Low Voltage Electrical Installations

**UNIT-I: D.C. Circuits**

Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems.

Time-domain analysis of first-order RL and RC circuits.

**UNIT-II: A.C. Circuits**

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance in series R-L-C circuit.

Three-phase balanced circuits, voltage and current relations in star and delta connections.

**UNIT-III: Transformers**

Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

**UNIT-IV: Electrical Machines**

Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor.

Construction and working of synchronous generators.



**UNIT-V: Electrical Installations**

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

**Suggested Text-Books/Reference-Books:**

1. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGraw Hill.
2. D.C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. L.S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011
4. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010
5. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India, 1989.

**ME105ES/ME205ES: ENGINEERING WORKSHOP****B.Tech. I Year I Sem.**

L	T	P	C
1	0	3	2.5

**Pre-requisites:** Practical skill**Course Objectives:**

- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, equipment and machines.
- To study commonly used carpentry joints.
- To have practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

**Course Outcomes:** At the end of the course, the student will be able to:

- Study and practice on machine tools and their operations
- Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.
- Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
- Apply basic electrical engineering knowledge for house wiring practice.

**1. TRADES FOR EXERCISES:****At least two exercises from each trade:**

- I. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
- II. Fitting – (V-Fit, Dovetail Fit & Semi-circular fit)
- III. Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel)
- IV. Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern)
- V. Welding Practice – ( Arc Welding & Gas Welding)
- VI. House-wiring – (Parallel & Series, Two-way Switch and Tube Light)
- VII. Black Smithy – ( Round to Square, Fan Hook and S-Hook)

**2. TRADES FOR DEMONSTRATION & EXPOSURE:**

Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and Wood Working

**TEXT BOOKS:**

1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha.

**REFERENCE BOOKS:**

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ SciTech
2. Workshop Manual / Venkat Reddy/ BSP

**EN105HS/EN205HS: ENGLISH****B.Tech. I Year I Sem.**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>

**INTRODUCTION**

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. *The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.*

**Learning Objectives:** The course will help to

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
- Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
- Develop study skills and communication skills in formal and informal situations.

**Course Outcomes:** Students should be able to

- Use English Language effectively in spoken and written forms.
- Comprehend the given texts and respond appropriately.
- Communicate confidently in various contexts and different cultures.
- Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

**SYLLABUS****UNIT –I**

**‘The Raman Effect’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.**

**Vocabulary Building:** The Concept of Word Formation --The Use of Prefixes and Suffixes.

**Grammar:** Identifying Common Errors in Writing with Reference to Articles and Prepositions.

**Reading:** Reading and Its Importance- Techniques for Effective Reading.

**Basic Writing Skills:** Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- **Techniques for writing precisely** – **Paragraph writing** – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

#### UNIT –II

**‘Ancient Architecture in India’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.**

**Vocabulary:** Synonyms and Antonyms.

**Grammar:** Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

**Reading:** Improving Comprehension Skills – Techniques for Good Comprehension

**Writing:** Format of a Formal Letter-**Writing Formal Letters** E.g., Letter of Complaint, Letter of Requisition, Job Application with Resume.

#### UNIT –III

**‘Blue Jeans’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.**

**Vocabulary:** Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use in English.

**Grammar:** Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

**Reading:** Sub-skills of Reading- Skimming and Scanning

**Writing:** Nature and Style of Sensible Writing- **Defining- Describing** Objects, Places and Events – **Classifying- Providing Examples or Evidence**

#### UNIT –IV

**‘What Should You Be Eating’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.**

**Vocabulary:** Standard Abbreviations in English

**Grammar:** Redundancies and Clichés in Oral and Written Communication.

**Reading:** Comprehension- Intensive Reading and Extensive Reading

**Writing: Writing Practices--**Writing Introduction and Conclusion - Essay Writing-Précis Writing.

#### UNIT –V

**‘How a Chinese Billionaire Built Her Fortune’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.**

**Vocabulary:** Technical Vocabulary and their usage

**Grammar:** Common Errors in English

**Reading:** Reading Comprehension-Exercises for Practice

**Writing: Technical Reports-** Introduction – Characteristics of a Report – Categories of Reports

Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing aReport.

**Prescribed Textbook:**

1. **Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.**

**References:**

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007).Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006).Study Writing. Cambridge University Press.
6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

**CH106BS/CH206ES: ENGINEERING CHEMISTRY LAB****B.Tech. I Year I Sem.**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>

**Course Objectives:** The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

- Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
- To determine the rate constant of reactions from concentrations as a function of time.
- The measurement of physical properties like adsorption and viscosity.
- To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

**Course Outcomes:** The experiments will make the student gain skills on:

- Determination of parameters like hardness and chloride content in water.
- Estimation of rate constant of a reaction from concentration – time relationships.
- Determination of physical properties like adsorption and viscosity.
- Calculation of  $R_f$  values of some organic molecules by TLC technique.

**List of Experiments:**

1. Determination of total hardness of water by complexometric method using EDTA
2. Determination of chloride content of water by Argentometry
3. Estimation of an HCl by Conductometric titrations
4. Estimation of Acetic acid by Conductometric titrations
5. Estimation of HCl by Potentiometric titrations
6. Estimation of  $Fe^{2+}$  by Potentiometry using  $KMnO_4$
7. Determination of rate constant of acid catalysed hydrolysis of methyl acetate
8. Synthesis of Aspirin and Paracetamol
9. Thin layer chromatography calculation of  $R_f$  values. eg ortho and para nitro phenols
10. Determination of acid value of coconut oil
11. Verification of Freundlich adsorption isotherm-adsorption of acetic acid on charcoal
12. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
13. Determination of partition coefficient of acetic acid between n-butanol and water.
14. Determination of surface tension of a given liquid using stalagmometer.

**References**

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi)
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi)
3. Vogel's text book of practical organic chemistry 5<sup>th</sup> edition
4. Text book on Experiments and calculations in Engineering chemistry – S.S. Dara

**EN107HS/EN207HS: ENGLISH LANGUAGE  
AND COMMUNICATION SKILLS LAB**

B.Tech. I Year I Sem.

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>

The **Language Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

**Course Objectives:**

- ✎ To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
- ✎ To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm
- ✎ To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- ✎ To improve the fluency of students in spoken English and neutralize their mother tongue influence
- ✎ To train students to use language appropriately for public speaking and interviews

**Learning Outcomes:** Students will be able to attain

- ☞ Better understanding of nuances of English language through audio- visual experience and group activities
- ☞ Neutralization of accent for intelligibility
- ☞ Speaking skills with clarity and confidence which in turn enhances their employability skills

**Syllabus****English Language and Communication Skills Lab (ELCS) shall have two parts:**

- a. Computer Assisted Language Learning (CALL) Lab**
- b. Interactive Communication Skills (ICS) Lab**

**Listening Skills**

Objectives

1. To enable students develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

*Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.*



- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

### Speaking Skills

#### Objectives

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts
  - Oral practice: Just A Minute (JAM) Sessions
  - Describing objects/situations/people
  - Role play – Individual/Group activities

- **The following course content is prescribed for the English Language and Communication Skills Lab based on Unit-6 of AICTE Model Curriculum 2018 for B.Tech First English. As the syllabus is very limited, it is required to prepare teaching/learning materials by the teachers collectively in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning and timesaving in the Lab)**

#### Exercise – I

##### CALL Lab:

*Understand:* Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening.

*Practice:* Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

##### ICS Lab:

*Understand:* Communication at Work Place- Spoken vs. Written language.

*Practice:* Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

#### Exercise – II

##### CALL Lab:

*Understand:* Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context.

*Practice:* Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

##### ICS Lab:

*Understand:* Features of Good Conversation – Non-verbal Communication.

*Practice:* Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

#### Exercise - III

##### CALL Lab:

*Understand:* Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

*Practice:* Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

**ICS Lab:**

*Understand:* How to make Formal Presentations.

*Practice:* Formal Presentations.

**Exercise – IV**

**CALL Lab:**

*Understand:* Listening for General Details.

*Practice:* Listening Comprehension Tests.

**ICS Lab:**

*Understand:* Public Speaking – Exposure to Structured Talks.

*Practice:* Making a Short Speech – Extempore.

**Exercise – V**

**CALL Lab:**

*Understand:* Listening for Specific Details.

*Practice:* Listening Comprehension Tests.

**ICS Lab:**

*Understand:* Interview Skills.

*Practice:* Mock Interviews.

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**Minimum Requirement of infrastructural facilities for ELCS Lab:**

**1. Computer Assisted Language Learning (CALL) Lab:**

**The Computer Assisted Language Learning Lab** has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

**System Requirement (Hardware component):**

*Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:*

- i) Computers with Suitable Configuration
- ii) High Fidelity Headphones

**2. Interactive Communication Skills (ICS) Lab:**

**The Interactive Communication Skills Lab:** A Spacious room with movable chairs and audio-visual aids with a Public-Address System, a LCD and a projector etc.

**EE108ES/EE208ES: BASIC ELECTRICAL ENGINEERING LAB****B.Tech. I Year I Sem.**

L	T	P	C
0	0	2	1

**Course Objectives:**

- To analyze a given network by applying various electrical laws and network theorems
- To know the response of electrical circuits for different excitations
- To calculate, measure and know the relation between basic electrical parameters.
- To analyze the performance characteristics of DC and AC electrical machines

**Course Outcomes:**

- Get an exposure to basic electrical laws.
- Understand the response of different types of electrical circuits to different excitations.
- Understand the measurement, calculation and relation between the basic electrical parameters
- Understand the basic characteristics of transformers and electrical machines.

**List of experiments/demonstrations:**

1. Verification of Ohms Law
2. Verification of KVL and KCL
3. Transient Response of Series RL and RC circuits using DC excitation
4. Transient Response of RLC Series circuit using DC excitation
5. Resonance in series RLC circuit
6. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits
7. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single Phase Transformer
8. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
9. Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)
10. Measurement of Active and Reactive Power in a balanced Three-phase circuit
11. Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
12. Torque-Speed Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
13. Performance Characteristics of a Three-phase Induction Motor
14. Torque-Speed Characteristics of a Three-phase Induction Motor
15. No-Load Characteristics of a Three-phase Alternator

**MA201BS: MATHEMATICS - II****B.Tech. I Year II Sem.**

L	T	P	C
3	1	0	4

**Course Objectives:** To learn

- Methods of solving the differential equations of first and higher order.
- Evaluation of multiple integrals and their applications
- The physical quantities involved in engineering field related to vector valued functions
- The basic properties of vector valued functions and their applications to line, surface and volume integrals

**Course Outcomes:** After learning the contents of this paper the student must be able to

- Identify whether the given differential equation of first order is exact or not
- Solve higher differential equation and apply the concept of differential equation to real world problems
- Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelepiped
- Evaluate the line, surface and volume integrals and converting them from one to another

**UNIT-I: First Order ODE**

Exact, linear and Bernoulli's equations; Applications : Newton's law of cooling, Law of natural growth and decay; Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

**UNIT-II: Ordinary Differential Equations of Higher Order**

Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type  $e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ , polynomials in  $x$ ,  $e^{ax}V(x)$  and  $xV(x)$ ; method of variation of parameters; Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

**UNIT-III: Multivariable Calculus (Integration)**

Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals.

Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals), Centre of mass and Gravity (constant and variable densities) by double and triple integrals (applications involving cubes, sphere and rectangular parallelepiped).

**UNIT-IV: Vector Differentiation**

Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoidal and Irrotational vectors.

**UNIT-V: Vector Integration**

Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

**TEXT BOOKS:**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36<sup>th</sup> Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9<sup>th</sup> Edition, John Wiley & Sons, 2006
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9<sup>th</sup> Edition, Pearson, Reprint, 2002.

**REFERENCES:**

1. Paras Ram, Engineering Mathematics, 2<sup>nd</sup> Edition, CBS Publishes
2. S. L. Ross, Differential Equations, 3<sup>rd</sup> Ed., Wiley India, 1984.

**AP102BS/AP202BS: APPLIED PHYSICS****B.Tech. I Year II Sem.**

L	T	P	C
3	1	0	4

**Course Objectives:**

- Students will demonstrate skills in scientific inquiry, problem solving and laboratory techniques.
- Students will be able to demonstrate competency and understanding of the concepts found in Quantum Mechanics, Fiber optics and lasers, Semiconductor physics and Electromagnetic theory and a broad base of knowledge in physics.
- The graduates will be able to solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.
- To study applications in engineering like memory devices, transformer core and electromagnetic machinery.

**Course Outcomes:** Upon graduation:

- The student would be able to learn the fundamental concepts on Quantum behaviour of matter in its micro state.
- The knowledge of fundamentals of Semiconductor physics, Optoelectronics, Lasers and fibre optics enable the students to apply to various systems like communications, solar cell, photo cells and so on.
- Design, characterization and study of properties of material help the students to prepare new materials for various engineering applications.
- The course also helps the students to be exposed to the phenomena of electromagnetism and also to have exposure on magnetic materials and dielectric materials.

**UNIT-I: Quantum Mechanics**

Introduction to quantum physics, Black body radiation, Planck's law, Photoelectric effect, Compton effect, de-Broglie's hypothesis, Wave-particle duality, Davisson and Germer experiment, Heisenberg's Uncertainty principle, Born's interpretation of the wave function, Schrodinger's time independent wave equation, Particle in one dimensional box.

**UNIT-II: Semiconductor Physics**

Intrinsic and Extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature, Carrier generation and recombination, Carrier transport: diffusion and drift, Hall effect, p-n junction diode, Zener diode and their V-I Characteristics, Bipolar Junction Transistor (BJT): Construction, Principle of operation.

**UNIT-III: Optoelectronics**

Radiative and non-radiative recombination mechanisms in semiconductors, LED and semiconductor lasers: Device structure, Materials, Characteristics and figures of merit, Semiconductor photodetectors: Solar cell, PIN and Avalanche and their structure, Materials, working principle and Characteristics.

**UNIT-IV: Lasers and Fibre Optics**

Lasers: Introduction to interaction of radiation with matter, Coherence, Principle and working of Laser, Population inversion, Pumping, Types of Lasers: Ruby laser, Carbon dioxide (CO<sub>2</sub>) laser, He-Ne laser, Applications of laser. Fibre Optics: Introduction, Optical fibre as a dielectric wave guide, Total internal reflection, Acceptance angle, Acceptance cone and Numerical aperture, Step and Graded index fibres, Losses associated with optical fibres, Applications of optical fibres.

**UNIT-V: Electromagnetism and Magnetic Properties of Materials**

Laws of electrostatics, Electric current and the continuity equation, Ampere's and Faraday's laws, Maxwell's equations, Polarisation, Permittivity and Dielectric constant, Internal fields in a solid, Clausius-Mossotti equation, Ferroelectrics and Piezoelectrics. Magnetisation, permeability and susceptibility, Classification of magnetic materials, Ferromagnetism and ferromagnetic domains, Hysteresis, Applications of magnetic materials.

**TEXT BOOKS:**

1. Engineering Physics, B.K. Pandey, S. Chaturvedi - Cengage Learning.
2. Halliday and Resnick, Physics - Wiley.
3. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand

**REFERENCES:**

1. Richard Robinett, Quantum Mechanics
2. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hill inc. (1995).
3. Online Course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Guptha on NPTEL

**CS103ES/CS203ES: PROGRAMMING FOR PROBLEM SOLVING****B.Tech. I Year II Sem.**

L	T	P	C
3	1	0	4

**Course Objectives:**

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- To learn the usage of structured programming approach in solving problems.

**Course Outcomes:** The student will learn

- To write algorithms and to draw flowcharts for solving problems.
- To convert the algorithms/flowcharts to C programs.
- To code and test a given logic in C programming language.
- To decompose a problem into functions and to develop modular reusable code.
- To use arrays, pointers, strings and structures to write C programs.
- Searching and sorting problems.

**Unit - 1: Introduction to Programming**

Introduction to components of a computer system: disks, primary and secondary memory, processor, operating system, compilers, creating, compiling and executing a program etc., Number systems

Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudo code with examples, Program design and structured programming

Introduction to C Programming Language: variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code, Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion, The main method and command line arguments

Bitwise operations: Bitwise AND, OR, XOR and NOT operators

Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do-while loops

I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr.

Command line arguments

**Unit - II: Arrays, Strings, Structures and Pointers:**

Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays

Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings

Structures: Defining structures, initializing structures, unions, Array of structures



Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, usage of self referential structures in linked list (no implementation)

Enumeration data type

### **Unit - III: Preprocessor and File handling in C:**

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef

Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions.

### **Unit - IV: Function and Dynamic Memory Allocation:**

Functions: Designing structured programs, Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries

Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions

Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data types

### **Unit - V: Introduction to Algorithms:**

Algorithms for finding roots of a quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number, etc.

Basic searching in an array of elements (linear and binary search techniques),

Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms),

Basic concept of order of complexity through the example programs

### **TEXT BOOKS:**

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3<sup>rd</sup> Edition)

### **REFERENCE BOOKS:**

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice
2. Hall of India
3. R.G. Dromey, How to solve it by Computer, Pearson (16<sup>th</sup> Impression)
4. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
5. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4<sup>th</sup> Edition

**ME104ES/ME204ES: ENGINEERING GRAPHICS****B.Tech. I Year II Sem.**

L	T	P	C
1	0	4	3

**Pre-requisites: Nil****Course objectives:**

- To provide basic concepts in engineering drawing.
- To impart knowledge about standard principles of orthographic projection of objects.
- To draw sectional views and pictorial views of solids.

**Course Outcomes:** At the end of the course, the student will be able to:

- Preparing working drawings to communicate the ideas and information.
- Read, understand and interpret engineering drawings.

**UNIT – I**

**Introduction to Engineering Drawing:** Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Scales – Plain & Diagonal.

**UNIT- II**

**Orthographic Projections:** Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures.—Auxiliary Planes.

**UNIT – III**

Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere

**UNIT – IV**

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Intersection of Solids: Intersection of – Prism vs Prism- Cylinder Vs Cylinder

**UNIT – V**

**Isometric Projections:** Principles of Isometric Projection – Isometric Scale – Isometric Views –Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions

**Introduction to CAD: (For Internal Evaluation Weightage only):**

Introduction to CAD Software Package Commands.- Free Hand Sketches of 2D- Creation of 2D Sketches by CAD Package

**TEXTBOOKS:**

1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing / N. S. Parthasarathy and Vela Murali/ Oxford

**REFERENCE BOOKS:**

1. Engineering Drawing / Basant Agrawal and McAgrawal/ McGraw Hill
2. Engineering Drawing/ M. B. Shah, B.C. Rane / Pearson.
3. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

**AP105BS/AP205BS: APPLIED PHYSICS LAB**

B.Tech. I Year II Sem.

L	T	P	C
0	0	3	1.5

**List of Experiments:**

1. Energy gap of P-N junction diode:  
To determine the energy gap of a semiconductor diode.
2. Solar Cell:  
To study the V-I Characteristics of solar cell.
3. Light emitting diode:  
Plot V-I and P-I characteristics of light emitting diode.
4. Stewart – Gee's experiment:  
Determination of magnetic field along the axis of a current carrying coil.
5. Hall effect:  
To determine Hall co-efficient of a given semiconductor.
6. Photoelectric effect:  
To determine work function of a given material.
7. LASER:  
To study the characteristics of LASER sources.
8. Optical fibre:  
To determine the bending losses of Optical fibres.
9. LCR Circuit:  
To determine the Quality factor of LCR Circuit.
10. R-C Circuit:  
To determine the time constant of R-C circuit.

**Note: Any 8 experiments are to be performed**

**CS106ES/CS206ES: PROGRAMMING FOR PROBLEM SOLVING LAB****B.Tech. I Year II Sem.**

L	T	P	C
0	0	3	1.5

*[Note: The programs may be executed using any available Open Source/ Freely available IDE  
Some of the Tools available are:*

*CodeLite: <https://codelite.org/>*

*Code::Blocks: <http://www.codeblocks.org/>*

*DevC++ : <http://www.bloodshed.net/devcpp.html>*

*Eclipse: <http://www.eclipse.org>*

*This list is not exhaustive and is NOT in any order of preference]*

**Course Objectives:** The students will learn the following:

- To work with an IDE to create, edit, compile, run and debug programs
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- To Write programs using the Dynamic Memory Allocation concept.
- To create, read from and write to text and binary files

**Course Outcomes:** The candidate is expected to be able to:

- formulate the algorithms for simple problems
- translate given algorithms to a working and correct program
- correct syntax errors as reported by the compilers
- identify and correct logical errors encountered during execution
- represent and manipulate data with arrays, strings and structures
- use pointers of different types
- create, read and write to and from simple text and binary files
- modularize the code with functions so that they can be reused

**Practice sessions:**

- Write a simple program that prints the results of all the operators available in C (including pre/ post increment, bitwise and/or/not, etc.). Read required operand values from standard input.
- Write a simple program that converts one given data type to another using auto conversion and casting. Take the values from standard input.

**Simple numeric problems:**

- Write a program to find the max and min from the three numbers.
- Write the program for the simple, compound interest.

- c. Write program that declares Class awarded for a given percentage of marks, where mark  $<40\%$  = Failed,  $40\%$  to  $<60\%$  = Second class,  $60\%$  to  $<70\%$  = First class,  $\geq 70\%$  = Distinction. Read percentage from standard input.
- d. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output should be:
  - e.  $5 \times 1 = 5$
  - f.  $5 \times 2 = 10$
  - g.  $5 \times 3 = 15$
- h. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

### Expression Evaluation:

- a. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula  $s = ut + \frac{1}{2}at^2$  where u and a are the initial velocity in m/sec (= 0) and acceleration in  $\text{m/sec}^2$  (=  $9.8 \text{ m/s}^2$ )).
- b. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, \*, /, % and use Switch Statement)
- c. Write a program that finds if a given number is a prime number
- d. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
- e. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- f. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
- g. Write a C program to find the roots of a Quadratic equation.
- h. Write a C program to calculate the following, where x is a fractional value.
  - i.  $1 - \frac{x}{2} + \frac{x^2}{4} - \frac{x^3}{6}$
  - j. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:  $1 + x + x^2 + x^3 + \dots + x^n$ . For example: if n is 3 and x is 5, then the program computes  $1 + 5 + 25 + 125$ .

### Arrays and Pointers and Functions:

- a. Write a C program to find the minimum, maximum and average in an array of integers.
- b. Write a functions to compute mean, variance, Standard Deviation, sorting of n elements in single dimension array.
- c. Write a C program that uses functions to perform the following:
  - d. Addition of Two Matrices
  - e. ii. Multiplication of Two Matrices

- f. iii. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be same.
- g. Write C programs that use both recursive and non-recursive functions
- h. To find the factorial of a given integer.
- i. ii. To find the GCD (greatest common divisor) of two given integers.
- j. iii. To find  $x^n$
- k. Write a program for reading elements using pointer into array and display the values using array.
- l. Write a program for display values reverse order from array using pointer.
- m. Write a program through pointer variable to sum of n elements from array.

**Files:**

- a. Write a C program to display the contents of a file to standard output device.
- b. Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
- c. Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.
- d. Write a C program that does the following:  
It should first create a binary file and store 10 integers, where the file name and 10 values are given in the command line. (hint: convert the strings using atoi function)  
Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint: use fseek function)  
The program should then read all 10 values and print them back.
- e. Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

**Strings:**

- a. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
- b. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
- c. Write a C program that uses functions to perform the following operations:
- d. To insert a sub-string in to a given main string from a given position.
- e. ii. To delete n Characters from a given position in a given string.
- f. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)
- g. Write a C program that displays the position of a character ch in the string S or – 1 if S doesn't contain ch.
- h. Write a C program to count the lines, words and characters in a given text.

**Miscellaneous:**

- a. Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices

are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.

- b. Write a C program to construct a pyramid of numbers as follows:

```

1           *           1           1           *
1 2        * *        2 3        2 2        * *
1 2 3      * * *      4 5 6      3 3 3      * * *
                                     4 4 4 4      * *
                                           *
```

### Sorting and Searching:

- Write a C program that uses non recursive function to search for a Key value in a given
- list of integers using linear search method.
- Write a C program that uses non recursive function to search for a Key value in a given
- sorted list of integers using binary search method.
- Write a C program that implements the Bubble sort method to sort a given list of
- integers in ascending order.
- Write a C program that sorts the given array of integers using selection sort in descending order
- Write a C program that sorts the given array of integers using insertion sort in ascending order
- Write a C program that sorts a given array of names

### Suggested Reference Books for solving the problems:

- Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
- B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3<sup>rd</sup> Edition)
- Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
- R.G. Dromey, How to solve it by Computer, Pearson (16<sup>th</sup> Impression)
- Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
- Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4<sup>th</sup> Edition



**\*MC109ES/\*MC209ES: ENVIRONMENTAL SCIENCE****B.Tech. I Year I Sem.**

L	T	P	C
3	0	0	0

**Course Objectives:**

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

**Course Outcomes:**

- Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

**UNIT-I**

**Ecosystems:** Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

**UNIT-II**

**Natural Resources: Classification of Resources:** Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

**UNIT-III**

**Biodiversity And Biotic Resources:** Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

**UNIT-IV**

**Environmental Pollution and Control Technologies: Environmental Pollution:** Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

#### UNIT-V

**Environmental Policy, Legislation & EIA:** Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

#### TEXT BOOKS:

- 1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
- 2 Environmental Studies by R. Rajagopalan, Oxford University Press.

#### REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4<sup>th</sup> Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS.Publications.

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

## B.TECH. COMPUTER SCIENCE AND ENGINEERING

### COURSE STRUCTURE & SYLLABUS (2016-17)

#### II YEAR I SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	MA301BS	Mathematics – IV	4	1	0	4
2	CS302ES	Data Structures through C++	4	0	0	4
3	CS303ES	Mathematical Foundations of Computer Science	4	0	0	4
4	CS304ES	Digital Logic Design	3	0	0	3
5	CS305ES	Object Oriented Programming through Java	3	0	0	3
6	CS306ES	Data Structures through C++ Lab	0	0	3	2
7	CS307ES	IT Workshop	0	0	3	2
8	CS308ES	Object Oriented Programming through Java Lab	0	0	3	2
9	* MC300ES	Environmental Science and Technology	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>1</b>	<b>9</b>	<b>24</b>

#### II YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	CS401BS	Computer Organization	4	0	0	4
2	CS402ES	Database Management Systems	4	0	0	4
3	CS403ES	Operating Systems	4	0	0	4
4	CS404ES	Formal Languages and Automata Theory	3	0	0	3
5	SM405MS	Business Economics and Financial Analysis	3	0	0	3
6	CS406ES	Computer Organization Lab	0	0	3	2
7	CS407ES	Database Management Systems Lab	0	0	3	2
8	CS408ES	Operating Systems Lab	0	0	3	2
9	* MC400HS	Gender Sensitization Lab	0	0	3	0
		<b>Total Credits</b>	<b>18</b>	<b>0</b>	<b>12</b>	<b>24</b>

\* Satisfactory/Unsatisfactory

**MA301BS: MATHEMATICS - IV**  
**(Complex Variables and Fourier Analysis)**

**B.Tech. II Year I Sem.**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>4</b>	<b>1</b>	<b>0</b>	<b>4</b>

**Prerequisites:** Foundation course (No Prerequisites).

**Course Objectives:** To learn

- differentiation and integration of complex valued functions
- evaluation of integrals using Cauchy's integral formula
- Laurent's series expansion of complex functions
- evaluation of integrals using Residue theorem
- express a periodic function by Fourier series and a non-periodic function by Fourier transform
- to analyze the displacements of one dimensional wave and distribution of one dimensional heat equation

**Course Outcomes:** After learning the contents of this paper the student must be able to:

- analyze the complex functions with reference to their analyticity, integration using Cauchy's integral theorem
- find the Taylor's and Laurent's series expansion of complex functions
- the bilinear transformation
- express any periodic function in term of sines and cosines
- express a non-periodic function as integral representation
- analyze one dimensional wave and heat equation

**UNIT – I**

**Functions of a complex variable:** Introduction, Continuity, Differentiability, Analyticity, properties, Cauchy, Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions-Milne-Thompson method

**UNIT - II**

**Complex integration:** Line integral, Cauchy's integral theorem, Cauchy's integral formula, and Generalized Cauchy's integral formula, Power series: Taylor's series- Laurent series, Singular points, isolated singular points, pole of order m – essential singularity, Residue, Cauchy Residue theorem (Without proof).

**UNIT – III**

**Evaluation of Integrals:** Types of real integrals:

a) Improper real integrals  $\int_{-\infty}^{\infty} f(x)dx$                       (b)  $\int_c^{c+2\pi} f(\cos \theta, \sin \theta)d\theta$

Bilinear transformation- fixed point- cross ratio- properties- invariance of circles.

#### **UNIT – IV**

**Fourier series and Transforms:** Introduction, Periodic functions, Fourier series of periodic function, Dirichlet's conditions, Even and odd functions, Change of interval, Half range sine and cosine series.

Fourier integral theorem (without proof), Fourier sine and cosine integrals, sine and cosine, transforms, properties, inverse transforms, Finite Fourier transforms.

#### **UNIT – V**

**Applications of PDE:** Classification of second order partial differential equations, method of separation of variables, Solution of one dimensional wave and heat equations.

#### **TEXT BOOKS:**

1. A first course in complex analysis with applications by Dennis G. Zill and Patrick Shanahan, Johns and Bartlett Publishers.
2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers.
3. Advanced engineering Mathematics with MATLAB by Dean G. Duffy

#### **REFERENCES:**

1. Fundamentals of Complex Analysis by Saff, E. B. and A. D. Snider, Pearson.
2. Advanced Engineering Mathematics by Louis C. Barrett, McGraw Hill.

## CS302ES: DATA STRUCTURES THROUGH C++

B.Tech. II Year I Sem.

L T P C  
4 0 0 4

### Course Objectives:

- To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
- To understand the notations used to analyze the Performance of algorithms.
- To understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
- To choose an appropriate data structure for a specified application.
- To understand and analyze various searching and sorting algorithms.
- To learn to implement ADTs such as lists, stacks, queues, trees, graphs, search trees in C++ to solve problems.

### Course Outcomes:

- Ability to choose appropriate data structures to represent data items in real world problems.
- Ability to analyze the time and space complexities of algorithms.
- Ability to design programs using a variety of data structures such as stacks, queues, hash tables, binary trees, search trees, heaps, graphs, and B-trees.
- Able to analyze and implement various kinds of searching and sorting techniques.

### UNIT - I

**C++ Programming Concepts:** Review of C, input and output in C++, functions in C++-value parameters, reference parameters, Parameter passing, function overloading, function templates, Exceptions-throwing an exception and handling an exception, arrays, pointers, new and delete operators, class and object, access specifiers, friend functions, constructors and destructor, Operator overloading, class templates, Inheritance and Polymorphism..

**Basic Concepts** - Data objects and Structures, Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations, Complexity Analysis Examples, Introduction to Linear and Non Linear data structures.

### UNIT - II

Representation of single, two dimensional arrays, sparse matrices-array and linked representations.

Linear list ADT-array representation and linked representation, Singly Linked Lists-Operations-Insertion, Deletion, Circularly linked lists-Operations for Circularly linked lists, Doubly Linked Lists- Operations- Insertion, Deletion.

Stack ADT, definition, array and linked implementations, applications-infix to postfix conversion, Postfix expression evaluation, recursion implementation, Queue ADT, definition, array and linked Implementations, Circular queues-Insertion and deletion operations.

### **UNIT - III**

Trees – definition, terminology, Binary trees-definition, Properties of Binary Trees, Binary Tree ADT, representation of Binary Trees-array and linked representations, Binary Tree traversals, Threaded binary trees, Priority Queues –Definition and applications, Max Priority Queue ADT-implementation-Max Heap-Definition, Insertion into a Max Heap, Deletion from a Max Heap.

### **UNIT - IV**

Searching - Linear Search, Binary Search, Hashing-Introduction, hash tables, hash functions, Overflow Handling, Comparison of Searching methods.

Sorting-Insertion Sort, Selection Sort, Radix Sort, Quick sort, Heap Sort, Merge sort, Comparison of Sorting methods.

### **UNIT - V**

Graphs–Definitions, Terminology, Applications and more definitions, Properties, Graph ADT, Graph Representations- Adjacency matrix, Adjacency lists, Graph Search methods - DFS and BFS, Complexity analysis,

Search Trees-Binary Search Tree ADT, Definition, Operations- Searching, Insertion and Deletion, Balanced search trees-AVL Trees-Definition and Examples only, B-Trees-Definition and Examples only, Red-Black Trees-Definitions and Examples only, Comparison of Search Trees.

### **TEXT BOOKS:**

1. Data structures, Algorithms and Applications in C++, 2<sup>nd</sup> Edition, Sartaj Sahni, Universities Press.
2. Data structures and Algorithms in C++, Adam Drozdek, 4<sup>th</sup> edition, Cengage learning.

### **REFERENCE BOOKS:**

1. Data structures with C++, J. Hubbard, Schaum's outlines, TMH.
2. Data structures and Algorithms in C++, M.T. Goodrich, R. Tamassia and D. Mount, Wiley India.
3. Data structures and Algorithm Analysis in C++, 3<sup>rd</sup> edition, M. A. Weiss, Pearson.
4. Classic Data Structures, D. Samanta, 2<sup>nd</sup> edition, PHI.

## CS303ES: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

**B.Tech. II Year I Sem.**

L	T	P	C
4	0	0	4

### Course Objectives:

- To introduce the concepts of mathematical logic.
- To introduce the concepts of sets, relations, and functions.
- To perform the operations associated with sets, functions, and relations.
- To relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.
- To introduce generating functions and recurrence relations.
- To use Graph Theory for solving problems.

### Course Outcomes

- Ability to apply mathematical logic to solve problems.
- Understand sets, relations, functions, and discrete structures.
- Able to use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, and functions.
- Able to formulate problems and solve recurrence relations.
- Able to model and solve real-world problems using graphs and trees.

### UNIT - I

**Mathematical logic:** Introduction, Statements and Notation, Connectives, Normal Forms, Theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

### UNIT - II

**Set theory:** Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and Ordering, Functions.

**Algebraic Structures:** Introduction, Algebraic Systems, Semi groups and Monoids, Groups, Lattices as Partially Ordered Sets, Boolean algebra.

### UNIT - III

**Elementary Combinatorics:** Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutations with Constrained Repetitions, Binomial Coefficients, The Binomial and Multinomial Theorems, The Principle of Inclusion-Exclusion.

### UNIT - IV

**Recurrence Relations:** Generating Functions of Sequences, Calculating Coefficients of generating functions, Recurrence relations, Solving recurrence relations by substitution and



Generating functions, The method of Characteristic roots, Solutions of Inhomogeneous Recurrence Relations.

#### **UNIT - V**

**Graphs:** Basic Concepts, Isomorphisms and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multigraphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

#### **TEXT BOOKS:**

1. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay, R. Manohar, McGraw Hill education (India) Private Limited. **(UNITS - I, II)**
2. Discrete Mathematics for Computer Scientists & Mathematicians, Joe L. Mott, Abraham Kandel, Theodore P. Baker, Pearson , 2<sup>nd</sup> ed. **(Units - III, IV, V)**

#### **REFERENCE BOOKS:**

1. Discrete Mathematics and its Applications, Kenneth H. Rosen, 7th Edition, McGraw Hill education (India) Private Limited.
2. Discrete Mathematics, D.S. Malik & M.K. Sen, Revised edition Cengage Learning.
3. Elements of Discrete Mathematics, C. L. Liu and D. P. Mohapatra, 4th edition, McGraw Hill education (India) Private Limited.
4. Discrete Mathematics with Applications, Thomas Koshy, Elsevier.
5. Discrete and Combinatorial Mathematics, R. P. Grimaldi, Pearson.

## CS304ES: DIGITAL LOGIC DESIGN

**B.Tech. II Year I Sem.**

**L T P C**  
**3 0 0 3**

### **Course Objectives:**

- To understand basic number systems, codes and logical gates.
- To understand the concepts of Boolean algebra.
- To understand the use of minimization logic to solve the Boolean logic expressions..
- To understand the design of combinational and sequential circuits.
- To understand the state reduction methods for Sequential circuits.
- To understand the basics of various types of memories.

### **Course Outcomes:**

- Able to understand number systems and codes.
- Able to solve Boolean expressions using Minimization methods.
- Able to design the sequential and combinational circuits.
- Able to apply state reduction methods to solve sequential circuits.

### **UNIT - I**

Digital Systems, Binary Numbers, Number base conversions, Octal, Hexadecimal and other base numbers, complements, signed binary numbers, Floating point number representation, binary codes, Error detection and correction, binary storage and registers, binary logic, Boolean algebra and logic gates , Basic theorems and properties of Boolean Algebra, Boolean functions, canonical and standard forms, Digital Logic Gates.

### **UNIT - II**

Gate–Level Minimization, The K-Map Method, Three-Variable Map, Four-Variable Map, Five-Variable Map , sum of products , product of sums simplification, Don't care conditions , NAND and NOR implementation and other two level implementations, Exclusive-OR function.

### **UNIT - III**

Combinational Circuits (CC), Analysis procedure, Design Procedure, Combinational circuit for different code converters and other problems, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, Demultiplexers.

### **UNIT - IV**

Synchronous Sequential Circuits, Latches, Flip-flops, analysis of clocked sequential circuits, Registers, Shift registers, Ripple counters, Synchronous counters, other counters. Asynchronous Sequential Circuits -Introduction, Analysis procedure, Circuits with latches, Design procedure, Reduction of state and follow tables, Race- free state assignment, Hazards.

## **UNIT - V**

Memory: Introduction, Random-Access memory, Memory decoding, ROM, Programmable Logic Array, Programmable Array Logic, Sequential programmable devices.

Register Transfer and Microoperations - Register Transfer Language, Register Transfer, Bus and Memory Transfers,

Arithmetic Microoperations, Logic Microoperations, Shift Microoperations, Arithmetic Logic Shift Unit.

### **TEXT BOOKS:**

1. Digital Design, M. Morris Mano, M.D.Ciletti, 5th edition, Pearson.(Units I, II, III, IV, Part of Unit V)
2. Computer System Architecture, M.Morris Mano, 3rd edition, Pearson.(Part of Unit V)

### **REFERENCE BOOKS:**

1. Switching and Finite Automata Theory, Z. Kohavi, Tata McGraw Hill.
2. Fundamentals of Logic Design, C. H. Roth, L. L. Kinney, 7<sup>th</sup> edition, Cengage Learning.
3. Fundamentals of Digital Logic & Micro Computer Design, 5TH Edition, M. Rafiquzzaman, John Wiley.

## CS305ES: OBJECT ORIENTED PROGRAMMING THROUGH JAVA

B.Tech. II Year I Sem.

L T P C  
3 0 0 3

### Course Objectives:

- To introduce the object oriented programming concepts.
- To understand object oriented programming concepts, and apply them in solving problems.
- To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes
- To introduce the implementation of packages and interfaces
- To introduce the concepts of exception handling and multithreading.
- To introduce the design of Graphical User Interface using applets and swing controls.

### Course Outcomes

- Able to solve real world problems using OOP techniques.
- Able to understand the use of abstract classes.
- Able to solve problems using java collection framework and I/o classes.
- Able to develop multithreaded applications with synchronization.
- Able to develop applets for web applications.
- Able to design GUI based applications

### UNIT - I

**Object-oriented thinking-** A way of viewing world – Agents and Communities, messages and methods, Responsibilities, Classes and Instances, Class Hierarchies- Inheritance, Method binding, Overriding and Exceptions, Summary of Object-Oriented concepts. Java buzzwords, An Overview of Java, Data types, Variables and Arrays, operators, expressions, control statements, Introducing classes, Methods and Classes, String handling.

**Inheritance**– Inheritance concept, Inheritance basics, Member access, Constructors, Creating Multilevel hierarchy, super uses, using final with inheritance, Polymorphism-ad hoc polymorphism, pure polymorphism, method overriding, abstract classes, Object class, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance.

### UNIT - II

**Packages-** Defining a Package, CLASSPATH, Access protection, importing packages.

**Interfaces-** defining an interface, implementing interfaces, Nested interfaces, applying interfaces, variables in interfaces and extending interfaces.

**Stream based I/O(java.io)** – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and writing Files, Random access file operations, The Console class, Serialization, Enumerations, auto boxing, generics.

### UNIT - III

**Exception handling** - Fundamentals of exception handling, Exception types, Termination or resumptive models, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built- in exceptions, creating own exception sub classes.

**Multithreading**- Differences between thread-based multitasking and process-based multitasking, Java thread model, creating threads, thread priorities, synchronizing threads, inter thread communication.

### UNIT - IV

**The Collections Framework (java.util)**- Collections overview, Collection Interfaces, The Collection classes- Array List, Linked List, Hash Set, Tree Set, Priority Queue, Array Deque. Accessing a Collection via an Iterator, Using an Iterator, The For-Each alternative, Map Interfaces and Classes, Comparators, Collection algorithms, Arrays, The Legacy Classes and Interfaces- Dictionary, Hashtable ,Properties, Stack, Vector  
More Utility classes, String Tokenizer, Bit Set, Date, Calendar, Random, Formatter, Scanner

### UNIT - V

**GUI Programming with Swing** – Introduction, limitations of AWT, MVC architecture, components, containers. Understanding Layout Managers, Flow Layout, Border Layout, Grid Layout, Card Layout, Grid Bag Layout.

**Event Handling**- The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes, Inner classes, Anonymous Inner classes.

A Simple Swing Application, **Applets** – Applets and HTML, Security Issues, Applets and Applications, passing parameters to applets. Creating a Swing Applet, Painting in Swing, A Paint example, Exploring Swing Controls- JLabel and Image Icon, JTextField, The Swing Buttons- JButton, JToggleButton, JCheckBox, JRadioButton, JTabbedPane, JScrollPane, JList, JComboBox, Swing Menus, Dialogs.

### TEXT BOOKS

1. Java The complete reference, 9<sup>th</sup> edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

### REFERENCE BOOKS

1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons.
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
4. Programming in Java, S. Malhotra, S. Chudhary, 2<sup>nd</sup> edition, Oxford Univ. Press.
5. Java Programming and Object oriented Application Development, R. A. Johnson, Cengage Learning.

## CS306ES: DATA STRUCTURES THROUGH C++ LAB

B.Tech. II Year I Sem.

L	T	P	C
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### Course Objectives:

- To write and execute programs in C++ to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees.
- To learn to write C++ programs to implement various sorting and searching algorithms

### Course Outcomes:

- Able to identify the appropriate data structures and algorithms for solving real world problems.
- Able to implement various kinds of searching and sorting techniques.
- Able to implement data structures such as stacks, queues, Search trees, and hash tables to solve various computing problems.

1. Write a C++ program that uses functions to perform the following:
  - a) Create a singly linked list of integers.
  - b) Delete a given integer from the above linked list.
  - c) Display the contents of the above list after deletion.
2. Write a template based C++ program that uses functions to perform the following:
  - a) Create a doubly linked list of elements.
  - b) Delete a given element from the above doubly linked list.
  - c) Display the contents of the above list after deletion.
3. Write a C++ program that uses stack operations to convert a given infix expression into its postfix equivalent, Implement the stack using an array.
4. Write a C++ program to implement a double ended queue ADT using an array, using a doubly linked list.
5. Write a C++ program that uses functions to perform the following:
  - a) Create a binary search tree of characters.
  - b) Traverse the above Binary search tree recursively in preorder, in order and post order,
6. Write a C++ program that uses function templates to perform the following:
  - a) Search for a key element in a list of elements using linear search.
  - b) Search for a key element in a list of sorted elements using binary search.
7. Write a C++ program that implements Insertion sort algorithm to arrange a list of integers in ascending order.

8. Write a template based C++ program that implements selection sort algorithm to arrange a list of elements in descending order.
9. Write a template based C++ program that implements Quick sort algorithm to arrange a list of elements in ascending order.
10. Write a C++ program that implements Heap sort algorithm for sorting a list of integers in ascending order.
11. Write a C++ program that implements Merge sort algorithm for sorting a list of integers in ascending order
12. Write a C++ program to implement all the functions of a dictionary (ADT) using hashing.
13. Write a C++ program that implements Radix sort algorithm for sorting a list of integers in ascending order
14. Write a C++ program that uses functions to perform the following:
  - a) Create a binary search tree of integers.
  - b) Traverse the above Binary search tree non recursively in inorder.
15. Write a C++ program that uses functions to perform the following:
  - a) Create a binary search tree of integers.
  - b) Search for an integer key in the above binary search tree non recursively.
  - c) Search for an integer key in the above binary search tree recursively.

#### **REFERENCE BOOKS**

1. Data Structures using C++, D. S. Malik, 2<sup>nd</sup> edition, Cengage learning.
2. Data Structures using C++, V. Patil, Oxford University Press.
3. Fundamentals of Data structures in C++, 2<sup>nd</sup> edition, E. Horowitz, S. Sahni and D. Mehta, Universities Press.
4. C++ Plus Data Structures, 4<sup>th</sup> edition, Nell Dale, Jones and Bartlett student edition.

## CS307ES: IT WORKSHOP

B.Tech. II Year I Sem.

L T P C  
0 0 3 2

### Course Objectives:

- The IT Workshop is a training lab course to get training on PC Hardware, Internet & World Wide Web, and Productivity tools for documentation, Spreadsheet computations, and Presentation.
- To introduce to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers, hardware and software level troubleshooting process.
- To introduce connecting the PC on to the internet from home and workplace and effectively usage of the internet, Usage of web browsers, email, newsgroups and discussion forums. To get knowledge in awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks.
- To introduce the usage of Productivity tools in crafting professional word documents, excel spreadsheets and power point presentations using open office tools and LaTeX.

### Course Outcomes:

- Apply knowledge for computer assembling and software installation.
- Ability how to solve the trouble shooting problems.
- Apply the tools for preparation of PPT, Documentation and budget sheet etc.

**PC Hardware:** The students should work on working PC to disassemble and assemble to working condition and install operating system like Linux or any other on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.

**Problem 1:** Every student should identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor. Every student should disassemble and assemble the PC back to working condition.

**Problem 2:** Every student should individually install operating system like Linux or MS windows on the personal computer. The system should be configured as dual boot with both windows and Linux.

**Problem 3:** Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition.



**Problem 4:** Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

### **Internet & World Wide Web.**

**Problem 5:** Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate how to access the websites and email.

**Problem 6:** Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

**Problem 7:** Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. Usage of search engines like Google, Yahoo, ask.com and others should be demonstrated by student.

**Problem 8:** Cyber Hygiene: Students should learn about viruses on the internet and install antivirus software. Student should learn to customize the browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

**Problem 9:** Develop home page: Student should learn to develop his/her home page using HTML consisting of his/her photo, name, address and education details as a table and his/her skill set as a list.

### **Productivity tools: LaTeX and Word**

**Word Orientation:** An overview of LaTeX and Microsoft (MS) office / equivalent (FOSS) tool word should be learned: Importance of LaTeX and MS office / equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that should be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

**Problem 10: Using LaTeX and Word** to create project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

**Problem 11: Creating project abstract** Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

**Problem 12: Creating a Newsletter:** Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs in word.

**Problem 13 - Spreadsheet Orientation:** Accessing, overview of toolbars, saving spreadsheet files, Using help and resources. **Creating a Scheduler:-** Gridlines, Format Cells, Summation, auto fill, Formatting Text

**Problem 14: Calculating GPA -** .Features to be covered:- Cell Referencing, Formulae in spreadsheet – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, Sorting, Conditional formatting.

**Problem 15: Creating Power Point:** Student should work on basic power point utilities and tools in Latex and Ms Office/equivalent (FOSS) which help them create basic power point presentation. PPT Orientation, Slide Layouts, Inserting Text, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting Images, Tables and Charts

**REFERENCE BOOKS:**

1. Introduction to Information Technology, IITL Education Solutions limited, Pearson Education.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
4. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
5. PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft)

## CS308ES: OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

**B.Tech. II Year I Sem.**

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### Course Objectives:

- To write programs using abstract classes.
- To write programs for solving real world problems using java collection frame work.
- To write multithreaded programs.
- To write GUI programs using swing controls in Java.
- To introduce java compiler and eclipse platform.
- To impart hands on experience with java programming.

### Course Outcomes:

- Able to write programs for solving real world problems using java collection frame work.
- Able to write programs using abstract classes.
- Able to write multithreaded programs.
- Able to write GUI programs using swing controls in Java.

### Note:

1. Use Linux and MySQL for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform.
2. The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.
1. Use Eclipse or Net bean platform and acquaint with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.
2. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,\*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.
3. A) Develop an applet in Java that displays a simple message.  
b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named “Compute” is clicked.
4. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1

and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

5. Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.
6. Write a Java program for the following:
  - i) Create a doubly linked list of elements.
  - ii) Delete a given element from the above list.
  - iii) Display the contents of the list after deletion.
7. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “Stop” or “Ready” or “Go” should appear above the buttons in selected color. Initially, there is no message shown.
8. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.
9. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Labels in Grid Layout.
10. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).
11. Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).
12. Write a Java program that correctly implements the producer – consumer problem using the concept of interthread communication.
13. Write a Java program to list all the files in a directory including the files present in all its subdirectories.

14. Write a Java program that implements Quick sort algorithm for sorting a list of names in ascending order
  
15. Write a Java program that implements Bubble sort algorithm for sorting in descending order and also shows the number of interchanges occurred for the given set of integers.

#### **REFERENCE BOOKS**

1. Java for Programmers, P. J. Deitel and H. M. Deitel, 10<sup>th</sup> Edition Pearson education.
2. Thinking in Java, Bruce Eckel, Pearson Education.
3. Java Programming, D. S. Malik and P. S. Nair, Cengage Learning.
4. Core Java, Volume 1, 9<sup>th</sup> edition, Cay S. Horstmann and G Cornell, Pearson.

## MC300ES: ENVIRONMENTAL SCIENCE AND TECHNOLOGY

B.Tech. II Year I Sem.

L	T	P	C
3	0	0	0

### Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures
- Understanding the environmental policies and regulations

### Course Outcomes:

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

### UNIT - I

**Ecosystems:** Definition, Scope and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

### UNIT - II

**Natural Resources: Classification of Resources:** Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

### UNIT - III

**Biodiversity And Biotic Resources:** Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

### UNIT - IV

**Environmental Pollution and Control Technologies: Environmental Pollution:** Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics

of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Problems and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol.

#### **UNIT - V**

**Environmental Policy, Legislation & EIA:** Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

#### **TEXT BOOKS:**

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

#### **REFERENCE BOOKS:**

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4<sup>th</sup> Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

## CS401ES: COMPUTER ORGANIZATION

B.Tech. II Year II Sem.

L T P C  
4 0 0 4

### Course Objectives:

- To understand basic components of computers.
- To understand the architecture of 8086 processor.
- To understand the instruction sets, instruction formats and various addressing modes of 8086.
- To understand the representation of data at the machine level and how computations are performed at machine level.
- To understand the memory organization and I/O organization.
- To understand the parallelism both in terms of single and multiple processors.

### Course Outcomes:

- Able to understand the basic components and the design of CPU, ALU and Control Unit.
- Ability to understand memory hierarchy and its impact on computer cost/performance.
- Ability to understand the advantage of instruction level parallelism and pipelining for high performance Processor design.
- Ability to understand the instruction set, instruction formats and addressing modes of 8086.
- Ability to write assembly language programs to solve problems.

### UNIT - I

**Digital Computers:** Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

**Basic Computer Organization and Design:** Instruction codes, Computer Registers, Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt, Complete Computer Description.

**Micro Programmed Control:** Control memory, Address sequencing, micro program example, design of control unit.

### UNIT - II

**Central Processing Unit:** The 8086 Processor Architecture, Register organization, Physical memory organization, General Bus Operation, I/O Addressing Capability, Special Processor Activities, Minimum and Maximum mode system and timings.

8086 Instruction Set and Assembler Directives-Machine language instruction formats, Addressing modes, Instruction set of 8086, Assembler directives and operators.



### **UNIT - III**

Assembly Language Programming with 8086- Machine level programs, Machine coding the programs, Programming with an assembler, Assembly Language example programs.  
Stack structure of 8086, Interrupts and Interrupt service routines, Interrupt cycle of 8086, Interrupt programming, Passing parameters to procedures, Macros, Timings and Delays.

### **UNIT - IV**

**Computer Arithmetic:** Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating - point Arithmetic operations.

**Input-Output Organization:** Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP), Intel 8089 IOP.

### **UNIT - V**

**Memory Organization:** Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

**Pipeline and Vector Processing:** Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

**Multi Processors:** Characteristics of Multiprocessors, Interconnection Structures, Inter processor arbitration, Inter processor communication, and synchronization.

### **TEXT BOOKS:**

1. Computer System Architecture, M. Moris Mano, Third Edition, Pearson. **(UNIST-I, IV, V)**
2. Advanced Microprocessors and Peripherals, K M Bhurchandi, A.K Ray ,3<sup>rd</sup> edition, McGraw Hill India Education Private Ltd. **(UNITS - II, III).**

### **REFERENCE:**

1. Microprocessors and Interfacing, D V Hall, SSSP Rao, 3<sup>rd</sup> edition, McGraw Hill India Education Private Ltd.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5<sup>th</sup> Edition, Tata McGraw Hill, 2002
3. Computer Organization and Architecture, William Stallings, 9th Edition, Pearson.
4. David A. Patterson, John L. Hennessy: Computer Organization and Design – The Hardware / Software Interface ARM Edition, 4<sup>th</sup> Edition, Elsevier, 2009.

## CS402ES: DATABASE MANAGEMENT SYSTEMS

B.Tech. II Year II Sem.

L T P C  
4 0 0 4

### Course Objectives:

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- To understand the relational database design principles.
- To become familiar with the basic issues of transaction processing and concurrency control.
- To become familiar with database storage structures and access techniques.

### Course Outcomes:

- Demonstrate the basic elements of a relational database management system.
- Ability to identify the data models for relevant problems.
- Ability to design entity relationship model and convert entity relationship diagrams into RDBMS and formulate SQL queries on the data.
- Apply normalization for the development of application software.

### UNIT - I

**Introduction:** Database System Applications, Purpose of Database Systems, View of Data, Database Languages – DDL, DML, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Data Mining and Information Retrieval, Specialty Databases, Database Users and Administrators, History of Database Systems.

**Introduction to Data base design:** Database Design and ER diagrams, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises.

**Relational Model:** Introduction to the Relational Model, Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design: ER to Relational, Introduction to Views, Destroying /Altering Tables and Views.

### UNIT - II

**Relational Algebra and Calculus:** Preliminaries, Relational Algebra, Relational calculus – Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and calculus.

**SQL:** Queries, Constraints, Triggers: Form of Basic SQL Query, UNION, INTERSECT, and EXCEPT, Nested Queries, Aggregate Operators, NULL values Complex Integrity Constraints in SQL, Triggers and Active Data bases, Designing Active Databases..

### **UNIT - III**

**Schema Refinement and Normal Forms:** Introduction to Schema Refinement, Functional Dependencies - Reasoning about FDs, Normal Forms, Properties of Decompositions, Normalization, Schema Refinement in Database Design, Other Kinds of Dependencies.

### **UNIT - IV**

**Transaction Management:** Transactions, Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity Transaction Isolation Levels, Implementation of Isolation Levels.

**Concurrency Control:** Lock-Based Protocols, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols, Multiversion Schemes.

Recovery System-Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with loss of nonvolatile storage, Early Lock Release and Logical Undo Operations, Remote Backup systems.

### **UNIT - V**

**Storage and Indexing:** Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing, Index Data Structures, Comparison of File Organizations.

Tree-Structured Indexing: Intuition for tree Indexes, Indexed Sequential Access Method (ISAM), B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

**Hash- Based Indexing:** Static Hashing, Extendible hashing, Linear Hashing, Extendible vs. Linear Hashing.

### **TEXT BOOKS:**

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, McGraw Hill Education (India) Private Limited, 3<sup>rd</sup> Edition. **(Part of UNIT-I, UNIT-II, UNIT-III, UNIT-V)**
2. Data base System Concepts, A. Silberschatz, Henry. F. Korth, S. Sudarshan, McGraw Hill Education(India) Private Limited 1, 6<sup>th</sup> edition. **( Part of UNIT-I, UNIT-IV)**

### **REFERENCE BOOKS:**

1. Database Systems, 6<sup>th</sup> edition, R Elmasri, Shamkant B.Navathe, Pearson Education.
2. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning.
3. Introduction to Database Management, M. L. Gillenson and others, Wiley Student Edition.
4. Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.
5. Introduction to Database Systems, C. J. Date, Pearson Education.

## CS403ES: OPERATING SYSTEMS

**B.Tech. II Year II Sem.**

**L T P C**  
**3 0 0 3**

### **Course Objectives:**

- To understand the OS role in the overall computer system
- To study the operations performed by OS as a resource manager
- To understand the scheduling policies of OS
- To understand the different memory management techniques
- To understand process concurrency and synchronization
- To understand the concepts of input/output, storage and file management
- To understand the goals and principles of protection
- Introduce system call interface for file and process management
- To study different OS and compare their features.

### **Course Outcomes:**

- Apply optimization techniques for the improvement of system performance.
- Ability to design and solve synchronization problems.
- Learn about minimization of turnaround time, waiting time and response time and also maximization of throughput by keeping CPU as busy as possible.
- Ability to change access controls to protect files.
- Ability to compare the different operating systems.

### **UNIT - I**

Overview-Introduction-Operating system objectives, User view, System view, Operating system definition, Computer System Organization, Computer System Architecture, OS Structure, OS Operations, Process Management, Memory Management, Storage Management, Protection and Security, Computing Environments.

Operating System services, User and OS Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, OS Structure.

### **UNIT - II**

Process and CPU Scheduling - Process concepts-The Process, Process State, Process Control Block, Threads, Process Scheduling-Scheduling Queues, Schedulers, Context Switch, Operations on Processes, System calls-fork(),exec(),wait(),exit(), Interprocess communication-ordinary pipes and named pipes in Unix.

Process Scheduling-Basic concepts, Scheduling Criteria, Scheduling algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Thread scheduling, Linux scheduling and Windows scheduling.

Process Synchronization, Background, The Critical Section Problem, Peterson's solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization in Linux and Windows.

### **UNIT - III**

Memory Management and Virtual Memory – Memory Management Strategies- Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of Page Table, IA-32 Segmentation, IA-32 Paging.

Virtual Memory Management-Background, Demand Paging, Copy-on-Write, Page Replacement, Page Replacement Algorithms, Allocation of Frames, Thrashing, Virtual memory in Windows..

### **UNIT - IV**

Storage Management-File System- Concept of a File, System calls for file operations - open (), read (), write (), close (), seek (), unlink (), Access methods, Directory and Disk Structure, File System Mounting, File Sharing, Protection.

File System Implementation - File System Structure, File System Implementation, Directory Implementation, Allocation methods, Free-space Management, Efficiency, and Performance.

Mass Storage Structure – Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap space Management

### **UNIT - V**

Deadlocks - System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.

Protection – System Protection, Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, Capability-Based Systems, Language-Based Protection.

### **TEXT BOOKS:**

1. Operating System Concepts , Abraham Silberschatz, Peter B. Galvin, Greg Gagne, 9th Edition, Wiley, 2016 India Edition
2. Operating Systems – Internals and Design Principles, W. Stallings, 7th Edition, Pearson.

### **REFERENCE BOOKS:**

1. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, PHI
2. Operating Systems: A concept-based Approach, 2nd Edition, D.M. Dhamdhare, TMH.
3. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
4. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
5. Principles of Operating systems, Naresh Chauhan, Oxford University Press.

## CS404ES: FORMAL LANGUAGES AND AUTOMATA THEORY

**B.Tech. II Year II Sem.**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### **Course Objectives:**

- To provide introduction to some of the central ideas of theoretical computer science from the perspective of formal languages.
- To introduce the fundamental concepts of formal languages, grammars and automata theory.
- Classify machines by their power to recognize languages.
- Employ finite state machines to solve problems in computing.
- To understand deterministic and non-deterministic machines.
- To understand the differences between decidability and undecidability.

### **Course Outcomes:**

- Able to understand the concept of abstract machines and their power to recognize the languages.
- Able to employ finite state machines for modeling and solving computing problems.
- Able to design context free grammars for formal languages.
- Able to distinguish between decidability and undecidability.
- Able to gain proficiency with mathematical tools and formal methods.

### **UNIT - I**

Introduction to Finite Automata, Structural Representations, Automata and Complexity, the Central Concepts of Automata Theory – Alphabets, Strings, Languages, Problems. Deterministic Finite Automata, Nondeterministic Finite Automata, an application: Text Search, Finite Automata with Epsilon-Transitions.

### **UNIT - II**

Regular Expressions, Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions, Properties of Regular Languages- Pumping Lemma for Regular Languages, Applications of the Pumping Lemma, Closure Properties of Regular Languages, Decision Properties of Regular Languages, Equivalence and Minimization of Automata.

### **UNIT - III**

Context-Free Grammars: Definition of Context-Free Grammars, Derivations Using a Grammar, Leftmost and Rightmost Derivations, the Language of a Grammar, Sentential Forms, Parse Trees, Applications of Context-Free Grammars, Ambiguity in Grammars and Languages.

Push Down Automata,: Definition of the Pushdown Automaton, the Languages of a PDA, Equivalence of PDA's and CFG's, Deterministic Pushdown Automata.

#### **UNIT - IV**

Normal Forms for Context- Free Grammars, the Pumping Lemma for Context-Free Languages, Closure Properties of Context-Free Languages. Decision Properties of CFL's - Complexity of Converting among CFG's and PDA's, Running time of conversions to Chomsky Normal Form.

Introduction to Turing Machines-Problems That Computers Cannot Solve, The Turing Machine, Programming Techniques for Turing Machines, Extensions to the basic Turing machine, Restricted Turing Machines, Turing Machines, and Computers

#### **UNIT - V**

Undecidability: A Language that is Not Recursively Enumerable, An Undecidable Problem That is RE, Undecidable Problems about Turing Machines, Post's Correspondence Problem, Other Undecidable Problems, Intractable Problems: The Classes P and NP, An NP-Complete Problem.

#### **TEXT BOOKS:**

1. Introduction to Automata Theory, Languages, and Computation, 3<sup>rd</sup> Edition, John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.
2. Introduction to the Theory of Computation, Michael Sipser, 3<sup>rd</sup> edition, Cengage Learning.

#### **REFERENCE BOOKS:**

1. Introduction to Languages and The Theory of Computation, John C Martin, TMH.
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
3. A Text book on Automata Theory, P. K. Srimani, Nasir S. F. B, Cambridge University Press.
4. Introduction to Formal languages Automata Theory and Computation Kamala Krithivasan, Rama R, Pearson.
5. Theory of Computer Science – Automata languages and computation, Mishra and Chandrashekar, 2nd edition, PHI.

## SM405ES: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS

**B.Tech. II Year II Sem.**

L	T	P	C
3	0	0	3

**Course Objective:** To learn the basic Business types, impact of the Economy on Business and Firms specifically. To analyze the Business from the Financial Perspective.

**Course Outcome:** The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm's financial position by analysing the Financial Statements of a Company.

### UNIT – I

#### **Introduction to Business and Economics:**

**Business:** Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance.

**Economics:** Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply in Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

### UNIT – II

#### **Demand and Supply Analysis:**

**Elasticity of Demand:** Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.

**Supply Analysis:** Determinants of Supply, Supply Function & Law of Supply.

### UNIT- III

#### **Production, Cost, Market Structures & Pricing:**

**Production Analysis:** Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions.

**Cost analysis:** Types of Costs, Short run and Long run Cost Functions.

**Market Structures:** Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, and Monopolistic Competition.

**Pricing:** Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, and Cost Volume Profit Analysis.



#### **UNIT - IV**

**Financial Accounting:** Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, Elements of Financial Statements, and Preparation of Final Accounts.

#### **UNIT - V**

**Financial Analysis through Ratios:** Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems). Introduction to Fund Flow and Cash Flow Analysis (simple problems).

#### **TEXT BOOKS:**

1. D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd. 2013.
2. Dhanesh K Khatri, Financial Accounting, Tata McGraw Hill, 2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata McGraw Hill Education Pvt. Ltd. 2012.

#### **REFERENCES:**

1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.
2. S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, Vikas Publications, 2013.

## CS406ES: COMPUTER ORGANIZATION LAB

**B.Tech. II Year II Sem.**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

### **Exercises in Digital Logic Design:**

1. Implement Logic gates using NAND and NOR gates
2. Design a Full adder using gates
3. Design and implement the 4:1 MUX, 8:1 MUX using gates /ICs.
4. Design and Implement a 3 to 8 decoder using gates
5. Design a 4 bit comparator using gates/IC
6. Design and Implement a 4 bit shift register using Flip flops
7. Design and Implement a Decade counter

### **Exercises in Micro Processor programming:**

Write assembly language programs for the following using GNU Assembler.

1. Write assembly language programs to evaluate the expressions:
  - i)  $a = b + c - d * e$
  - ii)  $z = x * y + w - v + u / k$
  - a. Considering 8-bit, 16 bit and 32 bit binary numbers as b, c, d, e.
  - b. Considering 2 digit, 4 digit and 8 digit BCD numbers.  
Take the input in consecutive memory locations and also Display the results by using "int xx" of 8086. Validate program for the boundary conditions.
2. Write an ALP of 8086 to take N numbers as input. And do the following operations on them.
  - a. Arrange in ascending and descending order.
3. Write an ALP of 8086 to take N numbers as input. And do the following operations on them.
  - a. Find max and minimum
  - b. Find average  
Considering 8-bit, 16 bit binary numbers and 2 digit, 4digit and 8 digit BCD numbers. Display the results by using "int xx" of 8086. Validate program for the boundary conditions.
4. Write an ALP of 8086 to take a string of as input (in 'C' format)and do the following Operations on it.
  - a. Find the length
  - b. Find it is Palindrome or n.  
Considering 8-bit, 16 bit binary numbers and 2 digit, 4digit and 8 digit BCD numbers. Display the results by using "int xx" of 8086. Validate program for the boundary conditions.
5. Write an ALP of 8086 to take a string of as input (in 'C' format) and do the following Operations on it.
  - a. Find whether given string substring or not.

6. Write an ALP of 8086 to take a string of as input (in 'C' format) and do the following Operations on it
  - a. Find the Armstrong number
  - b. Find the Fibonacci series for n numbersDisplay the results by using "int xx" of 8086.
7. Write the ALP to implement the above operations as procedures and call from the main procedure.
8. Write an ALP of 8086 to find the factorial of a given number as a Procedure and call from the main program which display the result.

**REFERENCE BOOKS:**

1. Switching theory and logic design –A. Anand Kumar PHI, 2013
2. Advanced microprocessor & Peripherals-A. K. Ray and K. M. Bherchandavi, TMH, 2nd edition.
3. Switching and Finite Automatic theory-Zvi Kohavi, Niraj K.Jha Cambridge, 3rd edition
4. Digital Design –Morris Mano, PHI, 3rd edition
5. Microprocessor and Interfacing –Douglas V. Hall, TMGH 2nd edition.

## CS407ES: DATABASE MANAGEMENT SYSTEMS LAB

B.Tech. II Year II Sem.

L	T	P	C
0	0	3	2

**Course Objectives:** This lab enables the students to practice the concepts learnt in the subject DBMS by developing a database for an example company named “Roadway Travels” whose description is as follows. The student is expected to practice the designing, developing and querying a database in the context of example database “Roadway travels”. Students are expected to use “Mysql” database.

### Course Outcomes:

- Ability to design and implement a database schema for given problem.
- Apply the normalization techniques for development of application software to realistic problems.
- Ability to formulate queries using SQL DML/DDI/DCL commands.

**Roadway Travels:** "Roadway Travels" is in business since 1997 with several buses connecting different places in India. Its main office is located in Hyderabad.

The company wants to *computerize its operations* in the following areas:

- Reservations and Ticketing
- Cancellations

**Reservations & Cancellation:** Reservations are directly handled by booking office. Reservations can be made 30 days in advance and tickets issued to passenger. One Passenger/person can book many tickets (to his/her family). Cancellations are also directly handed at the booking office.

In the process of *computerization* of **Roadway Travels** you have to design and develop a Database which consists the data of Buses, Passengers, Tickets, and Reservation and cancellation details. You should also develop query's using SQL to retrieve the data from the database.

The above process involves many steps like 1. Analyzing the [problem](#) and identifying the Entities and Relationships, 2. E-R Model 3. Relational Model 4. Normalization 5. Creating the database 6. Querying. *Students are supposed to work on these steps week wise and finally create a complete “Database System” to Roadway Travels.* Examples are given at every experiment for guidance to students.

### Experiment 1: E-R Model

Analyze the [problem](#) carefully and come up with the entities in it. Identify what data has to be persisted in the database. This contains the entities, attributes etc.

Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, if any.

Example:

**Entities:** 1. BUS 2. Ticket 3. Passenger

**Relationships:** 1. Reservation 2. Cancellation

**Primary Key Attributes:** 1. Ticket ID (Ticket Entity) 2. Passport ID (Passenger Entity)  
3. Bus\_NO (Bus Entity)

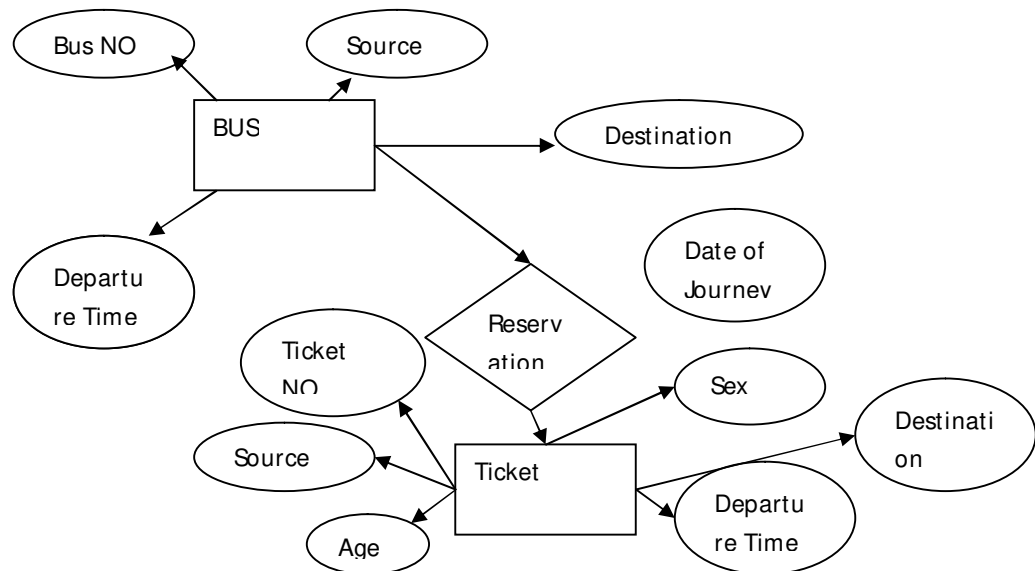
Apart from the above mentioned entities you can identify more. The above mentioned are few.

**Note:** The student is required to submit a document by writing the Entities and Keys to the lab teacher.

### Experiment 2: Concept design with E-R Model

Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entities and weak entities (if any). Indicate the type of relationships (total / partial). Try to incorporate generalization, aggregation, specialization etc wherever required.

#### Example: E-R diagram for bus



**Note:** The student is required to submit a document by drawing the E-R Diagram to the lab teacher.

### Experiment 3: Relational Model

Represent all the entities (Strong, Weak) in tabular fashion. Represent relationships in a tabular fashion. There are different ways of representing relationships as tables based on the cardinality. Represent attributes as columns in tables or as tables based on the requirement.

Different types of attributes (Composite, Multi-valued, and Derived) have different way of representation.

**Example:** The passenger tables look as below. This is an example. You can add more attributes based on your E-R model. This is not a normalized table.

Passenger

Name	Age	Sex	Address	<u>Passport ID</u>	Ticket _id

**Note:** *The student is required to submit a document by Represent relationships in a tabular fashion to the lab teacher.*

#### Experiment 4: Normalization

Database normalization is a technique for designing relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain types of logical or structural problems, namely data anomalies. For example, when multiple instances of a given piece of information occur in a table, the possibility exists that these instances will not be kept consistent when the data within the table is updated, leading to a loss of data integrity. A table that is sufficiently normalized is less vulnerable to problems of this kind, because its structure reflects the basic assumptions for when multiple instances of the same information should be represented by a single instance only.

For the above table in the First normalization we can remove the multi valued attribute Ticket\_id and place it in another table along with the primary key of passenger.

**First Normal Form: The above table can be divided into two tables as shown below.**

Passenger

Name	Age	Sex	Address	<u>Passport ID</u>

<u>Passport ID</u>	Ticket_id

You can do the second and third normal forms if required. Any how Normalized tables are given at the end.

### **Experiment 5: Installation of Mysql and practicing DDL commands**

Installation of MySQL. In this week you will learn Creating databases, How to create tables, altering the database, dropping tables and databases if not required. You will also try truncate, rename commands etc.

Example for creation of a normalized “Passenger” table.

```
CREATE TABLE Passenger (  
    Passport_id INTEGER PRIMARY KEY,  
    Name VARCHAR (50) Not NULL,  
    Age Integer Not NULL,  
    Sex Char,  
    Address VARCHAR (50) Not NULL);
```

Similarly create all other tables.

**Note: Detailed creation of tables is given at the end.**

### **Experiment 6: Practicing DML commands**

DML commands are used to for managing data within schema objects. Some examples:

- SELECT - retrieve data from the a database
- INSERT - insert data into a table
- UPDATE - updates existing data within a table
- DELETE - deletes all records from a table, the space for the records remain

#### **Inserting values into “Bus” table:**

Insert into Bus values (1234,'hyderabad', 'tirupathi');

Insert into Bus values (2345,'hyderabad', 'Banglore');

Insert into Bus values (23,'hyderabad', 'Kolkata');

Insert into Bus values (45,'Tirupathi', 'Banglore');

Insert into Bus values (34,'hyderabad', 'Chennai');

#### **Inserting values into “Passenger” table:**

Insert into Passenger values (1, 45,'ramesh', 45,'M', 'abc123');

Insert into Passenger values (2, 78,'geetha', 36,'F', 'abc124');

Insert into Passenger values (45, 90,'ram', 30,'M', 'abc12');

Insert into Passenger values (67, 89,'ravi', 50,'M', 'abc14');

Insert into Passenger values (56, 22,'seetha', 32,'F', 'abc55');

#### **Few more Examples of DML commands:**

Select \* from Bus; (selects all the attributes and display)

UPDATE BUS SET Bus No = 1 WHERE BUS NO=2;

### Experiment 7: Querying

In this week you are going to practice queries (along with sub queries) using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.

#### Practice the following Queries:

1. Display unique PNR\_no of all passengers.
2. Display all the names of male passengers.
3. Display the ticket numbers and names of all the passengers.
4. Find the ticket numbers of the passengers whose name start with 'r' and ends with 'h'.
5. Find the names of passengers whose age is between 30 and 45.
6. Display all the passengers names beginning with 'A'
7. Display the sorted list of passengers names

### Experiment 8 and Experiment 9: Querying (continued...)

You are going to practice queries using Aggregate functions (COUNT, SUM, AVG, and MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

1. Write a Query to display the Information present in the Passenger and cancellation tables. **Hint:** Use UNION Operator.
2. Display the number of days in a week on which the 9W01 bus is available.
3. Find number of tickets booked for each PNR\_no using GROUP BY CLAUSE. **Hint:** Use GROUP BY on PNR\_No.
4. Find the distinct PNR numbers that are present.
5. Find the number of tickets booked by a passenger where the number of seats is greater than 1. **Hint:** Use GROUP BY, WHERE and HAVING CLAUSES.
6. Find the total number of cancelled seats.

### Experiment 10: Triggers

In this week you are going to work on Triggers. Creation of insert trigger, delete trigger, update trigger. Practice triggers using the above database.

Eg: **CREATE TRIGGER updcheck BEFORE UPDATE ON passenger**

```
FOR EACH ROW  
BEGIN  
IF NEW.TicketNO > 60 THEN  
SET New.Ticket no = Ticket no;  
ELSE  
SET New.Ticketno = 0;  
END IF;  
END;
```

### Experiment 11: Procedures

In this session you are going to learn Creation of stored procedure, Execution of procedure and modification of procedure. Practice procedures using the above database.

Eg: **CREATE PROCEDURE myProc()**

```
BEGIN  
SELECT COUNT (Tickets) FROM Ticket WHERE age>=40;  
End;
```



## Experiment 12: Cursors

In this week you need to do the following: Declare a cursor that defines a result set. Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done

```
CREATE PROCEDURE myProc(in_customer_id INT)
BEGIN
  DECLARE v_id INT;
  DECLARE v_name VARCHAR (30);
  DECLARE c1 CURSOR FOR SELECT stdId,stdFirstname FROM students WHERE
    stdId=in_customer_id;
  OPEN c1;
  FETCH c1 into v_id, v_name;
  Close c1;
  END;
```

### Tables

#### BUS

Bus No: Varchar: PK (public key)

Source : Varchar

Destination : Varchar

#### Passenger

PPNO: Varchar (15)) : PK

Name: Varchar (15)

Age : int (4)

Sex:Char (10) : Male / Female

Address: VarChar (20)

#### Passenger\_Tickets

PPNO: Varchar (15)) : PK

Ticket\_No: Numeric (9)

#### Reservation

PNR\_No: Numeric (9) : FK

Journey\_date : datetime (8)

No\_of\_seats : int (8)

Address: Varchar (50)

Contact\_No: Numeric (9) --> Should not be less than 9 and Should not accept any other character other than Integer

Status: Char (2) : Yes / No

#### Cancellation

PNR\_No: Numeric(9) : FK

Journey\_date : datetime(8)

No\_of\_seats : int (8)

Address : Varchar (50)

Contact\_No: Numeric (9) --> Should not be less than 9 and Should not accept any other character other than Integer

Status: Char (2) : Yes / No

**Ticket**

Ticket\_No: Numeric (9): PK

Journey\_date : datetime(8)

Age : int (4)

Sex:Char(10) : Male / Female

Source : Varchar

Destination : Varchar

Dep\_time : Varchar

**REFERENCE BOOKS:**

1. Introduction to SQL, Rick F. Vander Lans, Pearson education.
2. Oracle PL/SQL, B. Rosenzweig and E. Silvestrova, Pearson education.
3. SQL & PL/SQL for Oracle 10 g, Black Book, Dr. P. S. Deshpande, Dream Tech.
4. Oracle Database 11 g PL/SQL Programming, M. Mc Laughlin, TMH.

## CS408ES: OPERATING SYSTEMS LAB

B.Tech. II Year II Sem.

L	T	P	C
0	0	3	2

### Course Objectives:

- To write programs in Linux environment using system calls.
- To implement the scheduling algorithms.
- To implement page replacement algorithms
- To implement file allocation methods.
- To understand and implement ipc mechanism using named and unnamed pipes.
- To develop solutions for synchronization problems using semaphores.

### Course Outcomes:

- Ability to develop application programs using system calls in Unix.
- Ability to implement interprocess communication between two processes.
- Ability to design and solve synchronization problems.
- Ability to simulate and implement operating system concepts such as scheduling, deadlock management, file management, and memory management.

**Use Linux operating system and GNU C compiler.**

### List of Programs:

1. Write C programs to simulate the following CPU scheduling algorithms:  
a) Round Robin    b) SJF
2. Write C programs to simulate the following CPU scheduling algorithms:  
a) FCFS            b) Priority
3. Write C programs to simulate the following File organization techniques:  
a) Single level directory    b) Two level    c) Hierarchical
4. Write C programs to simulate the following File allocation methods:  
a) Contiguous            b) Linked            c) Indexed
5. Write a C program to copy the contents of one file to another using system calls.
6. Write a C program to simulate Bankers Algorithm for Dead Lock Avoidance
7. Write a C program to simulate Bankers Algorithm for Dead Lock Prevention
8. Write C programs to simulate the following page replacement algorithms:  
a) FIFO    b) LRU    c) LFU
9. Write C programs to simulate the following techniques of memory management:  
a) Paging    b) Segmentation
10. Write a C program to implement the ls | sort command. (Use unnamed Pipe)
11. Write a C program to solve the Dining- Philosopher problem using semaphores.
12. Write C programs to implement ipc between two unrelated processes using named pipe.

### REFERENCE BOOKS:

1. An Introduction to Operating Systems, P.C.P Bhatt, 2<sup>nd</sup> edition, PHI.
2. Unix System Programming Using C++, Terrence Chan, PHI/Pearson.
3. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, PHI

## MC400HS: GENDER SENSITIZATION LAB

**B.Tech. II Year II Sem.**

**L T P C**  
**0 0 3 0**

### **Course Objectives:**

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

### **Course Outcomes:**

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature, and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

### **UNIT - I**

#### **UNDERSTANDING GENDER**

**Gender:** Why Should We Study It? (*Towards a World of Equals*: Unit -1)

**Socialization:** Making Women, Making Men (*Towards a World of Equals*: Unit -2)

Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

### **UNIT - II**

#### **GENDER AND BIOLOGY:**

**Missing Women:** Sex Selection and Its Consequences (*Towards a World of Equals*: Unit -4)  
Declining Sex Ratio. Demographic Consequences.

**Gender Spectrum:** Beyond the Binary (*Towards a World of Equals*: Unit -10)

Two or Many? Struggles with Discrimination.

### UNIT - III

#### GENDER AND LABOUR

**Housework:** the Invisible Labour (*Towards a World of Equals*: Unit -3)

“My Mother doesn’t Work.” “Share the Load.”

**Women’s Work:** Its Politics and Economics (*Towards a World of Equals*: Unit -7)

Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

### UNIT-IV

#### ISSUES OF VIOLENCE

**Sexual Harassment:** Say No! (*Towards a World of Equals*: Unit -6)

Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: “Chupulu”.

**Domestic Violence:** Speaking Out (*Towards a World of Equals*: Unit -8)

Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading: New Forums for Justice.

Thinking about Sexual Violence (*Towards a World of Equals*: Unit -11)

Blaming the Victim-“I Fought for my Life...” - Additional Reading: The Caste Face of Violence.

### UNIT - V

#### GENDER: CO - EXISTENCE

**Just Relationships:** Being Together as Equals (*Towards a World of Equals*: Unit -12)

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Additional Reading: Rosa Parks-The Brave Heart.

#### TEXTBOOK

All the five Units in the Textbook, “*Towards a World of Equals: A Bilingual Textbook on Gender*” written by A. Suneetha, Uma Bhugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by **Telugu Akademi, Hyderabad**, Telangana State in the year **2015**.

**Note:** Since it is an Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

#### REFERENCE BOOKS:

1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
2. Abdulali Sohaila. “*I Fought For My Life...and Won.*” Available online at:  
<http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/>

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.TECH. COMPUTER SCIENCE AND ENGINEERING  
III YEAR COURSE STRUCTURE & SYLLABUS (R16)****Applicable From 2016-17 Admitted Batch****III YEAR I SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	CS501PC	Design and Analysis of Algorithms	4	0	0	4
2	CS502PC	Data Communication and Computer Networks	4	0	0	4
3	CS503PC	Software Engineering	4	0	0	4
4	SM504MS	Fundamentals of Management	3	0	0	3
5		Open Elective –I	3	0	0	3
6	CS505PC	Design and Analysis of Algorithms Lab	0	0	3	2
7	CS506PC	Computer Networks Lab	0	0	3	2
8	CS507PC	Software Engineering Lab	0	0	3	2
9	*MC500HS	Professional Ethics	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>0</b>	<b>9</b>	<b>24</b>

**III YEAR II SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	CS601PC	Compiler Design	4	0	0	4
2	CS602PC	Web Technologies	4	0	0	4
3	CS603PC	Cryptography and Network Security	4	0	0	4
4		Open Elective-II	3	0	0	3
5		Professional Elective-I	3	0	0	3
6	CS604PC	Cryptography and Network Security Lab	0	0	3	2
7	CS605PC	Web Technologies Lab	0	0	3	2
8	EN606HS	Advanced English Communication Skills Lab	0	0	3	2
		<b>Total Credits</b>	<b>18</b>	<b>0</b>	<b>9</b>	<b>24</b>

**During Summer Vacation between III and IV Years: Industry Oriented Mini Project**

**Professional Elective – I**

CS611PE	Mobile Computing
CS612PE	Design Patterns
CS613PE	Artificial Intelligence
CS614PE	Information Security Management (Security Analyst - I)
CS615PE	Introduction to Analytics (Associate Analytics - I)

**\*Open Elective** subjects' syllabus is provided in a separate document.

**\*Open Elective** – Students should take Open Electives from the List of Open Electives Offered by Other Departments/Branches Only.

**Ex:** - A Student of Mechanical Engineering can take Open Electives from all other departments/branches except Open Electives offered by Mechanical Engineering Dept.

**DESIGN AND ANALYSIS OF ALGORITHMS**

**B.Tech. III Year I Sem.**  
**Course Code: CS501PC**

L	T	P	C
4	0	0	4

**Course Objectives**

- To analyze performance of algorithms.
- To choose the appropriate data structure and algorithm design method for a specified application.
- To understand how the choice of data structures and algorithm design methods impacts the performance of programs.
- To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
- To understand the differences between tractable and intractable problems.
- To introduce P and NP classes.

**Course Outcomes:**

- Ability to analyze the performance of algorithms.
- Ability to choose appropriate algorithm design techniques for solving problems.
- Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs.

**UNIT - I**

**Introduction**-Algorithm definition, Algorithm Specification, Performance Analysis-Space complexity, Time complexity, Randomized Algorithms.

**Divide and conquer**- General method, applications - Binary search, Merge sort, Quick sort, Strassen's Matrix Multiplication.

**UNIT - II**

Disjoint set operations, union and find algorithms, AND/OR graphs, Connected Components and Spanning trees, Bi-connected components **Backtracking**-General method, applications-The 8-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

**UNIT - III**

**Greedy method**- General method, applications- Knapsack problem, Job sequencing with deadlines, Minimum cost spanning trees, Single source shortest path problem.

**UNIT - IV**

**Dynamic Programming**- General Method, applications- Chained matrix multiplication, All pairs shortest path problem, Optimal binary search trees, 0/1 knapsack problem, Reliability design, Traveling sales person problem.



## **UNIT - V**

**Branch and Bound-** General Method, applications-0/1 Knapsack problem, LC Branch and Bound solution, FIFO Branch and Bound solution, Traveling sales person problem.

**NP-Hard and NP-Complete problems-** Basic concepts, Non-deterministic algorithms, NP - Hard and NP- Complete classes, Cook's theorem.

### **TEXT BOOKS:**

1. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Sartaj Sahni and S. Rajasekharan, Universities Press.
2. Design and Analysis of Algorithms, P. H. Dave, H.B.Dave, 2<sup>nd</sup> edition, Pearson Education.

### **REFERENCE BOOKS**

1. Algorithm Design: Foundations, Analysis and Internet examples, M. T. Goodrich and R. Tomassia, John Wiley and sons.
2. Design and Analysis of Algorithms, S. Sridhar, Oxford Univ. Press
3. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson Education.
4. Foundations of Algorithms,, R. Neapolitan and K. Naimipour, 4<sup>th</sup> edition, Jones and Bartlett Student edition.
5. Introduction to Algorithms, 3<sup>rd</sup> Edition, T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, PHI

**DATA COMMUNICATION AND COMPUTER NETWORKS**

**B.Tech. III Year I Sem.**  
**Course Code: CS502PC**

L	T	P	C
4	0	0	4

**Course Objectives:**

- To introduce the fundamental various types of computer networks.
- To demonstrate the TCP/IP and OSI models with merits and demerits.
- To explore the various layers of OSI Model.
- To introduce UDP and TCP Models.

**Course Outcomes:**

- Students should be understand and explore the basics of Computer Networks and Various Protocols. He/She will be in a position to understand the World Wide Web concepts.
- Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile and ad hoc networks.

**UNIT – I**

**Data Communications:** Components – Direction of Data flow – Networks – Components and Categories – Types of Connections – Topologies –Protocols and Standards – ISO / OSI model, Example Networks such as ATM, Frame Relay, ISDN Physical layer: Transmission modes, Multiplexing, Transmission Media, Switching, Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

**UNIT – II**

**Data link layer:** Introduction, Framing, and Error – Detection and Correction – Parity – LRC – CRC Hamming code, Flow and Error Control, Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocols. 111 Medium Access sub layer: ALOHA, CSMA/CD, LAN – Ethernet IEEE 802.3, IEEE 802.5 – IEEE 802.11, Random access, Controlled access, Channelization.

**UNIT – III**

**Network layer:** Logical Addressing, Internetworking, Tunneling, Address mapping, ICMP, IGMP, Forwarding, Uni-Cast Routing Protocols, Multicast Routing Protocols.

**UNIT – IV**

**Transport Layer:** Process to Process Delivery, UDP and TCP protocols, Data Traffic, Congestion, Congestion Control, QoS, Integrated Services, Differentiated Services, QoS in Switched Networks.

**UNIT – V**

**Application Layer:** Domain name space, DNS in internet, electronic mail, SMTP, FTP, WWW, HTTP, SNMP.

**TEXT BOOKS:**

1. Data Communications and Networking, Behrouz A. Forouzan , Fourth Edition TMH, 2006.
2. Computer Networks, Andrew S Tanenbaum, 4<sup>th</sup> Edition. Pearson Education, PHI.

**REFERENCES:**

1. Data communications and Computer Networks, P.C .Gupta, PHI.
2. An Engineering Approach to Computer Networks, S. Keshav, 2<sup>nd</sup> Edition, Pearson Education.
3. Understanding communications and Networks, 3<sup>rd</sup> Edition, W.A. Shay, Cengage Learning.
4. Computer Networking: A Top-Down Approach Featuring the Internet. James F. Kurose & Keith W. Ross, 3<sup>rd</sup> Edition, Pearson Education.
5. Data and Computer Communication, William Stallings, Sixth Edition, Pearson Education, 2000

**SOFTWARE ENGINEERING**

**B.Tech. III Year I Sem.**  
**Course Code: CS503PC**

**L T P C**  
**4 0 0 4**

**Course Objectives:**

- To understanding of software process models such as waterfall and evolutionary models.
- To understanding of software requirements and SRS document.
- To understanding of different software architectural styles.
- To understanding of software testing approaches such as unit testing and integration testing.
- To understanding on quality control and how to ensure good quality software.

**Course Outcomes:**

- Ability to identify the minimum requirements for the development of application.
- Ability to develop, maintain, efficient, reliable and cost effective software solutions
- Ability to critically thinking and evaluate assumptions and arguments.

**UNIT- I**

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, legacy software, Software myths.

A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

Process models: The waterfall model, Incremental process models, Evolutionary process models, Specialized process models, The Unified process.

**UNIT- II**

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System models: Context Models, Behavioral models, Data models, Object models, structured methods.

**UNIT- III**

Design Engineering: Design process and Design quality, Design concepts, the design model, pattern based software design.

Creating an architectural design: software architecture, Data design, Architectural styles and patterns, Architectural Design, assessing alternative architectural designs, mapping data flow into a software architecture.

Modeling component-level design: Designing class-based components, conducting component-level design, object constraint language, designing conventional components.

Performing User interface design: Golden rules, User interface analysis, and design, interface analysis, interface design steps, Design evaluation.

#### **UNIT- IV**

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Product metrics: Software Quality, Frame work for Product metrics, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Metrics for Process and Products: Software Measurement, Metrics for software quality.

#### **UNIT- V**

Risk management: Reactive vs Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

#### **TEXT BOOKS:**

1. Software engineering A practitioner's Approach, Roger S Pressman, sixth edition McGraw Hill International Edition.
2. Software Engineering, Ian Sommerville, seventh edition, Pearson education.

#### **REFERENCE BOOKS:**

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, Rajib Mall, PHI, 2005
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjerne, Springer International edition, 2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjerne, Springer International edition 2006.
7. Software Engineering Foundations, Yingxu Wang, Auerbach Publications, 2008.
8. Software Engineering Principles and Practice, Hans Van Vliet, 3<sup>rd</sup> edition, John Wiley & Sons Ltd.
9. Software Engineering 3: Domains, Requirements, and Software Design, D. Bjerne, Springer International Edition.
10. Introduction to Software Engineering, R. J. Leach, CRC Press.

## FUNDAMENTALS OF MANAGEMENT

**B.Tech. III Year I Sem.**  
**Course Code: SM504MS**

L	T	P	C
3	0	0	3

**Course Objective:** To understand the Management Concepts, applications of Concepts in Practical aspects of business and development of Managerial Skills.

**Course Outcome:** The students understand the significance of Management in their Profession. The various Management Functions like Planning, Organizing, Staffing, Leading, Motivation and Control aspects are learnt in this course. The students can explore the Management Practices in their domain area.

### UNIT - I

**Introduction to Management:** Definition, Nature and Scope, Functions, Managerial Roles, Levels of Management, Managerial Skills, Challenges of Management; Evolution of Management- Classical Approach- Scientific and Administrative Management; The Behavioral approach; The Quantitative approach; The Systems Approach; Contingency Approach, IT Approach.

### UNIT - II

**Planning and Decision Making:** General Framework for Planning - Planning Process, Types of Plans, Management by Objectives; Development of Business Strategy. Decision making and Problem Solving - Programmed and Non Programmed Decisions, Steps in Problem Solving and Decision Making; Bounded Rationality and Influences on Decision Making; Group Problem Solving and Decision Making, Creativity and Innovation in Managerial Work.

### UNIT - III

**Organization and HRM:** Principles of Organization: Organizational Design & Organizational Structures; Departmentalization, Delegation; Empowerment, Centralization, Decentralization, Recentralization; Organizational Culture; Organizational Climate and Organizational Change.

Human Resource Management & Business Strategy: Talent Management, Talent Management Models and Strategic Human Resource Planning; Recruitment and Selection; Training and Development; Performance Appraisal.

### UNIT - IV

**Leading and Motivation:** Leadership, Power and Authority, Leadership Styles; Behavioral Leadership, Situational Leadership, Leadership Skills, Leader as Mentor and Coach, Leadership during adversity and Crisis; Handling Employee and Customer Complaints, Team Leadership.

Motivation - Types of Motivation; Relationship between Motivation, Performance and Engagement, Content Motivational Theories - Needs Hierarchy Theory, Two Factor Theory, Theory X and Theory Y.

**UNIT - V**

**Controlling:** Control, Types and Strategies for Control, Steps in Control Process, Budgetary and Non- Budgetary Controls. Characteristics of Effective Controls, Establishing control systems, Control frequency and Methods.

**Text Books:**

1. Management Fundamentals, Robert N Lussier, 5e, Cengage Learning, 2013.
2. Fundamentals of Management, Stephen P. Robbins, Pearson Education, 2009.

**References:**

1. Essentials of Management, Koontz Kleihrich, Tata McGraw Hill.
2. Management Essentials, Andrew DuBrin, 9e, Cengage Learning, 2012.

**DESIGN AND ANALYSIS OF ALGORITHMS LAB**

**B.Tech. III Year I Sem.**  
**Course Code: CS505PC**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

**Course Objectives:**

- To write programs in java to solve problems using divide and conquer strategy.
- To write programs in java to solve problems using backtracking strategy.
- To write programs in java to solve problems using greedy and dynamic programming techniques.

**Course Outcomes:**

- Ability to write programs in java to solve problems using algorithm design techniques such as Divide and Conquer, Greedy, Dynamic programming, and Backtracking.

**List of Experiments:**

1. Write a java program to implement Quick sort algorithm for sorting a list of integers in ascending order
2. Write a java program to implement Merge sort algorithm for sorting a list of integers in ascending order.
3. i) Write a java program to implement the dfs algorithm for a graph.
4. ii) Write a java program to implement the bfs algorithm for a graph.
5. Write a java programs to implement backtracking algorithm for the N-queens problem.
6. Write a java program to implement the backtracking algorithm for the sum of subsets problem.
7. Write a java program to implement the backtracking algorithm for the Hamiltonian Circuits problem.
8. Write a java program to implement greedy algorithm for job sequencing with deadlines.
9. Write a java program to implement Dijkstra's algorithm for the Single source shortest path problem.
10. Write a java program that implements Prim's algorithm to generate minimum cost spanning tree.
11. Write a java program that implements Kruskal's algorithm to generate minimum cost spanning tree
12. Write a java program to implement Floyd's algorithm for the all pairs shortest path problem.
13. Write a java program to implement Dynamic Programming algorithm for the 0/1 Knapsack problem.
14. Write a java program to implement Dynamic Programming algorithm for the Optimal Binary Search Tree Problem.



**REFERENCE BOOKS**

1. Data structures, Algorithms and Applications in java, 2nd Edition, S. Sahani, Universities Press.
2. Data structures and Algorithms in java, 3<sup>rd</sup> edition, A. Drozdek, Cengage Learning.
3. Data structures with Java, J. R. Hubbard, 2nd edition, Schaum's Outlines, TMH.
4. Data structures and algorithms in Java, 2<sup>nd</sup> Edition, R. Lafore, Pearson Education.
5. Data Structures using Java, D. S. Malik and P.S. Nair, Cengage Learning.

**COMPUTER NETWORKS LAB**

**B.Tech. III Year I Sem.**  
**Course Code: CS506PC**

L	T	P	C
0	0	3	2

**Course Objectives:**

- To Understand the functionalities of various layers of OSI model
- To understand the operating System functionalities

**Course Outcomes:**

- Ability to understand the encryption and decryption concepts in Linux environment
- Ability to apply appropriate algorithm for the finding of shortest route.
- Ability to configure the routing table

**System/ Software Requirement**

- Intel based desktop PCs LAN CONNECTED with minimum of 166 MHZ or faster processor with at least 64 MB RAM and 100 MB free disk space

**Computer Networks Lab:**

1. Implement the data link layer framing methods such as character, character stuffing, and bit stuffing.
2. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP .
3. Implement Dijkstra's algorithm to compute the Shortest path thru a graph.
4. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table at each node using distance vector routing algorithm
5. Take an example subnet of hosts. Obtain broadcast tree for it.
6. Take a 64 bit playing text and encrypt the same using DES algorithm.
7. Write a program to break the above DES coding
8. Using RSA algorithm encrypts a text data and Decrypt the same.

**SOFTWARE ENGINEERING LAB**

**B.Tech. III Year I Sem.**  
**Course Code: CS507PC**

**L T P C**  
**0 0 3 2**

**Course Objectives:**

- To understand the software engineering methodologies involved in the phases for project development.
- To gain knowledge about open source tools used for implementing software engineering methods.
- To exercise developing product-startups implementing software engineering methods.
- Open source Tools: StarUML / UMLGraph / Topcased

Prepare the following documents and develop the software project startup, prototype model, using software engineering methodology for at least two real time scenarios or for the sample experiments.

- Problem Analysis and Project Planning -Thorough study of the problem – Identify Project scope, Objectives and Infrastructure.
- Software Requirement Analysis – Describe the individual Phases/modules of the project and Identify deliverables. Identify functional and non-functional requirements.
- Data Modeling – Use work products – data dictionary.
- Software Designing - Develop use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.
- Prototype model – Develop the prototype of the product.

The SRS and prototype model should be submitted for end semester examination.

List of Sample Experiments:

**1. Course management system (CMS)**

A course management system (CMS) is a collection of software tools providing an online environment for course interactions. A CMS typically includes a variety of online tools and environments, such as:

- An area for faculty posting of class materials such as course syllabus and handouts
- An area for student posting of papers and other assignments
- A grade book where faculty can record grades and each student can view his or her grades
- An integrated email tool allowing participants to send announcement email messages to the entire class or to a subset of the entire class
- A chat tool allowing synchronous communication among class participants

- A threaded discussion board allowing asynchronous communication among participants

In addition, a CMS is typically integrated with other databases in the university so that students enrolled in a particular course are automatically registered in the CMS as participants in that course.

The Course Management System (CMS) is a web application for department personnel, Academic Senate, and Registrar staff to view, enter, and manage course information formerly submitted via paper.

Departments can use CMS to create new course proposals, submit changes for existing courses, and track the progress of proposals as they move through the stages of online approval.

## **2. Easy Leave**

This project is aimed at developing a web based Leave Management Tool, which is of importance to either an organization or a college.

The **Easy Leave** is an Intranet based application that can be accessed throughout the organization or a specified group/Dept. This system can be used to automate the workflow of leave applications and their approvals. The periodic crediting of leave is also automated. There are features like notifications, cancellation of leave, automatic approval of leave, report generators etc in this Tool.

### **Functional components of the project:**

There are registered people in the system. Some are approvers. An approver can also be a requestor. In an organization, the hierarchy could be Engineers/Managers/Business Managers/Managing Director etc. In a college, it could be Lecturer/Professor/Head of the Department/Dean/Principal etc.

Following is a list of functionalities of the system: A person should be able to

- login to the system through the first page of the application
- change the password after logging into the system
- see his/her eligibility details (like how many days of leave he/she is eligible for etc)
- query the leave balance
- see his/her leave history since the time he/she joined the company/college
- apply for leave, specifying the from and to dates, reason for taking leave, address for communication while on leave and his/her superior's email id
- see his/her current leave applications and the leave applications that are submitted to him/her for approval or cancellation
- approve/reject the leave applications that are submitted to him/her
- withdraw his/her leave application (which has not been approved yet)
- Cancel his/her leave (which has been already approved). This will need to be approved by his/her Superior

- get help about the leave system on how to use the different features of the system
- As soon as a leave application /cancellation request /withdrawal /approval /rejection /password-change is made by the person, an automatic email should be sent to the person and his superior giving details about the action
- The number of days of leave (as per the assumed leave policy) should be automatically credited to everybody and a notification regarding the same be sent to them automatically
- An automatic leave-approval facility for leave applications which are older than 2 weeks should be there. Notification about the automatic leave approval should be sent to the person as well as his superior

### 3. E-Bidding

Auctions are among the latest economic institutions in place. They have been used since antiquity to sell a wide variety of goods, and their basic form has remained unchanged. In this dissertation, we explore the efficiency of common auctions when values are interdependent-the value to a particular bidder may depend on information available only to others-and asymmetric. In this setting, it is well known that sealed-bid auctions do not achieve efficient allocations in general since they do not allow the information held by different bidders to be shared.

Typically, in an auction, say of the kind used to sell art, the auctioneer sets a relatively low initial price. This price is then increased until only one bidder is willing to buy the object, and the exact manner in which this is done varies. In my model a bidder who drops out at some price can "reenter" at a higher price.

With the invention of E-commerce technologies over the Internet the opportunity to bid from the comfort of one's own home has seen a change like never seen before. Within the span of a few short years, what may have began as an experimental idea has grown to an immensely popular hobby, and in some cases, a means of livelihood, the Auction Patrol gathers tremendous response every day, all day. With the point and click of the mouse, one may bid on an item they may need or just want, and in moments they find that either they are the top bidder or someone else wants it more, and you're outbid! The excitement of an auction all from the comfort of home is a completely different experience.

Society cannot seem to escape the criminal element in the physical world, and so it is the same with Auction Patrols. This is one area where in a question can be raised as to how safe Auction Patrols.

Proposed system

To generate the quick reports

To make accuracy and efficient calculations

To provide proper information briefly

To provide data security

To provide huge maintenance of records  
Flexibility of transactions can be completed in time

#### **4. Electronic Cash counter**

This project is mainly developed for the Account Division of a Banking sector to provide better interface of the entire banking transactions. This system is aimed to give a better outlook to the user interfaces and to implement all the banking transactions like:

- Supply of Account Information
- New Account Creations
- Deposits
- Withdraws
- Cheque book issues
- Stop payments
- Transfer of accounts
- Report Generations.

#### **Proposed System:**

The development of the new system contains the following activities, which try to automate the entire process keeping in view of the database integration approach.

- User friendliness is provided in the application with various controls.
- The system makes the overall project management much easier and flexible.
- Readily upload the latest updates, allows user to download the alerts by clicking the URL.
- There is no risk of data mismanagement at any level while the project development is under process.
- It provides high level of security with different level of authentication

## PROFESSIONAL ETHICS

**B.Tech. III Year I Sem.**  
**Course Code: MC500HS**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Course Objective:** To enable the students to imbibe and internalize the Values and Ethical Behaviour in the personal and Professional lives.

**Course Outcome:** The students will understand the importance of Values and Ethics in their personal lives and professional careers. The students will learn the rights and responsibilities as an employee, team member and a global citizen.

### UNIT - I

**Introduction to Professional Ethics:** Basic Concepts, Governing Ethics, Personal & Professional Ethics, Ethical Dilemmas, Life Skills, Emotional Intelligence, Thoughts of Ethics, Value Education, Dimensions of Ethics, Profession and professionalism, Professional Associations, Professional Risks, Professional Accountabilities, Professional Success, Ethics and Profession.

### UNIT - II

**Basic Theories:** Basic Ethical Principles, Moral Developments, Deontology, Utilitarianism, Virtue Theory, Rights Theory, Casuist Theory, Moral Absolution, Moral Rationalism, Moral Pluralism, Ethical Egoism, Feminist Consequentialism, Moral Issues, Moral Dilemmas, Moral Autonomy.

### UNIT - III

**Professional Practices in Engineering:** Professions and Norms of Professional Conduct, Norms of Professional Conduct vs. Profession; Responsibilities, Obligations and Moral Values in Professional Ethics, Professional codes of ethics, the limits of predictability and responsibilities of the engineering profession.

Central Responsibilities of Engineers - The Centrality of Responsibilities of Professional Ethics; lessons from 1979 American Airlines DC-10 Crash and Kansas City Hyatt Regency Walk away Collapse.

### UNIT - IV

Work Place Rights & Responsibilities, Ethics in changing domains of Research, Engineers and Managers; Organizational Complaint Procedure, difference of Professional Judgment within the Nuclear Regulatory Commission (NRC), the Hanford Nuclear Reservation.

Ethics in changing domains of research - The US government wide definition of research misconduct, research misconduct distinguished from mistakes and errors, recent history of attention to research misconduct, the emerging emphasis on understanding and fostering responsible conduct, responsible authorship, reviewing & editing.

**UNIT - V**

Global issues in Professional Ethics: Introduction – Current Scenario, Technology Globalization of MNCs, International Trade, World Summits, Issues, Business Ethics and Corporate Governance, Sustainable Development Ecosystem, Energy Concerns, Ozone Deflection, Pollution, Ethics in Manufacturing and Marketing, Media Ethics; War Ethics; Bio Ethics, Intellectual Property Rights.

**TEXT BOOKS:**

1. Professional Ethics: R. Subramanian, Oxford University Press, 2015.
2. Ethics in Engineering Practice & Research, Caroline Whitbeck, 2e, Cambridge University Press 2015.

**REFERENCES:**

1. Engineering Ethics, Concepts Cases: Charles E Harris Jr., Michael S Pritchard, Michael J Rabins, 4e , Cengage learning, 2015.
2. Business Ethics concepts & Cases: Manuel G Velasquez, 6e, PHI, 2008.



## COMPILER DESIGN

**B.Tech. III Year II Sem.**  
**Course Code: CS601PC**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>

### Course Objectives:

- To understand the various phases in the design of a compiler.
- To understand the design of top-down and bottom-up parsers.
- To understand syntax directed translation schemes.
- To introduce lex and yacc tools.
- To learn to develop algorithms to generate code for a target machine.

### Course Outcomes:

- Ability to design, develop, and implement a compiler for any language.
- Able to use lex and yacc tools for developing a scanner and a parser.
- Able to design and implement LL and LR parsers.
- Able to design algorithms to perform code optimization in order to improve the performance of a program in terms of space and time complexity.
- Ability to design algorithms to generate machine code

### UNIT - I

**Introduction:** Language Processors, the structure of a compiler, the science of building a compiler, programming language basics.

**Lexical Analysis:** The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical-Analyzer Generator Lex, Finite Automata, From Regular Expressions to Automata, Design of a Lexical-Analyzer Generator, Optimization of DFA-Based Pattern Matchers.

### UNIT - II

**Syntax Analysis:** Introduction, Context-Free Grammars, Writing a Grammar, Top-Down Parsing, Bottom-Up Parsing, Introduction to LR Parsing: Simple LR, More Powerful LR Parsers, Using Ambiguous Grammars, Parser Generators.

### UNIT - III

**Syntax-Directed Translation:** Syntax-Directed Definitions, Evaluation Orders for SDD's, Applications of Syntax-Directed Translation, Syntax-Directed Translation Schemes, and Implementing L-Attributed SDD's.

**Intermediate-Code Generation:** Variants of Syntax Trees, Three-Address Code, Types and Declarations, Type Checking, Control Flow, Back patching, Switch-Statements, Intermediate Code for Procedures.

#### **UNIT - IV**

**Run-Time Environments:** Storage organization, Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management, Introduction to Garbage Collection, Introduction to Trace-Based Collection.

**Code Generation:** Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, A Simple Code Generator, Peephole Optimization, Register Allocation and Assignment, Dynamic Programming Code-Generation.

#### **UNIT - V**

**Machine-Independent Optimizations:** The Principal Sources of Optimization, Introduction to Data-Flow Analysis, Foundations of Data-Flow Analysis, Constant Propagation, Partial-Redundancy Elimination, Loops in Flow Graphs.

#### **TEXT BOOKS**

1. Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, Pearson.

#### **REFERENCE BOOKS**

1. Compiler Construction-Principles and Practice, Kenneth C Loudon, Cengage Learning.
2. Modern compiler implementation in C, Andrew W Appel, Revised edition, Cambridge University Press.
3. The Theory and Practice of Compiler writing, J. P. Tremblay and P. G. Sorenson, TMH
4. Writing compilers and interpreters, R. Mak, 3<sup>rd</sup> edition, Wiley student edition.
5. lex & yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly

**WEB TECHNOLOGIES**

**B.Tech. III Year II Sem.**  
**Course Code: CS602PC**

L	T	P	C
4	0	0	4

**Course Objectives:**

- To introduce PHP language for server side scripting
- To introduce XML and processing of XML Data with Java
- To introduce Server side programming with Java Servlets and JSP
- To introduce Client side scripting with Javascript and AJAX.

**Course Outcomes:**

- gain knowledge of client side scripting, validation of forms and AJAX programming
- have understanding of server side scripting with PHP language
- have understanding of what is XML and how to parse and use XML Data with Java
- To introduce Server side programming with Java Servlets and JSP

**UNIT - I**

**Introduction to PHP:** Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads, Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies

**File Handling in PHP:** File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories

**UNIT - II**

**XML:** Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemas, Document Object Model, XHTML

**Parsing XML Data - DOM and SAX Parsers in java.**

**UNIT - III**

**Introduction to Servlets:** Common Gateway Interface (CGI), Lifecycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions, connecting to a database using JDBC.

**UNIT - IV**

**Introduction to JSP:** The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session for session tracking, connecting to database in JSP.

**UNIT- V**

**Client side Scripting:** Introduction to Javascript: Javascript language - declaring variables, scope of variables, functions, event handlers (onclick, onsubmit etc.), Document Object Model, Form validation. Simple AJAX application.

**TEXT BOOKS:**

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill

**REFERENCE BOOKS:**

1. Web Programming, building internet applications, Chris Bates 2<sup>nd</sup> edition, Wiley Dreamtech
2. Java Server Pages –Hans Bergsten, SPD O'Reilly
3. Java Script, D. Flanagan, O'Reilly,SPD.
4. Beginning Web Programming-Jon Duckett WROX.
5. Programming World Wide Web, R. W. Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

## CRYPTOGRAPHY AND NETWORK SECURITY

**B.Tech. III Year II Sem.**  
**Course Code: CS603PC**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
4	0	0	4

### Course Objectives:

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- Understand various cryptographic algorithms.
- Understand the basic categories of threats to computers and networks
- Describe public-key cryptosystem.
- Describe the enhancements made to IPv4 by IPSec
- Understand Intrusions and intrusion detection
- Discuss the fundamental ideas of public-key cryptography.
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
- Discuss Web security and Firewalls

### Course Outcomes:

- Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
- Ability to identify information system requirements for both of them such as client and server.
- Ability to understand the current legal issues towards information security.

### UNIT – I

**Security Concepts:** Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

**Cryptography Concepts and Techniques:** Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

### UNIT – II

**Symmetric key Ciphers:** Block Cipher principles, DES, AES, Blowfish, RC5, IDEA, Block cipher operation, Stream ciphers, RC4.

**Asymmetric key Ciphers:** Principles of public key cryptosystems, RSA algorithm, Elgamal Cryptography, Diffie-Hellman Key Exchange, Knapsack Algorithm.

### UNIT – III

**Cryptographic Hash Functions:** Message Authentication, Secure Hash Algorithm (SHA-512), **Message authentication codes:** Authentication requirements, HMAC, CMAC, Digital signatures, Elgamal Digital Signature Scheme.

**Key Management and Distribution:** Symmetric Key Distribution Using Symmetric & Asymmetric Encryption, Distribution of Public Keys, Kerberos, X.509 Authentication Service, Public – Key Infrastructure

### UNIT – IV

**Transport-level Security:** Web security considerations, Secure Socket Layer and Transport Layer Security, HTTPS, Secure Shell (SSH)

**Wireless Network Security:** Wireless Security, Mobile Device Security, IEEE 802.11 Wireless LAN, IEEE 802.11i Wireless LAN Security

### UNIT – V

**E-Mail Security:** Pretty Good Privacy, S/MIME **IP Security:** IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, Internet Key Exchange

**Case Studies on Cryptography and security:** Secure Multiparty Calculation, Virtual Elections, Single sign On, Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability.

### TEXT BOOKS:

1. Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education, 6<sup>th</sup> Edition
2. Cryptography and Network Security: Atul Kahate, Mc Graw Hill, 3<sup>rd</sup> Edition

### REFERENCE BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1<sup>st</sup> Edition.
2. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 3<sup>rd</sup> Edition
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

**MOBILE COMPUTING  
(PROFESSIONAL ELECTIVE - I)**

**B.Tech. III Year II Sem.**  
**Course Code: CS611PE**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**Course Objectives:**

- To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
- To understand the typical mobile networking infrastructure through a popular GSM protocol
- To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer
- To understand the database issues in mobile environments & data delivery models.
- To understand the ad hoc networks and related concepts.
- To understand the platforms and protocols used in mobile environment.

**Course Outcomes:**

- Able to think and develop new mobile application.
- Able to take any new technical issue related to this new paradigm and come up with a solution(s).
- Able to develop new ad hoc network applications and/or algorithms/protocols.
- Able to understand & develop any existing or new protocol related to mobile environment

**UNIT - I**

**Introduction:** Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.

GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS, CSHSD, DECT.

**UNIT – II**

**(Wireless) Medium Access Control (MAC):** Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

**Mobile Network Layer:** IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

**UNIT – III**

**Mobile Transport Layer:** Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

**Database Issues:** Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

**UNIT - IV**

**Data Dissemination and Synchronization:** Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols

**UNIT - V**

**Mobile Adhoc Networks (MANETs):** Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc. , Mobile Agents, Service Discovery.

**Protocols and Platforms for Mobile Computing:** WAP, Bluetooth, XML, J2ME, Java Card, Palm OS, Windows CE, Symbian OS, Linux for Mobile Devices, Android.

**TEXT BOOKS:**

1. Jochen Schiller, “Mobile Communications”, Addison-Wesley, Second Edition, 2009.
2. Raj Kamal, “Mobile Computing”, Oxford University Press, 2007, ISBN: 0195686772.

**REFERENCE BOOKS:**

1. Jochen Schiller, “Mobile Communications”, Addison-Wesley, Second Edition, 2004.
2. Stojmenovic and Cacute, “Handbook of Wireless Networks and Mobile Computing”, Wiley, 2002, ISBN 0471419028.
3. Reza Behravanfar, “Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML”, ISBN: 0521817331, Cambridge University Press, Oct 2004.



**DESIGN PATTERNS**  
**(PROFESSIONAL ELECTIVE - I)**

**B.Tech. III Year II Sem.**  
**Course Code: CS612PE**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**Prerequisites**

1. A Course on Software Engineering”
2. A Course on “Object Oriented Programming Through Java”

**Course Objectives:**

- The aim of the course is to appreciate the idea behind Design Patterns in handling common problems faced during building an application
- This course covers all pattern types from creational to structural, behavioral to concurrency and highlights the scenarios when one pattern must be chosen over others.

**Course Outcomes:**

- Create software designs that are scalable and easily maintainable
- Understand the best use of Object Oriented concepts for creating truly OOP programs
- Use creational design patterns in software design for class instantiation
- Use structural design patterns for better class and object composition
- Use behavioral patterns for better organization and communication between the objects
- Use refactoring to compose the methods for proper code packaging
- Use refactoring to better organize the class responsibilities of current code

**UNIT - I**

**Introduction:** What is a design pattern? design patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

**UNIT - II**

**Designing a Document Editor:** Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary

**UNIT - III**

**Creational Patterns:** Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

**UNIT - IV**

**Structural Pattern:** Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy

**UNIT - V**

**Behavioral Patterns:** Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template Method, Visitor.

**TEXT BOOK:**

1. Design Patterns, Erich Gamma, Pearson Education

**REFERENCE BOOKS:**

1. Pattern's in Java, Vol –I, Mark Grand, Wiley Dream Tech.
2. Patterns in Java, Vol-II, Mark Grand, Wiley Dream Tech.
3. Java Enterprise Design Patterns Vol-III, Mark Grand, Wiley Dream Tech.
4. Head First Design Patterns, Eric Freeman, O'reily publications

**ARTIFICIAL INTELLIGENCE**  
**(Professional Elective - I)**

**B.Tech. III Year II Sem.**  
**Course Code: CS613PE**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**Course Objectives:**

- To learn the difference between optimal reasoning vs human like reasoning
- To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities
- To learn different knowledge representation techniques
- To understand the applications of AI: namely Game Playing, Theorem Proving, Expert Systems, Machine Learning and Natural Language Processing

**Course Outcomes:**

- Possess the ability to formulate an efficient problem space for a problem expressed in English.
- Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
- Possess the skill for representing knowledge using the appropriate technique
- Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems, Machine Learning and Natural Language Processing

**UNIT - I**

Introduction, History, Intelligent Systems, Foundations of AI, Sub areas of AI, Applications. Problem Solving - State-Space Search and Control Strategies: Introduction, General Problem Solving, Characteristics of Problem, Exhaustive Searches, Heuristic Search Techniques, Iterative-Deepening A\*, Constraint Satisfaction. Game Playing, Bounded Look-ahead Strategy and use of Evaluation Functions, Alpha-Beta Pruning

**UNIT - II**

Logic Concepts and Logic Programming: Introduction, Propositional Calculus, Propositional Logic, Natural Deduction System, Axiomatic System, Semantic Tableau System in Propositional Logic, Resolution Refutation in Propositional Logic, Predicate Logic, Logic Programming.

Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR, Knowledge Representation using Frames.

**UNIT - III**

Expert System and Applications: Introduction, Phases in Building Expert Systems, Expert System Architecture, Expert Systems Vs Traditional Systems, Truth Maintenance Systems, Application of Expert Systems, List of Shells and Tools.

Uncertainty Measure - Probability Theory: Introduction, Probability Theory, Bayesian Belief Networks, Certainty Factor Theory, Dempster-Shafer Theory.

#### **UNIT-IV**

Machine-Learning Paradigms: Introduction. Machine Learning Systems. Supervised and Unsupervised Learning. Inductive Learning. Learning Decision Trees (Text Book 2), Deductive Learning. Clustering, Support Vector Machines.

Artificial Neural Networks: Introduction, Artificial Neural Networks, Single-Layer Feed-Forward Networks, Multi-Layer Feed-Forward Networks, Radial-Basis Function Networks, Design Issues of Artificial Neural Networks, Recurrent Networks.

#### **UNIT-V**

Advanced Knowledge Representation Techniques: Case Grammars, Semantic Web

Natural Language Processing: Introduction, Sentence Analysis Phases, Grammars and Parsers, Types of Parsers, Semantic Analysis, Universal Networking Knowledge.

#### **TEXT BOOKS:**

1. Saroj Kaushik. Artificial Intelligence. Cengage Learning. 2011
2. Russell, Norvig: Artificial intelligence, A Modern Approach, Pearson Education, Second Edition. 2004

#### **REFERENCE BOOK:**

1. Rich, Knight, Nair: Artificial intelligence, Tata McGraw Hill, Third Edition 2009.
2. Introduction to Artificial Intelligence by Eugene Charniak, Pearson.
3. Introduction to Artificial Intelligence and expert systems Dan W.Patterson. PHI.
4. Artificial Intelligence by George Fluger Pearson fifth edition.

**INFORMATION SECURITY MANAGEMENT (SECURITY ANALYST-I)  
(PROFESSIONAL ELECTIVE - I)**

**B.Tech. III Year II Sem.**  
**Course Code: CS614PE**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**Course Objectives:**

- To introduce the terminology, technology and its applications
- To introduce the concept of Security Analyst
- To introduce the tools, technologies & programming languages which are used in day to day security analyst job role

**UNIT - I**

**Information Security Management:** Information Security Overview, Threats and Attack Vectors, Types of Attacks, Common Vulnerabilities, and Exposures (CVE), Security Attacks, Fundamentals of Information Security, Computer Security Concerns, Information Security Measures etc.

**Manage your work to meet requirements (NOS 9001)**

**UNIT - II**

**Fundamentals of Information Security:** Key Elements of Networks, Logical Elements of Network, Critical Information Characteristics, Information States etc.

**Work effectively with Colleagues (NOS 9002)**

**UNIT - III**

**Data Leakage:** What is Data Leakage and statistics, Data Leakage Threats, Reducing the Risk of Data Loss, Key Performance Indicators (KPI), Database Security etc.

**UNIT - IV**

**Information Security Policies, Procedures, and Audits:** Information Security Policies-necessity-key elements & characteristics, Security Policy Implementation, Configuration, Security Standards-Guidelines & Frameworks etc.

**UNIT - V**

**Information Security Management – Roles and Responsibilities:** Security Roles & Responsibilities, Accountability, Roles, and Responsibilities of Information Security Management, team-responding to emergency situation-risk analysis process etc.

**TEXT BOOKS:**

1. Management of Information Security by Michael E. Whitman and Herbert J. Mattord

**REFERENCES:**

1. <http://www.iso.org/iso/home/standards/management-standards/iso27001.htm>
2. <http://csrc.nist.gov/publications/nistpubs/800-55-Rev1/SP800-55-rev1.pdf>

**INTRODUCTION TO ANALYTICS (ASSOCIATE ANALYTICS -I)  
(PROFESSIONAL ELECTIVE - I)**

**B.Tech. III Year II Sem.**  
**Course Code: CS615PE**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**Course Objectives:**

- To introduce the terminology, technology and its applications
- To introduce the concept of Analytics for Business
- To introduce the tools, technologies & programming languages which is used in day to day analytics cycle

**UNIT - I**

**Introduction to Analytics and R programming (NOS 2101):** Introduction to R, R Studio (GUI): R Windows Environment, introduction to various data types, Numeric, Character, date, data frame, array, matrix etc., Reading Datasets, Working with different file types .txt, .csv etc. Outliers, Combining Datasets, R Functions and loops.

**Manage your work to meet requirements (NOS 9001):** Understanding Learning objectives, Introduction to work & meeting requirements, Time Management, Work management & prioritization, Quality & Standards Adherence,

**UNIT - II**

**Summarizing Data & Revisiting Probability (NOS 2101):** Summary Statistics - Summarizing data with R, Probability, Expected, Random, Bivariate Random variables, Probability distribution. Central Limit Theorem etc.

**Work effectively with Colleagues (NOS 9002):** Introduction to work effectively, Team Work, Professionalism, Effective Communication skills, etc.

**UNIT - III**

**SQL using R** Introduction to NoSQL, Connecting R to NoSQL databases. Excel and R integration with R connector.

**UNIT - IV**

**Correlation and Regression Analysis (NOS 9001):** Regression Analysis, Assumptions of OLS Regression, Regression Modelling. Correlation, ANOVA, Forecasting, Heteroscedasticity, Autocorrelation, Introduction to Multiple Regression etc.

**UNIT - V**

**Understand the Verticals - Engineering, Financial and others (NOS 9002)**

Understanding systems viz. Engineering Design, Manufacturing, Smart Utilities, Production lines, Automotive, Technology etc. Understanding Business problems related to various businesses.

**Requirements Gathering:** Gathering all the data related to Business objective.

**TEXT BOOK:**

1. Student's Handbook for Associate Analytics.

**REFERENCE BOOKS:**

1. Introduction to Probability and Statistics Using R, ISBN: 978-0-557-24979-4, is a textbook written for an undergraduate course in probability and statistics.
2. An Introduction to R, by Venables and Ripley and the R Development Core Team. This may be downloaded for free from the R Project website (<http://www.r-project.org/>, see Manuals). There are plenty of other free references available from the R Project website.
3. Montgomery, Douglas C., and George C. Runger, Applied statistics and probability for engineers. John Wiley & Sons, 2010
4. Time Series Analysis and Mining with R. Yanchang Zhao.

**CRYPTOGRAPHY AND NETWORK SECURITY LAB**

**B.Tech. III Year II Sem.**  
**Course Code: CS604PC**

**L T P C**  
**0 0 3 2**

1. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should XOR each character in this string with 0 and displays the result.
2. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should AND or and XOR each character in this string with 127 and display the result.
3. Write a Java program to perform encryption and decryption using the following algorithms
  - a. Ceaser cipher
  - b. Substitution cipher
  - c. Hill Cipher
4. Write a C/JAVA program to implement the DES algorithm logic.
5. Write a C/JAVA program to implement the Blowfish algorithm logic.
6. Write a C/JAVA program to implement the Rijndael algorithm logic.
7. Write the RC4 logic in Java Using Java cryptography; encrypt the text "Hello world" using Blowfish. Create your own key using Java key tool.
8. Write a Java program to implement RSA algorithm.
9. Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript.
10. Calculate the message digest of a text using the SHA-1 algorithm in JAVA.
11. Calculate the message digest of a text using the MD5 algorithm in JAVA.



**WEB TECHNOLOGIES LAB**

**B.Tech. III Year II Sem.**  
**Course Code: CS605PC**

**L T P C**  
**0 0 3 2**

**Course Objectives:**

- To enable the student to program web applications using the following technologies HTML, Javascript , AJAX, PHP, Tomcat Server, Servlets, JSP

**Course Outcomes:**

- Use LAMP Stack for web applications
- Use Tomcat Server for Servlets and JSPs
- Write simple applications with Technologies like HTML, Javascript, AJAX, PHP, Servlets and JSPs
- Connect to Database and get results
- Parse XML files using Java (DOM and SAX parsers)

**Note:**

1. Use LAMP Stack (Linux, Apache, MySQL and PHP) for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform wherever applicable
  2. The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed
1. Install the following on the local machine
    - Apache Web Server (if not installed)
    - Tomcat Application Server locally
    - Install MySQL (if not installed)
    - Install PHP and configure it to work with Apache web server and MySQL (if not already configured)
  2. Write an HTML page including javascript that takes a given set of integer numbers and shows them after sorting in descending order.
  3. Write an HTML page including any required Javascript that takes a number from one text field in the range of 0 to 999 and shows it in another text field in words. If the number is out of range, it should show “out of range” and if it is not a number, it should show “not a number” message in the result box.
  4. Write an HTML page that has one input, which can take multi-line text and a submit button. Once the user clicks the submit button, it should show the number of characters, words and lines in the text entered using an alert message. Words are separated with white space and lines are separated with new line character.

5. Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).
6. Create an XML document that contains 10 users information. Write a Java program, which takes User Id as input and returns the user details by taking the user information from the XML document using (a) DOM Parser and (b) SAX parser

Implement the following web applications using (a) PHP, (b) Servlets and (c) JSP:

7. A user validation web application, where the user submits the login name and password to the server. The name and password are checked against the data already available in Database and if the data matches, a successful login page is returned. Otherwise a failure message is shown to the user.
8. Modify the above program to use an xml file instead of database.
9. Modify the above program to use AJAX to show the result on the same page below the submit button.
10. A simple calculator web application that takes two numbers and an operator (+, -, /, \* and %) from an HTML page and returns the result page with the operation performed on the operands.
11. Modify the above program such that it stores each query in a database and checks the database first for the result. If the query is already available in the DB, it returns the value that was previously computed (from DB) or it computes the result and returns it after storing the new query and result in DB.
12. A web application takes a name as input and on submit it shows a hello <name> page where <name> is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, it should show a logout page with Thank You <name> message with the duration of usage (hint: Use session to store name and time).
13. A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with “Hello <name>, you are not authorized to visit this site” message, where <name> should be replaced with the entered name. Otherwise it should send “Welcome <name> to this site” message.
14. A web application for implementation:  
The user is first served a login page which takes user's name and password. After submitting the details the server checks these values against the data from a database and takes the following decisions.  
If name and password matches, serves a welcome page with user's full name.

If name matches and password doesn't match, then serves "password mismatch" page  
If name is not found in the database, serves a registration page, where user's full name is asked and on submitting the full name, it stores, the login name, password and full name in the database (hint: use session for storing the submitted login name and password)

15. A web application that lists all cookies stored in the browser on clicking "List Cookies" button. Add cookies if necessary.

**REFERENCE BOOKS:**

1. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill
2. Web Programming, building internet applications, Chris Bates 2nd edition, Wiley Dreamtech
3. Java Server Pages –Hans Bergsten, SPD O'Reilly
4. Java Script, D.Flanagan, O'Reilly, SPD.
5. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

## ADVANCED ENGLISH COMMUNICATION SKILLS LAB

**B.Tech. III Year II Sem.**

**L T P C**

**Course Code: EN606HS**

**0 0 3 2**

### **Introduction**

A course on *Advanced English Communication Skills (AECS) Lab* is considered essential at the third year level of B.Tech and B.Pharmacy courses. At this stage, the students need to prepare themselves for their career which requires them to listen to, read, speak and write in English both for their professional and interpersonal communication. The main purpose of this course is to prepare the students of Engineering for their placements.

**Course Objectives:** This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve students' fluency in spoken English
- To enable them to listen to English spoken at normal conversational speed
- To help students develop their vocabulary
- To read and comprehend texts in different contexts
- To communicate their ideas relevantly and coherently in writing
- To make students industry-ready
- To help students acquire behavioral skills for their personal and professional life
- To respond appropriately in different socio-cultural and professional contexts

**Course Outcomes:** Students will be able to:

- Acquire vocabulary and use it contextually
- Listen and speak effectively
- Develop proficiency in academic reading and writing
- Increase possibilities of job prospects
- Communicate confidently in formal and informal contexts

### **Syllabus**

The following course activities will be conducted as part of the Advanced English Communication Skills (AECS) Lab:

1. **Inter-personal Communication and Building Vocabulary** - Starting a Conversation – Responding Appropriately and Relevantly – Using Appropriate Body Language – Role Play in Different Situations - Synonyms and Antonyms, One-word Substitutes, Prefixes and Suffixes, Idioms and Phrases and Collocations.
2. **Reading Comprehension** –General Vs Local Comprehension, Reading for Facts, Guessing Meanings from Context, , Skimming, Scanning, Inferring Meaning.
3. **Writing Skills** – Structure and Presentation of Different Types of Writing – Letter Writing/Resume Writing/ e-correspondence/ Technical Report Writing.

4. **Presentation Skills** – Oral Presentations (individual or group) through JAM Sessions/Seminars/PPTs and Written Presentations through Posters/Projects/Reports/e-mails/Assignments... etc.,
5. **Group Discussion and Interview Skills** – Dynamics of Group Discussion, Intervention, Summarizing, Modulation of Voice, Body Language, Relevance, Fluency and Organization of Ideas and Rubrics of Evaluation- Concept and Process, Pre-interview Planning, Opening Strategies, Answering Strategies, Interview through Tele-conference & Video-conference and Mock Interviews.

**Minimum Hardware Requirement:** Advanced English Communication Skills (AECS) Laboratory shall have the following infrastructural facilities to accommodate at least 35 students in the lab:

- **Spacious room with appropriate acoustics**
- **Eight round tables with five movable chairs for each table.**
- **Audio-visual aids**
- **LCD Projector**
- **Public Address system**
- **Computer with suitable configuration**

**Suggested Software:** The software consisting of the prescribed topics elaborated above should be procured and used.

- **Oxford Advanced Learner's Compass, 8<sup>th</sup> Edition**
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**

**REFERENCES:**

1. Kumar, Sanjay and Pushp Lata. English for Effective Communication, Oxford University Press, 2015.
2. Konar, Nira. English Language Laboratories – A Comprehensive Manual, PHI Learning Pvt. Ltd., 2011.

**IV YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A70511	Linux Programming	4	-	4
A70530	Design Patterns	4	-	4
A70520	Data Warehousing and Data Mining	4	-	4
A70519	Cloud Computing	4	-	4
	<b>ELECTIVE – I</b>	4	-	4
A70540	Software Project Management			
A70532	Image processing and Pattern Recognition			
A70536	Mobile Computing			
A70529	Computer Graphics			
A70352	Operations Research			
	<b>ELECTIVE – II</b>	4	-	4
A70534	Machine Learning			
A70539	Soft Computing			
A70533	Information Retrieval Systems			
A70526	Artificial Intelligence			
A70628	Computer Forensics			
A70596	Linux Programming Lab	-	3	2
A70595	Data Warehousing and Mining Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**IV YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A80014	Management Science	4	-	4
	<b>ELECTIVE III</b>	4	-	4
A80551	Web Services			
A80538	Semantic Web and Social Networks			
A80537	Scripting Languages			
A80547	Multimedia & Rich Internet Applications			
	<b>ELECTIVE – IV</b>	4	-	4
A80542	Ad hoc and Sensor Networks			
A80550	Storage Area Networks			
A80543	Database Security			
A80439	Embedded Systems			
A80087	Industry Oriented Mini Project	-	-	2
A80089	Seminar	-	6	2
A80088	Project Work	-	15	10
A80090	Comprehensive Viva	-	-	2
	<b>Total</b>	<b>12</b>	<b>21</b>	<b>28</b>

**Note:** All End Examinations (Theory and Practical) are of three hours duration.

**T-Tutorial L – Theory P – Practical D-Drawing C – Credits**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem**

<b>L</b>	<b>T/P/D</b>	<b>C</b>
<b>4</b>	<b>-/-</b>	<b>4</b>

**(A70530) DESIGN PATTERNS****Objectives:**

- Understand the design patterns that are common in software applications.
- Understand how these patterns are related to Object Oriented design.

**UNIT-I**

Introduction: What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

**UNIT-II**

A Case Study: Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary.

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

**UNIT-III**

Structural Pattern Part-I: Adapter, Bridge, Composite.

Structural Pattern Part-II: Decorator, façade, Flyweight, Proxy.

**UNIT-IV**

Behavioral Patterns Part-I: Chain of Responsibility, Command, Interpreter, Iterator.

Behavioral Patterns Part-II: Mediator, Memento, Observer.

**UNIT-V**

Behavioral Patterns Part-II (cont'd): State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns.

What to Expect from Design Patterns, A Brief History, The Pattern Community An Invitation, A Parting Thought.

**TEXT BOOK:**

1. Design Patterns By Erich Gamma, Pearson Education

**REFERENCE BOOKS :**

1. Pattern's in JAVA Vol-I By Mark Grand, Wiley DreamTech.

2. Pattern's in JAVA Vol-II By Mark Grand, Wiley DreamTech.
3. JAVA Enterprise Design Patterns Vol-III By Mark Grand, Wiley DreamTech.
4. Head First Design Patterns By Eric Freeman-Oreilly-spd.
5. Peeling Design Patterns, Prof. Meda Srinivasa Rao, Narsimha Karumanchi, CareerMonk Publications.
6. Design Patterns Explained By Alan Shalloway, Pearson Education.
7. Pattern Oriented Software Architecture, F.Buschmann&others, John Wiley & Sons.

**Outcomes:**

- Ability to understand and apply common design patterns to incremental / iterative development.
- Ability to identify appropriate patterns for design of given problem.



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem**

L	T/P/D	C
4	-/-	4

**(A70520) DATA WAREHOUSING AND DATA MINING****Objectives:**

Study data warehouse principles and its working learn data mining concepts understand association rules mining. Discuss classification algorithms learn how data is grouped using clustering techniques.

**UNIT-I**

**Data warehouse:** Introduction to Data warehouse, Difference between operational database systems and data warehouses, Data warehouse Characteristics, Data warehouse Architecture and its Components, Extraction-Transformation-Loading, Logical(Multi-Dimensional), Data Modeling, Schema Design, Star and Snow-Flake Schema, Fact Consultation, Fact Table, Fully Addictive, Semi-Addictive, Non Addictive Measures; Fact-Less-Facts, Dimension Table Characteristics; OLAP Cube, OLAP Operations, OLAP Server Architecture-ROLAP, MOLAP and HOLAP.

**UNIT-II**

**Introduction to Data Mining:** Introduction, What is Data Mining, Definition, KDD, Challenges, Data Mining Tasks, Data Preprocessing, Data Cleaning, Missing data, Dimensionality Reduction, Feature Subset Selection, Discretization and Binaryzation, Data Transformation; Measures of Similarity and Dissimilarity- Basics.

**UNIT-III**

**Association Rules:** Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation; APRIORI Algorithm, The Partition Algorithms, FP-Growth Algorithms, Compact Representation of Frequent Item Set- Maximal Frequent Item Set, Closed Frequent Item Set.

**UNIT-IV**

**Classification:** Problem Definition, General Approaches to solving a classification problem , Evaluation of Classifiers , Classification techniques, Decision Trees-Decision tree Construction , Methods for Expressing attribute test conditions, Measures for Selecting the Best Split, Algorithm for Decision tree Induction ; Naive-Bayes Classifier, Bayesian Belief Networks; K- Nearest neighbor classification-Algorithm and Characteristics.

**UNIT-V**

**Clustering:** Problem Definition, Clustering Overview, Evaluation of Clustering Algorithms, Partitioning Clustering-K-Means Algorithm, K-Means Additional

issues, PAM Algorithm; Hierarchical Clustering-Agglomerative Methods and divisive methods, Basic Agglomerative Hierarchical Clustering Algorithm, Specific techniques, Key Issues in Hierarchical Clustering, Strengths and Weakness; Outlier Detection.

**TEXT BOOKS:**

- 1) Data Mining- Concepts and Techniques- Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition, 2006.
- 2) Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbanch, Pearson Education.

**REFERENCE BOOKS:**

- 1) Data Mining Techniques, Arun K Pujari, 3<sup>rd</sup> Edition, Universities Press.
- 2) Data Warehousing Fundamentals, Pualraj Ponnaiah, Wiley Student Edition.
- 3) The Data Warehouse Life Cycle Toolkit – Ralph Kimball, Wiley Student Edition.
- 4) Data Mining, Vikaram Pudi, P Radha Krishna, Oxford University Press

**Outcomes:**

- Student should be able to understand why the data warehouse in addition to database systems.
- Ability to perform the preprocessing of data and apply mining techniques on it.
- Ability to identify the association rules, classification and clusters in large data sets.
- Ability to solve real world problems in business and scientific information using data mining

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

IV Year B.Tech. CSE-I Sem

**L T/P/D C****4 -/- 4****(A70519) CLOUD COMPUTING****Objectives:**

- To explain the evolving computer model called cloud computing.
- To introduce the various levels of services that can be achieved by cloud.
- To describe the security aspects in cloud.

**UNIT- I**

**Systems Modeling, Clustering and Virtualization:** Distributed System Models and Enabling Technologies, Computer Clusters for Scalable Parallel Computing, Virtual Machines and Virtualization of Clusters and Data centers.

**UNIT- II**

**Foundations:** Introduction to Cloud Computing, Migrating into a Cloud, Enriching the 'Integration as a Service' Paradigm for the Cloud Era, The Enterprise Cloud Computing Paradigm.

**UNIT- III**

**Infrastructure as a Service (IAAS) & Platform and Software as a Service (PAAS / SAAS):** Virtual machines provisioning and Migration services, On the Management of Virtual machines for Cloud Infrastructures, Enhancing Cloud Computing Environments using a cluster as a Service, Secure Distributed Data Storage in Cloud Computing.

Aneka, Comet Cloud, T-Systems', Workflow Engine for Clouds, Understanding Scientific Applications for Cloud Environments.

**UNIT- IV**

**Monitoring, Management and Applications:** An Architecture for Federated Cloud Computing, SLA Management in Cloud Computing, Performance Prediction for HPC on Clouds, Best Practices in Architecting Cloud Applications in the AWS cloud, Building Content Delivery networks using Clouds, Resource Cloud Mashups.

**UNIT- V**

**Governance and Case Studies:** Organizational Readiness and Change management in the Cloud age, Data Security in the Cloud, Legal Issues in Cloud computing, Achieving Production Readiness for Cloud Services.

**TEXT BOOKS:**

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.

2. Distributed and Cloud Computing, Kai Hwang, Geoffery C.Fox, Jack J.Dongarra, Elsevier, 2012.

**REFERENCE BOOKS:**

1. Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill, rp2011.
2. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010.
3. Cloud Computing: Implementation, Management and Security, John W. Rittinghouse, James F.Ransome, CRC Press, rp2012.
4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O'Reilly, SPD, rp2011.
5. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

**Outcomes:**

- Ability to understand the virtualization and cloud computing concepts.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem****L T/P/D C****4 -/-/ 4****(A70540) SOFTWARE PROJECT MANAGEMENT****(Elective- I)****Objectives:**

The main goal of software development projects is to create a software system with a predetermined functionality and quality in a given time frame and with given costs. For achieving this goal, models are required for determining target values and for continuously controlling these values. This course focuses on principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience-based creation & improvement of models (process management). The goals of the course can be characterized as follows:

1. Understanding the specific roles within a software organization as related to project and process management
2. Understanding the basic infrastructure competences (e.g., process modeling and measurement)
3. Understanding the basic steps of project planning, project management, quality assurance, and process management and their relationships

**UNIT- I**

Conventional Software Management: The waterfall model, conventional software

Management performance. Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

**UNIT- II**

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

The old way and the new: The principles of conventional software engineering, principles of modern software management, transitioning to an iterative process.

**UNIT- III**

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering

artifacts, programmatic artifacts. Model based software architectures: A Management perspective and technical perspective.

#### **UNIT- IV**

Work Flows of the process: Software process workflows, Inter trans workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic status assessments. Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Interaction planning process, Pragmatic planning.

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.

Process Automation : Automation Building Blocks, The Project Environment.

#### **UNIT- V**

Project Control and Process instrumentation: The server care Metrics, Management indicators, quality indicators, life cycle expectations pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminants, Example.

Future Software Project Management: Modern Project Profiles Next generation

Software economics, modern Process transitions.

Case Study : The Command Center Processing and Display System- Replacement(CCPDS-R).

#### **TEXT BOOKS:**

1. Software Project Management, Walker Royce, Pearson Education.
2. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, Tata McGraw Hill.

#### **REFERENCE BOOKS:**

1. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006
2. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly, 2007
3. Software Engineering Project Management, Richard H. Thayer & Edward Yourdon, second edition, Wiley India, 2004.
4. Agile Project Management, Jim Highsmith, Pearson education, 2004
5. The art of Project management, Scott Berkun, O'Reilly, 2005.
6. Software Project Management in Practice, Pankaj Jalote, Pearson Education, 2002.

**Outcomes:**

- Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- Compare and differentiate organization structures and project structures.
- Implement a project to manage project schedule, expenses and resources with the application of suitable project management tools.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem****L T/P/D C****4 -/- 4****(A70532) IMAGE PROCESSING AND PATTERN RECOGNITION****(Elective - I)****Objectives:**

- Adequate background knowledge about image processing and pattern recognition
- Practical knowledge and skills about image processing and pattern recognition tools
- Necessary knowledge to design and implement a prototype of an image processing and pattern recognition *application*.

**UNIT – I**

Fundamental steps of image processing, components of an image processing of system. The image model and image acquisition, sampling and quantization, relationship between pixels, distance functions, scanner.

Statistical and spatial operations, Intensity functions transformations, histogram processing, smoothing & sharpening – spatial filters Frequency domain filters, homomorphic filtering, image filtering & restoration. Inverse and weiner filtering, FIR weiner filter, Filtering using image transforms, smoothing splines and interpolation.

**UNIT – II**

Morphological and other area operations, basic morphological operations, opening and closing operations, dilation erosion, Hit or Miss transform, morphological algorithms, extension to grey scale images.

Segmentation and Edge detection region operations, basic edge detection, second order detection, crack edge detection, gradient operators, compass and Laplace operators, edge linking and boundary detection, thresholding, region based segmentation, segmentation by morphological watersheds.

**UNIT –III**

Image compression: Types and requirements, statistical compression, spatial compression, contour coding, quantizing compression, image data compression-predictive technique, pixel coding, transfer coding theory, lossy and lossless predictive type coding, Digital Image Water marking.

**UNIT –IV**

Representation and Description: Chain codes, Polygonal approximation, Signature Boundary Segments, Skeltons, Boundary Descriptors, Regional Descriptors, Relational Descriptors, Principal components for Description,



Relational Descriptors

#### **UNIT- V**

**Pattern Recognition Fundamentals:** Basic Concepts of pattern recognition, Fundamental problems in pattern recognition system, design concepts and methodologies, example of automatic pattern recognition systems, a simple automatic pattern recognition model

**Pattern classification:** Pattern classification by distance function: Measures of similarity, Clustering criteria, K-means algorithm, Pattern classification by likelihood function: Pattern classification as a Statistical decision problem, Bayes classifier for normal patterns.

#### **TEXT BOOKS**

1. Digital Image Processing Third edition, Pearson Education, Rafael C. Gonzalez, Richard E. Woods.
2. Pattern recognition Principles: Julius T. Tou, and Rafel C. Gonzalez, Addison-Wesly Publishing Company.
3. Digital Image Processing, M.Anji Reddy, Y.Hari Shankar, BS Publications.

#### **REFERENCE BOOKS:**

1. Image Processing, Analysis and Machine Vision, Second Edition, Milan Sonka, Vaclav Hlavac and Roger Boyle. Thomson learning
2. Digital Image Processing – William k. Prattl –John Wiley edition.
3. Fundamentals of digital image processing – by A.K. Jain, PHI.
4. Pattern classification, Richard Duda, Hart and David strok John Wiley publishers.
5. Digital Image Processing, S.Jayaraman,S. Esakkirajan, T.Veerakumar, TMH.
6. Pattern Recognition, R.Shinghal, Oxford University Press.

#### **Outcomes:**

- Ability to apply computer algorithms to practical problems.
- Ability to image segmentation, reconstruction and restoration.
- Ability to perform the classification of patterns

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

IV Year B.Tech. CSE-I Sem

L	T/P/D	C
4	-/-	4

**(A70536) MOBILE COMPUTING****(Elective – I)****Objectives:**

- To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
- To understand the typical mobile networking infrastructure through a popular GSM protocol
- To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer
- To understand the database issues in mobile environments & data delivery models.
- To understand the ad hoc networks and related concepts.
- To understand the platforms and protocols used in mobile environment.

**UNIT- I**

**Introduction:** Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.

GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS, CSHSD, DECT.

**UNIT –II**

**(Wireless) Medium Access Control (MAC):** Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

**Mobile Network Layer:** IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

**UNIT –III**

**Mobile Transport Layer:** Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

**Database Issues:** Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

**UNIT- IV**

**Data Dissemination and Synchronization:** Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols

**UNIT- V**

**Mobile Ad hoc Networks (MANETs):** Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc. , Mobile Agents, Service Discovery.

**Protocols and Platforms for Mobile Computing :**WAP, Bluetooth, XML, J2ME, JavaCard, PalmOS, Windows CE, SymbianOS, Linux for Mobile Devices, Android.

**TEXT BOOKS:**

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2009.
2. Raj Kamal, "Mobile Computing", Oxford University Press, 2007, ISBN: 0195686772

**REFERENCE BOOKS:**

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2004.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002, ISBN 0471419028.
3. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, Oct 2004,

**Outcomes:**

- Able to think and develop new mobile application.
- Able to take any new technical issue related to this new paradigm and come up with a solution(s).
- Able to develop new ad hoc network applications and/or algorithms/ protocols.
- Able to understand & develop any existing or new protocol related to mobile environment

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**(A70529) COMPUTER GRAPHICS****(Elective- I)****Objectives:**

- To make students understand about fundamentals of Graphics to enable them to design animated scenes for virtual object creations.
- To make the student present the content graphically.

**UNIT- I**

**Introduction:** Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

**Output primitives:** Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

**UNIT- II**

**2-D Geometrical transforms:** Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

**2-D Viewing:** The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.

**UNIT- III**

**3-D Object representation:** Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces, sweep representations, octrees BSP Trees,

**3-D Geometric transformations:** Translation, rotation, scaling, reflection and shear transformations, composite transformations, 3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

**UNIT- IV**

**Visible surface detection methods:** Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods

**Illumination Models and Surface rendering Methods:** Basic illumination

models, polygon rendering methods

#### **UNIT- V**

**Computer animation:** Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications

#### **TEXT BOOKS:**

1. "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson education.
2. "Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc Graw hill edition.

#### **REFERENCE BOOKS:**

1. "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.
2. "Procedural elements for Computer Graphics", David F Rogers, Tata Mc Graw hill, 2nd edition.
3. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
4. "Principles of Computer Graphics", Shalini, Govil-Pai, Springer.
5. "Computer Graphics", Steven Harrington, TMH
6. Computer Graphics, F.S.Hill, S.M.Kelley, PHI.
7. Computer Graphics, P.Shirley, Steve Marschner & Others, Cengage Learning.
8. Computer Graphics & Animation, M.C.Trivedi, Jaico Publishing House.
9. An Integrated Introduction to Computer Graphics and Geometric Modelling, R.Goldman, CRC Press, Taylor&Francis Group.
10. Computer Graphics, Rajesh K.Maurya, Wiley India.

#### **Outcomes:**

- Students can animate scenes entertainment.
- Will be able work in computer aided design for content presentation..
- Better analogy data with pictorial representation.

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**(A70352) OPERATIONS RESEARCH****(Elective-I)****Objectives:**

- To introduce the methods of Operations Research.
- Emphasize the mathematical procedures of non linear programming search techniques.
- Introduce advanced topics such as Probabilistic models and dynamic programming.

**UNIT – I**

Development – Definition– Characteristics and Phases – Types of models – Operations Research models – applications.

**Allocation:** Linear Programming Problem Formulation – Graphical solution – Simplex method – Artificial variables techniques: Two–phase method, Big-M method.

**UNIT – II**

**Transportation Problem** – Formulation – Optimal solution, unbalanced transportation problem – Degeneracy.

**Assignment problem** – Formulation – Optimal solution - Variants of Assignment Problem- Traveling Salesman problem.

**UNIT – III**

**Sequencing** – Introduction – Flow –Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines

**Replacement:** Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely- Group Replacement.2

**UNIT – IV**

**Theory of Games:** Introduction –Terminology– Solution of games with saddle points and without saddle points- 2 x 2 games – dominance principle – m x 2 & 2 x n games -graphical method.

**Inventory:** Introduction – Single item, Deterministic models – Purchase inventory models with one price break and multiple price breaks –Stochastic models – demand may be discrete variable or continuous variable – Single Period model and no setup cost.

**UNIT – V**

**Waiting Lines:** Introduction – Terminology-Single Channel – Poisson arrivals and Exponential Service times – with infinite population and finite population models– Multichannel – Poisson arrivals and exponential service times with infinite population.

**Dynamic Programming:** Introduction – Terminology- Bellman’s Principle of Optimality – Applications of dynamic programming- shortest path problem – linear programming problem.

**Simulation:** Introduction, Definition, types of simulation models, Steps involved in the simulation process- Advantages and disadvantages- applications of simulation to queuing and inventory.

**TEXT BOOK :**

1. Operations Research /J.K.Sharma 4e. /MacMilan
2. Introduction to O.R/Hillier & Libermann/TMH

**REFERENCE BOOKS :**

1. Introduction to O.R /Taha/PHI
2. Operations Research/ NVS Raju/ SMS Education/3<sup>rd</sup> Revised Edition
3. Operations Research /A.M.Natarajan, P.Balasubramaniam, A. Tamilarasi/Pearson Education.
4. Operations Research / Wagner/ PHI Publications.
5. Operations Research/M.V. Durga Prasad, K, Vijaya Kumar Reddy, J. Suresh Kumar/ Cengage Learning.

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**(A70534) MACHINE LEARNING****(Elective – II)****Objectives:**

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.

**UNIT – I**

**Introduction:** An illustrative learning task, and a few approaches to it. What is known from algorithms? Theory, Experiment. Biology. Psychology.

**Concept Learning:** Version spaces. Inductive Bias. Active queries. Mistake bound/ PAC model. basic results. Overview of issues regarding data sources, success criteria.

**UNIT –II**

**Decision Tree Learning:** - Minimum Description Length Principle. Occam's razor. Learning with active queries

**Neural Network Learning:** Perceptions and gradient descent back propagation.

**UNIT –III**

**Sample Complexity and Over fitting:** Errors in estimating means. Cross Validation and jackknifing VC dimension. Irrelevant features: Multiplicative rules for weight tuning.

**Bayesian Approaches:** The basics Expectation Maximization. Hidden Markov Models

**UNIT—IV**

**Instance-based Techniques:** Lazy vs. eager generalization. K nearest neighbor, case- based reasoning.

**UNIT—V**

**Genetic Algorithms:** Different search methods for induction - Explanation-based Learning: using prior knowledge to reduce sample complexity.

**TEXT BOOKS:**

1. Tom Michel, Machine Learning, McGraw Hill, 1997



2. Trevor Hastie, Robert Tibshirani & Jerome Friedman. The Elements of Statistical Learning, Springer Verlag, 2001

**REFERENCE BOOKS:**

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.
2. Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc.,2001
3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995

**Outcomes:**

- Student should be able to understand the basic concepts such as decision trees and neural networks.
- Ability to formulate machine learning techniques to respective problems.
- Apply machine learning algorithms to solve problems of moderate complexity

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem****L T/P/D C****4 -/- 4****(A70539) SOFT COMPUTING****(Elective – II)****Objectives:**

- To give students knowledge of soft computing theories fundamentals, i.e. Fundamentals of artificial and neural networks, fuzzy sets and fuzzy logic and genetic algorithms.

**UNIT-I**

AI Problems and Search: AI problems, Techniques, Problem Spaces and Search, Heuristic Search Techniques- Generate and Test, Hill Climbing, Best First Search Problem reduction, Constraint Satisfaction and Means End Analysis. Approaches to Knowledge Representation- Using Predicate Logic and Rules.

**UNIT-II**

Artificial Neural Networks: Introduction, Basic models of ANN, important terminologies, Supervised Learning Networks, Perceptron Networks, Adaptive Linear Neuron, Backpropagation Network. Associative Memory Networks. Training Algorithms for pattern association, BAM and Hopfield Networks.

**UNIT-III**

Unsupervised Learning Network- Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks, Adaptive Resonance Theory Networks. Special Networks-Introduction to various networks.

**UNIT-IV**

Introduction to Classical Sets ( crisp Sets)and Fuzzy Sets- operations and Fuzzy sets. Classical Relations -and Fuzzy Relations- Cardinality, Operations, Properties and composition. Tolerance and equivalence relations.

Membership functions- Features, Fuzzification, membership value assignments, Defuzzification.

**UNIT-V**

Fuzzy Arithmetic and Fuzzy Measures, Fuzzy Rule Base and Approximate Reasoning Fuzzy Decision making

Fuzzy Logic Control Systems. Genetic Algorithm- Introduction and basic operators and terminology. Applications: Optimization of TSP, Internet Search Technique

**TEXT BOOKS:**

1. Principles of Soft Computing- S N Sivanandam, S N Deepa, Wiley India, 2007.
2. Soft Computing and Intelligent System Design -Fakhreddine O Karray, Clarence D Silva, Pearson Edition, 2004.

**REFERENCE BOOKS:**

1. Artificial Intelligence and SoftComputing- Behavioural and Cognitive Modelling of the Human Brain- Amit Konar, CRC press, Taylor and Francis Group.
2. Artificial Intelligence – Elaine Rich and Kevin Knight, TMH, 1991, rp2008.
3. Artificial Intelligence – Patric Henry Winston – Third Edition, Pearson Education.
4. A first course in Fuzzy Logic-Hung T Nguyen and Elbert A Walker, CRC. Press Taylor and Francis Group.
5. Artificial Intelligence and Intelligent Systems, N.P.Padhy, Oxford Univ. Press.

**Outcomes:**

- Student can able to building intelligent systems through soft computing techniques.
- Student should be able to understand the concept of artificial neural networks, fuzzy arithmetic and fuzzy logic with their day to day applications.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem****L T/P/D C****4 -/-/ 4****(A70533) INFORMATION RETRIEVAL SYSTEMS****(Elective – II)****Objectives:**

- To learn the different models for information storage and retrieval
- To learn about the various retrieval utilities
- To understand indexing and querying in information retrieval systems
- To expose the students to the notions of structured and semi structured data
- To learn about web search

**UNIT-I**

Introduction

Retrieval Strategies: Vector space model, Probabilistic retrieval strategies: Simple term weights, Non binary independence model Language Models.

**UNIT-II**

Retrieval Utilities: Relevance feedback, Clustering, N-grams, Regression analysis, Thesauri.

**UNIT-III**

Retrieval Utilities: Semantic networks, Parsing.

Cross-Language Information Retrieval: Introduction, Crossing the language barrier.

**UNIT-IV**

Efficiency: Inverted index, Query processing, Signature files, Duplicate document detection

**UNIT-V**

Integrating Structured Data and Text: A Historical progression, Information retrieval as a relational application, Semi-structured search using a relational schema.

Distributed Information Retrieval: A Theoretical model of distributed retrieval, Web search.

**TEXT BOOK:**

1. David A. Grossman, Ophir Frieder, Information Retrieval – Algorithms and Heuristics, Springer, 2<sup>nd</sup> Edition (Distributed by Universities Press), 2004.

**REFERENCE BOOKS:**

1. Gerald J Kowalski, Mark T Maybury. Information Storage and Retrieval Systems, Springer, 2000.
2. Soumen Chakrabarti, Mining the Web : Discovering Knowledge from Hypertext Data, Morgan-Kaufmann Publishers, 2002.
3. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, An Introduction to Information Retrieval, Cambridge University Press, Cambridge, England, 2009.

**Outcomes:**

- Possess the ability to store and retrieve textual documents using appropriate models.
- Possess the ability to use the various retrieval utilities for improving search.
- Possess an understanding of indexing and compressing documents to improve space and time efficiency.
- Possess the skill to formulate SQL like queries for unstructured data.
- Understand issues in web search.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem****L T/P/D C****4 -/-/ 4****(A70526) ARTIFICIAL INTELLIGENCE****(ELECTIVE- II)****Objectives:**

- To learn the difference between optimal reasoning vs human like reasoning
- To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities
- To learn different knowledge representation techniques
- To understand the applications of AI: namely Game Playing, Theorem Proving, Expert Systems, Machine Learning and Natural Language Processing

**UNIT-I**

Introduction, History, Intelligent Systems, Foundations of AI, Sub areas of AI, Applications.

Problem Solving - State-Space Search and Control Strategies: Introduction, General Problem Solving, Characteristics of Problem, Exhaustive Searches, Heuristic Search Techniques, Iterative-Deepening A\*, Constraint Satisfaction.

Game Playing, Bounded Look-ahead Strategy and use of Evaluation Functions, Alpha-Beta Pruning

**UNIT-II**

Logic Concepts and Logic Programming: Introduction, Propositional Calculus, Propositional Logic, Natural Deduction System, Axiomatic System, Semantic Tableau System in Propositional Logic, Resolution Refutation in Propositional Logic, Predicate Logic, Logic Programming.

Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR, Knowledge Representation using Frames.

**UNIT-III**

Expert System and Applications: Introduction, Phases in Building Expert Systems, Expert System Architecture, Expert Systems Vs Traditional Systems, Truth Maintenance Systems, Application of Expert Systems, List of Shells and Tools.

Uncertainty Measure - Probability Theory: Introduction, Probability Theory, Bayesian Belief Networks, Certainty Factor Theory, Dempster-Shafer Theory.

**UNIT-IV**

Machine-Learning Paradigms: Introduction. Machine Learning Systems. Supervised and Unsupervised Learning. Inductive Learning. Learning Decision Trees (Text Book 2), Deductive Learning. Clustering, Support Vector Machines.

Artificial Neural Networks: Introduction, Artificial Neural Networks, Single-Layer Feed-Forward Networks, Multi-Layer Feed-Forward Networks, Radial-Basis Function Networks, Design Issues of Artificial Neural Networks, Recurrent Networks.

**UNIT-V**

Advanced Knowledge Representation Techniques: Case Grammars, Semantic Web

Natural Language Processing: Introduction, Sentence Analysis Phases, Grammars and Parsers, Types of Parsers, Semantic Analysis, Universal Networking Knowledge.

**TEXT BOOKS:**

1. Saroj Kaushik. Artificial Intelligence. Cengage Learning, 2011.
2. Russell, Norvig: Artificial intelligence, A Modern Approach, Pearson Education, Second Edition. 2004.

**REFERENCE BOOK:**

1. Rich, Knight, Nair: Artificial intelligence, Tata McGraw Hill, Third Edition 2009.

**Outcomes:**

- Possess the ability to formulate an efficient problem space for a problem expressed in English.
- Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
- Possess the skill for representing knowledge using the appropriate technique.
- Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems, Machine Learning and Natural Language Processing.

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**(A70528) COMPUTER FORENSICS****(Elective-II)****Objectives:**

- A brief explanation of the objective is to provide digital evidences which are obtained from digital media.
- In order to understand the objectives of computer forensics, first of all, people have to recognize the different roles computer plays in a certain crime.
- According to a snippet from the United States Security Service, the functions computer has in different kinds of crimes.

**UNIT – I**

**Computer Forensics Fundamentals:** What is Computer Forensics?, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps taken by Computer Forensics Specialists

**Types of Computer Forensics Technology:** Types of Military Computer Forensic Technology, Types of Law Enforcement – Computer Forensic Technology – Types of Business Computer Forensic Technology

**Computer Forensics Evidence and Capture:** Data Recovery Defined – Data Back-up and Recovery – The Role of Back-up in Data Recovery – The Data-Recovery Solution

**UNIT – II**

**Evidence Collection and Data Seizure:** Why Collect Evidence? Collection Options – Obstacles – Types of Evidence – The Rules of Evidence – Volatile Evidence – General Procedure – Collection and Archiving – Methods of Collection – Artifacts – Collection Steps – Controlling Contamination: The Chain of Custody

**Duplication and Preservation of Digital Evidence:** Preserving the Digital Crime Scene – Computer Evidence Processing Steps – Legal Aspects of Collecting and Preserving Computer Forensic Evidence

**Computer Image Verification and Authentication:** Special Needs of Evidential Authentication – Practical Consideration – Practical Implementation

**UNIT – III**

**Computer Forensics analysis and validation:** Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions

**Network Forensics:** Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, using



network tools, examining the honeynet project.

**Processing Crime and Incident Scenes:** Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtaining a digital hash, reviewing a case

#### **UNIT – IV**

**Current Computer Forensic tools:** evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software

**E-Mail Investigations:** Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools

**Cell phone and mobile device forensics:** Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

#### **UNIT – V**

**Working with Windows and DOS Systems:** understanding file systems, exploring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS startup tasks, virtual machines.

#### **TEXT BOOKS:**

1. Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi.
2. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning

#### **REFERENCE BOOKS:**

1. Real Digital Forensics by Keith J. Jones, Richard Bejtlich, Curtis W. Rose, Addison- Wesley Pearson Education
2. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brian Jenkinson, Springer International edition.
3. Computer Evidence Collection & Presentation by Christopher L.T. Brown, Firewall Media.
4. Homeland Security, Techniques & Technologies by Jesus Mena, Firewall Media.
5. Software Forensics Collecting Evidence from the Scene of a Digital Crime by Robert M.Slade, TMH 2005
6. Windows Forensics by Chad Steel, Wiley India Edition.

#### **Outcomes:**

- Students will understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.
- It gives an opportunity to students to continue their zeal in research in computer forensics.

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**(A70596) LINUX PROGRAMMING LAB****Objectives:**

- To write shell scripts to solve problems.
- To implement some standard Linux utilities such as ls,cp etc using system calls.
- To develop network-based applications using C.

**List of sample problems:****Note: Use Bash for Shell scripts.**

1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
2. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
3. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
4. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
6. Write a shell script to list all of the directory files in a directory.
7. Write a shell script to find factorial of a given integer.
8. Write an awk script to count the number of lines in a file that do not contain vowels.
9. Write an awk script to find the number of characters, words and lines in a file.
10. Write a C program that makes a copy of a file using standard I/O and system calls.
11. Implement in C the following Linux commands using System calls  
a). cat            b) mv
12. Write a C program to list files in a directory.
13. Write a C program to emulate the Unix ls -l command.
14. Write a C program to list for every file in a directory, its inode number and file name.
15. Write a C program that redirects standard output to a file.Ex: ls > f1.
16. Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen.

17. Write a C program to create a Zombie process.
18. Write a C program that illustrates how an orphan is created.
19. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex:- ls -l | sort
20. Write C programs that illustrate communication between two unrelated processes using named pipe(FIFO File).
21. Write a C program in which a parent writes a message to a pipe and the child reads the message.
22. Write a C program (sender.c) to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.
23. Write a C program (receiver.c) that receives the messages (from the above message queue as specified in (22)) and displays them.
24. Write a C program that illustrates suspending and resuming processes using signals.
25. Write Client and Server programs in C for connection oriented communication between Server and Client processes using Unix Domain sockets to perform the following:  
Client process sends a message to the Server Process.The Server receives the message,reverses it and sends it back to the Client.The Client will then display the message to the standard output device.
26. Write Client and Server programs in C for connection oriented communication between Server and Client processes using Internet Domain sockets to perform the following:  
Client process sends a message to the Server Process.The Server receives the message,reverses it and sends it back to the Client.The Client will then display the message to the standard output device.
27. Write C programs to perform the following:  
One process creates a shared memory segment and writes a message("Hello") into it.Another process opens the shared memory segment and reads the message(ie. "Hello").It will then display the message("Hello") to standard output device.

**TEXT BOOKS:**

1. Beginning Linux Programming, 4<sup>th</sup> Edition, N.Matthew, R.Stones,Wrox, Wiley India Edition.
2. Advanced Unix Programming, N.B.Venkateswarulu, BS Publications.
3. Unix and Shell Programming, M.G. Venkatesh Murthy, Pearson Education.
4. Unix Shells by Example, 4th Edition, Ellie Quigley, Pearson Education.
5. Sed and Awk, O.Dougherty&A.Robbins,2<sup>nd</sup> edition, SPD.

**Outcomes:**

- Ability to understand the Linux environment
- Ability to perform the file management and multiple tasks using shell scripts in Linux environment

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem****L T/P/D C****- -3/- 2****(A70595) DATA WAREHOUSING AND MINING LAB****Objectives:**

Learn how to build a data warehouse and query it (using open source tools like Pentaho Data Integration and Pentaho Business Analytics), Learn to perform data mining tasks using a data mining toolkit (such as open source WEKA), Understand the data sets and data preprocessing, Demonstrate the working of algorithms for data mining tasks such as association rule mining, classification, clustering and regression, Exercise the data mining techniques with varied input values for different parameters.

**UNIT-1. Build Data Warehouse and Explore WEKA**

- A. Build a Data Warehouse/Data Mart (using open source tools like Pentaho Data Integration tool, Pentaho Business Analytics; or other data warehouse tools like Microsoft-SSIS, Informatica, Business Objects, etc.).
  - (i). Identify source tables and populate sample data
  - (ii). Design multi-dimensional data models namely Star, snowflake and Fact constellation schemas for any one enterprise (ex. Banking, Insurance, Finance, Healthcare, Manufacturing, Automobile, etc.).
  - (iii). Write ETL scripts and implement using data warehouse tools
  - (iv). Perform various OLAP operations such as slice, dice, roll up, drill up and pivot
  - (v). Explore visualization features of the tool for analysis like identifying trends etc.
- B. Explore WEKA Data Mining/Machine Learning Toolkit
  - (i). Downloading and/or installation of WEKA data mining toolkit,
  - (ii). Understand the features of WEKA toolkit such as Explorer, Knowledge Flow interface, Experimenter, command-line interface.
  - (iii). Navigate the options available in the WEKA (ex. Select attributes panel, Preprocess panel, Classify panel, Cluster panel, Associate panel and Visualize panel)
  - (iv). Study the arff file format
  - (v). Explore the available data sets in WEKA.
  - (vi). Load a data set (ex. Weather dataset, Iris dataset, etc.)
  - (vii). Load each dataset and observe the following:
    - i. List the attribute names and they types

- ii. Number of records in each dataset
- iii. Identify the class attribute (if any)
- iv. Plot Histogram
- v. Determine the number of records for each class.
- vi. Visualize the data in various dimensions

**Unit 2 Perform data preprocessing tasks and Demonstrate performing association rule mining on data sets**

- A. Explore various options available in Weka for preprocessing data and apply (like Discretization Filters, Resample filter, etc.) on each dataset
- B. Load each dataset into Weka and run Apriori algorithm with different support and confidence values. Study the rules generated.
- C. Apply different discretization filters on numerical attributes and run the Apriori association rule algorithm. Study the rules generated. Derive interesting insights and observe the effect of discretization in the rule generation process.

**Unit 3 Demonstrate performing classification on data sets**

- A. Load each dataset into Weka and run Id3, J48 classification algorithm. Study the classifier output. Compute entropy values, Kappa statistic.
- B. Extract if-then rules from the decision tree generated by the classifier, Observe the confusion matrix and derive Accuracy, F-measure, TPrate, FPrate, Precision and Recall values. Apply cross-validation strategy with various fold levels and compare the accuracy results.
- C. Load each dataset into Weka and perform Naïve-bayes classification and k-Nearest Neighbour classification. Interpret the results obtained.
- D. Plot RoC Curves
- E. Compare classification results of ID3, J48, Naïve-Bayes and k-NN classifiers for each dataset, and deduce which classifier is performing best and poor for each dataset and justify.

**Unit 4 Demonstrate performing clustering on data sets**

- A. Load each dataset into Weka and run simple k-means clustering algorithm with different values of k (number of desired clusters). Study the clusters formed. Observe the sum of squared errors and centroids, and derive insights.
- B. Explore other clustering techniques available in Weka.
- C. Explore visualization features of Weka to visualize the clusters. Derive interesting insights and explain.

**Unit 5 Demonstrate performing Regression on data sets**

- A. Load each dataset into Weka and build Linear Regression model. Study the clusters formed. Use Training set option. Interpret the regression model and derive patterns and conclusions from the regression results.
- B. Use options cross-validation and percentage split and repeat running the Linear Regression Model. Observe the results and derive meaningful results.
- C. Explore Simple linear regression technique that only looks at one variable.

**Resource Sites:**

1. <http://www.pentaho.com/>
2. <http://www.cs.waikato.ac.nz/ml/weka/>

**Outcomes:**

- Ability to understand the various kinds of tools.
- Demonstrate the classification, clusters and etc. in large data sets

**DATA MINING LAB****Objectives:**

- To obtain practical experience using data mining techniques on real world data sets.
- Emphasize hands-on experience working with all real data sets.

**List of Sample Problems:**

Task 1: Credit Risk Assessment

**Description:**

The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.

To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.

2. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

**The German Credit Data:**

Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data.

In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer !)

A few notes on the German dataset

- DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
- owns\_telephone. German phone rates are much higher than in Canada so fewer people own telephones.
- foreign\_worker. There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.
- There are 20 attributes used in judging a loan applicant. The goal is the classify the applicant into one of two categories, good or bad.

**Subtasks: (Turn in your answers to the following tasks)**

1. List all the categorical (or nominal) attributes and the real-valued attributes separately. (5 marks)
2. What attributes do you think might be crucial in making the credit assessment ? Come up with some simple rules in plain English using your selected attributes. (5 marks)
3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training. (10 marks)
4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy? (10 marks)

5. Is testing on the training set as you did above a good idea? Why or Why not ? (10 marks)
6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what is cross-validation briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why? (10 marks)
7. Check to see if the data shows a bias against “foreign workers” (attribute 20), or “personal-status” (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka’s GUI Explorer. Did removing these attributes have any significant effect? Discuss. (10 marks)
8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.) (10 marks)
9. Sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifications equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)? (10 marks)
10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model? (10 marks)
11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase? (10 marks)
12. (Extra Credit): How can you convert a Decision Trees into “if-then-else rules”. Make up your own small Decision Tree consisting of 2-3



levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one ! Can you predict what attribute that might be in this dataset ? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR. (10 marks)

**Task Resources:**

- Mentor lecture on Decision Trees
- Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)
- Decision Trees (Source: Tan, MSU)
- Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)
- Weka resources:
  - Introduction to Weka (html version) (download ppt version)
  - Download Weka
  - Weka Tutorial
  - ARFF format
  - Using Weka from command line

**Task 2: Hospital Management System**

Data Warehouse consists Dimension Table and Fact Table.

REMEMBER The following

Dimension

The dimension object (Dimension):

- \_ Name
- \_ Attributes (Levels) , with one primary key
- \_ Hierarchies

One time dimension is must.

About Levels and Hierarchies

Dimension objects (dimension) consist of a set of levels and a set of hierarchies defined over those levels. The levels represent levels of aggregation. Hierarchies describe parent-child relationships among a set of levels.

For example, a typical calendar dimension could contain five levels. Two

hierarchies can be defined on these levels:

H1: YearL > QuarterL > MonthL > WeekL > DayL

H2: YearL > WeekL > DayL

The hierarchies are described from parent to child, so that Year is the parent of Quarter, Quarter the parent of Month, and so forth.

About Unique Key Constraints

When you create a definition for a hierarchy, Warehouse Builder creates an identifier key for each level of the hierarchy and a unique key constraint on the lowest level (Base Level)

Design a Hospital Management system data warehouse (TARGET) consists of Dimensions Patient, Medicine, Supplier, Time. Where measures are ' NO UNITS', UNIT PRICE.

Assume the Relational database (SOURCE) table schemas as follows

TIME (day, month, year),

PATIENT (patient\_name, Age, Address, etc.,)

MEDICINE ( Medicine\_Brand\_name, Drug\_name, Supplier, no\_units, Uinit\_Price, etc.,)

SUPPLIER :( Supplier\_name, Medicine\_Brand\_name, Address, etc.,)

If each Dimension has 6 levels, decide the levels and hierarchies, Assume the level names suitably.

Design the Hospital Management system data warehouse using all schemas. Give the example 4-D cube with assumption names.

**Outcomes:**

- Ability to add mining algorithms as a component to the exiting tools
- Ability to apply mining techniques for realistic data.

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	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A80014) MANAGEMENT SCIENCE****Objectives:**

This course is intended to familiarise the students with the framework for the managers and leaders available for understanding and making decisions relating to issues related organisational structure, production operations, marketing, Human resource Management, product management and strategy.

**UNIT -I:**

**Introduction to Management and Organisation:** Concepts of Management and organization- nature, importance and Functions of Management, Systems Approach to Management - Taylor's Scientific Management Theory – Fayal's Principles of Management – Maslow's theory of Hierarchy of Human Needs – Douglas McGregor's Theory X and Theory Y – Hertzberg Two Factor Theory of Motivation - Leadership Styles, Social responsibilities of Management. Designing Organisational Structures: Basic concepts related to Organisation - Departmentation and Decentralisation, Types and Evaluation of mechanistic and organic structures of organisation and suitability.

**UNIT -II:**

**Operations and Marketing Management:** Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement – Business Process Reengineering (BPR) - Statistical Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling, TQM, Six Sigma, Deming's contribution to quality. Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records – JIT System, Supply Chain Management, Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

**UNIT -III:**

**Human Resources Management (HRM):** Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating – Capability Maturity Model (CMM) Levels – Performance Management System.

**UNIT -IV:**

**Project Management (PERT/CPM):** Network Analysis, Programme

Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

**UNIT -V:**

**Strategic Management and Contemporary Strategic Issues:** Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

**TEXT BOOKS:**

1. Stoner, Freeman, Gilbert, *Management*, 6th Ed, Pearson Education, New Delhi, 2004
2. P. Vijaya Kumar, N. Appa Rao and Ashima B. Chhalill, Cengage Learning India Pvt Ltd, 2012.

**REFERENCE BOOKS:**

1. Kotler Philip and Keller Kevin Lane: *Marketing Management*, Pearson, 2012.
2. Koontz and Wehrich: *Essentials of Management*, McGraw Hill, 2012.
3. Thomas N. Duening and John M. Ivancevich *Management—Principles and Guidelines*, Biztantra, 2012.
4. Kanishka Bedi, *Production and Operations Management*, Oxford University Press, 2012.
5. Samuel C. Certo: *Modern Management*, 2012.
6. Schermerhorn, Capling, Poole and Wiesner: *Management*, Wiley, 2012.
7. Parnell: *Strategic Management*, Cengage, 2012.
8. Lawrence R Jauch, R. Gupta and William F. Glueck: *Business Policy and Strategic Management*, Frank Bros. 2012.
9. Aryasri: *Management Science*, McGraw Hill, 2012

**Outcomes:**

By the end of the course, the student will be in a position to

- Plan an organisational structure for a given context in the organisation
- carry out production operations through Work study
- understand the markets, customers and competition better and price the given products appropriately.
- ensure quality for a given product or service
- plan and control the HR function better
- plan, schedule and control projects through PERT and CPM
- evolve a strategy for a business or service organisation

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	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A80551) WEB SERVICES****(Elective – III)****Objectives:**

- To understand the details of web services technologies like WSDL, UDDI, SOAP
- To learn how to implement and deploy web service client and server
- To explore interoperability between different frameworks

**UNIT- I**

**Evolution and Emergence of Web Services** - Evolution of distributed computing, Core distributed computing technologies – client/server, CORBA, JAVA RMI, Microsoft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA).

**Introduction to Web Services** – The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

**Web Services Architecture** – Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication models, basic steps of implementing web services.

**UNIT- II**

**Fundamentals of SOAP** – SOAP Message Structure, SOAP encoding, Encoding of different data types, SOAP message exchange models, SOAP communication and messaging, Java and Axis, limitations of SOAP.

**UNIT- III**

**Describing Web Services** – WSDL – WSDL in the world of Web Services, Web Services life cycle, anatomy of WSDL definition document, WSDL bindings, WSDL Tools, limitations of WSDL.

**UNIT- IV**

**Discovering Web Services** – Service discovery, role of service discovery in a SOA, service discovery mechanisms, UDDI – UDDI registries, uses of UDDI Registry, Programming with UDDI, UDDI data structures, Publishing API, Publishing, searching and deleting information in a UDDI Registry, limitations of UDDI.

**UNIT- V**

**Web Services Interoperability** – Means of ensuring Interoperability, Overview of .NET, Creating a .NET client for an Axis Web Service, creating Java client for a Web service, Challenges in Web Services Interoperability.

**Web Services Security** – XML security frame work, Goals of Cryptography, Digital signature, Digital Certificate, XML Encryption.

**TEXT BOOK:**

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India.

**REFERENCE BOOKS:**

1. Java Web Service Architecture, James McGovern, Sameer Tyagi et al., Elsevier
2. Building Web Services with Java, 2<sup>nd</sup> Edition, S. Graham and others, Pearson Edn.
3. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly,SPD.
4. Web Services, G. Alonso, F. Casati and others, Springer.

**Outcomes:**

- Basic details of WSDL, UDDI, SOAP
- Implement WS client and server with interoperable systems

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>IV Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A80538) SEMANTIC WEB AND SOCIAL NETWORKS****(Elective – III)****Objectives:**

- To learn Web Intelligence
- To learn Knowledge Representation for the Semantic Web
- To learn Ontology Engineering
- To learn Semantic Web Applications, Services and Technology
- To learn Social Network Analysis and semantic web

**UNIT- I**

Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of Today's Web, The Next Generation Web.

Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

**UNIT- II**

Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web –Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL),UML,XML/XML Schema.

Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping.

**UNIT- III**

Logic, Rule and Inference Engines. Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base.

**UNIT- IV**

XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods, What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks.

**UNIT- V**

Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

**TEXT BOOKS:**

1. Thinking on the Web - Berners Lee, Godel and Turing, Wiley interscience,2008.
2. Social Networks and the Semantic Web, Peter Mika, Springer,2007.

**REFERENCE BOOKS:**

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J.Davies, Rudi Studer, Paul Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers,(Taylor & Francis Group)
3. Information Sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
4. Programming the Semantic Web, T.Segaran, C.Evans, J.Taylor,O'Reilly, SPD.

**Outcomes:**

- Ability to understand and knowledge representation for the semantic web.
- Ability to create ontology.
- Ability to build a blogs and social networks.



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<b>IV Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A80537) SCRIPTING LANGUAGES****(Elective – III)****Objectives:**

The course demonstrates an in depth understanding of the tools and the scripting languages necessary for design and development of applications dealing with Bio-information/ Bio-data. The instructor is advised to discuss examples in the context of Bio-data/ Bio-information application development.

**UNIT – I**

**Introduction to PERL and Scripting:** Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

**UNIT – II**

**Advanced perl:** Finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

**PHP Basics :** PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Data types, Variables, Constants, expressions, string interpolation, control structures, Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

**UNIT – III**

**Advanced PHP Programming:** PHP and Web Forms, Files, PHP Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World.

**UNIT - IV**

**TCL :** TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures , strings , patterns, files, Advance TCL-eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.

Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding , Perl-Tk.

#### **UNIT – V**

**Python:** Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling.

Integrated Web Applications in Python – Building Small, Efficient Python Web Systems, Web Application Framework.

#### **TEXT BOOKS:**

1. The World of Scripting Languages , David Barron, Wiley Publications.
2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL, 3<sup>rd</sup> Edition, Jason Gilmore, Apress Publications (Dream tech.).

#### **REFERENCE BOOKS:**

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware(Addison Wesley) Pearson Education.
2. Programming Python,M.Lutz,SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1,I.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.
6. Guide to Programming with Python, M.Dawson, Cengage Learning.
7. Perl by Example, E.Quigley, Pearson Education.
8. Programming Perl,Larry Wall, T.Christiansen and J.Orwant,O'Reilly, SPD.
9. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
10. PHP and MySQL by Example, E.Quigley, Prentice Hall(Pearson).
11. Perl Power, J.P.Flynt, Cengage Learning.
12. PHP Programming solutions, V.Vaswani, TMH.

#### **Outcomes:**

- Ability to understand the differences between scripting languages.
- Ability to apply your knowledge of the weaknesses of scripting languages to select implementation..
- Master an understanding of python especially the object oriented concepts.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-II Sem****L T/P/D C****4 -/- 4****(A 80547) MULTIMEDIA & RICH INTERNET APPLICATIONS****(Elective – III)****Objectives:**

This course aims to further develop students' competency in producing dynamic and creative graphic solutions for multimedia productions. It provides students with the basic concepts and techniques of interactive authoring. It also introduces students with the advanced scripting skills necessary for implementing highly interactive, rich internet applications using multimedia technologies and authoring tools. Students will develop aesthetic value and competencies in multimedia authoring. Artistic visual style and layout design are stressed, as well as the editing and integration of graphic images, animation, video and audio files. The course allows students to master industry-wide software and technologies to create highly interactive, rich internet applications.

**UNIT - I**

Fundamental concepts in Text and Image: Multimedia and hypermedia, World Wide Web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

**UNIT- II**

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

Multimedia Data Compression: Lossless compression algorithms, Lossy compression algorithms, Image compression standards.

**UNIT III**

Basic Video compression techniques, Case study: MPEG Video Coding I, Basic Audio compression techniques, Case study: MPEG Audio compression.

**Web 2.0** : What is web 2.0, Search, Content Networks, User Generated Content, Blogging, Social Networking, Social Media, Tagging, Social Marking, Rich Internet Applications, Web Services, Mashups, Location Based Services, XML, RSS, Atom, JSON, and VoIP, Web 2.0 Monetization and Business Models, Future of the Web.

**UNIT - IV**

**Rich Internet Applications(RIAs) with Adobe Flash** : Adobe Flash-Introduction, Flash Movie Development, Learning Flash with Hands-on

Examples, Publish your flash movie, Creating special effects with Flash, Creating a website splash screen, action script, web sources.

**Rich Internet Applications(RIAs) with Flex 3** - Introduction, Developing with Flex 3, Working with Components, Advanced Component Development, Visual Effects and Multimedia,

#### **UNIT - V**

**Ajax- Enabled Rich Internet Application** : Introduction, Traditional Web Applications vs Ajax Applications, Rich Internet Application with Ajax, History of Ajax, Raw Ajax example using xmlhttprequest object, Using XML, Creating a full scale Ajax Enabled application, Dojo ToolKit.

#### **TEXT BOOKS:**

1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHI Learning, 2004
2. Professional Adobe Flex 3, Joseph Balderson, Peter Ent, et al, Wrox Publications, Wiley India, 2009.
3. AJAX, Rich Internet Applications, and Web Development for Programmers, Paul J Deitel and Harvey M Deitel, Deitel Developer Series, Pearson Education.

#### **REFERENCE BOOKS:**

1. Multimedia Communications: Applications, Networks, Protocols and Standards, Fred Halsall, Pearson Education, 2001, rp 2005.
2. Multimedia Making it work, Tay Vaughan, 7<sup>th</sup> edition, TMH, 2008.
3. Introduction to multimedia communications and Applications, Middleware, Networks, K.R.Rao, Zoran, Dragored, Wiley India, 2006, rp. 2009.
4. Multimedia Computing, Communications & Applications, Ralf Steinmetz and Klara Nahrstedt, Pearson Education, 2004
5. Principles of Multimedia, Ranjan Parekh, TMH, 2006.
6. Multimedia in Action, James E.Shuman, Cengage Learning, 198, rp 2008.
7. Multimedia Systems design, Prabhat K. Andleigh, Kiran Thakrar, PHI, 1986.
8. Multimedia and Communications Technology, Steve Heath, Elsevier, 1999, rp 2003.
9. Adobe Flash CS3 Professional, Adobe press, Pearson Education, 2007.
10. Flash CS3 Professional Advanced, Russel Chun, Pearson Education, 2007.

11. Flash CS5, Chris Grover, O'Reilly, SPD, 2010.
12. SAMS Teach yourself Adobe flash CS3, Pearson Education, 2007.
13. Flex 4 Cookbook, Joshua Noble, et.al, O'Reilly,SPD 2010.
14. Flex3 – A beginner's guide, Michele E.Davis, Jon A.Phillips, TMH, 2008.
15. Mastering Dojo,R.Gill,C.Riecke and A.Russell,SPD.

**Outcomes:**

- Ability to create and design rich internet applications.
- Ability to develop different multimedia tools to produce web based and independent user interfaces.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-II Sem****L T/P/D C****4 -/- 4****(A80542) AD HOC AND SENSOR NETWORKS****(Elective – IV)****Objectives:**

- To understand the concepts of sensor networks
- To understand the MAC and transport protocols for adhoc networks
- To understand the security of sensor networks
- To understand the applications of adhoc and sensor networks

**UNIT- I**

**Introduction to Ad Hoc Wireless Networks:** Characteristics of MANETs, Applications of MANETs, Challenges.

**Routing in MANETs:** Topology-based versus Position-based approaches, Topology based routing protocols, Position based routing, Other Routing Protocols.

**UNIT- II**

**Data Transmission in MANETs:** The Broadcast Storm, Multicasting, Geocasting

**TCP over Ad Hoc Networks:** TCP Protocol overview, TCP and MANETs, Solutions for TCP over Ad Hoc

**UNIT- III**

**Basics of Wireless Sensors and Applications:** The Mica Mote, Sensing and Communication Range, Design Issues, Energy consumption, Clustering of Sensors, Applications

**Data Retrieval in Sensor Networks:** Classification of WSNs, MAC layer, Routing layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

**UNIT- IV**

**Security :** Security in Ad hoc Wireless Networks, Key Management, Secure Routing, Cooperation in MANETs, Intrusion Detection Systems.

**Sensor Network Platforms and Tools:** Sensor Network Hardware, Sensor Network Programming Challenges, Node-Level Software Platforms

**UNIT- V**

**Operating System – TinyOS**

**Imperative Language:** nesC, Dataflow style language: TinyGALS, Node-Level Simulators, ns-2 and its sensor network extension, TOSSIM

**TEXT BOOKS:**

1. Ad Hoc and Sensor Networks – Theory and Applications, *Carlos Corderio Dharma P. Aggarwal*, World Scientific Publications / Cambridge University Press, March 2006
2. Wireless Sensor Networks: An Information Processing Approach, *Feng Zhao, Leonidas Guibas*, Elsevier Science imprint, Morgan Kaufman Publishers, 2005, rp2009.

**REFERENCE BOOKS:**

1. Adhoc Wireless Networks – Architectures and Protocols, C.Siva Ram Murthy, B.S.Murthy, Pearson Education, 2004
2. Wireless Sensor Networks – Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010
3. Wireless Ad hoc Mobile Wireless Networks – Principles, Protocols and Applications, Subir Kumar Sarkar, et al., Auerbach Publications, Taylor & Francis Group, 2008.
4. Ad hoc Networking, *Charles E. Perkins*, Pearson Education, 2001.
5. Wireless Ad hoc Networking, *Shih-Lin Wu, Yu-Chee Tseng*, Auerbach Publications, Taylor & Francis Group, 2007
6. Wireless Ad hoc and Sensor Networks – Protocols, Performance and Control, Jagannathan Sarangapani, CRC Press, Taylor & Francis Group, 2007, rp 2010.
7. Security in Ad hoc and Sensor Networks, Raheem Beyah, et al., World Scientific Publications / Cambridge University Press, 2010
8. Ad hoc Wireless Networks – A communication-theoretic perspective, Ozan K. Tonguz, Gialuigi Ferrari, Wiley India, 2006, rp2009.
9. Wireless Sensor Networks – Signal processing and communications perspectives, Ananthram Swami, et al., Wiley India, 2007, rp2009.

**Outcomes:**

- Ability to understand the concept of ad-hoc and sensor networks.
- Ability to design and implement sensor network protocols.
- Ability to set up and evaluate measurements of protocol performance in sensor networks..

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-II Sem****L T/P/D C****4 -/- 4****(A80550) STORAGE AREA NETWORKS****(Elective – IV)****Objectives:**

- Understand Storage Area Networks characteristics and components.
- Become familiar with the SAN vendors and their products
- Learn Fibre Channel protocols and how SAN components use them to communicate with each other
- Become familiar with Cisco MDS 9000 Multilayer Directors and Fabric Switches Thoroughly learn Cisco SAN-OS features.
- Understand the use of all SAN-OS commands. Practice variations of SANOS features

**UNIT- I**

Review data creation and the amount of data being created and understand the value of data to a business, challenges in data storage and data management, Solutions available for data storage, Core elements of a data center infrastructure, role of each element in supporting business activities

Hardware and software components of the host environment, Key protocols and concepts used by each component ,Physical and logical components of a connectivity environment ,Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications.

**UNIT- II**

Concept of RAID and its components , Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Compare and contrast integrated and modular storage systems ,High-level architecture and working of an intelligent storage system

Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN , Benefits of the different networked storage options, Understand the need for long-term archiving solutions and describe how CAS fulfills the need , Understand the appropriateness of the different networked storage options for different application environments

**UNIT- III**

List reasons for planned/unplanned outages and the impact of downtime,



Impact of downtime, Differentiate between business continuity (BC) and disaster recovery (DR) ,RTO and RPO, Identify single points of failure in a storage infrastructure and list solutions to mitigate these failures.

**UNIT- IV**

Architecture of backup/recovery and the different backup/recovery topologies , replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities

**UNIT- V**

Identify key areas to monitor in a data center, Industry standards for data center monitoring and management, Key metrics to monitor for different components in a storage infrastructure, Key management tasks in a data center. Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain

Virtualization technologies, block-level and file-level virtualization technologies and processes.

**Case Studies:**

The technologies described in the course are reinforced with EMC examples of actual solutions.

Realistic case studies enable the participant to design the most appropriate solution for given sets of criteria.

**TEXT BOOK:**

1. EMC Corporation, Information Storage and Management, Wiley.

**REFERENCE BOOKS:**

1. Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, Osborne, 2003.
2. Marc Farley, "Building Storage Networks", Tata McGraw Hill, Osborne, 2001.
3. Meeta Gupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002.

**Outcomes:**

- Ability to demonstrate the storage area networks and their products
- Ability to provide the mechanisms for the backup/recovery.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>IV Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A80543) DATABASE SECURITY****(Elective-IV)****Objectives:**

- To learn the security of databases
- To learn the design techniques of database security
- To learn the secure software design

**UNIT- I**

**Introduction:** Introduction to Databases Security Problems in Databases Security Controls Conclusions

**Security Models -1:** Introduction Access Matrix Model Take-Grant Model Acten Model PN Model Hartson and Hsiao's Model Fernandez's Model Bussolati and Martella's Model for Distributed databases

**UNIT- II**

**Security Models -2:** Bell and LaPadula's Model Biba's Model Dion's Model Sea View Model Jajodia and Sandhu's Model The Lattice Model for the Flow Control conclusion

**Security Mechanisms :** Introduction User Identification/Authentication Memory Protection Resource Protection Control Flow Mechanisms Isolation Security Functionalities in Some Operating Systems Trusted Computer System Evaluation Criteria

**UNIT- III**

**Security Software Design :** Introduction A Methodological Approach to Security Software Design Secure Operating System Design Secure DBMS Design Security Packages Database Security Design

**Statistical Database Protection & Intrusion Detection Systems:** Introduction Statistics Concepts and Definitions Types of Attacks Inference Controls evaluation Criteria for Control Comparison. Introduction IDES System RETISS System ASES System Discovery

**UNIT- IV**

**Models For The Protection Of New Generation Database Systems -1:** Introduction A Model for the Protection of Frame Based Systems A Model for the Protection of Object-Oriented Systems SORION Model for the Protection of Object-Oriented Databases

**UNIT- V**

**Models For The Protection Of New Generation Database Systems -2:** A

Model for the Protection of New Generation Database Systems: the Orion Model  
Model Jajodia and Kogan's Model A Model for the Protection of Active Databases  
Conclusions

**TEXT BOOKS:**

1. Database Security by Castano *Pearson Edition (1/e)*
2. Database Security and Auditing: Protecting Data Integrity and Accessibility, 1st Edition, Hassan Afyouni, THOMSON Edition.

**REFERENCE BOOK:**

1. Database security by alfred basta, melissa zgola, CENGAGE learning.

**Outcomes:**

- Ability to carry out a risk analysis for large database.
- Ability to set up, and maintain the accounts with privileges and roles.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

IV Year B.Tech. CSE-II Sem

L	T/P/D	C
4	-/-	4

**(A80439) EMBEDDED SYSTEMS****(Elective –IV)****Objectives:**

- Design embedded computer system hardware
- Design, implement, and debug multi-threaded application software that operates under real-time constraints on embedded computer systems
- Use and describe the implementation of a real-time operating system on an embedded computer system
- Formulate an embedded computer system design problem including multiple constraints, create a design that satisfies the constraints, \*implement the design in hardware and software, and measure performance against the design constraints
- Create computer software and hardware implementations that operate according to well-known standards
- Organize and write design documents and project reports
- Organize and make technical presentations that describe a design.

**UNIT - I**

**Embedded Computing** : Introduction, Complex Systems and Microprocessor, The Embedded System Design Process, Formalisms for System Design, Design Examples. **(Chapter I from Text Book 1, Wolf).**

**The 8051 Architecture** : Introduction, 8051 Micro controller Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts. **(Chapter 3 from Text Book 2, Ayala).**

**UNIT - II**

**Basic Assembly Language Programming Concepts** : The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051. Data Transfer and Logical Instructions.

**(Chapters 4,5 and 6 from Text Book 2, Ayala).**

Arithmetic Operations, Decimal Arithmetic. Jump and Call Instructions, Further Details on Interrupts.

**(Chapter 7 and 8 from Text Book 2, Ayala)**

**UNIT - III**

**Applications** : Interfacing with Keyboards, Displays, D/A and A/D

Conversions, Multiple Interrupts, Serial Data Communication. (Chapter 10 and 11 from Text Book 2, Ayala).

**Introduction to Real – Time Operating Systems** : Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment. (Chapter 6 and 7 from Text Book 3, Simon).

#### UNIT - IV

**Basic Design Using a Real-Time Operating System** : Principles, Semaphores and Queues, HardReal-Time Scheduling Considerations, Saving Memory and Power, An example RTOS like uC-OS (Open Source); Embedded Software Development Tools: Host and Target machines, Linker/ Locators for Embedded

Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System. (Chapter 8,9,10 & 11 from Text Book 3, Simon).

#### UNIT – V

**Introduction to advanced architectures** : ARM and SHARC, Processor and memory organization and Instruction level parallelism; Networked embedded systems: Bus protocols, I2C bus and CAN bus; Internet-Enabled Systems, Design Example-Elevator Controller. (Chapter 8 from Text Book 1, Wolf).

#### TEXT BOOKS :

1. Computers and Components, Wayne Wolf, Elseveir.
2. The 8051 Microcontroller , Kenneth J.Ayala, Thomson.

#### REFERENCE BOOKS :

1. Embedding system building blocks, Labrosse, via CMP publishers.
2. Embedded Systems, Raj Kamal, TMH.
3. Micro Controllers, Ajay V Deshmukhi, TMH.
4. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley.
5. Microcontrollers, Raj kamal, Pearson Education.
6. An Embedded Software Primer, David E. Simon, Pearson Education.

#### Outcomes:

- Ability to understanding of general system theory and how this applies to embedded system.
- Ability to build a prototype circuit on breadboard using 8051 microcontroller.

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IV Year B.Tech. CSE-II Sem	L	T/P/D	C
	-	-/-	2

**(A80087) INDUSTRY ORIENTED MINI PROJECT**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

IV Year B.Tech. CSE-II Sem	L	T/P/D	C
	-	-/6/-	2

**(A80089) SEMINAR**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

IV Year B.Tech. CSE-II Sem	L	T/P/D	C
	-	-/15/-	10

**(A80088) PROJECT WORK**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

IV Year B.Tech. CSE-II Sem	L	T/P/D	C
	-	-/-	2

**(A80090) COMPREHENSIVE VIVA**

# BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY

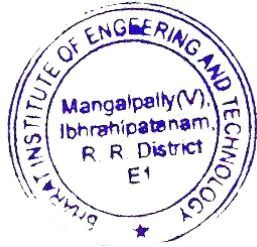
Mangalpally (Village), Ibrahimpatnam (Mandal), Ranga Reddy (District), Telangana-501510

1.3.2. Average percentage of courses that include experiential learning through project work/field work/internship during last five years

## B.Tech-COMPUTER SCIENCE ENGINEERING

2017-18

S. No.	Regulations	No. of Course	Year of Study
1.	R16	15	I & II year I & II semester
2.	R15	8	III Year I & II Semesters
3.	R13	10	IV year I & II Semesters



*Vatthara Subu*  
**PRINCIPAL**  
Principal  
Bharat Institute of Engg. and Tech  
Mangalpally(V), Ibrahimpatnam(M)  
Ranga Reddy (Dist)-Telangana-501510

With effect from 02/08/2016

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B.Tech COURSE STRUCTURE (2016-17)**

(Common for EEE, ECE, CSE, EIE, BME, IT, ETE, ECM, ICE)

**I YEAR I SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics-I	3	1	0	3
2	CH102BS	Engineering Chemistry	4	0	0	4
3	PH103BS	Engineering Physics-I	3	0	0	3
4	EN104HS	Professional Communication in English	3	0	0	3
5	ME105ES	Engineering Mechanics	3	0	0	3
6	EE106ES	Basic Electrical and Electronics Engineering	4	0	0	4
7	EN107HS	English Language Communication Skills Lab	0	0	3	2
8	ME108ES	Engineering Workshop	0	0	3	2
9	*EA109MC	NSS	0	0	0	0
		<b>Total Credits</b>	<b>20</b>	<b>1</b>	<b>6</b>	<b>24</b>

**I YEAR II SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	PH201BS	Engineering Physics-II	3	0	0	3
2	MA202BS	Mathematics-II	4	1	0	4
3	MA203BS	Mathematics-III	4	1	0	4
4	CS204ES	Computer Programming in C	3	0	0	3
5	ME205ES	Engineering Graphics	2	0	4	4
6	CH206BS	Engineering Chemistry Lab	0	0	3	2
7	PH207BS	Engineering Physics Lab	0	0	3	2
8	CS208ES	Computer Programming in C Lab	0	0	3	2
9	*EA209MC	NCC/NSO	0	0	0	0
		<b>Total Credits</b>	<b>16</b>	<b>2</b>	<b>13</b>	<b>24</b>

\*Mandatory Course.



**MATHEMATICS- I**  
**(Linear Algebra and Differential Equations)**

**B.Tech. I Year I Sem.**

Course Code: **MA101BS**

**L T/P/D C**

**3 1/0/0 3**

**Prerequisites:** Foundation course (No prerequisites).

**Course Objectives:**

To learn

- types of matrices and their properties
- the concept of rank of a matrix and applying the same to understand the consistency
- solving the linear systems
- the concepts of eigen values and eigen vectors and reducing the quadratic forms into their canonical forms
- partial differentiation, concept of total derivative
- finding maxima and minima of functions of two variables
- methods of solving the linear differential equations of first and higher order
- the applications of the differential equations
- formation of the partial differential equations and solving the first order equations.

**Course Outcomes:**

After learning the contents of this paper the student must be able to

- write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
- find the Eigen values and Eigen vectors which come across under linear transformations
- find the extreme values of functions of two variables with/ without constraints.
- identify whether the given first order DE is exact or not
- solve higher order DE's and apply them for solving some real world problems

**UNIT-I**

**Initial Value Problems and Applications**

Exact differential equations - Reducible to exact.

Linear differential equations of higher order with constant coefficients: Non homogeneous terms with RHS term of the type  $e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ , polynomials in  $x$ ,  $e^{ax}V(x)$ ,  $xV(x)$ - Operator form of the differential equation, finding particular integral using inverse operator, Wronskian of functions, method of variation of parameters.

Applications: Newton's law of cooling, law of natural growth and decay, orthogonal trajectories, Electrical circuits.

**UNIT-II**

**Linear Systems of Equations**

Types of real matrices and complex matrices, rank, echelon form, normal form, consistency and solution of linear systems (homogeneous and Non-homogeneous) - Gauss elimination, Gauss Jordan and LU decomposition methods- Applications: Finding current in the electrical circuits.

### **UNIT–III**

#### **Eigen values, Eigen Vectors and Quadratic Forms**

Eigen values, Eigen vectors and their properties, Cayley - Hamilton theorem (without proof), Inverse and powers of a matrix using Cayley - Hamilton theorem, Diagonalization, Quadratic forms, Reduction of Quadratic forms into their canonical form, rank and nature of the Quadratic forms – Index and signature.

### **UNIT–IV**

#### **Partial Differentiation**

Introduction of partial differentiation, homogeneous function, Euler's theorem, total derivative, Chain rule, Taylor's and McLaurin's series expansion of functions of two variables, functional dependence, Jacobian.

Applications: maxima and minima of functions of two variables without constraints and Lagrange's method (with constraints)

### **UNIT-V**

#### **First Order Partial Differential Equations**

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Lagranges method to solve the first order linear equations and the standard type methods to solve the non linear equations.

#### **Text Books:**

1. A first course in differential equations with modeling applications by Dennis G. Zill, Cengage Learning publishers.
2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers.

#### **References:**

1. Advanced Engineering Mathematics by E. Kreyszig, John Wiley and Sons Publisher.
2. Engineering Mathematics by N. P. Bali, Lakshmi Publications.

## ENGINEERING CHEMISTRY

B.Tech. I Year I Sem.

Course Code: CH102BS/CH202BS

L T/P/D C

4 0/0/0 4

### Course Objectives:

- 1) To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
- 2) To include the importance of water in industrial usage, significance of corrosion control to protect the structures, polymers and their controlled usage.
- 3) To acquire knowledge of engineering materials and about fuels and batteries.
- 4) To acquire required knowledge about engineering materials like cement, refractories and composites.

### Course Outcomes:

Students will gain the basic knowledge of electrochemical procedures related to corrosion and its control. They can understand the basic properties of water and its usage in domestic and industrial purposes. They learn the use of fundamental principles to make predictions about the general properties of materials. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

### UNIT-I

**Water and its treatment:** Introduction – hardness of water – causes of hardness – types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Numerical problems. Potable water and its specifications- Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and Ozonization. Defluoridation – Nalgonda technique - Determination of F<sup>-</sup> ion by ion- selective electrode method.

#### Boiler troubles:

Sludges, scales and Caustic embrittlement. Internal treatment of Boiler feed water – Calgon conditioning – Phosphate conditioning - Colloidal conditioning – Softening of water by ion-exchange processes. Desalination of water – Reverse osmosis. Numerical problems – Sewage water - Steps involved in treatment of sewage.

### UNIT-II

#### Electrochemistry and Batteries:

**Electrochemistry:** Electrode- electrode potential, standard electrode potential, types of electrodes – Construction and functioning of Standard hydrogen electrode, calomel and glass electrode. Nernst equation - electrochemical series and its applications. Electrochemical cells: Daniel cell – cell notation, cell reaction and cell emf – Concept of concentration cells – Electrolyte concentration cell – Numerical problems.

**Batteries:** Cell and battery - Primary battery (dry cell, alkaline cell and Lithium cell) and Secondary battery (lead acid, Ni-Cd and lithium ion cell),

**Fuel cells:** Hydrogen –oxygen and methanol-oxygen fuel cells – Applications.

### UNIT-III

**Polymers:** Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples.

**Plastics:** Definition and characteristics- thermoplastic and thermosetting plastics, compounding and fabrication of plastics (compression and injection moulding). Preparation, Properties and engineering applications of PVC and Bakelite.

**Fibers:** Characteristics of fibers – preparation, properties and applications of Nylon-6, 6 and Dacron. Fiber reinforced plastics (FRP) – Applications.

**Rubbers:** Natural rubber and its vulcanization - compounding of rubber.

**Elastomers:** Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.

**Conducting polymers:** Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

**Biodegradable polymers:** Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.

### UNIT-IV

**Fuels and Combustion:** Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking – types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG.

**Combustion:** Definition, Calorific value of fuel – HCV, LCV; Calculation of air quantity required for combustion of a fuel.

### UNIT-V

#### **Cement, Refractories, Lubricants and Composites:**

**Cement:** Portland cement, its composition, setting and hardening of Portland cement.

**Special cements:** White cement, water proof cement, High alumina cement and Acid resistant cement.

**Refractories:** Classification, characteristics of good refractories, Refractoriness, refractoriness under load, porosity and chemical inertness – applications of refractories.

**Lubricants:** Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.

**Composites:** Introduction- Constituents of composites – advantages, classification and constituents of composites. Applications of composites.

#### **Text books:**

- 1) Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, New Delhi (2010)
- 2) Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, New Delhi. (2016)

**Reference Books:**

- 1) Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
- 2) Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)
- 3) Engineering Chemistry by Thirumala Chary and Laxminarayana, Scitech Publishers, Chennai (2016).

## ENGINEERING PHYSICS/ENGINEERING PHYSICS - I

**B.Tech. I Year I Sem.**

Course Code: **PH103BS**

**L T/P/D C**

**3 0/0/0 3**

### Course Objectives:

- To understand interaction of light with matter through interference, diffraction and polarization.
- To able to distinguish ordinary light with a laser light and to realize propagation of light through optical fibers.
- To understand various crystal systems and there structures elaborately.
- To study various crystal imperfections and probing methods like X-RD.

**Course outcomes:** after completion of this course the student is able to

- Realize the importance of light phenomena in thin films and resolution.
- Learn principle, working of various laser systems and light propagation through optical fibers.
- Distinguish various crystal systems and understand atomic packing factor.
- Know the various defects in crystals.

### UNIT-I

**Interference:** Coherence, division of amplitude and division of wave front, interference in thin films (transmitted and reflected light), Newton's rings experiment.

**Diffraction:** Distinction between Fresnel and Fraunhofer diffraction, diffraction due to single slit, N-slits, Diffraction grating experiment.

### UNIT-II

**Polarization:** Introduction, Malus's law, double refraction, Nicol prism, Quarter wave and half wave plates.

**Lasers:** Characteristics of lasers, spontaneous and stimulated emission of radiation, Einstein coefficients, population inversion, ruby laser, helium – neon laser, semi conductor laser, applications of lasers

### UNIT-III

**Fiber Optics:** Principle of optical fiber, construction of fiber, acceptance angle and acceptance cone, numerical aperture, types of optical fibers: step index and graded index fibers, attenuation in optical fibers, applications of optical fibers in medicine and sensors.

### UNIT-IV

**Crystallography:** Space lattice, unit cell and lattice parameters, crystal systems, Bravais lattices, atomic radius, co-ordination number and packing factor of SC, BCC, FCC, HCP and diamond, Miller indices, crystal planes and directions, inter planar spacing of orthogonal crystal systems.

### UNIT-V

**X-ray Diffraction and Defects in Crystals:** Bragg's law, X-ray diffraction methods: Laue method, powder method; point defects: vacancies, substitutional, interstitial, Frenkel and

Schottky defects, line defects (qualitative) and Burger's vector, surface defects: stacking faults, twin, tilt and grain boundaries.

**Text Books:**

1. Physics Vol. 2, Halliday, Resnick and Kramer John Wiley and Sons, Edition 4.
2. Modern Engineering Physics, K. Vijaya Kumar and S. Chandra Lingam, S. Chand and Co. Pvt. Ltd.
3. Introduction to Solid State Physics, Charles Kittel, Wiley Student edition.

**Reference Books:**

1. X-Ray Crystallography, Phillips, John Wiley publishers.
2. Waves, Frank S Crawford Jr, Berkeley Physics course, Volume 3.
3. Solid State Physics, AJ Dekker, MacMilan Publishers.
4. Introduction to Crystallography, Phillips, John Wiley publishers.

## PROFESSIONAL COMMUNICATION IN ENGLISH

**B.Tech. I Year I Sem.**

Course Code: **EN104HS/EN204HS**

**L T/P/D C**

**3 0/0/0 3**

### INTRODUCTION

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic and communicative competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text book for detailed study. The students should be encouraged to read the texts/poems silently leading to reading comprehension. Reading comprehension passages are given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, from newspaper articles, advertisements, promotional material, etc. *The focus in this syllabus is on skill development, fostering ideas and practice of language skills.*

### Course Objectives:

The course will help students to:

- a. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
- b. Equip students to study academic subjects more effectively using the theoretical and Practical components of English syllabus.
- c. Develop study skills and communication skills in formal and informal situations.

### Course Outcomes:

Students will be able to:

1. Use English Language effectively in spoken and written forms.
2. Comprehend the given texts and respond appropriately.
3. Communicate confidently in formal and informal contexts.

### SYLLABUS

#### Reading Skills:

#### Objectives:

1. To develop an awareness in students about the significance of silent reading and comprehension.
2. To develop students' ability to guess meanings of words from the context and grasp the overall message of the text, draw inferences, etc., by way of:
  - Skimming and Scanning the text
  - Intensive and Extensive Reading
  - Reading for Pleasure
  - Identifying the topic sentence



- Inferring lexical and contextual meaning
- Recognizing Coherence/Sequencing of Sentences

**NOTE:** The students will be trained in reading skills using the prescribed texts for detailed study. They will be tested in reading comprehension of different ‘unseen’ passages which may be taken from authentic texts, such as magazines/newspaper articles.

### Writing Skills:

### Objectives:

1. To develop an awareness in the students about writing as an exact and formal skill
2. To create an awareness in students about the components of different forms of writing, beginning with the lower order ones through;
  - Writing of sentences
  - Use of appropriate vocabulary
  - Paragraph writing
  - Coherence and cohesiveness
  - Narration / description
  - Note Making
  - Formal and informal letter writing
  - Describing graphs using expressions of comparison

In order to improve the proficiency of the students in the acquisition of language skills mentioned above, the following text and course contents, divided into Five Units, are prescribed:

### Text Books:

1. ***“Fluency in English – A Course book for Engineering Students”*** by Board of Editors: **Hyderabad: Orient BlackSwan Pvt. Ltd. 2016. Print.**
2. Raman, Meenakshi and Sharma, Sangeeta. ***“Technical Communication- Principles and Practice”***. Third Edition. **New Delhi: Oxford University Press. 2015. Print.**

The course content / study material is divided into **Five Units**.

**Note:** *Listening and speaking skills are covered in the syllabus of ELCS Lab.*

### UNIT –I:

Chapter entitled ‘**Presidential Address**’ by **Dr. A.P.J. Kalam** from ***“Fluency in English– A Course book for Engineering Students”*** published by Orient BlackSwan, Hyderabad.

**Vocabulary:** Word Formation -- Root Words --The Use of Prefixes and Suffixes-- Collocations-- Exercises for Practice.

**Grammar:** Punctuation – Parts of Speech- Articles -Exercises for Practice.

**Reading:** ***Double Angels*** by David Scott-Reading and Its Importance- Techniques for Effective Reading- Signal Words- Exercises for Practice

**Writing:** Writing Sentences- Techniques for Effective Writing-- Paragraph Writing-Types, Structure and Features of a Paragraph-Coherence and Cohesiveness: Logical, Lexical and Grammatical Devices - Exercises for Practice

## UNIT –II:

Chapter entitled *Satya Nadella: Email to Employees on his First Day as CEO* from “*Fluency in English– A Course book for Engineering Students*” Published by Orient BlackSwan, Hyderabad.

**Vocabulary:** Synonyms and Antonyms – Homonyms, Homophones, Homographs- Exercises for Practice (Chapter 17 ‘*Technical Communication- Principles and Practice*’. *Third Edition* published by Oxford University Press may also be followed.)

**Grammar:** Verbs-Transitive, Intransitive and Non-finite Verbs – Mood and Tense— Gerund – Words with Appropriate Prepositions – Phrasal Verbs - Exercises for Practice

**Reading:** Sub-skills of Reading- Skimming, Scanning, Extensive Reading and Intensive Reading - *The Road Not Taken* by **Robert Frost** -- Exercises for Practice

**Writing:** Letter Writing –Format, Styles, Parts, Language to be used in Formal Letters- Letter of Apology – Letter of Complaint-Letter of Inquiry with Reply – Letter of Requisition -- Exercises for Practice

## UNIT –III:

From the book entitled ‘*Technical Communication- Principles and Practice*’. *Third Edition* published by Oxford University Press.

**Vocabulary:** Introduction- A Brief History of Words – Using the Dictionary and Thesaurus– Changing Words from One Form to Another – Confusables (From Chapter 17 entitled ‘*Grammar and Vocabulary Development*’)

**Grammar:** Tenses: Present Tense- Past Tense- Future Tense- Active Voice – Passive Voice- Conditional Sentences – Adjective and Degrees of Comparison. (From Chapter 17 entitled ‘*Grammar and Vocabulary Development*’)

**Reading:** Improving Comprehension Skills – Techniques for Good Comprehension- Skimming and Scanning- Non-verbal Signals – Structure of the Text – Structure of Paragraphs – Punctuation – Author’s viewpoint (Inference) – Reader Anticipation: Determining the Meaning of Words – Summarizing- Typical Reading Comprehension Questions. (From Chapter 10 entitled ‘*Reading Comprehension*’)

**Writing:** Introduction- Letter Writing-Writing the Cover Letter- Cover Letters Accompanying Resumes- Emails. (From Chapter 15 entitled ‘*Formal Letters, Memos, and Email*’)

## UNIT –IV:

Chapter entitled ‘*Good Manners*’ by **J.C. Hill** from *Fluency in English – A Course book for Engineering Students*” published by Orient Blackswan, Hyderabad.

**Vocabulary:** Idiomatic Expressions –One- word Substitutes --- Exercises for Practice (Chapter 17 ‘*Technical Communication- Principles and Practice*’. *Third Edition* published by Oxford University Press may also be followed.)

**Grammar:** Sequence of Tenses- Concord (Subject in Agreement with the Verb) – Exercises for Practice

**Reading:** ‘*If*’ poem by **Rudyard Kipling**--Tips for Writing a Review --- Author’s Viewpoint – Reader’s Anticipation-- Herein the Students will be required to Read and Submit a Review of a Book (Literary or Non-literary) of their choice – Exercises for Practice.

**Writing:** Information Transfer-Bar Charts-Flow Charts-Tree Diagrams etc., -- Exercises for Practice.  
Introduction - Steps to Effective Precis Writing – Guidelines- Samples (Chapter 12 entitled ‘*The Art of Condensation*’ from ***Technical Communication- Principles and Practice. Third Edition*** published by Oxford University Press)

**UNIT –V:**

Chapter entitled ‘*Father Dear Father*’ by **Raj Kinger** from ***Fluency in English – A Course book for Engineering Students***” Published by Orient BlackSwan, Hyderabad

**Vocabulary:** Foreign Words—Words borrowed from other Languages- Exercises for Practice

**Grammar:** Direct and Indirect Speech- Question Tags- Exercises for Practice

**Reading:** Predicting the Content- Understanding the Gist – SQ3R Reading Technique- Study Skills – Note Making - Understanding Discourse Coherence – Sequencing Sentences. (From Chapter 10 entitled ‘**Reading Comprehension**’ - ***Technical Communication- Principles and Practice. Third Edition*** published by Oxford University Press.)

**Writing:** Technical Reports- Introduction – Characteristics of a Report – Categories of Reports –Formats- Prewriting – Structure of Reports (Manuscript Format) - Types of Reports - Writing the Report. (From Chapter 13 entitled ‘**Technical Reports**’ - ***Technical Communication- Principles and Practice. Third Edition*** published by Oxford University Press.)

 **Exercises from both the texts not prescribed shall be used for classroom tasks.**

**References**

- 1 Green, David. *Contemporary English Grammar –Structures and Composition*. MacMillan India. 2014 (Print)
2. Rizvi, M. Ashraf. *Effective Technical Communication*. Tata Mc Graw –Hill. 2015 (Print).

## ENGINEERING MECHANICS

**B.Tech. I Year I Sem.**  
Course Code: **ME105ES**

**L T/P/D C**  
**3 0/0/0 3**

**Pre Requisites:** None

### **Course Objectives:**

- To understand the resolving forces and moments for a given force system
- To analyze the types of friction for moving bodies and problems related to friction.
- To determine the centroid and second moment of area

### **UNIT-I**

**Introduction to Mechanics:** Basic Concepts, system of Forces Coplanar Concurrent Forces - Components in Space Resultant -Moment of Forces and its Application - Couples and Resultant of Force Systems. Equilibrium of system of Forces: Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems.

### **UNIT-II**

**Friction:** Types of friction -Limiting friction -Laws of Friction -static and Dynamic Frictions - Motion of Bodies –Wedge Screw, Screw-jack and differential screw –jack.

### **UNIT-III**

**Centroid and Center of Gravity:** Introduction – Centroids of lines – Centroids of area - Centroids of Composite figures - Theorem of Pappus -Centre of Gravity of Bodies – Centroids of Volumes – Center of gravity of composite bodies.

**Area moments of Inertia:** Introduction – Definition of Moment of Inertia -Polar Moment of Inertia – Radius of gyration. Transfer Theorem for moment of inertia – Moments of inertia by integration - Moments of Inertia of Composite Figures, Product of Inertia, Transfer Formula for Product of Inertia.

### **UNIT-IV**

**Mass Moment of Inertia:** Introduction - Moment of Inertia of Masses – Radius of gyration - Transfer Formula for Mass Moments of Inertia – Mass moments of inertia by integration - Mass moment of inertia of composite bodies.

**Virtual Work:** Theory of virtual work-Application.

### **UNIT-V**

**Kinetics:** Kinetics of a particle-D'Alemberts principle-Motion in a curved path – work, energy and power. Principle of conservation of energy- Kinetics of rigid body in translation, rotation-work done-Principle of work-energy-Impulse-momentum.

**Mechanical Vibrations:** Definitions, Concepts-Simple Harmonic motion- free vibrations-Simple and compound pendulums

### **Text Books:**

1. Singer's Engineering Mechanics Statics and Dynamics/ K. Vijaya Kumar Reddy, J. Suresh Kumar/ BSP

2. Engineering Mechanics/ Irving Shames, G. Krishna Mohan Rao / Prentice Hall
3. Foundations and applications of Engineering Mechanics by HD Ram and AK Chouhan, Cambridge publications.

**References:**

1. A Text of Engineering Mechanics /YVD Rao/ K. Govinda Rajulu/ M. Manzoor Hussain / Academic Publishing Company
2. Engineering Mechanics / Bhattacharyya/ Oxford.

## BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

**B.Tech. I Year I Sem.**

Course Code: **EE106ES/EE205ES:**

**L T/P/D C**

**4 0/0/0 4**

**Pre-requisite: None**

**Course Objectives:** Objectives of this course are

- To introduce the concept of electrical circuits and its components
- To introduce the concepts of diodes and transistors, and
- To impart the knowledge of various configurations, characteristics and applications.

**Course Outcomes:** After this course, the student will be able

- To analyze and solve problems of electrical circuits using network laws and theorems.
- To identify and characterize diodes and various types of transistors.

### UNIT- I

**Electrical Circuits:** R-L-C Parameters, Voltage and Current, Independent and Dependent Sources, Source Transformation – V-I relationship for passive elements, Kirchhoff's Laws, Network reduction techniques – series, parallel, series-parallel, star-to-delta, delta-to-star transformation, Nodal Analysis,

**Single Phase AC Circuits:** R.M.S. and Average values, Form Factor, steady state analysis of series, parallel and series-parallel combinations of R, L and C with sinusoidal excitation, concept of reactance, impedance, susceptance and admittance – phase and phase difference, Concept of power factor, j-notation, complex and polar forms of representation.

### UNIT-II

**Resonance:** Series resonance and Parallel resonance circuits, concept of bandwidth and Q factor, Locus Diagrams for RL, RC and RLC Combinations for Various Parameters.

**Network Theorems:** Thevenin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity, Tellegen's, Millman's and Compensation theorems for DC and AC excitations.

### UNIT- III

**P-N Junction Diode:** Diode equation, Energy Band diagram, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Load line analysis, Diffusion and Transition Capacitances.

**Rectifiers and Filters:** P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L- section Filters,  $\pi$ - section Filters.

### UNIT- IV

**Bipolar Junction Transistor (BJT):** Construction, Principle of Operation, Symbol, Amplifying Action, Common Emitter, Common Base and Common Collector configurations.

Transistor Biasing And Stabilization - Operating point, DC and AC load lines, Biasing - Fixed Bias, Emitter Feedback Bias, Collector to Emitter feedback bias, Voltage divider bias, Bias

stability, Stabilization against variations in  $V_{BE}$  and  $\beta$ , Bias Compensation using Diodes and Transistors.

**Transistor Configurations:** BJT modeling, Hybrid model, Determination of h-parameters from transistor characteristics, Analysis of CE, CB and CC configurations using h-parameters, Comparison of CE, CB and CC configurations.

#### **UNIT- V**

**Junction Field Effect Transistor:** Construction, Principle of Operation, Symbol, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET, Small Signal Model, Biasing FET.

**Special Purpose Devices:** Breakdown Mechanisms in Semi-Conductor Diodes, Zener diode characteristics, Use of Zener diode as simple regulator, Principle of operation and Characteristics of Tunnel Diode (With help of Energy band diagram) and Varactor Diode, Principle of Operation of SCR.

#### **Text books:**

- 1) Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar Oxford University
- 2) Basic Electrical and electronics Engineering-D P Kothari. I J Nagarath Mc Graw Hill Education

#### **References:**

- 1) Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, PEI/PHI, 9<sup>th</sup> Ed, 2006.
- 2) Millman's Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabratajit, TMH, 2/e, 1998.
- 3) Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6<sup>th</sup> edition.
- 4) Linear circuit analysis (time domain phasor and Laplace transform approaches)- 2<sup>nd</sup> edition by Raymond A. DeCarlo and Pen-Min-Lin, Oxford University Press-2004.
- 5) Network Theory by N. C. Jagan and C. Lakshminarayana, B.S. Publications.
- 6) Network Theory by Sudhakar, Shyam Mohan Palli, TMH.

## ENGLISH LANGUAGE COMMUNICATION SKILLS (ELCS) LAB

**B.Tech. I Year I Sem.**

Course Code: EN107HS/EN207HS

**L T/P/D C**

**0 0/3/0 2**

The **English Language Communication Skills (ELCS) Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

### Course Objectives:

- To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
- To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency of students in spoken English and neutralize their mother tongue influence
- To train students to use language appropriately for public speaking, group discussions and interviews

### Course Outcomes:

Students will be able to attain:

- Better understanding of nuances of English language through audio- visual experience and group activities
- Neutralization of accent for intelligibility
- Speaking skills with clarity and confidence which in turn enhances their employability skills.

**Syllabus: English Language Communication Skills Lab (ELCS) shall have two parts:**

- **Computer Assisted Language Learning (CALL) Lab**
- **Interactive Communication Skills (ICS) Lab**

### Listening Skills:

Objectives

- To enable students develop their listening skills so that they may appreciate the role in the LSRW skills approach to language and improve their pronunciation
- To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds and regions.

*Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.*

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information



## **Speaking Skills:**

### Objectives

- To involve students in speaking activities in various contexts
- To enable students express themselves fluently and appropriately in social and professional contexts :
  - Oral practice
  - Describing objects/situations/people
  - Role play – Individual/Group activities
  - Just A Minute (JAM) Sessions.

The following course content is prescribed for the **English Language Communication Skills Lab**.

### **Exercise – I**

#### **CALL Lab:**

*Understand:* Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening.

*Practice:* Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs- Consonant Clusters- Past Tense Marker and Plural Marker.

*Testing Exercises*

#### **ICS Lab:**

*Understand:* Spoken vs. Written language- Formal and Informal English.

*Practice:* Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

### **Exercise – II**

#### **CALL Lab:**

*Understand:* Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Sentence Stress – Intonation.

*Practice:* Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Sentence Stress – Intonation.

*Testing Exercises*

#### **ICS Lab:**

*Understand:* Features of Good Conversation – Strategies for Effective Communication.

*Practice:* Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

### **Exercise - III**

#### **CALL Lab:**

*Understand:* Errors in Pronunciation-the Influence of Mother Tongue (MTI).

*Practice:* Common Indian Variants in Pronunciation – Differences between British and American Pronunciation.

*Testing Exercises*

**ICS Lab:**

*Understand:* Descriptions- Narrations- Giving Directions and Guidelines.

*Practice:* Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

**Exercise – IV**

**CALL Lab:**

*Understand:* Listening for General Details.

*Practice:* Listening Comprehension Tests.

*Testing Exercises*

**ICS Lab:**

*Understand:* Public Speaking – Exposure to Structured Talks - Non-verbal Communication- Presentation Skills.

*Practice:* Making a Short Speech – Extempore- Making a Presentation.

**Exercise – V**

**CALL Lab:**

*Understand:* Listening for Specific Details.

*Practice:* Listening Comprehension Tests.

*Testing Exercises*

**ICS Lab:**

*Understand:* Group Discussion- Interview Skills.

*Practice:* Group Discussion- Mock Interviews.

**Minimum Requirement of infrastructural facilities for ELCS Lab:**

**1. Computer Assisted Language Learning (CALL) Lab:**

**The Computer Assisted Language Learning Lab** has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

**System Requirement (Hardware component):**

*Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:*

Computers with Suitable Configuration

High Fidelity Headphones

**2. Interactive Communication Skills (ICS) Lab:**

**The Interactive Communication Skills Lab:** A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V. or LCD, a digital stereo –audio and video system and camcorder etc.

**Lab Manuals:**

- 1) A book entitled “*ELCS Lab Manual – A Workbook for CALL and ICS Lab Activities*” by Board of Editors: Hyderabad: Orient BlackSwan Pvt. Ltd. 2016. Print.
- 2) Hart, Steve; Nair, Aravind R.; Bhambhani, Veena. “*EMBARK- English for undergraduates*” Delhi: Cambridge University Press. 2016. Print.

**Suggested Software:**

- 1) Cambridge Advanced Learners’ English Dictionary with CD.
- 2) Grammar Made Easy by Darling Kindersley.
- 3) Punctuation Made Easy by Darling Kindersley.
- 4) Oxford Advanced Learner’s Compass, 8<sup>th</sup> Edition.
- 5) English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- 6) English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- 7) TOEFL and GRE (KAPLAN, AARCO and BARRONS, USA, Cracking GRE by CLIFFS).

**References:**

- 1) Jayashree Mohanraj. *Let Us Hear Them Speak*. New Delhi: Sage Texts. 2015. Print.  
Hancock, M. *English Pronunciation in Use. Intermediate Cambridge*: Cambridge University Press. 2009. Print.

## ENGINEERING WORKSHOP

**B.Tech. I Year I Sem.**

Course Code: **ME108ES/ME208ES**

**L T/P/D C**

**0 0/3/0 2**

**Pre-requisites:** Practical skill

### **Course Objective:**

- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, equipment and machines.
- To study commonly used carpentry joints.
- To have practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

**Course Outcomes:** At the end of the course, the student will be able to:

- Study and practice on machine tools and their operations
- Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.
- Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
- Apply basic electrical engineering knowledge for house wiring practice.

### **1. TRADES FOR EXERCISES:**

**At least two exercises from each trade:**

- 1) Carpentry
- 2) Fitting
- 3) Tin-Smithy and Development of jobs carried out and soldering.
- 4) Black Smithy
- 5) House-wiring
- 6) Foundry
- 7) Welding
- 8) Power tools in construction, wood working, electrical engineering and mechanical engineering.

### **2. TRADES FOR DEMONSTRATION and EXPOSURE:**

- Plumbing, Machine Shop, Metal Cutting (Water Plasma)

### **Text books:**

- 1) Workshop Practice /B. L. Juneja / Cengage
- 2) Workshop Manual / K.Venugopal / Anuradha.

### **Reference books:**

- 1) Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech
- 2) Workshop Manual / Venkat Reddy/ BSP

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech COURSE STRUCTURE (2016-17)**

(Common for EEE, ECE, CSE, EIE, BME, IT, ETE, ECM, ICE)

**I YEAR II SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	PH201BS	Engineering Physics-II	3	0	0	3
2	MA202BS	Mathematics-II	4	1	0	4
3	MA203BS	Mathematics-III	4	1	0	4
4	CS204ES	Computer Programming in C	3	0	0	3
5	ME205ES	Engineering Graphics	2	0	4	4
6	CH206BS	Engineering Chemistry Lab	0	0	3	2
7	PH207BS	Engineering Physics Lab	0	0	3	2
8	CS208ES	Computer Programming in C Lab	0	0	3	2
9	*EA209MC	NCC/NSO	0	0	0	0
		<b>Total Credits</b>	<b>16</b>	<b>2</b>	<b>13</b>	<b>24</b>

\*Mandatory Course.

## PH201BS: ENGINEERING PHYSICS - II

**B.Tech. I Year II Sem.**

**L T/P/D C**

**3 0/0/0 3**

### Course Objectives:

- To understand the behavior of a particle quantum mechanically.
- To be able to distinguish pure and impure semi conductors and understand formation of P-N Junction.
- To understand various magnetic and dielectric properties of materials.
- To study super conductor behavior of materials.

### Course Outcomes: After completion of this course the student is able to

- Realize the importance of behavior of a particle quantum mechanically.
- Learn concentration estimation of charge carriers in semi conductors.
- Learn various magnetic dielectric properties and apply them in engineering applications.
- Know the basic principles and applications of super conductors.

### UNIT - I

**Principles of Quantum Mechanics:** Waves and particles, de-Broglie hypothesis, matter waves, Davisson and Germer experiment, Heisenberg uncertainty principle, Schrodinger time independent wave equation, physical significance of wave function, particle in 1-D potential box, electron in periodic potential, Kronig-Penny model (qualitative treatment), E-K curve, origin of energy band formation in solids.

### UNIT - II

**Semiconductor Physics:** Fermi level in intrinsic and extrinsic semiconductors, calculation of carrier concentration in intrinsic & extrinsic semiconductors, direct and indirect band gap semiconductors, formation of PN junction, open circuit PN junction, energy diagram of PN junction diode, solar cell: I-V characteristics and applications.

### UNIT - III

**Dielectric Properties:** Electric dipole, dipole moment, dielectric constant, polarizability, electric susceptibility, displacement vector, electronic, ionic and orientation polarizations and calculation of their polarizabilities, internal field, Clausius-Mossotti relation, Piezoelectricity, pyroelectricity and ferroelectricity-BaTiO<sub>3</sub> structure.

### UNIT - IV

**Magnetic Properties & Superconductivity:** Permeability, field intensity, magnetic field induction, magnetization, magnetic susceptibility, origin of magnetic moment, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, hysteresis curve based on domain theory, soft and hard magnetic materials, properties of anti-ferro and ferri magnetic materials,

**Superconductivity:** Superconductivity phenomenon, Meissner effect, applications of superconductivity.

## **UNIT - V**

**Introduction to nanoscience:** Origin of nanoscience, nanoscale, surface to volume ratio, quantum confinement, dominance of electromagnetic forces, random molecular motion, bottom-up fabrication: Sol-gel, CVD and PVD techniques, top-down fabrication: ball mill method, characterization by XRD, SEM and TEM.

### **Text Books:**

1. Solid State Physics, A. J. Dekkar, Macmillan publishers Ind. Ltd.,
2. Solid State Physics, Chales Kittel, Wiley student edition.
3. Fundamentals of Physics, Alan Giambattisa, BM Richardson and Robert C Richardson, Tata McGraw hill Publishers.

### **Reference Books:**

1. Modern Engineering Physics, K. Vijaya Kumar, S. Chandralingam S. Chand & Co. Pvt. Ltd.,
2. University Physics, Francis W. Sears, Hugh D. Young, Marle Zeemansky and Roger A Freedman, Pearson Education.
3. Fundamentals of Acoustics, Kinster and Frey, John Wiley and Sons.
4. Introduction to Quantum Mechanics Leonard I. Schiff McGraw-Hill

**MA102BS/MA202BS: MATHEMATICS - II**  
**(Advanced Calculus)**

**B.Tech. I Year II Sem.**

**L T/P/D C**  
**4 1/0/0 4**

**Prerequisites:** Foundation course (No prerequisites).

**Course Objectives:** To learn

- concepts & properties of Laplace Transforms
- solving differential equations using Laplace transform techniques
- evaluation of integrals using Beta and Gamma Functions
- evaluation of multiple integrals and applying them to compute the volume and areas of regions
- the physical quantities involved in engineering field related to the vector valued functions.
- the basic properties of vector valued functions and their applications to line, surface and volume integrals.

**Course Outcomes:** After learning the contents of this course the student must be able to

- use Laplace transform techniques for solving DE's
- evaluate integrals using Beta and Gamma functions
- evaluate the multiple integrals and can apply these concepts to find areas, volumes, moment of inertia etc of regions on a plane or in space
- evaluate the line, surface and volume integrals and converting them from one to another

**UNIT – I**

**Laplace Transforms:** Laplace transforms of standard functions, Shifting theorems, derivatives and integrals, properties- Unit step function, Dirac's delta function, Periodic function, Inverse Laplace transforms, Convolution theorem (without proof).

Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.

**UNIT - II**

**Beta and Gamma Functions:** Beta and Gamma functions, properties, relation between Beta and Gamma functions, evaluation of integrals using Beta and Gamma functions.

Applications: Evaluation of integrals.

**UNIT – III**

**Multiple Integrals:** Double and triple integrals, Change of variables, Change of order of integration. **Applications:** Finding areas, volumes & Center of gravity (evaluation using Beta and Gamma functions).

**UNIT – IV**

**Vector Differentiation:** Scalar and vector point functions, Gradient, Divergence, Curl and their physical and geometrical interpretation, Laplacian operator, Vector identities.



## **UNIT – V**

**Vector Integration:** Line Integral, Work done, Potential function, area, surface and volume integrals, Vector integral theorems: Greens, Stokes and Gauss divergence theorems (without proof) and related problems.

### **Text Books:**

1. Advanced Engineering Mathematics by R K Jain & S R K Iyengar, Narosa Publishers
2. Engineering Mathematics by Srimanthapal and Subodh C. Bhunia, Oxford Publishers

### **References:**

1. Advanced Engineering Mathematics by Peter V. O. Neil, Cengage Learning Publishers.
2. Advanced Engineering Mathematics by Lawrence Turyn, CRC Press

**MA203BS: Mathematics - III**  
**(Statistical and Numerical Methods)**

**B.Tech. I Year II Sem.**

**L T/P/D C**  
**4 1/0/0 4**

**Prerequisites:** Foundation course (No prerequisites).

**Course Objectives:** To learn

- random variables that describe randomness or an uncertainty in certain realistic situation
- binomial geometric and normal distributions
- sampling distribution of mean, variance, point estimation and interval estimation
- the testing of hypothesis and ANOVA
- the topics those deals with methods to find roots of an equation
- to fit a desired curve by the method of least squares for the given data
- solving ordinary differential equations using numerical techniques

**Course Outcomes:** After learning the contents of this course the student must be able to

- differentiate among random variables involved in the probability models which are useful for all branches of engineering
- calculate mean, proportions and variances of sampling distributions and to make important decisions s for few samples which are taken from a large data
- solve the tests of ANOVA for classified data
- find the root of a given equation and solution of a system of equations
- fit a curve for a given data
- find the numerical solutions for a given first order initial value problem

**UNIT – I**

**Random variables and Distributions:**

Introduction, Random variables, Discrete random variable, Continuous random variable, Probability distribution function, Probability density function, Expectation, Moment generating function, Moments and properties. Discrete distributions: Binomial and geometric distributions. Continuous distribution: Normal distributions.

**UNIT – II**

**Sampling Theory:** Introduction, Population and samples, Sampling distribution of means ( $\sigma$  Known)-Central limit theorem, t-distribution, Sampling distribution of means ( $\sigma$  unknown)- Sampling distribution of variances –  $\chi^2$  and F- distributions, Point estimation, Maximum error of estimate, Interval estimation.

**UNIT – III**

**Tests of Hypothesis:** Introduction, Hypothesis, Null and Alternative Hypothesis, Type I and Type II errors, Level of significance, One tail and two-tail tests, Tests concerning one mean and proportion, two means-proportions and their differences-ANOVA for one-way classified data.

#### **UNIT – IV**

**Algebraic and Transcendental Equations & Curve Fitting:** Introduction, Bisection Method, Method of False position, Iteration methods: fixed point iteration and Newton Raphson methods. Solving linear system of equations by Gauss-Jacobi and Gauss-Seidal Methods.

**Curve Fitting:** Fitting a linear, second degree, exponential, power curve by method of least squares.

#### **UNIT – V**

**Numerical Integration and solution of Ordinary Differential equations:** Trapezoidal rule- Simpson's  $1/3^{\text{rd}}$  and  $3/8^{\text{th}}$  rule- Solution of ordinary differential equations by Taylor's series, Picard's method of successive approximations, Euler's method, Runge-Kutta method (second and fourth order)

#### **Text Books:**

1. Probability and Statistics for Engineers by Richard Arnold Johnson, Irwin Miller and John E. Freund, New Delhi, Prentice Hall.
2. Probability and Statistics for Engineers and Sciences by Jay L. Devore, Cengage Learning.
3. Numerical Methods for Scientific and Engineering Computation by M. K. Jain, S. R. K. Iyengar and R. K. Jain, New Age International Publishers

#### **References:**

1. Fundamentals of Mathematical Statistics by S. C. Gupta & V. K. Kapoor, S. Chand.
2. Introductory Methods of Numerical Analysis by S. S. Sastry, PHI Learning Pvt. Ltd.
3. Mathematics for engineers and scientists by Alan Jeffrey, 6<sup>th</sup> edition, CRC press.

## CS104ES/CS204ES: COMPUTER PROGRAMMING IN C

**B.Tech. I Year II Sem.**

**L T/P/D C**  
**3 0/0/0 3**

### **Course Objectives:**

- To learn the fundamentals of computers.
- To understand the various steps in Program development.
- To learn the syntax and semantics of C Programming Language.
- To learn how to write modular and readable C Programs.
- To learn to write programs using structured programming approach in C to solve problems.

### **Course Outcomes:**

- Demonstrate the basic knowledge of computer hardware and software.
- Ability to write algorithms for solving problems.
- Ability to draw flowcharts for solving problems.
- Ability to code a given logic in C programming language.
- Gain knowledge in using C language for solving problems.

### **UNIT - I**

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development, algorithms and flowcharts , Number systems-Binary, Decimal, Hexadecimal and Conversions, storing integers and real numbers.

Introduction to C Language – Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Operators(Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements- Selection Statements(making decisions) – if and switch statements, Repetition statements ( loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Program examples.

### **UNIT - II**

Functions-Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Limitations of recursion, example C programs.

Arrays – Concepts, using arrays in C, inter function communication, array applications- linear search, binary search and bubble sort, two – dimensional arrays, multidimensional arrays, C program examples.

### **UNIT - III**

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and

arrays, Passing an array to a function, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

#### **UNIT - IV**

Enumerated, Structure and Union Types – The Type Definition (typedef), Enumerated types, Structures –Declaration, initialization, accessing structures, operations on structures, Complex structures-Nested structures, structures containing arrays, structures containing pointers, arrays of structures, structures and functions, Passing structures through pointers, self referential structures, unions, bit fields, C programming examples, command–line arguments, Preprocessor commands.

#### **UNIT – V**

Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling), Positioning functions (fseek ,rewind and ftell), C program examples.

#### **Text Books:**

1. Computer Science: A Structured Programming Approach Using C, B. A. Forouzan and R. F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh , Second Edition, Oxford University Press.

#### **Reference Books:**

1. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, Second Edition, Pearson education.
2. Programming with C, B. Gottfried, 3<sup>rd</sup> edition, Schaum's outlines, McGraw Hill Education (India) Pvt Ltd.
3. C From Theory to Practice, G S. Tselikis and N D. Tselikas, CRC Press.
4. Basic computation and Programming with C, Subrata Saha and S. Mukherjee, Cambridge University Press.

## ME106ES/ME205ES: ENGINEERING GRAPHICS

**B.Tech. I Year II Sem.**

**L T/P/D C**  
**2 0/0/4 4**

**Pre-requisites:** None

### **Course objectives:**

- To provide basic concepts in engineering drawing.
- To impart knowledge about standard principles of orthographic projection of objects.
- To draw sectional views and pictorial views of solids.

### **Course Outcomes:**

- Ability to prepare working drawings to communicate the ideas and information.
- Ability to read, understand and interpret engineering drawings.

### **UNIT – I**

**Introduction To Engineering Drawing:** Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid Involute. Scales – Plain, Diagonal, and Vernier Scales.

### **UNIT - II**

**Orthographic Projections:** Principles of Orthographic Projections – Conventions – Projections of Points and Lines Projections of Plane regular geometric figures.—Auxiliary Planes.

### **UNIT – III**

Projections of Regular Solids – Auxiliary Views.

### **UNIT – IV**

Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere. Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid, and Cone

### **UNIT – V**

**Isometric Projections:** Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions Auto CAD: Basic principles only.

### **Text Books:**

1. Engineering Drawing / Basant Agrawal and Mc Agrawal/ Mc Graw Hill
2. Engineering Drawing/ M.B. Shah, B.C. Rane / Pearson.

**Reference Books:**

1. Engineering Drawing / N.S. Parthasarathy and Vela Murali/ Oxford
2. Engineering Drawing N.D. Bhatt / Charotar

**LIST OF EXPERIMENTS**

**Volumetric Analysis:**

1. Estimation of Ferrous ion by Dichrometry.
2. Estimation of hardness of water by Complexometric method using EDTA.
3. Estimation of Ferrous and Ferric ions in a given mixture by Dichrometry.
4. Estimation Ferrous ion by Permanganometry.
5. Estimation of copper by Iodomery.
6. Estimation of percentage of purity of  $MnO_2$  in pyrolusite
7. Determination of percentage of available chlorine in bleaching powder.
8. Determination of salt concentration by ion- exchange resin.

**Instrumental methods of Analysis:**

1. Estimation of HCl by Conductometry.
2. Estimation of Ferrous ion by Potentiometry.
3. Determination of Ferrous iron in cement by Colorimetric method.
4. Determination of viscosity of an oil by Redwood / Oswald's Viscometer.
5. Estimation of manganese in  $KMnO_4$  by Colorimetric method.
6. Estimation of HCl and Acetic acid in a given mixture by Conductometry.
7. Estimation of HCl by Potentiometry.

**Preparation of Polymers:**

1. Preparation of Bakelite and urea formaldehyde resin.

**Note:** All the above experiments must be performed.

**Text Books:**

1. Vogel's Text Book of Quantitative Chemical Analysis, 5<sup>th</sup> Edition (2015)
2. G. H. Jeffery, J. Bassett, J. Mendham and R. C. Denney.
3. A Text Book on experiments and calculations in Engineering Chemistry by S.S. Dara S. Chand & Company Ltd., Delhi (2003).



**B.Tech. I Year II Sem.**

**L T/P/D C**  
**0 0/3/0 2**

**LIST OF EXPERIMENTS**

1. Dispersive power of the material of a prism – Spectrometer.
2. Determination of wavelengths of white source – Diffraction grating.
3. Newton's Rings – Radius of curvature of Plano convex lens.
4. Melde's experiment – Transverse and longitudinal modes.
5. Charging, discharging and time constant of an R-C circuit.
6. L-C-R circuit – Resonance & Q-factor.
7. Magnetic field along the axis of current carrying coil – Stewart and Gees method and to verify Biot – Savart's law.
8. Study the characteristics of LED and LASER diode.
9. Bending losses of fibres & Evaluation of numerical aperture of a given fibre.
10. Energy gap of a material of p-n junction.
11. Torsional pendulum – Rigidity modulus.
12. Wavelength of light, resolving power and dispersive power of a diffraction grating using laser.
13. V-I characteristics of a solar cell.

**Note:** Minimum 10 experiments must be performed.

## CS108ES/CS208ES: COMPUTER PROGRAMMING IN C LAB

**B.Tech. I Year II Sem.**

**L T/P/D C**  
**0 0/3/0 2**

### Course Objective:

- To write programs in C using structured programming approach to solve the problems.

### Course Outcomes:

- Ability to design and test programs to solve mathematical and scientific problems.
- Ability to write structured programs using control structures and functions.

### Recommended Systems/Software Requirements:

- Intel based desktop PC
- GNU C Compiler

- a) Write a C program to find the factorial of a positive integer.
  - b) Write a C program to find the roots of a quadratic equation.
- a) Write a C program to determine if the given number is a prime number or not.
  - b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- a) Write a C program to construct a pyramid of numbers.
  - b) Write a C program to calculate the following Sum:  
$$\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$$
- a) The least common multiple (LCM) of two positive integers a and b is the smallest integer that is evenly divisible by both a and b. Write a C program that reads two integers and calls LCM (a, b) function that takes two integer arguments and returns their LCM. The LCM (a, b) function should calculate the least common multiple by calling the GCD (a, b) function and using the following relation:  
$$\text{LCM}(a, b) = ab / \text{GCD}(a, b)$$
  - b) Write a C program that reads two integers n and r to compute the ncr value using the following relation:  
$$n_{c_r}(n, r) = n! / r! (n-r)! .$$
 Use a function for computing the factorial value of an integer.
- a) Write C program that reads two integers x and n and calls a recursive function to compute  $x^n$
  - b) Write a C program that uses a recursive function to solve the Towers of Hanoi problem.
  - c) Write a C program that reads two integers and calls a recursive function to compute  $n_{c_r}$  value.

6.
  - a) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user using Sieve of Eratosthenes algorithm.
  - b) Write a C program that uses non recursive function to search for a Key value in a given list of integers. Use linear search method.
  
7.
  - a) Write a menu-driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.
  - b) Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers. Use binary search method.
  
8.
  - a) Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.
  - b) Write a C program that reads two matrices and uses functions to perform the following:
    1. Addition of two matrices
    2. Multiplication of two matrices
  
9.
  - a) Write a C program that uses functions to perform the following operations:
    1. to insert a sub-string into a given main string from a given position.
    2. to delete n characters from a given position in a given string.
  - b) Write a C program that uses a non recursive function to determine if the given string is a palindrome or not.
  
10.
  - a) Write a C program to replace a substring with another in a given line of text.
    - b) Write a C program that reads 15 names each of up to 30 characters, stores them in an array, and uses an array of pointers to display them in ascending (ie. alphabetical) order.
  
11.
  - a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
  - b) Write a C program to convert a positive integer to a roman numeral. Ex. 11 is converted to XI.
  
12.
  - a) Write a C program to display the contents of a file to standard output device.
  - b) Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
  
13.
  - a) Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command-line arguments.
  - b) Write a C program to compare two files, printing the first line where they differ.
  
14.
  - a) Write a C program to change the nth character (byte) in a text file. Use fseek function.

- b) Write a C program to reverse the first n characters in a file. The file name and n are specified on the command line. Use fseek function.
15. a) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).
- b) Define a macro that finds the maximum of two numbers. Write a C program that uses the macro and prints the maximum of two numbers.

**Reference Books:**

1. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.
2. Computer Programming in C, V. Rajaraman, PHI.
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4. C++: The complete reference, H. Schildt, TMH Publishers.

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

## B.TECH. COMPUTER SCIENCE AND ENGINEERING

### COURSE STRUCTURE & SYLLABUS (2016-17)

#### II YEAR I SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	MA301BS	Mathematics – IV	4	1	0	4
2	CS302ES	Data Structures through C++	4	0	0	4
3	CS303ES	Mathematical Foundations of Computer Science	4	0	0	4
4	CS304ES	Digital Logic Design	3	0	0	3
5	CS305ES	Object Oriented Programming through Java	3	0	0	3
6	CS306ES	Data Structures through C++ Lab	0	0	3	2
7	CS307ES	IT Workshop	0	0	3	2
8	CS308ES	Object Oriented Programming through Java Lab	0	0	3	2
9	* MC300ES	Environmental Science and Technology	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>1</b>	<b>9</b>	<b>24</b>

#### II YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	CS401BS	Computer Organization	4	0	0	4
2	CS402ES	Database Management Systems	4	0	0	4
3	CS403ES	Operating Systems	4	0	0	4
4	CS404ES	Formal Languages and Automata Theory	3	0	0	3
5	SM405MS	Business Economics and Financial Analysis	3	0	0	3
6	CS406ES	Computer Organization Lab	0	0	3	2
7	CS407ES	Database Management Systems Lab	0	0	3	2
8	CS408ES	Operating Systems Lab	0	0	3	2
9	* MC400HS	Gender Sensitization Lab	0	0	3	0
		<b>Total Credits</b>	<b>18</b>	<b>0</b>	<b>12</b>	<b>24</b>

\* Satisfactory/Unsatisfactory

**MA301BS: MATHEMATICS - IV**  
**(Complex Variables and Fourier Analysis)**

**B.Tech. II Year I Sem.**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>4</b>	<b>1</b>	<b>0</b>	<b>4</b>

**Prerequisites:** Foundation course (No Prerequisites).

**Course Objectives:** To learn

- differentiation and integration of complex valued functions
- evaluation of integrals using Cauchy's integral formula
- Laurent's series expansion of complex functions
- evaluation of integrals using Residue theorem
- express a periodic function by Fourier series and a non-periodic function by Fourier transform
- to analyze the displacements of one dimensional wave and distribution of one dimensional heat equation

**Course Outcomes:** After learning the contents of this paper the student must be able to:

- analyze the complex functions with reference to their analyticity, integration using Cauchy's integral theorem
- find the Taylor's and Laurent's series expansion of complex functions
- the bilinear transformation
- express any periodic function in term of sines and cosines
- express a non-periodic function as integral representation
- analyze one dimensional wave and heat equation

**UNIT – I**

**Functions of a complex variable:** Introduction, Continuity, Differentiability, Analyticity, properties, Cauchy, Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions-Milne-Thompson method

**UNIT - II**

**Complex integration:** Line integral, Cauchy's integral theorem, Cauchy's integral formula, and Generalized Cauchy's integral formula, Power series: Taylor's series- Laurent series, Singular points, isolated singular points, pole of order m – essential singularity, Residue, Cauchy Residue theorem (Without proof).

**UNIT – III**

**Evaluation of Integrals:** Types of real integrals:

a) Improper real integrals  $\int_{-\infty}^{\infty} f(x)dx$                       (b)  $\int_c^{c+2\pi} f(\cos \theta, \sin \theta)d\theta$

Bilinear transformation- fixed point- cross ratio- properties- invariance of circles.

#### **UNIT – IV**

**Fourier series and Transforms:** Introduction, Periodic functions, Fourier series of periodic function, Dirichlet's conditions, Even and odd functions, Change of interval, Half range sine and cosine series.

Fourier integral theorem (without proof), Fourier sine and cosine integrals, sine and cosine, transforms, properties, inverse transforms, Finite Fourier transforms.

#### **UNIT – V**

**Applications of PDE:** Classification of second order partial differential equations, method of separation of variables, Solution of one dimensional wave and heat equations.

#### **TEXT BOOKS:**

1. A first course in complex analysis with applications by Dennis G. Zill and Patrick Shanahan, Johns and Bartlett Publishers.
2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers.
3. Advanced engineering Mathematics with MATLAB by Dean G. Duffy

#### **REFERENCES:**

1. Fundamentals of Complex Analysis by Saff, E. B. and A. D. Snider, Pearson.
2. Advanced Engineering Mathematics by Louis C. Barrett, McGraw Hill.

## CS302ES: DATA STRUCTURES THROUGH C++

B.Tech. II Year I Sem.

L T P C  
4 0 0 4

### Course Objectives:

- To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
- To understand the notations used to analyze the Performance of algorithms.
- To understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
- To choose an appropriate data structure for a specified application.
- To understand and analyze various searching and sorting algorithms.
- To learn to implement ADTs such as lists, stacks, queues, trees, graphs, search trees in C++ to solve problems.

### Course Outcomes:

- Ability to choose appropriate data structures to represent data items in real world problems.
- Ability to analyze the time and space complexities of algorithms.
- Ability to design programs using a variety of data structures such as stacks, queues, hash tables, binary trees, search trees, heaps, graphs, and B-trees.
- Able to analyze and implement various kinds of searching and sorting techniques.

### UNIT - I

**C++ Programming Concepts:** Review of C, input and output in C++, functions in C++-value parameters, reference parameters, Parameter passing, function overloading, function templates, Exceptions-throwing an exception and handling an exception, arrays, pointers, new and delete operators, class and object, access specifiers, friend functions, constructors and destructor, Operator overloading, class templates, Inheritance and Polymorphism..

**Basic Concepts** - Data objects and Structures, Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations, Complexity Analysis Examples, Introduction to Linear and Non Linear data structures.

### UNIT - II

Representation of single, two dimensional arrays, sparse matrices-array and linked representations.

Linear list ADT-array representation and linked representation, Singly Linked Lists-Operations-Insertion, Deletion, Circularly linked lists-Operations for Circularly linked lists, Doubly Linked Lists- Operations- Insertion, Deletion.



Stack ADT, definition, array and linked implementations, applications-infix to postfix conversion, Postfix expression evaluation, recursion implementation, Queue ADT, definition, array and linked Implementations, Circular queues-Insertion and deletion operations.

### **UNIT - III**

Trees – definition, terminology, Binary trees-definition, Properties of Binary Trees, Binary Tree ADT, representation of Binary Trees-array and linked representations, Binary Tree traversals, Threaded binary trees, Priority Queues –Definition and applications, Max Priority Queue ADT-implementation-Max Heap-Definition, Insertion into a Max Heap, Deletion from a Max Heap.

### **UNIT - IV**

Searching - Linear Search, Binary Search, Hashing-Introduction, hash tables, hash functions, Overflow Handling, Comparison of Searching methods.

Sorting-Insertion Sort, Selection Sort, Radix Sort, Quick sort, Heap Sort, Merge sort, Comparison of Sorting methods.

### **UNIT - V**

Graphs–Definitions, Terminology, Applications and more definitions, Properties, Graph ADT, Graph Representations- Adjacency matrix, Adjacency lists, Graph Search methods - DFS and BFS, Complexity analysis,

Search Trees-Binary Search Tree ADT, Definition, Operations- Searching, Insertion and Deletion, Balanced search trees-AVL Trees-Definition and Examples only, B-Trees-Definition and Examples only, Red-Black Trees-Definitions and Examples only, Comparison of Search Trees.

### **TEXT BOOKS:**

1. Data structures, Algorithms and Applications in C++, 2<sup>nd</sup> Edition, Sartaj Sahni, Universities Press.
2. Data structures and Algorithms in C++, Adam Drozdek, 4<sup>th</sup> edition, Cengage learning.

### **REFERENCE BOOKS:**

1. Data structures with C++, J. Hubbard, Schaum's outlines, TMH.
2. Data structures and Algorithms in C++, M.T. Goodrich, R. Tamassia and D. Mount, Wiley India.
3. Data structures and Algorithm Analysis in C++, 3<sup>rd</sup> edition, M. A. Weiss, Pearson.
4. Classic Data Structures, D. Samanta, 2<sup>nd</sup> edition, PHI.

## CS303ES: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

**B.Tech. II Year I Sem.**

L	T	P	C
4	0	0	4

### Course Objectives:

- To introduce the concepts of mathematical logic.
- To introduce the concepts of sets, relations, and functions.
- To perform the operations associated with sets, functions, and relations.
- To relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.
- To introduce generating functions and recurrence relations.
- To use Graph Theory for solving problems.

### Course Outcomes

- Ability to apply mathematical logic to solve problems.
- Understand sets, relations, functions, and discrete structures.
- Able to use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, and functions.
- Able to formulate problems and solve recurrence relations.
- Able to model and solve real-world problems using graphs and trees.

### UNIT - I

**Mathematical logic:** Introduction, Statements and Notation, Connectives, Normal Forms, Theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

### UNIT - II

**Set theory:** Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and Ordering, Functions.

**Algebraic Structures:** Introduction, Algebraic Systems, Semi groups and Monoids, Groups, Lattices as Partially Ordered Sets, Boolean algebra.

### UNIT - III

**Elementary Combinatorics:** Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutations with Constrained Repetitions, Binomial Coefficients, The Binomial and Multinomial Theorems, The Principle of Inclusion-Exclusion.

### UNIT - IV

**Recurrence Relations:** Generating Functions of Sequences, Calculating Coefficients of generating functions, Recurrence relations, Solving recurrence relations by substitution and

Generating functions, The method of Characteristic roots, Solutions of Inhomogeneous Recurrence Relations.

#### **UNIT - V**

**Graphs:** Basic Concepts, Isomorphisms and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multigraphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

#### **TEXT BOOKS:**

1. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay, R. Manohar, McGraw Hill education (India) Private Limited. **(UNITS - I, II)**
2. Discrete Mathematics for Computer Scientists & Mathematicians, Joe L. Mott, Abraham Kandel, Theodore P. Baker, Pearson , 2<sup>nd</sup> ed. **(Units - III, IV, V)**

#### **REFERENCE BOOKS:**

1. Discrete Mathematics and its Applications, Kenneth H. Rosen, 7th Edition, McGraw Hill education (India) Private Limited.
2. Discrete Mathematics, D.S. Malik & M.K. Sen, Revised edition Cengage Learning.
3. Elements of Discrete Mathematics, C. L. Liu and D. P. Mohapatra, 4th edition, McGraw Hill education (India) Private Limited.
4. Discrete Mathematics with Applications, Thomas Koshy, Elsevier.
5. Discrete and Combinatorial Mathematics, R. P. Grimaldi, Pearson.

## CS304ES: DIGITAL LOGIC DESIGN

**B.Tech. II Year I Sem.**

**L T P C**  
**3 0 0 3**

### **Course Objectives:**

- To understand basic number systems, codes and logical gates.
- To understand the concepts of Boolean algebra.
- To understand the use of minimization logic to solve the Boolean logic expressions..
- To understand the design of combinational and sequential circuits.
- To understand the state reduction methods for Sequential circuits.
- To understand the basics of various types of memories.

### **Course Outcomes:**

- Able to understand number systems and codes.
- Able to solve Boolean expressions using Minimization methods.
- Able to design the sequential and combinational circuits.
- Able to apply state reduction methods to solve sequential circuits.

### **UNIT - I**

Digital Systems, Binary Numbers, Number base conversions, Octal, Hexadecimal and other base numbers, complements, signed binary numbers, Floating point number representation, binary codes, Error detection and correction, binary storage and registers, binary logic, Boolean algebra and logic gates , Basic theorems and properties of Boolean Algebra, Boolean functions, canonical and standard forms, Digital Logic Gates.

### **UNIT - II**

Gate–Level Minimization, The K-Map Method, Three-Variable Map, Four-Variable Map, Five-Variable Map , sum of products , product of sums simplification, Don't care conditions , NAND and NOR implementation and other two level implementations, Exclusive-OR function.

### **UNIT - III**

Combinational Circuits (CC), Analysis procedure, Design Procedure, Combinational circuit for different code converters and other problems, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, Demultiplexers.

### **UNIT - IV**

Synchronous Sequential Circuits, Latches, Flip-flops, analysis of clocked sequential circuits, Registers, Shift registers, Ripple counters, Synchronous counters, other counters. Asynchronous Sequential Circuits -Introduction, Analysis procedure, Circuits with latches, Design procedure, Reduction of state and follow tables, Race- free state assignment, Hazards.

## **UNIT - V**

Memory: Introduction, Random-Access memory, Memory decoding, ROM, Programmable Logic Array, Programmable Array Logic, Sequential programmable devices.

Register Transfer and Microoperations - Register Transfer Language, Register Transfer, Bus and Memory Transfers,

Arithmetic Microoperations, Logic Microoperations, Shift Microoperations, Arithmetic Logic Shift Unit.

### **TEXT BOOKS:**

1. Digital Design, M. Morris Mano, M.D.Ciletti, 5th edition, Pearson.(Units I, II, III, IV, Part of Unit V)
2. Computer System Architecture, M.Morris Mano, 3rd edition, Pearson.(Part of Unit V)

### **REFERENCE BOOKS:**

1. Switching and Finite Automata Theory, Z. Kohavi, Tata McGraw Hill.
2. Fundamentals of Logic Design, C. H. Roth, L. L. Kinney, 7<sup>th</sup> edition, Cengage Learning.
3. Fundamentals of Digital Logic & Micro Computer Design, 5TH Edition, M. Rafiquzzaman, John Wiley.

## CS305ES: OBJECT ORIENTED PROGRAMMING THROUGH JAVA

B.Tech. II Year I Sem.

L T P C  
3 0 0 3

### Course Objectives:

- To introduce the object oriented programming concepts.
- To understand object oriented programming concepts, and apply them in solving problems.
- To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes
- To introduce the implementation of packages and interfaces
- To introduce the concepts of exception handling and multithreading.
- To introduce the design of Graphical User Interface using applets and swing controls.

### Course Outcomes

- Able to solve real world problems using OOP techniques.
- Able to understand the use of abstract classes.
- Able to solve problems using java collection framework and I/o classes.
- Able to develop multithreaded applications with synchronization.
- Able to develop applets for web applications.
- Able to design GUI based applications

### UNIT - I

**Object-oriented thinking-** A way of viewing world – Agents and Communities, messages and methods, Responsibilities, Classes and Instances, Class Hierarchies- Inheritance, Method binding, Overriding and Exceptions, Summary of Object-Oriented concepts. Java buzzwords, An Overview of Java, Data types, Variables and Arrays, operators, expressions, control statements, Introducing classes, Methods and Classes, String handling.

**Inheritance**– Inheritance concept, Inheritance basics, Member access, Constructors, Creating Multilevel hierarchy, super uses, using final with inheritance, Polymorphism-ad hoc polymorphism, pure polymorphism, method overriding, abstract classes, Object class, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance.

### UNIT - II

**Packages-** Defining a Package, CLASSPATH, Access protection, importing packages.

**Interfaces-** defining an interface, implementing interfaces, Nested interfaces, applying interfaces, variables in interfaces and extending interfaces.

**Stream based I/O(java.io)** – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and writing Files, Random access file operations, The Console class, Serialization, Enumerations, auto boxing, generics.

### UNIT - III

**Exception handling** - Fundamentals of exception handling, Exception types, Termination or resumptive models, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built- in exceptions, creating own exception sub classes.

**Multithreading-** Differences between thread-based multitasking and process-based multitasking, Java thread model, creating threads, thread priorities, synchronizing threads, inter thread communication.

### UNIT - IV

**The Collections Framework (java.util)-** Collections overview, Collection Interfaces, The Collection classes- Array List, Linked List, Hash Set, Tree Set, Priority Queue, Array Deque. Accessing a Collection via an Iterator, Using an Iterator, The For-Each alternative, Map Interfaces and Classes, Comparators, Collection algorithms, Arrays, The Legacy Classes and Interfaces- Dictionary, Hashtable ,Properties, Stack, Vector  
More Utility classes, String Tokenizer, Bit Set, Date, Calendar, Random, Formatter, Scanner

### UNIT - V

**GUI Programming with Swing** – Introduction, limitations of AWT, MVC architecture, components, containers. Understanding Layout Managers, Flow Layout, Border Layout, Grid Layout, Card Layout, Grid Bag Layout.

**Event Handling-** The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes, Inner classes, Anonymous Inner classes.

A Simple Swing Application, **Applets** – Applets and HTML, Security Issues, Applets and Applications, passing parameters to applets. Creating a Swing Applet, Painting in Swing, A Paint example, Exploring Swing Controls- JLabel and Image Icon, JTextField, The Swing Buttons- JButton, JToggleButton, JCheckBox, JRadioButton, JTabbedPane, JScrollPane, JList, JComboBox, Swing Menus, Dialogs.

### TEXT BOOKS

1. Java The complete reference, 9<sup>th</sup> edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

### REFERENCE BOOKS

1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons.
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
4. Programming in Java, S. Malhotra, S. Chudhary, 2<sup>nd</sup> edition, Oxford Univ. Press.
5. Java Programming and Object oriented Application Development, R. A. Johnson, Cengage Learning.

## CS306ES: DATA STRUCTURES THROUGH C++ LAB

B.Tech. II Year I Sem.

L	T	P	C
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### Course Objectives:

- To write and execute programs in C++ to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees.
- To learn to write C++ programs to implement various sorting and searching algorithms

### Course Outcomes:

- Able to identify the appropriate data structures and algorithms for solving real world problems.
- Able to implement various kinds of searching and sorting techniques.
- Able to implement data structures such as stacks, queues, Search trees, and hash tables to solve various computing problems.

1. Write a C++ program that uses functions to perform the following:
  - a) Create a singly linked list of integers.
  - b) Delete a given integer from the above linked list.
  - c) Display the contents of the above list after deletion.
2. Write a template based C++ program that uses functions to perform the following:
  - a) Create a doubly linked list of elements.
  - b) Delete a given element from the above doubly linked list.
  - c) Display the contents of the above list after deletion.
3. Write a C++ program that uses stack operations to convert a given infix expression into its postfix equivalent, Implement the stack using an array.
4. Write a C++ program to implement a double ended queue ADT using an array, using a doubly linked list.
5. Write a C++ program that uses functions to perform the following:
  - a) Create a binary search tree of characters.
  - b) Traverse the above Binary search tree recursively in preorder, in order and post order,
6. Write a C++ program that uses function templates to perform the following:
  - a) Search for a key element in a list of elements using linear search.
  - b) Search for a key element in a list of sorted elements using binary search.
7. Write a C++ program that implements Insertion sort algorithm to arrange a list of integers in ascending order.



8. Write a template based C++ program that implements selection sort algorithm to arrange a list of elements in descending order.
9. Write a template based C++ program that implements Quick sort algorithm to arrange a list of elements in ascending order.
10. Write a C++ program that implements Heap sort algorithm for sorting a list of integers in ascending order.
11. Write a C++ program that implements Merge sort algorithm for sorting a list of integers in ascending order
12. Write a C++ program to implement all the functions of a dictionary (ADT) using hashing.
13. Write a C++ program that implements Radix sort algorithm for sorting a list of integers in ascending order
14. Write a C++ program that uses functions to perform the following:
  - a) Create a binary search tree of integers.
  - b) Traverse the above Binary search tree non recursively in inorder.
15. Write a C++ program that uses functions to perform the following:
  - a) Create a binary search tree of integers.
  - b) Search for an integer key in the above binary search tree non recursively.
  - c) Search for an integer key in the above binary search tree recursively.

#### **REFERENCE BOOKS**

1. Data Structures using C++, D. S. Malik, 2<sup>nd</sup> edition, Cengage learning.
2. Data Structures using C++, V. Patil, Oxford University Press.
3. Fundamentals of Data structures in C++, 2<sup>nd</sup> edition, E. Horowitz, S. Sahni and D. Mehta, Universities Press.
4. C++ Plus Data Structures, 4<sup>th</sup> edition, Nell Dale, Jones and Bartlett student edition.

## CS307ES: IT WORKSHOP

B.Tech. II Year I Sem.

L T P C  
0 0 3 2

### Course Objectives:

- The IT Workshop is a training lab course to get training on PC Hardware, Internet & World Wide Web, and Productivity tools for documentation, Spreadsheet computations, and Presentation.
- To introduce to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers, hardware and software level troubleshooting process.
- To introduce connecting the PC on to the internet from home and workplace and effectively usage of the internet, Usage of web browsers, email, newsgroups and discussion forums. To get knowledge in awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks.
- To introduce the usage of Productivity tools in crafting professional word documents, excel spreadsheets and power point presentations using open office tools and LaTeX.

### Course Outcomes:

- Apply knowledge for computer assembling and software installation.
- Ability how to solve the trouble shooting problems.
- Apply the tools for preparation of PPT, Documentation and budget sheet etc.

**PC Hardware:** The students should work on working PC to disassemble and assemble to working condition and install operating system like Linux or any other on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.

**Problem 1:** Every student should identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor. Every student should disassemble and assemble the PC back to working condition.

**Problem 2:** Every student should individually install operating system like Linux or MS windows on the personal computer. The system should be configured as dual boot with both windows and Linux.

**Problem 3:** Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition.

**Problem 4:** Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

### **Internet & World Wide Web.**

**Problem 5:** Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate how to access the websites and email.

**Problem 6:** Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

**Problem 7:** Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. Usage of search engines like Google, Yahoo, ask.com and others should be demonstrated by student.

**Problem 8:** Cyber Hygiene: Students should learn about viruses on the internet and install antivirus software. Student should learn to customize the browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

**Problem 9:** Develop home page: Student should learn to develop his/her home page using HTML consisting of his/her photo, name, address and education details as a table and his/her skill set as a list.

### **Productivity tools: LaTeX and Word**

**Word Orientation:** An overview of LaTeX and Microsoft (MS) office / equivalent (FOSS) tool word should be learned: Importance of LaTeX and MS office / equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that should be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

**Problem 10: Using LaTeX and Word** to create project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

**Problem 11: Creating project abstract** Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

**Problem 12: Creating a Newsletter:** Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs in word.

**Problem 13 - Spreadsheet Orientation:** Accessing, overview of toolbars, saving spreadsheet files, Using help and resources. **Creating a Scheduler:-** Gridlines, Format Cells, Summation, auto fill, Formatting Text

**Problem 14: Calculating GPA -** .Features to be covered:- Cell Referencing, Formulae in spreadsheet – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, Sorting, Conditional formatting.

**Problem 15: Creating Power Point:** Student should work on basic power point utilities and tools in Latex and Ms Office/equivalent (FOSS) which help them create basic power point presentation. PPT Orientation, Slide Layouts, Inserting Text, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting Images, Tables and Charts

**REFERENCE BOOKS:**

1. Introduction to Information Technology, IITL Education Solutions limited, Pearson Education.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
4. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
5. PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft)

## CS308ES: OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

**B.Tech. II Year I Sem.**

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### Course Objectives:

- To write programs using abstract classes.
- To write programs for solving real world problems using java collection frame work.
- To write multithreaded programs.
- To write GUI programs using swing controls in Java.
- To introduce java compiler and eclipse platform.
- To impart hands on experience with java programming.

### Course Outcomes:

- Able to write programs for solving real world problems using java collection frame work.
- Able to write programs using abstract classes.
- Able to write multithreaded programs.
- Able to write GUI programs using swing controls in Java.

### Note:

1. Use Linux and MySQL for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform.
2. The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.
1. Use Eclipse or Net bean platform and acquaint with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.
2. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,\*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.
3. A) Develop an applet in Java that displays a simple message.  
b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named “Compute” is clicked.
4. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1

and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

5. Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.
6. Write a Java program for the following:
  - i) Create a doubly linked list of elements.
  - ii) Delete a given element from the above list.
  - iii) Display the contents of the list after deletion.
7. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “Stop” or “Ready” or “Go” should appear above the buttons in selected color. Initially, there is no message shown.
8. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.
9. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Labels in Grid Layout.
10. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).
11. Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).
12. Write a Java program that correctly implements the producer – consumer problem using the concept of interthread communication.
13. Write a Java program to list all the files in a directory including the files present in all its subdirectories.

14. Write a Java program that implements Quick sort algorithm for sorting a list of names in ascending order
  
15. Write a Java program that implements Bubble sort algorithm for sorting in descending order and also shows the number of interchanges occurred for the given set of integers.

#### **REFERENCE BOOKS**

1. Java for Programmers, P. J. Deitel and H. M. Deitel, 10<sup>th</sup> Edition Pearson education.
2. Thinking in Java, Bruce Eckel, Pearson Education.
3. Java Programming, D. S. Malik and P. S. Nair, Cengage Learning.
4. Core Java, Volume 1, 9<sup>th</sup> edition, Cay S. Horstmann and G Cornell, Pearson.

## MC300ES: ENVIRONMENTAL SCIENCE AND TECHNOLOGY

B.Tech. II Year I Sem.

L	T	P	C
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### Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures
- Understanding the environmental policies and regulations

### Course Outcomes:

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

### UNIT - I

**Ecosystems:** Definition, Scope and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

### UNIT - II

**Natural Resources: Classification of Resources:** Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

### UNIT - III

**Biodiversity And Biotic Resources:** Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

### UNIT - IV

**Environmental Pollution and Control Technologies: Environmental Pollution:** Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics



of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Problems and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol.

#### **UNIT - V**

**Environmental Policy, Legislation & EIA:** Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

#### **TEXT BOOKS:**

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

#### **REFERENCE BOOKS:**

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4<sup>th</sup> Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

## CS401ES: COMPUTER ORGANIZATION

B.Tech. II Year II Sem.

L T P C  
4 0 0 4

### Course Objectives:

- To understand basic components of computers.
- To understand the architecture of 8086 processor.
- To understand the instruction sets, instruction formats and various addressing modes of 8086.
- To understand the representation of data at the machine level and how computations are performed at machine level.
- To understand the memory organization and I/O organization.
- To understand the parallelism both in terms of single and multiple processors.

### Course Outcomes:

- Able to understand the basic components and the design of CPU, ALU and Control Unit.
- Ability to understand memory hierarchy and its impact on computer cost/performance.
- Ability to understand the advantage of instruction level parallelism and pipelining for high performance Processor design.
- Ability to understand the instruction set, instruction formats and addressing modes of 8086.
- Ability to write assembly language programs to solve problems.

### UNIT - I

**Digital Computers:** Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

**Basic Computer Organization and Design:** Instruction codes, Computer Registers, Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt, Complete Computer Description.

**Micro Programmed Control:** Control memory, Address sequencing, micro program example, design of control unit.

### UNIT - II

**Central Processing Unit:** The 8086 Processor Architecture, Register organization, Physical memory organization, General Bus Operation, I/O Addressing Capability, Special Processor Activities, Minimum and Maximum mode system and timings.

8086 Instruction Set and Assembler Directives-Machine language instruction formats, Addressing modes, Instruction set of 8086, Assembler directives and operators.

### **UNIT - III**

Assembly Language Programming with 8086- Machine level programs, Machine coding the programs, Programming with an assembler, Assembly Language example programs.  
Stack structure of 8086, Interrupts and Interrupt service routines, Interrupt cycle of 8086, Interrupt programming, Passing parameters to procedures, Macros, Timings and Delays.

### **UNIT - IV**

**Computer Arithmetic:** Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating - point Arithmetic operations.

**Input-Output Organization:** Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP), Intel 8089 IOP.

### **UNIT - V**

**Memory Organization:** Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

**Pipeline and Vector Processing:** Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

**Multi Processors:** Characteristics of Multiprocessors, Interconnection Structures, Inter processor arbitration, Inter processor communication, and synchronization.

### **TEXT BOOKS:**

1. Computer System Architecture, M. Moris Mano, Third Edition, Pearson. **(UNIST-I, IV, V)**
2. Advanced Microprocessors and Peripherals, K M Bhurchandi, A.K Ray ,3<sup>rd</sup> edition, McGraw Hill India Education Private Ltd. **(UNITS - II, III).**

### **REFERENCE:**

1. Microprocessors and Interfacing, D V Hall, SSSP Rao, 3<sup>rd</sup> edition, McGraw Hill India Education Private Ltd.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5<sup>th</sup> Edition, Tata McGraw Hill, 2002
3. Computer Organization and Architecture, William Stallings, 9th Edition, Pearson.
4. David A. Patterson, John L. Hennessy: Computer Organization and Design – The Hardware / Software Interface ARM Edition, 4<sup>th</sup> Edition, Elsevier, 2009.

## CS402ES: DATABASE MANAGEMENT SYSTEMS

B.Tech. II Year II Sem.

L T P C  
4 0 0 4

### Course Objectives:

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- To understand the relational database design principles.
- To become familiar with the basic issues of transaction processing and concurrency control.
- To become familiar with database storage structures and access techniques.

### Course Outcomes:

- Demonstrate the basic elements of a relational database management system.
- Ability to identify the data models for relevant problems.
- Ability to design entity relationship model and convert entity relationship diagrams into RDBMS and formulate SQL queries on the data.
- Apply normalization for the development of application software.

### UNIT - I

**Introduction:** Database System Applications, Purpose of Database Systems, View of Data, Database Languages – DDL, DML, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Data Mining and Information Retrieval, Specialty Databases, Database Users and Administrators, History of Database Systems.

**Introduction to Data base design:** Database Design and ER diagrams, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises.

**Relational Model:** Introduction to the Relational Model, Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design: ER to Relational, Introduction to Views, Destroying /Altering Tables and Views.

### UNIT - II

**Relational Algebra and Calculus:** Preliminaries, Relational Algebra, Relational calculus – Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and calculus.

**SQL:** Queries, Constraints, Triggers: Form of Basic SQL Query, UNION, INTERSECT, and EXCEPT, Nested Queries, Aggregate Operators, NULL values Complex Integrity Constraints in SQL, Triggers and Active Data bases, Designing Active Databases..

### **UNIT - III**

**Schema Refinement and Normal Forms:** Introduction to Schema Refinement, Functional Dependencies - Reasoning about FDs, Normal Forms, Properties of Decompositions, Normalization, Schema Refinement in Database Design, Other Kinds of Dependencies.

### **UNIT - IV**

**Transaction Management:** Transactions, Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity Transaction Isolation Levels, Implementation of Isolation Levels.

**Concurrency Control:** Lock-Based Protocols, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols, Multiversion Schemes.

Recovery System-Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with loss of nonvolatile storage, Early Lock Release and Logical Undo Operations, Remote Backup systems.

### **UNIT - V**

**Storage and Indexing:** Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing, Index Data Structures, Comparison of File Organizations.

Tree-Structured Indexing: Intuition for tree Indexes, Indexed Sequential Access Method (ISAM), B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

**Hash- Based Indexing:** Static Hashing, Extendible hashing, Linear Hashing, Extendible vs. Linear Hashing.

### **TEXT BOOKS:**

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, McGraw Hill Education (India) Private Limited, 3<sup>rd</sup> Edition. **(Part of UNIT-I, UNIT-II, UNIT-III, UNIT-V)**
2. Data base System Concepts, A. Silberschatz, Henry. F. Korth, S. Sudarshan, McGraw Hill Education(India) Private Limited 1, 6<sup>th</sup> edition. **( Part of UNIT-I, UNIT-IV)**

### **REFERENCE BOOKS:**

1. Database Systems, 6<sup>th</sup> edition, R Elmasri, Shamkant B.Navathe, Pearson Education.
2. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning.
3. Introduction to Database Management, M. L. Gillenson and others, Wiley Student Edition.
4. Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.
5. Introduction to Database Systems, C. J. Date, Pearson Education.

## CS403ES: OPERATING SYSTEMS

**B.Tech. II Year II Sem.**

**L T P C**  
**3 0 0 3**

### **Course Objectives:**

- To understand the OS role in the overall computer system
- To study the operations performed by OS as a resource manager
- To understand the scheduling policies of OS
- To understand the different memory management techniques
- To understand process concurrency and synchronization
- To understand the concepts of input/output, storage and file management
- To understand the goals and principles of protection
- Introduce system call interface for file and process management
- To study different OS and compare their features.

### **Course Outcomes:**

- Apply optimization techniques for the improvement of system performance.
- Ability to design and solve synchronization problems.
- Learn about minimization of turnaround time, waiting time and response time and also maximization of throughput by keeping CPU as busy as possible.
- Ability to change access controls to protect files.
- Ability to compare the different operating systems.

### **UNIT - I**

Overview-Introduction-Operating system objectives, User view, System view, Operating system definition, Computer System Organization, Computer System Architecture, OS Structure, OS Operations, Process Management, Memory Management, Storage Management, Protection and Security, Computing Environments.

Operating System services, User and OS Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, OS Structure.

### **UNIT - II**

Process and CPU Scheduling - Process concepts-The Process, Process State, Process Control Block, Threads, Process Scheduling-Scheduling Queues, Schedulers, Context Switch, Operations on Processes, System calls-fork(),exec(),wait(),exit(), Interprocess communication-ordinary pipes and named pipes in Unix.

Process Scheduling-Basic concepts, Scheduling Criteria, Scheduling algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Thread scheduling, Linux scheduling and Windows scheduling.

Process Synchronization, Background, The Critical Section Problem, Peterson's solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization in Linux and Windows.

### **UNIT - III**

Memory Management and Virtual Memory – Memory Management Strategies- Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of Page Table, IA-32 Segmentation, IA-32 Paging.

Virtual Memory Management-Background, Demand Paging, Copy-on-Write, Page Replacement, Page Replacement Algorithms, Allocation of Frames, Thrashing, Virtual memory in Windows..

### **UNIT - IV**

Storage Management-File System- Concept of a File, System calls for file operations - open (), read (), write (), close (), seek (), unlink (), Access methods, Directory and Disk Structure, File System Mounting, File Sharing, Protection.

File System Implementation - File System Structure, File System Implementation, Directory Implementation, Allocation methods, Free-space Management, Efficiency, and Performance.

Mass Storage Structure – Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap space Management

### **UNIT - V**

Deadlocks - System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.

Protection – System Protection, Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, Capability-Based Systems, Language-Based Protection.

### **TEXT BOOKS:**

1. Operating System Concepts , Abraham Silberschatz, Peter B. Galvin, Greg Gagne, 9th Edition, Wiley, 2016 India Edition
2. Operating Systems – Internals and Design Principles, W. Stallings, 7th Edition, Pearson.

### **REFERENCE BOOKS:**

1. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, PHI
2. Operating Systems: A concept-based Approach, 2nd Edition, D.M. Dhamdhare, TMH.
3. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
4. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
5. Principles of Operating systems, Naresh Chauhan, Oxford University Press.

## CS404ES: FORMAL LANGUAGES AND AUTOMATA THEORY

**B.Tech. II Year II Sem.**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### **Course Objectives:**

- To provide introduction to some of the central ideas of theoretical computer science from the perspective of formal languages.
- To introduce the fundamental concepts of formal languages, grammars and automata theory.
- Classify machines by their power to recognize languages.
- Employ finite state machines to solve problems in computing.
- To understand deterministic and non-deterministic machines.
- To understand the differences between decidability and undecidability.

### **Course Outcomes:**

- Able to understand the concept of abstract machines and their power to recognize the languages.
- Able to employ finite state machines for modeling and solving computing problems.
- Able to design context free grammars for formal languages.
- Able to distinguish between decidability and undecidability.
- Able to gain proficiency with mathematical tools and formal methods.

### **UNIT - I**

Introduction to Finite Automata, Structural Representations, Automata and Complexity, the Central Concepts of Automata Theory – Alphabets, Strings, Languages, Problems. Deterministic Finite Automata, Nondeterministic Finite Automata, an application: Text Search, Finite Automata with Epsilon-Transitions.

### **UNIT - II**

Regular Expressions, Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions, Properties of Regular Languages- Pumping Lemma for Regular Languages, Applications of the Pumping Lemma, Closure Properties of Regular Languages, Decision Properties of Regular Languages, Equivalence and Minimization of Automata.

### **UNIT - III**

Context-Free Grammars: Definition of Context-Free Grammars, Derivations Using a Grammar, Leftmost and Rightmost Derivations, the Language of a Grammar, Sentential Forms, Parse Trees, Applications of Context-Free Grammars, Ambiguity in Grammars and Languages.

Push Down Automata,: Definition of the Pushdown Automaton, the Languages of a PDA, Equivalence of PDA's and CFG's, Deterministic Pushdown Automata.



#### **UNIT - IV**

Normal Forms for Context- Free Grammars, the Pumping Lemma for Context-Free Languages, Closure Properties of Context-Free Languages. Decision Properties of CFL's - Complexity of Converting among CFG's and PDA's, Running time of conversions to Chomsky Normal Form.

Introduction to Turing Machines-Problems That Computers Cannot Solve, The Turing Machine, Programming Techniques for Turing Machines, Extensions to the basic Turing machine, Restricted Turing Machines, Turing Machines, and Computers

#### **UNIT - V**

Undecidability: A Language that is Not Recursively Enumerable, An Undecidable Problem That is RE, Undecidable Problems about Turing Machines, Post's Correspondence Problem, Other Undecidable Problems, Intractable Problems: The Classes P and NP, An NP-Complete Problem.

#### **TEXT BOOKS:**

1. Introduction to Automata Theory, Languages, and Computation, 3<sup>rd</sup> Edition, John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.
2. Introduction to the Theory of Computation, Michael Sipser, 3<sup>rd</sup> edition, Cengage Learning.

#### **REFERENCE BOOKS:**

1. Introduction to Languages and The Theory of Computation, John C Martin, TMH.
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
3. A Text book on Automata Theory, P. K. Srimani, Nasir S. F. B, Cambridge University Press.
4. Introduction to Formal languages Automata Theory and Computation Kamala Krithivasan, Rama R, Pearson.
5. Theory of Computer Science – Automata languages and computation, Mishra and Chandrashekar, 2nd edition, PHI.

## SM405ES: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS

**B.Tech. II Year II Sem.**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**Course Objective:** To learn the basic Business types, impact of the Economy on Business and Firms specifically. To analyze the Business from the Financial Perspective.

**Course Outcome:** The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm's financial position by analysing the Financial Statements of a Company.

### UNIT – I

#### **Introduction to Business and Economics:**

**Business:** Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance.

**Economics:** Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply in Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

### UNIT – II

#### **Demand and Supply Analysis:**

**Elasticity of Demand:** Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.

**Supply Analysis:** Determinants of Supply, Supply Function & Law of Supply.

### UNIT- III

#### **Production, Cost, Market Structures & Pricing:**

**Production Analysis:** Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions.

**Cost analysis:** Types of Costs, Short run and Long run Cost Functions.

**Market Structures:** Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, and Monopolistic Competition.

**Pricing:** Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, and Cost Volume Profit Analysis.

#### **UNIT - IV**

**Financial Accounting:** Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, Elements of Financial Statements, and Preparation of Final Accounts.

#### **UNIT - V**

**Financial Analysis through Ratios:** Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems). Introduction to Fund Flow and Cash Flow Analysis (simple problems).

#### **TEXT BOOKS:**

1. D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd. 2013.
2. Dhanesh K Khatri, Financial Accounting, Tata McGraw Hill, 2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata McGraw Hill Education Pvt. Ltd. 2012.

#### **REFERENCES:**

1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.
2. S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, Vikas Publications, 2013.

## CS406ES: COMPUTER ORGANIZATION LAB

B.Tech. II Year II Sem.

L	T	P	C
0	0	3	2

### Exercises in Digital Logic Design:

1. Implement Logic gates using NAND and NOR gates
2. Design a Full adder using gates
3. Design and implement the 4:1 MUX, 8:1 MUX using gates /ICs.
4. Design and Implement a 3 to 8 decoder using gates
5. Design a 4 bit comparator using gates/IC
6. Design and Implement a 4 bit shift register using Flip flops
7. Design and Implement a Decade counter

### Exercises in Micro Processor programming:

Write assembly language programs for the following using GNU Assembler.

1. Write assembly language programs to evaluate the expressions:
  - i)  $a = b + c - d * e$
  - ii)  $z = x * y + w - v + u / k$
  - a. Considering 8-bit, 16 bit and 32 bit binary numbers as b, c, d, e.
  - b. Considering 2 digit, 4 digit and 8 digit BCD numbers.  
Take the input in consecutive memory locations and also Display the results by using "int xx" of 8086. Validate program for the boundary conditions.
2. Write an ALP of 8086 to take N numbers as input. And do the following operations on them.
  - a. Arrange in ascending and descending order.
3. Write an ALP of 8086 to take N numbers as input. And do the following operations on them.
  - a. Find max and minimum
  - b. Find average  
Considering 8-bit, 16 bit binary numbers and 2 digit, 4digit and 8 digit BCD numbers. Display the results by using "int xx" of 8086. Validate program for the boundary conditions.
4. Write an ALP of 8086 to take a string of as input (in 'C' format)and do the following Operations on it.
  - a. Find the length
  - b. Find it is Palindrome or n.  
Considering 8-bit, 16 bit binary numbers and 2 digit, 4digit and 8 digit BCD numbers. Display the results by using "int xx" of 8086. Validate program for the boundary conditions.
5. Write an ALP of 8086 to take a string of as input (in 'C' format) and do the following Operations on it.
  - a. Find whether given string substring or not.

6. Write an ALP of 8086 to take a string of as input (in 'C' format) and do the following Operations on it
  - a. Find the Armstrong number
  - b. Find the Fibonacci series for n numbersDisplay the results by using "int xx" of 8086.
7. Write the ALP to implement the above operations as procedures and call from the main procedure.
8. Write an ALP of 8086 to find the factorial of a given number as a Procedure and call from the main program which display the result.

**REFERENCE BOOKS:**

1. Switching theory and logic design –A. Anand Kumar PHI, 2013
2. Advanced microprocessor & Peripherals-A. K. Ray and K. M. Bherchandavi, TMH, 2nd edition.
3. Switching and Finite Automatic theory-Zvi Kohavi, Niraj K.Jha Cambridge, 3rd edition
4. Digital Design –Morris Mano, PHI, 3rd edition
5. Microprocessor and Interfacing –Douglas V. Hall, TMGH 2nd edition.

## CS407ES: DATABASE MANAGEMENT SYSTEMS LAB

B.Tech. II Year II Sem.

L	T	P	C
0	0	3	2

**Course Objectives:** This lab enables the students to practice the concepts learnt in the subject DBMS by developing a database for an example company named “Roadway Travels” whose description is as follows. The student is expected to practice the designing, developing and querying a database in the context of example database “Roadway travels”. Students are expected to use “Mysql” database.

### Course Outcomes:

- Ability to design and implement a database schema for given problem.
- Apply the normalization techniques for development of application software to realistic problems.
- Ability to formulate queries using SQL DML/DDI/DCL commands.

**Roadway Travels:** "Roadway Travels" is in business since 1997 with several buses connecting different places in India. Its main office is located in Hyderabad.

The company wants to *computerize its operations* in the following areas:

- Reservations and Ticketing
- Cancellations

**Reservations & Cancellation:** Reservations are directly handled by booking office. Reservations can be made 30 days in advance and tickets issued to passenger. One Passenger/person can book many tickets (to his/her family). Cancellations are also directly handed at the booking office.

In the process of *computerization* of **Roadway Travels** you have to design and develop a Database which consists the data of Buses, Passengers, Tickets, and Reservation and cancellation details. You should also develop query's using SQL to retrieve the data from the database.

The above process involves many steps like 1. Analyzing the [problem](#) and identifying the Entities and Relationships, 2. E-R Model 3. Relational Model 4. Normalization 5. Creating the database 6. Querying. *Students are supposed to work on these steps week wise and finally create a complete “Database System” to Roadway Travels.* Examples are given at every experiment for guidance to students.

### Experiment 1: E-R Model

Analyze the [problem](#) carefully and come up with the entities in it. Identify what data has to be persisted in the database. This contains the entities, attributes etc.

Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, if any.

Example:

**Entities:** 1. BUS 2. Ticket 3. Passenger

**Relationships:** 1. Reservation 2. Cancellation

**Primary Key Attributes:** 1. Ticket ID (Ticket Entity) 2. Passport ID (Passenger Entity)  
3. Bus\_NO (Bus Entity)

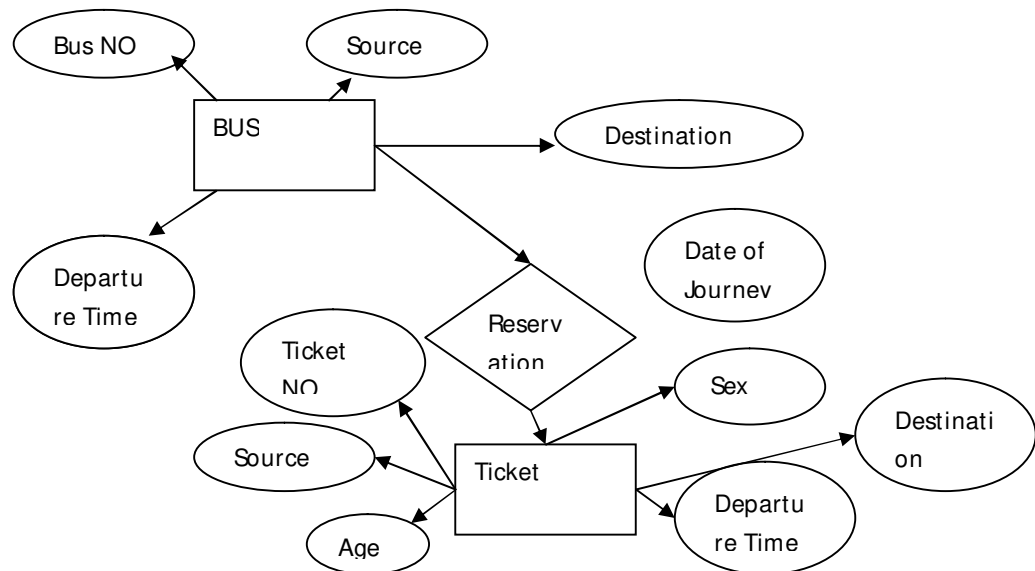
Apart from the above mentioned entities you can identify more. The above mentioned are few.

**Note:** The student is required to submit a document by writing the Entities and Keys to the lab teacher.

### Experiment 2: Concept design with E-R Model

Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entities and weak entities (if any). Indicate the type of relationships (total / partial). Try to incorporate generalization, aggregation, specialization etc wherever required.

#### Example: E-R diagram for bus



**Note:** The student is required to submit a document by drawing the E-R Diagram to the lab teacher.

### Experiment 3: Relational Model

Represent all the entities (Strong, Weak) in tabular fashion. Represent relationships in a tabular fashion. There are different ways of representing relationships as tables based on the cardinality. Represent attributes as columns in tables or as tables based on the requirement.

Different types of attributes (Composite, Multi-valued, and Derived) have different way of representation.

**Example:** The passenger tables look as below. This is an example. You can add more attributes based on your E-R model. This is not a normalized table.

Passenger

Name	Age	Sex	Address	<u>Passport ID</u>	Ticket _id

**Note:** *The student is required to submit a document by Represent relationships in a tabular fashion to the lab teacher.*

#### Experiment 4: Normalization

Database normalization is a technique for designing relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain types of logical or structural problems, namely data anomalies. For example, when multiple instances of a given piece of information occur in a table, the possibility exists that these instances will not be kept consistent when the data within the table is updated, leading to a loss of data integrity. A table that is sufficiently normalized is less vulnerable to problems of this kind, because its structure reflects the basic assumptions for when multiple instances of the same information should be represented by a single instance only.

For the above table in the First normalization we can remove the multi valued attribute Ticket\_id and place it in another table along with the primary key of passenger.

**First Normal Form: The above table can be divided into two tables as shown below.**

Passenger

Name	Age	Sex	Address	<u>Passport ID</u>

<u>Passport ID</u>	Ticket_id

You can do the second and third normal forms if required. Any how Normalized tables are given at the end.



### **Experiment 5: Installation of Mysql and practicing DDL commands**

Installation of MySQL. In this week you will learn Creating databases, How to create tables, altering the database, dropping tables and databases if not required. You will also try truncate, rename commands etc.

Example for creation of a normalized “Passenger” table.

```
CREATE TABLE Passenger (  
    Passport_id  INTEGER PRIMARY KEY,  
    Name  VARCHAR (50) Not NULL,  
    Age  Integer Not NULL,  
    Sex  Char,  
    Address VARCHAR (50) Not NULL);
```

Similarly create all other tables.

**Note: Detailed creation of tables is given at the end.**

### **Experiment 6: Practicing DML commands**

DML commands are used to for managing data within schema objects. Some examples:

- SELECT - retrieve data from the a database
- INSERT - insert data into a table
- UPDATE - updates existing data within a table
- DELETE - deletes all records from a table, the space for the records remain

#### **Inserting values into “Bus” table:**

Insert into Bus values (1234,'hyderabad', 'tirupathi');

Insert into Bus values (2345,'hyderabad', 'Banglore');

Insert into Bus values (23,'hyderabad', 'Kolkata');

Insert into Bus values (45,'Tirupathi', 'Banglore');

Insert into Bus values (34,'hyderabad', 'Chennai');

#### **Inserting values into “Passenger” table:**

Insert into Passenger values (1, 45,'ramesh', 45,'M', 'abc123');

Insert into Passenger values (2, 78,'geetha', 36,'F', 'abc124');

Insert into Passenger values (45, 90,'ram', 30,'M', 'abc12');

Insert into Passenger values (67, 89,'ravi', 50,'M', 'abc14');

Insert into Passenger values (56, 22,'seetha', 32,'F', 'abc55');

#### **Few more Examples of DML commands:**

Select \* from Bus; (selects all the attributes and display)

UPDATE BUS SET Bus No = 1 WHERE BUS NO=2;

### Experiment 7: Querying

In this week you are going to practice queries (along with sub queries) using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.

#### Practice the following Queries:

1. Display unique PNR\_no of all passengers.
2. Display all the names of male passengers.
3. Display the ticket numbers and names of all the passengers.
4. Find the ticket numbers of the passengers whose name start with 'r' and ends with 'h'.
5. Find the names of passengers whose age is between 30 and 45.
6. Display all the passengers names beginning with 'A'
7. Display the sorted list of passengers names

### Experiment 8 and Experiment 9: Querying (continued...)

You are going to practice queries using Aggregate functions (COUNT, SUM, AVG, and MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

1. Write a Query to display the Information present in the Passenger and cancellation tables. **Hint:** Use UNION Operator.
2. Display the number of days in a week on which the 9W01 bus is available.
3. Find number of tickets booked for each PNR\_no using GROUP BY CLAUSE. **Hint:** Use GROUP BY on PNR\_No.
4. Find the distinct PNR numbers that are present.
5. Find the number of tickets booked by a passenger where the number of seats is greater than 1. **Hint:** Use GROUP BY, WHERE and HAVING CLAUSES.
6. Find the total number of cancelled seats.

### Experiment 10: Triggers

In this week you are going to work on Triggers. Creation of insert trigger, delete trigger, update trigger. Practice triggers using the above database.

Eg: **CREATE TRIGGER updcheck BEFORE UPDATE ON passenger**

```
FOR EACH ROW  
BEGIN  
IF NEW.TicketNO > 60 THEN  
SET New.Ticket no = Ticket no;  
ELSE  
SET New.Ticketno = 0;  
END IF;  
END;
```

### Experiment 11: Procedures

In this session you are going to learn Creation of stored procedure, Execution of procedure and modification of procedure. Practice procedures using the above database.

Eg: **CREATE PROCEDURE myProc()**

```
BEGIN  
SELECT COUNT (Tickets) FROM Ticket WHERE age >= 40;  
End;
```

## Experiment 12: Cursors

In this week you need to do the following: Declare a cursor that defines a result set. Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done

```
CREATE PROCEDURE myProc(in_customer_id INT)
BEGIN
  DECLARE v_id INT;
  DECLARE v_name VARCHAR (30);
  DECLARE c1 CURSOR FOR SELECT stdId,stdFirstname FROM students WHERE
    stdId=in_customer_id;
  OPEN c1;
  FETCH c1 into v_id, v_name;
  Close c1;
  END;
```

### Tables

#### BUS

Bus No: Varchar: PK (public key)

Source : Varchar

Destination : Varchar

#### Passenger

PPNO: Varchar (15)) : PK

Name: Varchar (15)

Age : int (4)

Sex:Char (10) : Male / Female

Address: VarChar (20)

#### Passenger\_Tickets

PPNO: Varchar (15)) : PK

Ticket\_No: Numeric (9)

#### Reservation

PNR\_No: Numeric (9) : FK

Journey\_date : datetime (8)

No\_of\_seats : int (8)

Address: Varchar (50)

Contact\_No: Numeric (9) --> Should not be less than 9 and Should not accept any other character other than Integer

Status: Char (2) : Yes / No

#### Cancellation

PNR\_No: Numeric(9) : FK

Journey\_date : datetime(8)

No\_of\_seats : int (8)

Address : Varchar (50)

Contact\_No: Numeric (9) --> Should not be less than 9 and Should not accept any other character other than Integer

Status: Char (2) : Yes / No

**Ticket**

Ticket\_No: Numeric (9): PK

Journey\_date : datetime(8)

Age : int (4)

Sex:Char(10) : Male / Female

Source : Varchar

Destination : Varchar

Dep\_time : Varchar

**REFERENCE BOOKS:**

1. Introduction to SQL, Rick F. Vander Lans, Pearson education.
2. Oracle PL/SQL, B. Rosenzweig and E. Silvestrova, Pearson education.
3. SQL & PL/SQL for Oracle 10 g, Black Book, Dr. P. S. Deshpande, Dream Tech.
4. Oracle Database 11 g PL/SQL Programming, M. Mc Laughlin, TMH.

## CS408ES: OPERATING SYSTEMS LAB

B.Tech. II Year II Sem.

L	T	P	C
0	0	3	2

### Course Objectives:

- To write programs in Linux environment using system calls.
- To implement the scheduling algorithms.
- To implement page replacement algorithms
- To implement file allocation methods.
- To understand and implement ipc mechanism using named and unnamed pipes.
- To develop solutions for synchronization problems using semaphores.

### Course Outcomes:

- Ability to develop application programs using system calls in Unix.
- Ability to implement interprocess communication between two processes.
- Ability to design and solve synchronization problems.
- Ability to simulate and implement operating system concepts such as scheduling, deadlock management, file management, and memory management.

**Use Linux operating system and GNU C compiler.**

### List of Programs:

1. Write C programs to simulate the following CPU scheduling algorithms:  
a) Round Robin    b) SJF
2. Write C programs to simulate the following CPU scheduling algorithms:  
a) FCFS        b) Priority
3. Write C programs to simulate the following File organization techniques:  
a) Single level directory    b) Two level    c) Hierarchical
4. Write C programs to simulate the following File allocation methods:  
a) Contiguous        b) Linked        c) Indexed
5. Write a C program to copy the contents of one file to another using system calls.
6. Write a C program to simulate Bankers Algorithm for Dead Lock Avoidance
7. Write a C program to simulate Bankers Algorithm for Dead Lock Prevention
8. Write C programs to simulate the following page replacement algorithms:  
a) FIFO    b) LRU    c) LFU
9. Write C programs to simulate the following techniques of memory management:  
a) Paging    b) Segmentation
10. Write a C program to implement the ls | sort command. (Use unnamed Pipe)
11. Write a C program to solve the Dining- Philosopher problem using semaphores.
12. Write C programs to implement ipc between two unrelated processes using named pipe.

### REFERENCE BOOKS:

1. An Introduction to Operating Systems, P.C.P Bhatt, 2<sup>nd</sup> edition, PHI.
2. Unix System Programming Using C++, Terrence Chan, PHI/Pearson.
3. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, PHI

## MC400HS: GENDER SENSITIZATION LAB

B.Tech. II Year II Sem.

L T P C  
0 0 3 0

### Course Objectives:

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

### Course Outcomes:

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature, and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

### UNIT - I

#### UNDERSTANDING GENDER

**Gender:** Why Should We Study It? (*Towards a World of Equals*: Unit -1)

**Socialization:** Making Women, Making Men (*Towards a World of Equals*: Unit -2)

Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

### UNIT - II

#### GENDER AND BIOLOGY:

**Missing Women:** Sex Selection and Its Consequences (*Towards a World of Equals*: Unit -4)  
Declining Sex Ratio. Demographic Consequences.

**Gender Spectrum:** Beyond the Binary (*Towards a World of Equals*: Unit -10)

Two or Many? Struggles with Discrimination.

### UNIT - III

#### GENDER AND LABOUR

**Housework:** the Invisible Labour (*Towards a World of Equals*: Unit -3)

“My Mother doesn’t Work.” “Share the Load.”

**Women’s Work:** Its Politics and Economics (*Towards a World of Equals*: Unit -7)

Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

### UNIT-IV

#### ISSUES OF VIOLENCE

**Sexual Harassment:** Say No! (*Towards a World of Equals*: Unit -6)

Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: “Chupulu”.

**Domestic Violence:** Speaking Out (*Towards a World of Equals*: Unit -8)

Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading: New Forums for Justice.

Thinking about Sexual Violence (*Towards a World of Equals*: Unit -11)

Blaming the Victim-“I Fought for my Life...” - Additional Reading: The Caste Face of Violence.

### UNIT - V

#### GENDER: CO - EXISTENCE

**Just Relationships:** Being Together as Equals (*Towards a World of Equals*: Unit -12)

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Additional Reading: Rosa Parks-The Brave Heart.

#### TEXTBOOK

All the five Units in the Textbook, “*Towards a World of Equals: A Bilingual Textbook on Gender*” written by A. Suneetha, Uma Bhugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by **Telugu Akademi, Hyderabad**, Telangana State in the year **2015**.

**Note:** Since it is an Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

#### REFERENCE BOOKS:

1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
2. Abdulali Sohaila. “*I Fought For My Life...and Won.*” Available online at:  
<http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulali/>

**II YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A40506	Computer Organization	4	-	4
A40507	Database Management Systems	4	-	4
A40503	Java Programming	4	-	4
A40009	Environmental studies	4	-	4
A40509	Formal Languages and Automata Theory	4	-	4
A40508	Design and Analysis of Algorithms	4	-	4
A40585	Java Programming Lab	-	3	2
A40584	Database Management Systems Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A50511	Principles of Programming Languages	4	-	4
	<b>OPEN ELECTIVE</b>	4	-	4
A50018	Human Values and Professional Ethics			
A50017	Intellectual Property Rights			
A50117	Disaster Management			
A50518	Software Engineering	4	-	4
A50514	Compiler Design	4	-	4
A50510	Operating Systems	4	-	4
A50515	Computer Networks	4	-	4
A50589	Operating Systems Lab	-	3	2
A50587	Compiler Design Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A60521	Distributed Systems	4	-	4
A60522	Information Security	4	-	4
A60524	Object Oriented Analysis and Design	4	-	4
A60525	Software Testing Methodologies	4	-	4
A60010	Managerial Economics and Financial Analysis	4	-	4
A60512	Web Technologies	4	-	4
A60591	Case Tools and Web Technologies Lab	-	3	2
A60086	Advanced Communication Skills Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>



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<b>III Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A50511) PRINCIPLES OF PROGRAMMING LANGUAGES****Objectives:**

- To briefly describe various programming paradigms.
- To provide conceptual understanding of High level language design and implementation.
- To introduce the power of scripting languages.

**UNIT- I**

**Preliminary Concepts:** Reasons for studying, concepts of programming languages, Programming domains, Language Evaluation Criteria, influences on Language design, Language categories, Programming Paradigms – Imperative, Object Oriented, functional Programming , Logic Programming. Programming Language Implementation – Compilation and Virtual Machines, programming environments. Syntax and Semantics: general Problem of describing Syntax and Semantics, formal methods of describing syntax - BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, attribute grammars, denotational semantics and axiomatic semantics for common programming language features.

**UNIT- II**

**Data types:** Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization. Expressions and Statements: Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements, Control Structures – Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements, guarded commands.

**UNIT-III**

**Subprograms and Blocks:** Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions user defined overloaded operators, co routines.

**UNIT- IV**

**Abstract Data types:** Abstractions and encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT,

object oriented programming in small talk, C++, Java, C#, Ada 95

**Concurrency:** Subprogram level concurrency, semaphores, monitors, message passing, Java threads, C# threads.

**Exception handling :** Exceptions, exception Propagation, Exception handler in Ada, C++ and Java.

**Logic Programming Language :** Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

#### UNIT- V

**Functional Programming Languages:** Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages.

Scripting Language: Pragmatics, Key Concepts, Case Study : Python – Values and Types, Variables , Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library.

#### TEXT BOOKS:

1. Concepts of Programming Languages Robert .W. Sebesta 8/e, Pearson Education,2008.
2. Programming Language Design Concepts, D. A. Watt, Wiley dreamtech,rp-2007.

#### REFERENCE BOOKS:

1. Programming Languages, 2nd Edition, A.B. Tucker, R.E. Noonan, TMH.
2. Programming Languages, K. C.Louden, 2nd Edition, Thomson, 2003.
3. LISP, Patric Henry Winston and Paul Horn, Pearson Education.
4. Programming in Prolog, W.F. Clocksin,& C.S.Mellish, 5th Edition, Springer.
5. Programming Python, M.Lutz, 3rd Edition, O'reilly, SPD, rp-2007.
6. Core Python Programming, Chun, II Edition, Pearson Education, 2007.
7. Guide to Programming with Python, Michael Dawson, Thomson, 2008

#### Outcomes:

- Ability to express syntax and semantics in formal notation.
- Ability to apply suitable programming paradigm for the application.
- Gain Knowledge and comparison of the features programming languages.

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**(A50018) HUMAN VALUES AND PROFESSIONAL ETHICS****(Open Elective)**

Objectives : This introductory course input is intended

- To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Value based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

**Unit I:**

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self Exploration-what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

**Unit II:**

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' - Sukh and Savidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

**Unit III:**

**Understanding Harmony in the Family and Society- Harmony in Human**

- **Human Relationship** : Understanding harmony in the Family- the basic unit of human interaction. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; **Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.** Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals. Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha )- from family to world family!

**Unit IV:**

**Understanding Harmony in the Nature and Existence - Whole existence as Co-existence** : Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

**Unit V:**

**Implications of the above Holistic Understanding of Harmony on Professional Ethics** : Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

- a) Ability to utilize the professional competence for augmenting universal human order,
- b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
- c) Ability to identify and develop appropriate technologies and management patterns for above production systems.

Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order:

- a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers
- b) At the level of society: as mutually enriching institutions and organizations

**TEXT BOOKS**

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in

Human Values and Professional Ethics.

2. Prof. KV Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

#### **REFERENCE BOOKS**

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. A Nagraj, 1998, Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Susan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
5. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A.N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethichs (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.

#### **Relevant CDs, Movies, Documentaries & Other Literature:**

1. Value Education website, <http://www.uptu.ac.in>
2. Story of Stuff, <http://www.storyofstuff.com>
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charlie Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story

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**(A50017) INTELLECTUAL PROPERTY RIGHTS****(Open Elective)****UNIT – I**

**Introduction to Intellectual property:** Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

**UNIT – II**

**Trade Marks :** Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

**UNIT – III**

**Law of copy rights :** Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents : Foundation of patent law, patent searching process, ownership rights and transfer

**UNIT – IV**

**Trade Secrets :** Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

**Unfair competition :** Misappropriation right of publicity, False advertising.

**UNIT – V**

**New development of intellectual property:** new developments in trade mark law ; copy right law, patent law, intellectual property audits.

International overview on intellectual property, international – trade mark law, copy right law, international patent law, international development in trade secrets law.

**TEXT BOOKS & REFERENCES:**

1. Intellectual property right, Deborah. E. Bouchoux, cengage learning.
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tate Mc Graw Hill Publishing company ltd.,

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**(A50117) DISASTER MANAGEMENT****(Open Elective)****Unit-I**

**Environmental Hazards & Disasters:** Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

**Unit –II**

**Types of Environmental hazards & Disasters:** Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards –

**Unit –III**

Endogenous Hazards - Volcanic Eruption – Earthquakes – Landslides - Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - - Earthquake Hazards in India - - Human adjustment, perception & mitigation of earthquake.

**Unit –IV**

Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters

**Infrequent events:** Cyclones – Lightning – Hailstorms

**Cyclones:** Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes , distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves Floods:- Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & mitigation) Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Palnetary Hazards/ Disasters- Man induced Hazards / Disasters- Physical hazards/ Disasters-Soil Erosion

**Soil Erosion:**-- Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion

**Chemical hazards/ disasters:**-- Release of toxic chemicals, nuclear explosion- Sedimentation processes Sedimentation processes:- Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation

**Biological hazards/ disasters:**- Population Explosion.

#### **Unit –V**

Emerging approaches in Disaster Management- Three Stages

1. Pre- disaster stage (preparedness)
2. Emergency Stage
3. Post Disaster stage-Rehabilitation

#### **TEXT BOOKS:**

1. Disaster Mitigation: Experiences And Reflections by Pardeep Sahni
2. Natural Hazards & Disasters by Donald Hyndman & David Hyndman – Cengage Learning

#### **REFERENCES**

1. R.B.Singh (Ed) Environmental Geography, Heritage Publishers New Delhi,1990
2. Savinder Singh Environmental Geography, Prayag Pustak Bhawan, 1997
3. Kates,B.I & White, G.F The Environment as Hazards, oxford, New York, 1978
4. R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
5. H.K. Gupta (Ed) Disaster Management, Universiters Press, India, 2003
6. R.B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994
7. Dr. Satender , Disaster Management t in Hills, Concept Publishing Co., New Delhi, 2003
8. A.S. Arya Action Plan For Earthquake,Disaster, Mitigation in V.K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994
9. R.K. Bhandani An overview on Natural & Man made Disaster & their Reduction,CSIR, New Delhi
10. M.C. Gupta Manuals on Natural Disaster management in India, National Centre for Disaster Management, IIPA, New Delhi, 2001



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**(A50518) SOFTWARE ENGINEERING****Objectives:**

- To understanding of software process models such as waterfall and evolutionary models.
- To understanding of software requirements and SRS document.
- To understanding of different software architectural styles.
- To understanding of software testing approaches such as unit testing and integration testing.
- To understanding on quality control and how to ensure good quality software.

**UNIT- I**

**Introduction to Software Engineering:** The evolving role of software, Changing Nature of Software, legacy software, Software myths.

**A Generic view of process:** Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

**Process models:** The waterfall model, Incremental process models, Evolutionary process models, Specialized process models, The Unified process.

**UNIT- II**

**Software Requirements:** Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

**Requirements engineering process:** Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

**System models:** Context Models, Behavioral models, Data models, Object models, structured methods.

**UNIT- III**

**Design Engineering:** Design process and Design quality, Design concepts, the design model, pattern based software design.

**Creating an architectural design:** software architecture, Data design, Architectural styles and patterns, Architectural Design, assessing alternative architectural designs, mapping data flow into a software architecture.

**Modeling component-level design :** Designing class-based components, conducting component-level design, Object constraint language, designing conventional components.

**Performing User interface design:** Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

#### **UNIT- IV**

**Testing Strategies:** A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

**Product metrics:** Software Quality, Frame work for Product metrics, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Metrics for Process and Products: Software Measurement, Metrics for software quality.

#### **UNIT- V**

**Risk management:** Reactive vs Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

**Quality Management:** Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

#### **TEXT BOOKS:**

1. Software Engineering A practitioner's Approach, Roger S Pressman, sixth edition McGrawHill International Edition.
2. Software Engineering, Ian Sommerville, seventh edition, Pearson education.

#### **REFERENCE BOOKS:**

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, Rajib Mall,PHI, 2005
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition 2006.
7. Software Engineering Foundations, Yingxu Wang, Auerbach

Publications,2008.

8. Software Engineering Principles and Practice, Hans Van Vliet,3rd edition, John Wiley & Sons Ltd.
9. Software Engineering 3: Domains, Requirements, and Software Design, D. Bjorner, Springer International Edition.
10. Introduction to Software Engineering, R.J. Leach, CRC Press.

**Outcomes:**

- Ability to identify the minimum requirements for the development of application.
- Ability to develop, maintain, efficient, reliable and cost effective software solutions
- Ability to critically think and evaluate assumptions and arguments.

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**(A50514) COMPILER DESIGN****Objectives:**

- To describe the steps and algorithms used by language translators.
- To discuss the effectiveness of optimization.
- To explain the machine dependent aspects of Compilation

**UNIT – I**

**Overview of Compilation:** Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation – LEX lexical analyzer generator.

**Top down Parsing:** Context free grammars, Top down parsing – Backtracking, LL (1), recursive descent parsing, Predictive parsing, Preprocessing steps required for predictive parsing.

**UNIT – II**

**Bottom up parsing :** Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing , handling ambiguous grammar, YACC – automatic parser generator.

**UNIT – III**

**Semantic analysis :** Intermediate forms of source Programs – abstract syntax tree, polish notation and three address codes. Attributed grammars, Syntax directed translation, Conversion of popular Programming languages language Constructs into Intermediate code forms, Type checker.

**Symbol Tables :** Symbol table format, organization for block structures languages, hashing, tree structures representation of scope information. Block structures and non block structure storage allocation: static, Runtime stack and heap storage allocation, storage allocation for arrays, strings and records.

**UNIT – IV**

**Code optimization :** Consideration for Optimization, Scope of Optimization, local optimization, loop optimization, frequency reduction, folding, DAG representation.

**Data flow analysis :** Flow graph, data flow equation, global optimization, redundant sub expression elimination, Induction variable elements, Live variable analysis, Copy propagation.

**UNIT – V**

**Object code generation** : Object code forms, machine dependent code optimization, register allocation and assignment generic code generation algorithms, DAG for register allocation.

**TEXT BOOKS :**

1. Principles of compiler design -A.V. Aho . J.D.Ullman; Pearson Education.
2. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.

**REFERENCE BOOKS :**

1. lex &yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
2. Modern Compiler Design- Dick Grune, Henry E. Bal, Caryl T. H. Jacobs, Wiley dreamtech.
3. Engineering a Compiler-Cooper & Linda, Elsevier.
4. Compiler Construction, Loudon, Thomson.

**Outcomes:**

- Ability to understand the design of a compiler given features of the languages.
- Ability to implement practical aspects of automata theory.
- Gain Knowledge of powerful compiler generation tools.

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**(A50510) OPERATING SYSTEMS****Objectives:**

- To understand main components of OS and their working
- To study the operations performed by OS as a resource manager
- To understand the scheduling policies of OS
- To understand the different memory management techniques
- To understand process concurrency and synchronization
- To understand the concepts of input/output, storage and file management
- To study different OS and compare their features.

**UNIT- I**

**Operating System Introduction:** Operating Systems objectives and functions, Computer System Architecture, OS Structure, OS Operations, Evolution of Operating Systems - Simple Batch, Multi programmed, time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, Special -Purpose Systems, Operating System services, User OS Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, OS Structure, Virtual Machines.

**UNIT- II**

Process and CPU Scheduling - Process concepts-The Process, Process State, Process Control Block, Threads, Process Scheduling-Scheduling Queues, Schedulers, Context Switch, Preemptive Scheduling, Dispatcher, Scheduling Criteria, Scheduling algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Thread scheduling, Case studies: Linux, Windows.

Process Coordination – Process Synchronization, The Critical Section Problem, Peterson's solution, Synchronization Hardware, Semaphores, and Classic Problems of Synchronization, Monitors, Case Studies: Linux, Windows.

**UNIT- III**

Memory Management and Virtual Memory - Logical & Physical Address Space, Swapping, Contiguous Allocation, Paging, Structure of Page Table, Segmentation, Segmentation with Paging, Virtual Memory, Demand Paging, Performance of Demanding Paging, Page Replacement Page Replacement Algorithms, Allocation of Frames, Thrashing.

**UNIT- IV**

File System Interface - The Concept of a File, Access methods, Directory Structure, File System Mounting, File Sharing, Protection, File System Implementation - File System Structure, File System Implementation, Allocation methods, Free-space Management, Directory Implementation, Efficiency and Performance.

Mass Storage Structure – Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap space Management

**UNIT- V**

Deadlocks - System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

Protection – System Protection, Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, Capability-Based Systems, Language-Based Protection.

**TEXT BOOKS:**

1. Operating System Principles , Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 8th Edition, Wiley Student Edition
2. Operating Systems – Internals and Design Principles, W. Stallings, 6th Edition, Pearson.

**REFERENCE BOOKS:**

1. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, PHI
2. Operating Systems A concept-based Approach, 2nd Edition, D.M.Dhamdhere, TMH.
3. Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.
4. Operating Systems, A.S.Godbole, 2nd Edition, TMH
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6. Operating Systems, S.Haldar and A.A.Aravind, Pearson Education.
7. Operating Systems, R.Elmasri, A,G.Carrick and D.Levine, Mc Graw Hill.
8. Operating Systems in depth, T.W. Doeppner, Wiley.

**Outcomes:**

- Apply optimization techniques for the improvement of system performance.
- Ability to understand the synchronous and asynchronous

communication mechanisms in their respective OS.

- Learn about minimization of turnaround time, waiting time and response time and also maximization of throughput with keeping CPU as busy as possible.
- Ability to compare the different OS



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**(A50515) COMPUTER NETWORKS****Objectives:**

- To introduce the fundamental various types of computer networks.
- To demonstrate the TCP/IP and OSI models with merits and demerits.
- To explore the various layers of OSI Model.
- To introduce UDP and TCP Models.

**UNIT-I**

**Overview of the Internet:** Protocol, Layering Scenario, TCP/IP Protocol Suite: The OSI Model, Internet history standards and administration; Comparison of the OSI and TCP/IP reference model.

**Physical Layer:** Guided transmission media, wireless transmission media.

**Data Link Layer –** design issues, CRC Codes, Elementary Data link Layer protocols, sliding window protocol

**UNIT-II**

**Multiple Access Protocols –**ALOHA, CSMA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer, data link layer switching & use of bridges, learning bridges, spanning tree bridges, repeaters , hubs, bridges , switches, routers and gateways.

**UNIT-III**

**Network Layer:** Network Layer Design issues, store and forward packet switching connection less and connection oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Count to Infinity Problem, Hierarchical Routing, Congestion control algorithms, admission control.

**UNIT-IV**

**Internetworking:** Tunneling, Internetwork Routing, Packet fragmentation, IPv4, Ipv6 Protocol, IP addresses, CIDR, ICMP, ARP, RARP, DHCP.

**Transport Layer:** Services provided to the upper layers elements of transport protocol-addressing connection establishment, connection release, Connection Release, Crash Recovery.

**UNIT-V**

The Internet Transport Protocols UDP-RPC, Real Time Transport Protocols, The Internet Transport Protocols- Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP

Connection Release, The TCP Connection Management Modeling, The TCP Sliding Window, The TCP Congestion Control, The future of TCP.

Application Layer-Introduction ,providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS, SSH

**TEXT BOOKS:**

1. Data Communications and Networking – Behrouz A. Forouzan, Fifth Edition TMH, 2013.
2. Computer Networks -- Andrew S Tanenbaum, 4th Edition, Pearson Education.

**REFERENCE BOOKS:**

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W.A.Shay, Cengage Learning.
3. Introduction to Computer Networks and Cyber Security, Chwan-Hwa (John) Wu, J. David Irwin, CRC Press.
4. Computer Networks, L.L.Peterson and B.S.Davie, 4th edition, ELSEVIER.
5. Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose,K.W.Ross,3rd Edition, Pearson Education.

**Outcomes:**

- Students should be understand and explore the basics of Computer Networks and Various Protocols. He/She will be in a position to understand the World Wide Web concepts.
- Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile and ad hoc networks.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-I Sem****L T/P/D C****- -/3/- 2****(A50589) OPERATING SYSTEMS LAB****Objectives:**

- To use inux perating system for study of operating system concepts.
- To write the code to mplement nd odify ariousconcepts in operating systems using Linux.

**List of Programs:**

1. Simulate the following CPU scheduling algorithms  
a) Round Robin b) SJF c) FCFS d) Priority
2. Simulate all file allocation strategies  
a) Sequential b) Indexed c) Linked
3. Simulate MVT and MFT
4. Simulat all File Organization Techniques  
a) Single level directory b) Two level c) Hierarchical d) DAG
5. Simulate Bankers Algorithm for Dead Lock Avoidance
6. Simulate Bankers Algorithm for Dead Lock Prevention
7. Simulate all page replacement algorithms  
a) FIF b) LRU c) LFU Etc.
8. Simulate Paging Technique of memory management.

**Outcomes:**

- The course objectives ensure the development of students applied skills in operating systems related areas.
- Students willgin knowledge in writing oftware routines odules or mplementing various concepts of perating systems

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-I Sem****L T/P/D C****- /3/- 2****(A50587) COMPILER DESIGN LAB****Objectives:**

- To provide an understanding of the language translation peculiarities by designing a complete translator for a mini language.

**Recommended Systems/Software Requirements:**

- Intel based desktop PC with minimum of 166 MHZ or faster processor with atleast 64 MB RAM and 100 MB free disk space
- C++ compiler and JDK kit

Consider the following mini Language, a simple procedural high-level language, only operating on integer

data, with a syntax looking vaguely like a simple C crossed with Pascal. The syntax of the language is

defined by the following BNF grammar:

```
<program> ::= <block>
```

```
<block> ::= { <variabledefinition> <slis> }
```

```
| { <slis> }
```

```
<variabledefinition> ::= int <vardeflist> ;
```

```
<vardeflist> ::= <vardec> | <vardec> , <vardeflist>
```

```
<vardec> ::= <identifier> | <identifier> [ <constant> ]
```

```
<slis> ::= <statement> | <statement> ; <slis>
```

```
<statement> ::= <assignment> | <ifstatement> | <whilestatement>
```

```
| <block> | <printstatement> | <empty>
```

```
<assignment> ::= <identifier> = <expression>
```

```
| <identifier> [ <expression> ] = <expression>
```

```
<ifstatement> ::= if <bexpression> then <slis> else <slis> endif
```

```
| if <bexpression> then <slis> endif
```

```
<whilestatement> ::= while <bexpression> do <slis> enddo
```

```
<printstatement> ::= print ( <expression> )
```

```
<expression> ::= <expression> <addingop> <term> | <term> | <addingop>
```

```
<term>
```

```
<bexpression> ::= <expression> <relop> <expression>
```

```
<relop> ::= < | <= | == | >= | > | !=
```

```

<addingop> ::= + | -
<term> ::= <term> <multop> <factor> | <factor>
<multop> ::= * | /
<factor> ::= <constant> | <identifier> | <identifier> [ <expression>]
| ( <expression> )
<constant> ::= <digit> | <digit> <constant>
<identifier> ::= <identifier> <letterordigit> | <letter>
<letterordigit> ::= <letter> | <digit>
<letter> ::= a|b|c|d|e|f|g|h|i|j|k|l|m|n|o|p|q|r|s|t|u|v|w|x|y|z
<digit> ::= 0|1|2|3|4|5|6|7|8|9

```

<empty> has the obvious meaning

Comments (zero or more characters enclosed between the standard C/Java-style comment brackets /

\*...\*/) can be inserted. The language has rudimentary support for 1-dimensional arrays. The declaration

int a[3] declares an array of three elements, referenced as a[0], a[1] and a[2]. Note also that you should

worry about the scoping of names.

A simple program written in this language is:

```

{ int a[3],t1,t2;
t1=2;
a[0]=1; a[1]=2; a[t1]=3;
t2=-(a[2]+t1*6)/(a[2]-t1);
if t2>5 then
print(t2);
else {
int t3;
t3=99;
t2=-25;
print(-t1+t2*t3); /* this is a comment
on 2 lines */
} endif }

```

1. Design a Lexical analyzer for the above language. The lexical analyzer should ignore redundant spaces, tabs and newlines. It should also ignore comments. Although the syntax specification states that

identifiers can be arbitrarily long, you may restrict the length to some reasonable value.

2. Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generating tools.
3. Design Predictive parser for the given language
4. Design LALR bottom up parser for the above language.
5. Convert the BNF rules into Yacc form and write code to generate abstract syntax tree.
6. Write program to generate machine code from the abstract syntax tree generated by the parser. The following instruction set may be considered as target code.

The following is a simple register-based machine, supporting a total of 17 instructions. It has three distinct internal storage areas. The first is the set of 8 registers, used by the individual instructions as detailed below, the second is an area used for the storage of variables and the third is an area used for the storage of program. The instructions can be preceded by a label. This consists of an integer in the range 1 to 9999 and the label is followed by a colon to separate it from the rest of the instruction. The numerical label can be used as the argument to a jump instruction, as detailed below.

In the description of the individual instructions below, instruction argument types are specified as follows :

R

specifies a register in the form R0, R1, R2, R3, R4, R5, R6 or R7 (or r0, r1, etc.).

L

specifies a numerical label (in the range 1 to 9999).

V

specifies a "variable location" (a variable number, or a variable location pointed to by a register - see below).

A

specifies a constant value, a variable location, a register or a variable location pointed to by a register (an indirect address). Constant values are specified as an integer value, optionally preceded by a minus sign, preceded by a # symbol. An indirect address is specified by an @ followed by a register.

So, for example, an A-type argument could have the form 4 (variable number 4), #4 (the constant value 4), r4 (register 4) or @r4 (the contents of register 4 identifies the variable location to be accessed).

The instruction set is defined as follows:

LOAD A,R

loads the integer value specified by A into register R.

STORE R,V

stores the value in register R to variable V.

OUT R

outputs the value in register R.

NEG R

negates the value in register R.

ADD A,R

adds the value specified by A to register R, leaving the result in register R.

SUB A,R

subtracts the value specified by A from register R, leaving the result in register R.

MUL A,R

multiplies the value specified by A by register R, leaving the result in register R.

DIV A,R

divides register R by the value specified by A, leaving the result in register R.

JMP L

causes an unconditional jump to the instruction with the label L.

JEQ R,L

jumps to the instruction with the label L if the value in register R is zero.

JNE R,L

jumps to the instruction with the label L if the value in register R is not zero.

JGE R,L

jumps to the instruction with the label L if the value in register R is greater than or equal to zero.

JGT R,L

jumps to the instruction with the label L if the value in register R is greater than zero.

JLE R,L

jumps to the instruction with the label L if the value in register R is less than or equal to zero.

JLT R,L

jumps to the instruction with the label L if the value in register R is less than zero.

NOP

is an instruction with no effect. It can be tagged by a label.

STOP

stops execution of the machine. All programs should terminate by executing a STOP instruction.

**Outcomes:**

- By this laboratory, students will understand the practical approach of how a compiler works.
- This will enable him to work in the development phase of new computer languages in industry.



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>III Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A60521) DISTRIBUTED SYSTEMS****Objectives:**

- To understand what and why a distributed system is.
- To understand theoretical concepts, namely, virtual time, agreement and consensus protocols.
- To understand IPC, Group Communication & RPC Concepts.
- To understand the DFS and DSM Concepts.
- To understand the concepts of transaction in distributed environment and associated concepts, namely, concurrency control, deadlocks and error recovery.

**UNIT-I**

**Characterization of Distributed Systems:** Introduction, Examples of Distributed Systems, Resource Sharing and the Web, Challenges.

**System Models:** Introduction, Architectural Models, Fundamental Models.

**UNIT-II**

**Time and Global States:** Introduction, Clocks Events and Process States, Synchronizing Physical Clocks, Logical Time and Logical Clocks, Global States, Distributed Debugging.

**Coordination and Agreement:** Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication, Consensus and Related Problems.

**UNIT-III**

**InterProcess Communication:** Introduction, The API for the Internet Protocols, External Data Representation and Marshalling, Client-Server Communication, Group Communication, Case Study: IPC in **UNIX**.

**Distributed Objects and Remote Invocation:** Introduction, Communication between Distributed Objects, Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI.

**UNIT-IV**

**Distributed File Systems:** Introduction, File Service Architecture, Case Study 1: Sun Network File System, Case Study 2: The Andrew File System.

**Name Services:** Introduction, Name Services and the Domain Name System, Directory Services, Case Study of the Global Name Services.

**Distributed Shared Memory:** Introduction, Design and Implementation Issues, Sequential Consistency and IVY case study, Release Consistency,

Munin Case Study, Other Consistency Models.

**UNIT- V**

**Transactions and Concurrency Control:** Introduction, Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Timestamp Ordering, Comparison of Methods for Concurrency Control.

**Distributed Transactions:** Introduction, Flat and Nested Distributed Transactions, Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Deadlocks, Transaction Recovery.

**TEXT BOOK:**

- 1) Distributed Systems, Concepts and Design, George Coulouris, J Dollimore and Tim Kindberg, Pearson Education, 4<sup>th</sup> Edition, 2009.

**REFERENCE BOOKS:**

- 1) Distributed Systems, Principles and Paradigms, Andrew S. Tanenbaum, Maarten Van Steen, 2<sup>nd</sup> Edition, PHI.
- 2) Distributed Systems, An Algorithm Approach, Sukumar Ghosh, Chapman&Hall/CRC, Taylor & Fransis Group, 2007.

**Outcomes:**

- Able to comprehend and design a new distributed system with the desired features.
- Able to start literature survey leading to further research in any subarea.
- Able to develop new distributed applications.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-II Sem**

L	T/P/D	C
4	-/-	4

**(A60522) INFORMATION SECURITY****Objectives:**

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- Understand various cryptographic algorithms.
- Understand the basic categories of threats to computers and networks
- Describe public-key cryptosystem.
- Describe the enhancements made to IPv4 by IPsec
- Understand Intrusions and intrusion detection
- Discuss the fundamental ideas of public-key cryptography.
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
- Discuss Web security and Firewalls

**UNIT – I**

**Attacks on Computers and Computer Security:** Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

**Cryptography: Concepts and Techniques:** Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

**UNIT – II**

**Symmetric key Ciphers:** Block Cipher principles & Algorithms(DES, AES, Blowfish), Differential and Linear Cryptanalysis, Block cipher modes of operation, Stream ciphers, RC4, Location and placement of encryption function, Key distribution  
**Asymmetric key Ciphers:** Principles of public key cryptosystems, Algorithms(RSA, Diffie-Hellman, ECC), Key Distribution.

**UNIT – III**

**Message Authentication Algorithms and Hash Functions:** Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm  
**Authentication Applications:** Kerberos, X.509

Authentication Service, Public – Key Infrastructure, Biometric Authentication

#### **UNIT – IV**

**E-Mail Security:** Pretty Good Privacy, S/MIME **IP Security:** IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, key management

#### **UNIT – V**

**Web Security:** Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction **Intruders, Virus and Firewalls:** Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls **Case Studies on Cryptography and security:** Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability, Virtual Elections

#### **TEXT BOOKS:**

1. Cryptography and Network Security : William Stallings, Pearson Education, 4<sup>th</sup> Edition
2. Cryptography and Network Security : Atul Kahate, Mc Graw Hill, 2<sup>nd</sup> Edition

#### **REFERENCE BOOKS:**

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1<sup>st</sup> Edition.
2. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 2<sup>nd</sup> Edition
3. Information Security, Principles and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM.Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

#### **Outcomes:**

- Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
- Ability to identify information system requirements for both of them such as client and server.
- Ability to understand the current legal issues towards information security.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-II Sem****L T/P/D C****4 -/- 4****(A60524) OBJECT ORIENTED ANALYSIS AND DESIGN****Objectives:**

- Concisely define the following key terms: class, object, state, behavior, object class, class diagram, object diagram, operation, encapsulation, constructor operation, query operation, update operation, scope operation, association, association role, multiplicity, association class, abstract class, concrete class, class-scope attribute, abstract operation, method, polymorphism, overriding, multiple classification, aggregation, and composition.
- Describe the activities in the different phases of the object-oriented development life cycle.
- State the advantages of object-oriented modeling vis-à-vis structured approaches.
- Compare and contrast the object-oriented model with the E-R and EER models.
- Model a real-world application by using a UML class diagram.
- Provide a snapshot of the detailed state of a system at a point in time using a UML (Unified Modeling Language) object diagram.
- Recognize when to use generalization, aggregation, and composition relationships.
- Specify different types of business rules in a class diagram.

**UNIT- I**

**Introduction to UML:** Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

**UNIT- II**

**Basic Structural Modeling:** Classes, Relationships, common Mechanisms, and diagrams.

Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

**UNIT- III**

Basic Behavioral Modeling-I: Interactions, Interaction diagrams.

Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity

Diagrams.

#### **UNIT- IV**

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

#### **UNIT- V**

Patterns and Frameworks, Artifact Diagrams. Case Study: The Unified Library application

#### **TEXT BOOKS:**

1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education 2nd Edition.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

#### **REFERENCE BOOKS:**

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML, TMH.
5. Applying UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
6. Object-Oriented Analysis and Design with the Unified Process By John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.
7. UML and C++, R.C.Lee, and W.M.Tepfenhart, PHI.
8. Object Oriented Analysis, Design and Implementation, B.Dathan, S.Ramnath, Universities Press.
9. OODesign with UML and Java, K.Barclay, J.Savage, Elsevier.
10. Learning UML 2.0, Russ Miles and Kim Hamilton, O'Reilly, SPD.

**Outcomes:** Graduate can able to take up the case studies and model it in different views with respect user requirement such as use case, logical, component and deployment and etc, and preparation of document of the project for the unified Library application.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-II Sem****L T/P/D C****4 -/-/ 4****(A60525) SOFTWARE TESTING METHODOLOGIES****Objectives:**

To understand the software testing methodologies such as flow graphs and path testing, transaction flows testing, data flow testing, domain testing and logic base testing.

**UNIT - I**

Introduction:- Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs.

Flow graphs and Path testing:- Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

**UNIT - II**

Transaction Flow Testing:-transaction flows, transaction flow testing techniques.

Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

**UNIT - III**

Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

**UNIT-IV**

Paths, Path products and Regular expressions:- path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

Logic Based Testing:- overview, decision tables, path expressions, kv charts, specifications.

**UNIT - V**

State, State Graphs and Transition testing:- state graphs, good & bad state graphs, state testing, Testability tips.

Graph Matrices and Application:-Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter or Win-runner).

**TEXT BOOKS:**

1. Software Testing techniques – Boris Beizer, Dreamtech, second

edition.

2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

**REFERENCE BOOKS:**

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing, 3<sup>rd</sup> edition, P.C. Jorgensen, Aurbach Publications (Dist. by SPD).
3. Software Testing, N.Chauhan, Oxford University Press.
4. Introduction to Software Testing, P.Ammann&J.Offutt, Cambridge Univ.Press.
5. Effective methods of Software Testing, Perry, John Wiley, 2<sup>nd</sup> Edition, 1999.
6. Software Testing Concepts and Tools, P.Nageswara Rao, dreamtech Press.
7. Software Testing, M.G.Limaye, TMH.
8. Software Testing, S.Desikan, G.Ramesh, Pearson.
9. Foundations of Software Testing, D.Graham & Others, Cengage Learning.
10. Foundations of Software Testing, A.P.Mathur, Pearson.

**Outcomes:**

- Ability to apply the process of testing and various methodologies in testing for developed software.
- Ability to write test cases for given software to test it before delivery to the customer.



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

III Year B.Tech. CSE-II Sem

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4 -/- 4

**(A60010) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS****Objectives:**

To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations namely: demand and supply, production function, cost analysis, markets, forms of business organisations, capital budgeting and financial accounting and financial analysis.

**Unit I**

**Introduction & Demand Analysis:** Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. *Elasticity of Demand:* Definition, Types, Measurement and Significance of Elasticity of Demand. *Demand Forecasting,* Factors governing demand forecasting, methods of demand forecasting.

**Unit II**

**Production & Cost Analysis:** *Production Function* – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. *Cost Analysis:* Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

**Unit III**

**Markets & New Economic Environment:** Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. *Pricing:* Objectives and Policies of Pricing. Methods of Pricing. *Business:* Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, *New Economic Environment:* Changing Business Environment in Post-liberalization scenario.

**Unit IV**

**Capital Budgeting:** Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital - Trading Forecast, Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

**Unit V**

**Introduction to Financial Accounting & Financial Analysis:** Accounting concepts and Conventions - Introduction IFRS - Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). *Financial Analysis:* Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios. Du Pont Chart.

**TEXT BOOKS:**

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2013.
3. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, 2012.

**REFERENCES:**

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2012.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey & Chrystel, Economics, Oxford University Press, 2012
5. Domnick Salvatore: Managerial Economics in a Global Economy, Thomson, 2012.
6. Narayanaswamy: Financial Accounting—A Managerial Perspective, Pearson, 2012.
7. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2012.
8. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2012.
9. Dwivedi: Managerial Economics, Vikas, 2012.
10. Shailaja & Usha : MEFA, University Press, 2012.
11. Aryasri: Managerial Economics and Financial Analysis, TMH, 2012.
12. Vijay Kumar & Appa Rao, Managerial Economics & Financial Analysis, Cengage 2011.
13. J. V. Prabhakar Rao & P.V. Rao, Managerial Economics & Financial Analysis, Maruthi Publishers, 2011.

**Outcomes:**

At the end of the course, the student will

- Understand the market dynamics namely, demand and supply, demand forecasting , elasticity of demand and supply, pricing methods and pricing in different market structures.

- Gain an insight into how production function is carried out to achieve least cost combination of inputs and cost analysis
- Develop an understanding of
- Analyse how capital budgeting decisions are carried out
- Understand the framework for both manual and computerised accounting process
- Know how to analyse and interpret the financial statements through ratio analysis.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>III Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A60512) WEB TECHNOLOGIES****Objectives:**

- To introduce PHP language for server side scripting
- To introduce XML and processing of XML Data with Java
- To introduce Server side programming with Java Servlets and JSP
- To introduce Client side scripting with Javascript and AJAX.

**UNIT- I**

**Introduction to PHP:** Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads, Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies

**File Handling in PHP:** File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories

**UNIT- II**

**XML:** Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemas, Document Object Model, XHTML

**Parsing XML Data** - DOM and SAX Parsers in java.

**UNIT- III**

**Introduction to Servlets:** Common Gateway Interface (CGI), Lifecycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions, connecting to a database using JDBC.

**UNIT- IV**

**Introduction to JSP:** The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session for session tracking, connecting to database in JSP.

**UNIT- V**

**Client side Scripting:** Introduction to Javascript: Javascript language - declaring variables, scope of variables, functions, event handlers (onclick, onsubmit etc.), Document Object Model, Form validation.

Simple AJAX application.

**TEXT BOOKS:**

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill

**REFERENCE BOOKS:**

1. Web Programming, building internet applications, Chris Bates 2<sup>nd</sup> edition, Wiley Dreamtech
2. Java Server Pages –Hans Bergsten, SPD O'Reilly
3. Java Script, D.Flanagan, O'Reilly,SPD.
4. Beginning Web Programming–Jon Duckett WROX.
5. Programming world wide web, R.W.Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

**Outcomes:**

- gain knowledge of client side scripting, validation of forms and AJAX programming
- have understanding of server side scripting with PHP language
- have understanding of what is XML and how to parse and use XML Data with Java
- To introduce Server side programming with Java Servlets and JSP

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-II Sem****L T/P/D C****- -/3/- 2****(A60591) CASE TOOLS and WEB TECHNOLOGIES LAB****CASE TOOLS LAB****Objectives:**

- Understand how UML supports the entire OOAD process.
  - Become familiar with all phases of OOAD.
  - Understand different software testing tools and their features
- I. Students are divided into batches of 5 each and each batch has to draw the following diagrams using UML for an ATM system whose description is given below.

UML diagrams to be developed are:

1. Use Case Diagram.
2. Class Diagram.
3. Sequence Diagram.
4. Collaboration Diagram.
5. State Diagram
6. Activity Diagram.
7. Component Diagram
8. Deployment Diagram.
9. Test Design.

**Description for an ATM System**

The software to be designed will control a simulated automated teller machine (ATM) having a magnetic stripe reader for reading an ATM card, a customer console (keyboard and display) for interaction with the customer, a slot for depositing envelopes, a dispenser for cash (in multiples of Rs. 100, Rs. 500 and Rs. 1000), a printer for printing customer receipts, and a key-operated switch to allow an operator to start or stop the machine. The ATM will communicate with the bank's computer over an appropriate communication link. (The software on the latter is not part of the requirements for this problem.)

The ATM will service one customer at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN) - both of which will be sent to the bank for validation as part of each transaction. The customer will then be able to perform one or more transactions. The card will be retained in the machine until the customer indicates that he/she

desires no further transactions, at which point it will be returned - except as noted below.

The ATM must be able to provide the following services to the customer:

1. A customer must be able to make a cash withdrawal from any suitable account linked to the card, in multiples of Rs. 100 or Rs. 500 or Rs. 1000. Approval must be obtained from the bank before cash is dispensed.
2. A customer must be able to make a deposit to any account linked to the card, consisting of cash and/or checks in an envelope. The customer will enter the amount of the deposit into the ATM, subject to manual verification when the envelope is removed from the machine by an operator. Approval must be obtained from the bank before physically accepting the envelope.
3. A customer must be able to make a transfer of money between any two accounts linked to the card.
4. A customer must be able to make a balance inquiry of any account linked to the card.
5. A customer must be able to abort a transaction in progress by pressing the Cancel key instead of responding to a request from the machine.

The ATM will communicate each transaction to the bank and obtain verification that it was allowed by the bank. Ordinarily, a transaction will be considered complete by the bank once it has been approved. In the case of a deposit, a second message will be sent to the bank indicating that the customer has deposited the envelope. (If the customer fails to deposit the envelope within the timeout period, or presses cancel instead, no second message will be sent to the bank and the deposit will not be credited to the customer.)

If the bank determines that the customer's PIN is invalid, the customer will be required to re-enter the PIN before a transaction can proceed. If the customer is unable to successfully enter the PIN after three tries, the card will be permanently retained by the machine, and the customer will have to contact the bank to get it back.

If a transaction fails for any reason other than an invalid PIN, the ATM will display an explanation of the problem, and will then ask the customer whether he/she wants to do another transaction.

The ATM will provide the customer with a printed receipt for each successful transaction

The ATM will have a key-operated switch that will allow an operator to start and stop the servicing of customers. After turning the switch to the "on" position, the operator will be required to verify and enter the total cash on hand. The machine can only be turned off when it is not servicing a customer.

When the switch is moved to the “off” position, the machine will shut down, so that the operator may remove deposit envelopes and reload the machine with cash, blank receipts, etc.

- II. Study of any testing tool (e.g. Win runner)
- III. Study of any web testing tool (e.g. Selenium)
- IV. Study of any bug tracking tool (e.g. Bugzilla, bugbit)
- V. Study of any test management tool (e.g. Test Director)
- VI. Study of any open source-testing tool (e.g. Test Link)

**Outcomes:**

Ability to understand the history, cost of using and building CASE tools.

Ability to construct and evaluate hybrid CASE tools by integrating existing tools.

**WEB TECHNOLOGIES LAB**

**Objectives:**

- To enable the student to program web applications using the following technologies HTML ,Javascript ,AJAX ,PHP ,Tomcat Server, Servlets ,JSP

**Note:**

1. **Use LAMP Stack (Linux, Apache, MySQL and PHP) for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform wherever applicable**
2. **The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed**
  1. Install the following on the local machine
    - Apache Web Server (if not installed)
    - Tomcat Application Server locally
    - Install MySQL (if not installed)
    - Install PHP and configure it to work with Apache web server and MySQL (if not already configured)
  2. Write an HTML page including any required Javascript that takes a number from one text field in the range of 0 to 999 and shows it in another text field in words. If the number is out of range, it should show “out of range” and if it is not a number, it should show “not a number” message in the result box.
  3. Write an HTML page that has one input, which can take multi-line



text and a submit button. Once the user clicks the submit button, it should show the number of characters, words and lines in the text entered using an alert message. Words are separated with white space and lines are separated with new line character.

4. Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).
5. Create an XML document that contains 10 users information. Write a Java program, which takes User Id as input and returns the user details by taking the user information from the XML document using (a) DOM Parser and (b) SAX parser
6. Implement the following web applications using (a) PHP, (b) Servlets and (c) JSP:
  - i. A user validation web application, where the user submits the login name and password to the server. The name and password are checked against the data already available in Database and if the data matches, a successful login page is returned. Otherwise a failure message is shown to the user.
  - ii. Modify the above program to use an xml file instead of database.
  - iii. Modify the above program to use AJAX to show the result on the same page below the submit button.
  - iv. A simple calculator web application that takes two numbers and an operator (+, -, /, \* and %) from an HTML page and returns the result page with the operation performed on the operands.
  - v. Modify the above program such that it stores each query in a database and checks the database first for the result. If the query is already available in the DB, it returns the value that was previously computed (from DB) or it computes the result and returns it after storing the new query and result in DB.
  - vi. A web application takes a name as input and on submit it shows a hello <name> page where <name> is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, it should show a logout page with Thank You <name> message with the duration of usage (hint: Use session to store name and time).
  - vii. A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with "Hello <name>, you are not authorized to visit this site" message, where <name> should be replaced with the entered name. Otherwise it should send "Welcome <name> to this site" message.

viii. A web application for implementation:

The user is first served a login page which takes user's name and password. After submitting the details the server checks these values against the data from a database and takes the following decisions.

If name and password matches, serves a welcome page with user's full name.

If name matches and password doesn't match, then serves "password mismatch" page

If name is not found in the database, serves a registration page, where user's full name is asked and on submitting the full name, it stores, the login name, password and full name in the database (hint: use session for storing the submitted login name and password)

ix. A web application that lists all cookies stored in the browser on clicking "List Cookies" button. Add cookies if necessary.

**TEXT BOOKS:**

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill

**REFERENCE BOOKS:**

1. Web Programming, building internet applications, Chris Bates 2<sup>nd</sup> edition, Wiley Dreamtech
2. Java Server Pages –Hans Bergsten, SPD O'Reilly
3. Java Script, D.Flanagan, O'Reilly, SPD.
4. Beginning Web Programming-Jon Duckett WROX.
5. Programming world wide web, R.W.Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

**Outcomes:**

- Use LAMP Stack for web applications
- Use Tomcat Server for Servlets and JSPs
- Write simple applications with Technologies like HTML, Javascript, AJAX, PHP, Servlets and JSPs
- Connect to Database and get results
- Parse XML files using Java (DOM and SAX parsers)

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-II Sem****L T/P/D C****- -/3/- 2****(A60086) ADVANCED COMMUNICATION SKILLS (ACS) LAB****Introduction**

The introduction of the Advanced Communication Skills Lab is considered essential at 3<sup>rd</sup> year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organise ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

**Objectives:**

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

**Syllabus:**

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

1. **Activities on Fundamentals of Inter-personal Communication and Building Vocabulary** - Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.
2. **Activities on Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
3. **Activities on Writing Skills** – Structure and presentation of different types of writing – *letter writing/Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing* – planning for writing – improving one's writing.
4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/**PPTs** and written presentations through posters/projects/reports/ e-mails/assignments etc.
5. **Activities on Group Discussion and Interview Skills** – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

**Minimum Requirement:**

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- **Spacious room with appropriate acoustics.**
- **Round Tables with movable chairs**
- **Audio-visual aids**
- **LCD Projector**
- **Public Address system**
- **P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ**
- **T. V, a digital stereo & Camcorder**
- **Headphones of High quality**

**Prescribed Lab Manual:** A book titled *A Course Book of Advanced*

**Communication Skills (ACS) Lab** published by Universities Press, Hyderabad.

**Suggested Software:**

The software consisting of the prescribed topics elaborated above should be procured and used.

- **Oxford Advanced Learner's Compass**, 7<sup>th</sup> Edition
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE**( KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- **The following software from 'train2success.com'**
  - **Preparing for being Interviewed**
  - **Positive Thinking**
  - **Interviewing Skills**
  - **Telephone Skills**
  - **Time Management**

**Books Recommended:**

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
3. Technical Communication by Paul V. Anderson. 2007. Cengage Learning Pvt. Ltd. New Delhi.
4. Business and Professional Communication: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.
5. The Basics of Communication: A Relational Perspective. Steve Duck & David T. McMahan. Sage South Asia Edition. Sage Publications. 2012.
6. English Vocabulary in Use series, Cambridge University Press 2008.
7. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
8. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
9. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.

10. Handbook for Technical Writing by David A McMurrey & Joanne Buckley CENGAGE Learning 2008.
11. Job Hunting by Colm Downes, Cambridge University Press 2008.
12. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
13. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.
14. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/ Cambridge University Press.
15. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

**DISTRIBUTION AND WEIGHTAGE OF MARKS:*****Advanced Communication Skills Lab Practicals:***

1. The practical examinations for the ACS Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

**Mini Project: As a part of Internal Evaluation**

1. **Seminar/ Professional Presentation**
  2. **A Report on the same has to be prepared and presented.**
- \* ***Teachers may use their discretion to choose topics relevant and suitable to the needs of students.***
  - \* ***Not more than two students to work on each mini project.***
  - \* ***Students may be assessed by their performance both in oral presentation and written report.***

**Outcomes**

- ☞ Accomplishment of sound vocabulary and its proper use contextually.
- ☞ Flair in Writing and felicity in written expression.
- ☞ Enhanced job prospects.
- ☞ Effective Speaking Abilities

**IV YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A70511	Linux Programming	4	-	4
A70530	Design Patterns	4	-	4
A70520	Data Warehousing and Data Mining	4	-	4
A70519	Cloud Computing	4	-	4
	<b>ELECTIVE – I</b>	4	-	4
A70540	Software Project Management			
A70532	Image processing and Pattern Recognition			
A70536	Mobile Computing			
A70529	Computer Graphics			
A70352	Operations Research			
	<b>ELECTIVE – II</b>	4	-	4
A70534	Machine Learning			
A70539	Soft Computing			
A70533	Information Retrieval Systems			
A70526	Artificial Intelligence			
A70628	Computer Forensics			
A70596	Linux Programming Lab	-	3	2
A70595	Data Warehousing and Mining Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**IV YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A80014	Management Science	4	-	4
	<b>ELECTIVE III</b>	4	-	4
A80551	Web Services			
A80538	Semantic Web and Social Networks			
A80537	Scripting Languages			
A80547	Multimedia & Rich Internet Applications			
	<b>ELECTIVE – IV</b>	4	-	4
A80542	Ad hoc and Sensor Networks			
A80550	Storage Area Networks			
A80543	Database Security			
A80439	Embedded Systems			
A80087	Industry Oriented Mini Project	-	-	2
A80089	Seminar	-	6	2
A80088	Project Work	-	15	10
A80090	Comprehensive Viva	-	-	2
	<b>Total</b>	<b>12</b>	<b>21</b>	<b>28</b>

**Note:** All End Examinations (Theory and Practical) are of three hours duration.

**T-Tutorial L – Theory P – Practical D-Drawing C – Credits**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem**

<b>L</b>	<b>T/P/D</b>	<b>C</b>
<b>4</b>	<b>-/-</b>	<b>4</b>

**(A70517) LINUX PROGRAMMING****Objectives:**

- To understand and make effective use of Linux utilities and Shell scripting language (bash) to solve Problems.
- To implement in C some standard Linux utilities such as ls,mv,cp etc.using system calls.
- To develop the skills necessary for systems programming including file system programming, process and signal management, and interprocess communication.
- To develop the basic skills required to write network programs using Sockets.

**UNIT- I**

Linux Utilities-File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities.

Sed-Scripts, Operation, Addresses, Commands, Applications, awk-Execution, Fields and Records, Scripts, Operation, Patterns, Actions, Associative Arrays, String and Mathematical functions, System commands in awk, Applications.

Shell programming with Bourne again shell(bash)- Introduction, shell responsibilities, pipes and Redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts.

**UNIT- II**

Files and Directories- File Concept, File types, File System Structure,file metadata-Inodes, kernel support for files, system calls for file I/O operations-open, creat, read, write, close, lseek, dup2,file status information-stat family, file and record locking- fcntl function, file permissions - chmod, fchmod,file ownership-chown,lchown, fchown, links-soft links and hard links – symlink, link, unlink.

Directories-Creating, removing and changing Directories-mkdir, rmdir, chdir, obtaining current working directory-getcwd, Directory contents, Scanning Directories-opendir, readdir, closedir, rewinddir functions.

**UNIT- III**

Process – Process concept, Layout of a C program image in main



memory, Process environment-environment list, environment variables, getenv, setenv, Kernel support for process, process identification, process control - process creation, replacing a process image, waiting for a process, process termination, zombie process, orphan process, system call interface for process management-fork, vfork, exit, wait, waitpid, exec family, Process Groups, Sessions and Controlling Terminal, Differences between threads and processes.

Signals – Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise, alarm, pause, abort, sleep functions.

#### **UNIT- IV**

Interprocess Communication - Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, pipes-creation, IPC between related processes using unnamed pipes, FIFOs-creation, IPC between unrelated processes using FIFOs(Named pipes), differences between unnamed and named pipes, popen and pclose library functions.

Message Queues- Kernel support for messages, APIs for message queues, client/server example.

Semaphores-Kernel support for semaphores, APIs for semaphores, file locking with semaphores.

#### **UNIT- V**

Shared Memory- Kernel support for shared memory, APIs for shared memory, shared memory example.

Sockets- Introduction to Berkeley Sockets, IPC over a network, Client-Server model, Socket address structures (Unix domain and Internet domain), Socket system calls for connection oriented protocol and connectionless protocol, example-client/server programs-Single Server-Client connection, Multiple simultaneous clients, Socket options-setsockopt and fcntl system calls, Comparison of IPC mechanisms.

#### **TEXT BOOKS:**

1. Unix System Programming using C++, T.Chan, PHI.
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH.
3. Unix Network Programming , W.R.Stevens, PHI.

#### **REFERENCE BOOKS:**

1. Beginning Linux Programming, 4<sup>th</sup> Edition, N.Matthew, R.Stones, Wrox, Wiley India Edition.
2. Unix for programmers and users, 3<sup>rd</sup> Edition, Graham Glass, King Ables, Pearson.

3. System Programming with C and Unix, A.Hoover, Pearson.
4. Unix System Programming, Communication, Concurrency and Threads, K.A.Robbins and S.Robbins, Pearson Education.
5. Unix shell Programming, S.G.Kochan and P.Wood,3<sup>rd</sup> edition, Pearson Education.
6. Shell Scripting, S.Parker, Wiley India Pvt. Ltd.
7. Advanced Programming in the Unix Environment,2<sup>nd</sup> edition, W.R.Stevens and S.A.Rago, Pearson Education.
8. Unix and Shell programming, B.A.Forouzan and R.F.Gilberg, Cengage Learning.
9. Linux System Programming, Robert Love, O'Reilly, SPD.
10. C Programming Language, Kernighan and Ritchie, PHI

**Outcomes:**

- Work confidently in Linux environment.
- Work with shell script to automate different tasks as Linux administration.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem**

<b>L</b>	<b>T/P/D</b>	<b>C</b>
<b>4</b>	<b>-/-</b>	<b>4</b>

**(A70530) DESIGN PATTERNS****Objectives:**

- Understand the design patterns that are common in software applications.
- Understand how these patterns are related to Object Oriented design.

**UNIT-I**

Introduction: What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

**UNIT-II**

A Case Study: Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary.

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

**UNIT-III**

Structural Pattern Part-I: Adapter, Bridge, Composite.

Structural Pattern Part-II: Decorator, façade, Flyweight, Proxy.

**UNIT-IV**

Behavioral Patterns Part-I: Chain of Responsibility, Command, Interpreter, Iterator.

Behavioral Patterns Part-II: Mediator, Memento, Observer.

**UNIT-V**

Behavioral Patterns Part-II (cont'd): State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns.

What to Expect from Design Patterns, A Brief History, The Pattern Community An Invitation, A Parting Thought.

**TEXT BOOK:**

1. Design Patterns By Erich Gamma, Pearson Education

**REFERENCE BOOKS :**

1. Pattern's in JAVA Vol-I By Mark Grand, Wiley DreamTech.

2. Pattern's in JAVA Vol-II By Mark Grand, Wiley DreamTech.
3. JAVA Enterprise Design Patterns Vol-III By Mark Grand, Wiley DreamTech.
4. Head First Design Patterns By Eric Freeman-Oreilly-spd.
5. Peeling Design Patterns, Prof. Meda Srinivasa Rao, Narsimha Karumanchi, CareerMonk Publications.
6. Design Patterns Explained By Alan Shalloway, Pearson Education.
7. Pattern Oriented Software Architecture, F.Buschmann&others, John Wiley & Sons.

**Outcomes:**

- Ability to understand and apply common design patterns to incremental / iterative development.
- Ability to identify appropriate patterns for design of given problem.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>IV Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A70520) DATA WAREHOUSING AND DATA MINING****Objectives:**

Study data warehouse principles and its working learn data mining concepts understand association rules mining. Discuss classification algorithms learn how data is grouped using clustering techniques.

**UNIT-I**

**Data warehouse:** Introduction to Data warehouse, Difference between operational database systems and data warehouses, Data warehouse Characteristics, Data warehouse Architecture and its Components, Extraction-Transformation-Loading, Logical(Multi-Dimensional), Data Modeling, Schema Design, Star and Snow-Flake Schema, Fact Consultation, Fact Table, Fully Addictive, Semi-Addictive, Non Addictive Measures; Fact-Less-Facts, Dimension Table Characteristics; OLAP Cube, OLAP Operations, OLAP Server Architecture-ROLAP, MOLAP and HOLAP.

**UNIT-II**

**Introduction to Data Mining:** Introduction, What is Data Mining, Definition, KDD, Challenges, Data Mining Tasks, Data Preprocessing, Data Cleaning, Missing data, Dimensionality Reduction, Feature Subset Selection, Discretization and Binaryzation, Data Transformation; Measures of Similarity and Dissimilarity- Basics.

**UNIT-III**

**Association Rules:** Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation; APRIORI Algorithm, The Partition Algorithms, FP-Growth Algorithms, Compact Representation of Frequent Item Set- Maximal Frequent Item Set, Closed Frequent Item Set.

**UNIT-IV**

**Classification:** Problem Definition, General Approaches to solving a classification problem , Evaluation of Classifiers , Classification techniques, Decision Trees-Decision tree Construction , Methods for Expressing attribute test conditions, Measures for Selecting the Best Split, Algorithm for Decision tree Induction ; Naive-Bayes Classifier, Bayesian Belief Networks; K- Nearest neighbor classification-Algorithm and Characteristics.

**UNIT-V**

**Clustering:** Problem Definition, Clustering Overview, Evaluation of Clustering Algorithms, Partitioning Clustering-K-Means Algorithm, K-Means Additional

issues, PAM Algorithm; Hierarchical Clustering-Agglomerative Methods and divisive methods, Basic Agglomerative Hierarchical Clustering Algorithm, Specific techniques, Key Issues in Hierarchical Clustering, Strengths and Weakness; Outlier Detection.

**TEXT BOOKS:**

- 1) Data Mining- Concepts and Techniques- Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition, 2006.
- 2) Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbach, Pearson Education.

**REFERENCE BOOKS:**

- 1) Data Mining Techniques, Arun K Pujari, 3<sup>rd</sup> Edition, Universities Press.
- 2) Data Warehousing Fundamentals, Pualraj Ponnaiah, Wiley Student Edition.
- 3) The Data Warehouse Life Cycle Toolkit – Ralph Kimball, Wiley Student Edition.
- 4) Data Mining, Vikaram Pudi, P Radha Krishna, Oxford University Press

**Outcomes:**

- Student should be able to understand why the data warehouse in addition to database systems.
- Ability to perform the preprocessing of data and apply mining techniques on it.
- Ability to identify the association rules, classification and clusters in large data sets.
- Ability to solve real world problems in business and scientific information using data mining

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

IV Year B.Tech. CSE-I Sem

**L T/P/D C****4 -/- 4****(A70519) CLOUD COMPUTING****Objectives:**

- To explain the evolving computer model called cloud computing.
- To introduce the various levels of services that can be achieved by cloud.
- To describe the security aspects in cloud.

**UNIT- I**

**Systems Modeling, Clustering and Virtualization:** Distributed System Models and Enabling Technologies, Computer Clusters for Scalable Parallel Computing, Virtual Machines and Virtualization of Clusters and Data centers.

**UNIT- II**

**Foundations:** Introduction to Cloud Computing, Migrating into a Cloud, Enriching the 'Integration as a Service' Paradigm for the Cloud Era, The Enterprise Cloud Computing Paradigm.

**UNIT- III**

**Infrastructure as a Service (IAAS) & Platform and Software as a Service (PAAS / SAAS):** Virtual machines provisioning and Migration services, On the Management of Virtual machines for Cloud Infrastructures, Enhancing Cloud Computing Environments using a cluster as a Service, Secure Distributed Data Storage in Cloud Computing.

Aneka, Comet Cloud, T-Systems', Workflow Engine for Clouds, Understanding Scientific Applications for Cloud Environments.

**UNIT- IV**

**Monitoring, Management and Applications:** An Architecture for Federated Cloud Computing, SLA Management in Cloud Computing, Performance Prediction for HPC on Clouds, Best Practices in Architecting Cloud Applications in the AWS cloud, Building Content Delivery networks using Clouds, Resource Cloud Mashups.

**UNIT- V**

**Governance and Case Studies:** Organizational Readiness and Change management in the Cloud age, Data Security in the Cloud, Legal Issues in Cloud computing, Achieving Production Readiness for Cloud Services.

**TEXT BOOKS:**

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.

2. Distributed and Cloud Computing, Kai Hwang, Geoffery C.Fox, Jack J.Dongarra, Elsevier, 2012.

**REFERENCE BOOKS:**

1. Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill, rp2011.
2. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010.
3. Cloud Computing: Implementation, Management and Security, John W. Rittinghouse, James F.Ransome, CRC Press, rp2012.
4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O'Reilly, SPD, rp2011.
5. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

**Outcomes:**

- Ability to understand the virtualization and cloud computing concepts.



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem****L T/P/D C****4 -/-/ 4****(A70540) SOFTWARE PROJECT MANAGEMENT****(Elective- I)****Objectives:**

The main goal of software development projects is to create a software system with a predetermined functionality and quality in a given time frame and with given costs. For achieving this goal, models are required for determining target values and for continuously controlling these values. This course focuses on principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience-based creation & improvement of models (process management). The goals of the course can be characterized as follows:

1. Understanding the specific roles within a software organization as related to project and process management
2. Understanding the basic infrastructure competences (e.g., process modeling and measurement)
3. Understanding the basic steps of project planning, project management, quality assurance, and process management and their relationships

**UNIT- I**

Conventional Software Management: The waterfall model, conventional software

Management performance. Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

**UNIT- II**

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

The old way and the new: The principles of conventional software engineering, principles of modern software management, transitioning to an iterative process.

**UNIT- III**

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering

artifacts, programmatic artifacts. Model based software architectures: A Management perspective and technical perspective.

#### **UNIT- IV**

Work Flows of the process: Software process workflows, Inter trans workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic status assessments. Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Interaction planning process, Pragmatic planning.

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.

Process Automation : Automation Building Blocks, The Project Environment.

#### **UNIT- V**

Project Control and Process instrumentation: The server care Metrics, Management indicators, quality indicators, life cycle expectations pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminants, Example.

Future Software Project Management: Modern Project Profiles Next generation

Software economics, modern Process transitions.

Case Study : The Command Center Processing and Display System- Replacement(CCPDS-R).

#### **TEXT BOOKS:**

1. Software Project Management, Walker Royce, Pearson Education.
2. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, Tata McGraw Hill.

#### **REFERENCE BOOKS:**

1. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006
2. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly, 2007
3. Software Engineering Project Management, Richard H. Thayer & Edward Yourdon, second edition, Wiley India, 2004.
4. Agile Project Management, Jim Highsmith, Pearson education, 2004
5. The art of Project management, Scott Berkun, O'Reilly, 2005.
6. Software Project Management in Practice, Pankaj Jalote, Pearson Education, 2002.

**Outcomes:**

- Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- Compare and differentiate organization structures and project structures.
- Implement a project to manage project schedule, expenses and resources with the application of suitable project management tools.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem****L T/P/D C****4 -/- 4****(A70532) IMAGE PROCESSING AND PATTERN RECOGNITION****(Elective - I)****Objectives:**

- Adequate background knowledge about image processing and pattern recognition
- Practical knowledge and skills about image processing and pattern recognition tools
- Necessary knowledge to design and implement a prototype of an image processing and pattern recognition *application*.

**UNIT – I**

Fundamental steps of image processing, components of an image processing of system. The image model and image acquisition, sampling and quantization, relationship between pixels, distance functions, scanner.

Statistical and spatial operations, Intensity functions transformations, histogram processing, smoothing & sharpening – spatial filters Frequency domain filters, homomorphic filtering, image filtering & restoration. Inverse and weiner filtering, FIR weiner filter, Filtering using image transforms, smoothing splines and interpolation.

**UNIT – II**

Morphological and other area operations, basic morphological operations, opening and closing operations, dilation erosion, Hit or Miss transform, morphological algorithms, extension to grey scale images.

Segmentation and Edge detection region operations, basic edge detection, second order detection, crack edge detection, gradient operators, compass and Laplace operators, edge linking and boundary detection, thresholding, region based segmentation, segmentation by morphological watersheds.

**UNIT –III**

Image compression: Types and requirements, statistical compression, spatial compression, contour coding, quantizing compression, image data compression-predictive technique, pixel coding, transfer coding theory, lossy and lossless predictive type coding, Digital Image Water marking.

**UNIT –IV**

Representation and Description: Chain codes, Polygonal approximation, Signature Boundary Segments, Skeltons, Boundary Descriptors, Regional Descriptors, Relational Descriptors, Principal components for Description,

Relational Descriptors

#### **UNIT- V**

**Pattern Recognition Fundamentals:** Basic Concepts of pattern recognition, Fundamental problems in pattern recognition system, design concepts and methodologies, example of automatic pattern recognition systems, a simple automatic pattern recognition model

**Pattern classification:** Pattern classification by distance function: Measures of similarity, Clustering criteria, K-means algorithm, Pattern classification by likelihood function: Pattern classification as a Statistical decision problem, Bayes classifier for normal patterns.

#### **TEXT BOOKS**

1. Digital Image Processing Third edition, Pearson Education, Rafael C. Gonzalez, Richard E. Woods.
2. Pattern recognition Principles: Julius T. Tou, and Rafel C. Gonzalez, Addison-Wesly Publishing Company.
3. Digital Image Processing, M.Anji Reddy, Y.Hari Shankar, BS Publications.

#### **REFERENCE BOOKS:**

1. Image Processing, Analysis and Machine Vision, Second Edition, Milan Sonka, Vaclav Hlavac and Roger Boyle. Thomson learning
2. Digital Image Processing – William k. Prattl –John Wiley edition.
3. Fundamentals of digital image processing – by A.K. Jain, PHI.
4. Pattern classification, Richard Duda, Hart and David strok John Wiley publishers.
5. Digital Image Processing, S.Jayaraman,S. Esakkirajan, T.Veerakumar, TMH.
6. Pattern Recognition, R.Shinghal, Oxford University Press.

#### **Outcomes:**

- Ability to apply computer algorithms to practical problems.
- Ability to image segmentation, reconstruction and restoration.
- Ability to perform the classification of patterns

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**(A70536) MOBILE COMPUTING****(Elective – I)****Objectives:**

- To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
- To understand the typical mobile networking infrastructure through a popular GSM protocol
- To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer
- To understand the database issues in mobile environments & data delivery models.
- To understand the ad hoc networks and related concepts.
- To understand the platforms and protocols used in mobile environment.

**UNIT- I**

**Introduction:** Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.

GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS, CSHSD, DECT.

**UNIT –II**

**(Wireless) Medium Access Control (MAC):** Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

**Mobile Network Layer:** IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

**UNIT –III**

**Mobile Transport Layer:** Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

**Database Issues:** Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

**UNIT- IV**

**Data Dissemination and Synchronization:** Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols

**UNIT- V**

**Mobile Ad hoc Networks (MANETs):** Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc. , Mobile Agents, Service Discovery.

**Protocols and Platforms for Mobile Computing :**WAP, Bluetooth, XML, J2ME, JavaCard, PalmOS, Windows CE, SymbianOS, Linux for Mobile Devices, Android.

**TEXT BOOKS:**

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2009.
2. Raj Kamal, "Mobile Computing", Oxford University Press, 2007, ISBN: 0195686772

**REFERENCE BOOKS:**

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2004.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002, ISBN 0471419028.
3. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, Oct 2004,

**Outcomes:**

- Able to think and develop new mobile application.
- Able to take any new technical issue related to this new paradigm and come up with a solution(s).
- Able to develop new ad hoc network applications and/or algorithms/ protocols.
- Able to understand & develop any existing or new protocol related to mobile environment

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**(A70529) COMPUTER GRAPHICS****(Elective- I)****Objectives:**

- To make students understand about fundamentals of Graphics to enable them to design animated scenes for virtual object creations.
- To make the student present the content graphically.

**UNIT- I**

**Introduction:** Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

**Output primitives:** Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

**UNIT- II**

**2-D Geometrical transforms:** Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

**2-D Viewing:** The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.

**UNIT- III**

**3-D Object representation:** Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces, sweep representations, octrees BSP Trees,

**3-D Geometric transformations:** Translation, rotation, scaling, reflection and shear transformations, composite transformations, 3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

**UNIT- IV**

**Visible surface detection methods:** Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods

**Illumination Models and Surface rendering Methods:** Basic illumination



models, polygon rendering methods

#### **UNIT- V**

**Computer animation:** Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications

#### **TEXT BOOKS:**

1. "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson education.
2. "Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc Graw hill edition.

#### **REFERENCE BOOKS:**

1. "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.
2. "Procedural elements for Computer Graphics", David F Rogers, Tata Mc Graw hill, 2nd edition.
3. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
4. "Principles of Computer Graphics", Shalini, Govil-Pai, Springer.
5. "Computer Graphics", Steven Harrington, TMH
6. Computer Graphics, F.S.Hill, S.M.Kelley, PHI.
7. Computer Graphics, P.Shirley, Steve Marschner & Others, Cengage Learning.
8. Computer Graphics & Animation, M.C.Trivedi, Jaico Publishing House.
9. An Integrated Introduction to Computer Graphics and Geometric Modelling, R.Goldman, CRC Press, Taylor&Francis Group.
10. Computer Graphics, Rajesh K.Maurya, Wiley India.

#### **Outcomes:**

- Students can animate scenes entertainment.
- Will be able work in computer aided design for content presentation..
- Better analogy data with pictorial representation.

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**(A70352) OPERATIONS RESEARCH****(Elective-I)****Objectives:**

- To introduce the methods of Operations Research.
- Emphasize the mathematical procedures of non linear programming search techniques.
- Introduce advanced topics such as Probabilistic models and dynamic programming.

**UNIT – I**

Development – Definition– Characteristics and Phases – Types of models – Operations Research models – applications.

**Allocation:** Linear Programming Problem Formulation – Graphical solution – Simplex method – Artificial variables techniques: Two–phase method, Big-M method.

**UNIT – II**

**Transportation Problem** – Formulation – Optimal solution, unbalanced transportation problem – Degeneracy.

**Assignment problem** – Formulation – Optimal solution - Variants of Assignment Problem- Traveling Salesman problem.

**UNIT – III**

**Sequencing** – Introduction – Flow –Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines

**Replacement:** Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely- Group Replacement.2

**UNIT – IV**

**Theory of Games:** Introduction –Terminology– Solution of games with saddle points and without saddle points- 2 x 2 games – dominance principle – m x 2 & 2 x n games -graphical method.

**Inventory:** Introduction – Single item, Deterministic models – Purchase inventory models with one price break and multiple price breaks –Stochastic models – demand may be discrete variable or continuous variable – Single Period model and no setup cost.

**UNIT – V**

**Waiting Lines:** Introduction – Terminology-Single Channel – Poisson arrivals and Exponential Service times – with infinite population and finite population models– Multichannel – Poisson arrivals and exponential service times with infinite population.

**Dynamic Programming:** Introduction – Terminology- Bellman’s Principle of Optimality – Applications of dynamic programming- shortest path problem – linear programming problem.

**Simulation:** Introduction, Definition, types of simulation models, Steps involved in the simulation process- Advantages and disadvantages- applications of simulation to queuing and inventory.

**TEXT BOOK :**

1. Operations Research /J.K.Sharma 4e. /MacMilan
2. Introduction to O.R/Hillier & Libermann/TMH

**REFERENCE BOOKS :**

1. Introduction to O.R /Taha/PHI
2. Operations Research/ NVS Raju/ SMS Education/3<sup>rd</sup> Revised Edition
3. Operations Research /A.M.Natarajan, P.Balasubramaniam, A. Tamilarasi/Pearson Education.
4. Operations Research / Wagner/ PHI Publications.
5. Operations Research/M.V. Durga Prasad, K, Vijaya Kumar Reddy, J. Suresh Kumar/ Cengage Learning.

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**(A70534) MACHINE LEARNING****(Elective – II)****Objectives:**

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.

**UNIT – I**

**Introduction:** An illustrative learning task, and a few approaches to it. What is known from algorithms? Theory, Experiment. Biology. Psychology.

**Concept Learning:** Version spaces. Inductive Bias. Active queries. Mistake bound/ PAC model. basic results. Overview of issues regarding data sources, success criteria.

**UNIT –II**

**Decision Tree Learning:** - Minimum Description Length Principle. Occam's razor. Learning with active queries

**Neural Network Learning:** Perceptions and gradient descent back propagation.

**UNIT –III**

**Sample Complexity and Over fitting:** Errors in estimating means. Cross Validation and jackknifing VC dimension. Irrelevant features: Multiplicative rules for weight tuning.

**Bayesian Approaches:** The basics Expectation Maximization. Hidden Markov Models

**UNIT—IV**

**Instance-based Techniques:** Lazy vs. eager generalization. K nearest neighbor, case- based reasoning.

**UNIT—V**

**Genetic Algorithms:** Different search methods for induction - Explanation-based Learning: using prior knowledge to reduce sample complexity.

**TEXT BOOKS:**

1. Tom Michel, Machine Learning, McGraw Hill, 1997

2. Trevor Hastie, Robert Tibshirani & Jerome Friedman. The Elements of Statistical Learning, Springer Verlag, 2001

**REFERENCE BOOKS:**

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.
2. Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc.,2001
3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995

**Outcomes:**

- Student should be able to understand the basic concepts such as decision trees and neural networks.
- Ability to formulate machine learning techniques to respective problems.
- Apply machine learning algorithms to solve problems of moderate complexity

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem****L T/P/D C****4 -/- 4****(A70539) SOFT COMPUTING****(Elective – II)****Objectives:**

- To give students knowledge of soft computing theories fundamentals, i.e. Fundamentals of artificial and neural networks, fuzzy sets and fuzzy logic and genetic algorithms.

**UNIT-I**

AI Problems and Search: AI problems, Techniques, Problem Spaces and Search, Heuristic Search Techniques- Generate and Test, Hill Climbing, Best First Search Problem reduction, Constraint Satisfaction and Means End Analysis. Approaches to Knowledge Representation- Using Predicate Logic and Rules.

**UNIT-II**

Artificial Neural Networks: Introduction, Basic models of ANN, important terminologies, Supervised Learning Networks, Perceptron Networks, Adaptive Linear Neuron, Backpropagation Network. Associative Memory Networks. Training Algorithms for pattern association, BAM and Hopfield Networks.

**UNIT-III**

Unsupervised Learning Network- Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks, Adaptive Resonance Theory Networks. Special Networks-Introduction to various networks.

**UNIT-IV**

Introduction to Classical Sets ( crisp Sets)and Fuzzy Sets- operations and Fuzzy sets. Classical Relations -and Fuzzy Relations- Cardinality, Operations, Properties and composition. Tolerance and equivalence relations.

Membership functions- Features, Fuzzification, membership value assignments, Defuzzification.

**UNIT-V**

Fuzzy Arithmetic and Fuzzy Measures, Fuzzy Rule Base and Approximate Reasoning Fuzzy Decision making

Fuzzy Logic Control Systems. Genetic Algorithm- Introduction and basic operators and terminology. Applications: Optimization of TSP, Internet Search Technique

**TEXT BOOKS:**

1. Principles of Soft Computing- S N Sivanandam, S N Deepa, Wiley India, 2007.
2. Soft Computing and Intelligent System Design -Fakhreddine O Karray, Clarence D Silva, Pearson Edition, 2004.

**REFERENCE BOOKS:**

1. Artificial Intelligence and SoftComputing- Behavioural and Cognitive Modelling of the Human Brain- Amit Konar, CRC press, Taylor and Francis Group.
2. Artificial Intelligence – Elaine Rich and Kevin Knight, TMH, 1991, rp2008.
3. Artificial Intelligence – Patric Henry Winston – Third Edition, Pearson Education.
4. A first course in Fuzzy Logic-Hung T Nguyen and Elbert A Walker, CRC. Press Taylor and Francis Group.
5. Artificial Intelligence and Intelligent Systems, N.P.Padhy, Oxford Univ. Press.

**Outcomes:**

- Student can able to building intelligent systems through soft computing techniques.
- Student should be able to understand the concept of artificial neural networks, fuzzy arithmetic and fuzzy logic with their day to day applications.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem****L T/P/D C****4 -/- 4****(A70533) INFORMATION RETRIEVAL SYSTEMS****(Elective – II)****Objectives:**

- To learn the different models for information storage and retrieval
- To learn about the various retrieval utilities
- To understand indexing and querying in information retrieval systems
- To expose the students to the notions of structured and semi structured data
- To learn about web search

**UNIT-I**

Introduction

Retrieval Strategies: Vector space model, Probabilistic retrieval strategies: Simple term weights, Non binary independence model Language Models.

**UNIT-II**

Retrieval Utilities: Relevance feedback, Clustering, N-grams, Regression analysis, Thesauri.

**UNIT-III**

Retrieval Utilities: Semantic networks, Parsing.

Cross-Language Information Retrieval: Introduction, Crossing the language barrier.

**UNIT-IV**

Efficiency: Inverted index, Query processing, Signature files, Duplicate document detection

**UNIT-V**

Integrating Structured Data and Text: A Historical progression, Information retrieval as a relational application, Semi-structured search using a relational schema.

Distributed Information Retrieval: A Theoretical model of distributed retrieval, Web search.

**TEXT BOOK:**

1. David A. Grossman, Ophir Frieder, Information Retrieval – Algorithms and Heuristics, Springer, 2<sup>nd</sup> Edition (Distributed by Universities Press), 2004.



**REFERENCE BOOKS:**

1. Gerald J Kowalski, Mark T Maybury. Information Storage and Retrieval Systems, Springer, 2000.
2. Soumen Chakrabarti, Mining the Web : Discovering Knowledge from Hypertext Data, Morgan-Kaufmann Publishers, 2002.
3. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, An Introduction to Information Retrieval, Cambridge University Press, Cambridge, England, 2009.

**Outcomes:**

- Possess the ability to store and retrieve textual documents using appropriate models.
- Possess the ability to use the various retrieval utilities for improving search.
- Possess an understanding of indexing and compressing documents to improve space and time efficiency.
- Possess the skill to formulate SQL like queries for unstructured data.
- Understand issues in web search.

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**(A70526) ARTIFICIAL INTELLIGENCE****(ELECTIVE- II)****Objectives:**

- To learn the difference between optimal reasoning vs human like reasoning
- To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities
- To learn different knowledge representation techniques
- To understand the applications of AI: namely Game Playing, Theorem Proving, Expert Systems, Machine Learning and Natural Language Processing

**UNIT-I**

Introduction, History, Intelligent Systems, Foundations of AI, Sub areas of AI, Applications.

Problem Solving - State-Space Search and Control Strategies: Introduction, General Problem Solving, Characteristics of Problem, Exhaustive Searches, Heuristic Search Techniques, Iterative-Deepening A\*, Constraint Satisfaction. Game Playing, Bounded Look-ahead Strategy and use of Evaluation Functions, Alpha-Beta Pruning

**UNIT-II**

Logic Concepts and Logic Programming: Introduction, Propositional Calculus, Propositional Logic, Natural Deduction System, Axiomatic System, Semantic Tableau System in Propositional Logic, Resolution Refutation in Propositional Logic, Predicate Logic, Logic Programming.

Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR, Knowledge Representation using Frames.

**UNIT-III**

Expert System and Applications: Introduction, Phases in Building Expert Systems, Expert System Architecture, Expert Systems Vs Traditional Systems, Truth Maintenance Systems, Application of Expert Systems, List of Shells and Tools.

Uncertainty Measure - Probability Theory: Introduction, Probability Theory, Bayesian Belief Networks, Certainty Factor Theory, Dempster-Shafer Theory.

**UNIT-IV**

Machine-Learning Paradigms: Introduction. Machine Learning Systems. Supervised and Unsupervised Learning. Inductive Learning. Learning Decision Trees (Text Book 2), Deductive Learning. Clustering, Support Vector Machines.

Artificial Neural Networks: Introduction, Artificial Neural Networks, Single-Layer Feed-Forward Networks, Multi-Layer Feed-Forward Networks, Radial-Basis Function Networks, Design Issues of Artificial Neural Networks, Recurrent Networks.

**UNIT-V**

Advanced Knowledge Representation Techniques: Case Grammars, Semantic Web

Natural Language Processing: Introduction, Sentence Analysis Phases, Grammars and Parsers, Types of Parsers, Semantic Analysis, Universal Networking Knowledge.

**TEXT BOOKS:**

1. Saroj Kaushik. Artificial Intelligence. Cengage Learning, 2011.
2. Russell, Norvig: Artificial intelligence, A Modern Approach, Pearson Education, Second Edition. 2004.

**REFERENCE BOOK:**

1. Rich, Knight, Nair: Artificial intelligence, Tata McGraw Hill, Third Edition 2009.

**Outcomes:**

- Possess the ability to formulate an efficient problem space for a problem expressed in English.
- Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
- Possess the skill for representing knowledge using the appropriate technique.
- Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems, Machine Learning and Natural Language Processing.

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**(A70528) COMPUTER FORENSICS****(Elective-II)****Objectives:**

- A brief explanation of the objective is to provide digital evidences which are obtained from digital media.
- In order to understand the objectives of computer forensics, first of all, people have to recognize the different roles computer plays in a certain crime.
- According to a snippet from the United States Security Service, the functions computer has in different kinds of crimes.

**UNIT – I**

**Computer Forensics Fundamentals:** What is Computer Forensics?, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps taken by Computer Forensics Specialists

**Types of Computer Forensics Technology:** Types of Military Computer Forensic Technology, Types of Law Enforcement – Computer Forensic Technology – Types of Business Computer Forensic Technology

**Computer Forensics Evidence and Capture:** Data Recovery Defined – Data Back-up and Recovery – The Role of Back-up in Data Recovery – The Data-Recovery Solution

**UNIT – II**

**Evidence Collection and Data Seizure:** Why Collect Evidence? Collection Options – Obstacles – Types of Evidence – The Rules of Evidence – Volatile Evidence – General Procedure – Collection and Archiving – Methods of Collection – Artifacts – Collection Steps – Controlling Contamination: The Chain of Custody

**Duplication and Preservation of Digital Evidence:** Preserving the Digital Crime Scene – Computer Evidence Processing Steps – Legal Aspects of Collecting and Preserving Computer Forensic Evidence

**Computer Image Verification and Authentication:** Special Needs of Evidential Authentication – Practical Consideration – Practical Implementation

**UNIT – III**

**Computer Forensics analysis and validation:** Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions

**Network Forensics:** Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, using

network tools, examining the honeynet project.

**Processing Crime and Incident Scenes:** Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtaining a digital hash, reviewing a case

#### **UNIT – IV**

**Current Computer Forensic tools:** evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software

**E-Mail Investigations:** Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools

**Cell phone and mobile device forensics:** Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

#### **UNIT – V**

**Working with Windows and DOS Systems:** understanding file systems, exploring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS startup tasks, virtual machines.

#### **TEXT BOOKS:**

1. Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi.
2. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning

#### **REFERENCE BOOKS:**

1. Real Digital Forensics by Keith J. Jones, Richard Bejtlich, Curtis W. Rose, Addison- Wesley Pearson Education
2. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brian Jenkinson, Springer International edition.
3. Computer Evidence Collection & Presentation by Christopher L.T. Brown, Firewall Media.
4. Homeland Security, Techniques & Technologies by Jesus Mena, Firewall Media.
5. Software Forensics Collecting Evidence from the Scene of a Digital Crime by Robert M.Slade, TMH 2005
6. Windows Forensics by Chad Steel, Wiley India Edition.

#### **Outcomes:**

- Students will understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.
- It gives an opportunity to students to continue their zeal in research in computer forensics.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem****L T/P/D C****- -/3/- 2****(A70596) LINUX PROGRAMMING LAB****Objectives:**

- To write shell scripts to solve problems.
- To implement some standard Linux utilities such as ls, cp etc using system calls.
- To develop network-based applications using C.

**List of sample problems:****Note: Use Bash for Shell scripts.**

1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
2. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
3. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
4. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
6. Write a shell script to list all of the directory files in a directory.
7. Write a shell script to find factorial of a given integer.
8. Write an awk script to count the number of lines in a file that do not contain vowels.
9. Write an awk script to find the number of characters, words and lines in a file.
10. Write a C program that makes a copy of a file using standard I/O and system calls.
11. Implement in C the following Linux commands using System calls  
a). cat            b) mv
12. Write a C program to list files in a directory.
13. Write a C program to emulate the Unix ls -l command.
14. Write a C program to list for every file in a directory, its inode number and file name.
15. Write a C program that redirects standard output to a file. Ex: ls > f1.
16. Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen.

17. Write a C program to create a Zombie process.
18. Write a C program that illustrates how an orphan is created.
19. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex:- ls -l | sort
20. Write C programs that illustrate communication between two unrelated processes using named pipe(FIFO File).
21. Write a C program in which a parent writes a message to a pipe and the child reads the message.
22. Write a C program (sender.c) to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.
23. Write a C program (receiver.c) that receives the messages (from the above message queue as specified in (22)) and displays them.
24. Write a C program that illustrates suspending and resuming processes using signals.
25. Write Client and Server programs in C for connection oriented communication between Server and Client processes using Unix Domain sockets to perform the following:  
Client process sends a message to the Server Process.The Server receives the message,reverses it and sends it back to the Client.The Client will then display the message to the standard output device.
26. Write Client and Server programs in C for connection oriented communication between Server and Client processes using Internet Domain sockets to perform the following:  
Client process sends a message to the Server Process.The Server receives the message,reverses it and sends it back to the Client.The Client will then display the message to the standard output device.
27. Write C programs to perform the following:  
One process creates a shared memory segment and writes a message("Hello") into it.Another process opens the shared memory segment and reads the message(ie. "Hello").It will then display the message("Hello") to standard output device.

**TEXT BOOKS:**

1. Beginning Linux Programming, 4<sup>th</sup> Edition, N.Matthew, R.Stones,Wrox, Wiley India Edition.
2. Advanced Unix Programming, N.B.Venkateswarulu, BS Publications.
3. Unix and Shell Programming, M.G. Venkatesh Murthy, Pearson Education.
4. Unix Shells by Example, 4th Edition, Ellie Quigley, Pearson Education.
5. Sed and Awk, O.Dougherty&A.Robbins,2<sup>nd</sup> edition, SPD.

**Outcomes:**

- Ability to understand the Linux environment
- Ability to perform the file management and multiple tasks using shell scripts in Linux environment

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem****L T/P/D C****- -3/- 2****(A70595) DATA WAREHOUSING AND MINING LAB****Objectives:**

Learn how to build a data warehouse and query it (using open source tools like Pentaho Data Integration and Pentaho Business Analytics), Learn to perform data mining tasks using a data mining toolkit (such as open source WEKA), Understand the data sets and data preprocessing, Demonstrate the working of algorithms for data mining tasks such as association rule mining, classification, clustering and regression, Exercise the data mining techniques with varied input values for different parameters.

**UNIT-1. Build Data Warehouse and Explore WEKA**

- A. Build a Data Warehouse/Data Mart (using open source tools like Pentaho Data Integration tool, Pentaho Business Analytics; or other data warehouse tools like Microsoft-SSIS, Informatica, Business Objects, etc.).
  - (i). Identify source tables and populate sample data
  - (ii). Design multi-dimensional data models namely Star, snowflake and Fact constellation schemas for any one enterprise (ex. Banking, Insurance, Finance, Healthcare, Manufacturing, Automobile, etc.).
  - (iii). Write ETL scripts and implement using data warehouse tools
  - (iv). Perform various OLAP operations such as slice, dice, roll up, drill up and pivot
  - (v). Explore visualization features of the tool for analysis like identifying trends etc.
- B. Explore WEKA Data Mining/Machine Learning Toolkit
  - (i). Downloading and/or installation of WEKA data mining toolkit,
  - (ii). Understand the features of WEKA toolkit such as Explorer, Knowledge Flow interface, Experimenter, command-line interface.
  - (iii). Navigate the options available in the WEKA (ex. Select attributes panel, Preprocess panel, Classify panel, Cluster panel, Associate panel and Visualize panel)
  - (iv). Study the arff file format
  - (v). Explore the available data sets in WEKA.
  - (vi). Load a data set (ex. Weather dataset, Iris dataset, etc.)
  - (vii). Load each dataset and observe the following:
    - i. List the attribute names and they types



- ii. Number of records in each dataset
- iii. Identify the class attribute (if any)
- iv. Plot Histogram
- v. Determine the number of records for each class.
- vi. Visualize the data in various dimensions

**Unit 2 Perform data preprocessing tasks and Demonstrate performing association rule mining on data sets**

- A. Explore various options available in Weka for preprocessing data and apply (like Discretization Filters, Resample filter, etc.) on each dataset
- B. Load each dataset into Weka and run Apriori algorithm with different support and confidence values. Study the rules generated.
- C. Apply different discretization filters on numerical attributes and run the Apriori association rule algorithm. Study the rules generated. Derive interesting insights and observe the effect of discretization in the rule generation process.

**Unit 3 Demonstrate performing classification on data sets**

- A. Load each dataset into Weka and run Id3, J48 classification algorithm. Study the classifier output. Compute entropy values, Kappa statistic.
- B. Extract if-then rules from the decision tree generated by the classifier, Observe the confusion matrix and derive Accuracy, F-measure, TPrate, FPrate, Precision and Recall values. Apply cross-validation strategy with various fold levels and compare the accuracy results.
- C. Load each dataset into Weka and perform Naïve-bayes classification and k-Nearest Neighbour classification. Interpret the results obtained.
- D. Plot RoC Curves
- E. Compare classification results of ID3, J48, Naïve-Bayes and k-NN classifiers for each dataset, and deduce which classifier is performing best and poor for each dataset and justify.

**Unit 4 Demonstrate performing clustering on data sets**

- A. Load each dataset into Weka and run simple k-means clustering algorithm with different values of k (number of desired clusters). Study the clusters formed. Observe the sum of squared errors and centroids, and derive insights.
- B. Explore other clustering techniques available in Weka.
- C. Explore visualization features of Weka to visualize the clusters. Derive interesting insights and explain.

**Unit 5 Demonstrate performing Regression on data sets**

- A. Load each dataset into Weka and build Linear Regression model. Study the clusters formed. Use Training set option. Interpret the regression model and derive patterns and conclusions from the regression results.
- B. Use options cross-validation and percentage split and repeat running the Linear Regression Model. Observe the results and derive meaningful results.
- C. Explore Simple linear regression technique that only looks at one variable.

**Resource Sites:**

1. <http://www.pentaho.com/>
2. <http://www.cs.waikato.ac.nz/ml/weka/>

**Outcomes:**

- Ability to understand the various kinds of tools.
- Demonstrate the classification, clusters and etc. in large data sets

**DATA MINING LAB****Objectives:**

- To obtain practical experience using data mining techniques on real world data sets.
- Emphasize hands-on experience working with all real data sets.

**List of Sample Problems:**

Task 1: Credit Risk Assessment

**Description:**

The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.

To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.

2. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

**The German Credit Data:**

Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data.

In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer !)

A few notes on the German dataset

- DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
- owns\_telephone. German phone rates are much higher than in Canada so fewer people own telephones.
- foreign\_worker. There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.
- There are 20 attributes used in judging a loan applicant. The goal is the classify the applicant into one of two categories, good or bad.

**Subtasks: (Turn in your answers to the following tasks)**

1. List all the categorical (or nominal) attributes and the real-valued attributes separately. (5 marks)
2. What attributes do you think might be crucial in making the credit assessment ? Come up with some simple rules in plain English using your selected attributes. (5 marks)
3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training. (10 marks)
4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy? (10 marks)

5. Is testing on the training set as you did above a good idea? Why or Why not ? (10 marks)
6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what is cross-validation briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why? (10 marks)
7. Check to see if the data shows a bias against “foreign workers” (attribute 20), or “personal-status” (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka’s GUI Explorer. Did removing these attributes have any significant effect? Discuss. (10 marks)
8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.) (10 marks)
9. Sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifications equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)? (10 marks)
10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model? (10 marks)
11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase? (10 marks)
12. (Extra Credit): How can you convert a Decision Trees into “if-then-else rules”. Make up your own small Decision Tree consisting of 2-3

levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one ! Can you predict what attribute that might be in this dataset ? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR. (10 marks)

**Task Resources:**

- Mentor lecture on Decision Trees
- Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)
- Decision Trees (Source: Tan, MSU)
- Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)
- Weka resources:
  - Introduction to Weka (html version) (download ppt version)
  - Download Weka
  - Weka Tutorial
  - ARFF format
  - Using Weka from command line

**Task 2: Hospital Management System**

Data Warehouse consists Dimension Table and Fact Table.

REMEMBER The following

Dimension

The dimension object (Dimension):

- \_ Name
- \_ Attributes (Levels) , with one primary key
- \_ Hierarchies

One time dimension is must.

About Levels and Hierarchies

Dimension objects (dimension) consist of a set of levels and a set of hierarchies defined over those levels. The levels represent levels of aggregation. Hierarchies describe parent-child relationships among a set of levels.

For example, a typical calendar dimension could contain five levels. Two

hierarchies can be defined on these levels:

H1: YearL > QuarterL > MonthL > WeekL > DayL

H2: YearL > WeekL > DayL

The hierarchies are described from parent to child, so that Year is the parent of Quarter, Quarter the parent of Month, and so forth.

About Unique Key Constraints

When you create a definition for a hierarchy, Warehouse Builder creates an identifier key for each level of the hierarchy and a unique key constraint on the lowest level (Base Level)

Design a Hospital Management system data warehouse (TARGET) consists of Dimensions Patient, Medicine, Supplier, Time. Where measures are ' NO UNITS', UNIT PRICE.

Assume the Relational database (SOURCE) table schemas as follows

TIME (day, month, year),

PATIENT (patient\_name, Age, Address, etc.,)

MEDICINE ( Medicine\_Brand\_name, Drug\_name, Supplier, no\_units, Uinit\_Price, etc.,)

SUPPLIER :( Supplier\_name, Medicine\_Brand\_name, Address, etc.,)

If each Dimension has 6 levels, decide the levels and hierarchies, Assume the level names suitably.

Design the Hospital Management system data warehouse using all schemas. Give the example 4-D cube with assumption names.

**Outcomes:**

- Ability to add mining algorithms as a component to the exiting tools
- Ability to apply mining techniques for realistic data.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>IV Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A80014) MANAGEMENT SCIENCE****Objectives:**

This course is intended to familiarise the students with the framework for the managers and leaders available for understanding and making decisions relating to issues related organisational structure, production operations, marketing, Human resource Management, product management and strategy.

**UNIT -I:**

**Introduction to Management and Organisation:** Concepts of Management and organization- nature, importance and Functions of Management, Systems Approach to Management - Taylor's Scientific Management Theory – Fayal's Principles of Management – Maslow's theory of Hierarchy of Human Needs – Douglas McGregor's Theory X and Theory Y – Hertzberg Two Factor Theory of Motivation - Leadership Styles, Social responsibilities of Management. Designing Organisational Structures: Basic concepts related to Organisation - Departmentation and Decentralisation, Types and Evaluation of mechanistic and organic structures of organisation and suitability.

**UNIT -II:**

**Operations and Marketing Management:** Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement – Business Process Reengineering (BPR) - Statistical Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling, TQM, Six Sigma, Deming's contribution to quality. Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records – JIT System, Supply Chain Management, Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

**UNIT -III:**

**Human Resources Management (HRM):** Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating – Capability Maturity Model (CMM) Levels – Performance Management System.

**UNIT -IV:**

**Project Management (PERT/CPM):** Network Analysis, Programme

Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

**UNIT -V:**

**Strategic Management and Contemporary Strategic Issues:** Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

**TEXT BOOKS:**

1. Stoner, Freeman, Gilbert, *Management*, 6th Ed, Pearson Education, New Delhi, 2004
2. P. Vijaya Kumar, N. Appa Rao and Ashima B. Chhalill, Cengage Learning India Pvt Ltd, 2012.

**REFERENCE BOOKS:**

1. Kotler Philip and Keller Kevin Lane: *Marketing Management*, Pearson, 2012.
2. Koontz and Wehrich: *Essentials of Management*, McGraw Hill, 2012.
3. Thomas N. Duening and John M. Ivancevich *Management—Principles and Guidelines*, Biztantra, 2012.
4. Kanishka Bedi, *Production and Operations Management*, Oxford University Press, 2012.
5. Samuel C. Certo: *Modern Management*, 2012.
6. Schermerhorn, Capling, Poole and Wiesner: *Management*, Wiley, 2012.
7. Parnell: *Strategic Management*, Cengage, 2012.
8. Lawrence R Jauch, R. Gupta and William F. Glueck: *Business Policy and Strategic Management*, Frank Bros. 2012.
9. Aryasri: *Management Science*, McGraw Hill, 2012

**Outcomes:**

By the end of the course, the student will be in a position to

- Plan an organisational structure for a given context in the organisation
- carry out production operations through Work study
- understand the markets, customers and competition better and price the given products appropriately.
- ensure quality for a given product or service
- plan and control the HR function better
- plan, schedule and control projects through PERT and CPM
- evolve a strategy for a business or service organisation



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<b>IV Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A80551) WEB SERVICES****(Elective – III)****Objectives:**

- To understand the details of web services technologies like WSDL, UDDI, SOAP
- To learn how to implement and deploy web service client and server
- To explore interoperability between different frameworks

**UNIT- I**

**Evolution and Emergence of Web Services** - Evolution of distributed computing, Core distributed computing technologies – client/server, CORBA, JAVA RMI, Microsoft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA).

**Introduction to Web Services** – The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

**Web Services Architecture** – Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication models, basic steps of implementing web services.

**UNIT- II**

**Fundamentals of SOAP** – SOAP Message Structure, SOAP encoding, Encoding of different data types, SOAP message exchange models, SOAP communication and messaging, Java and Axis, limitations of SOAP.

**UNIT- III**

**Describing Web Services** – WSDL – WSDL in the world of Web Services, Web Services life cycle, anatomy of WSDL definition document, WSDL bindings, WSDL Tools, limitations of WSDL.

**UNIT- IV**

**Discovering Web Services** – Service discovery, role of service discovery in a SOA, service discovery mechanisms, UDDI – UDDI registries, uses of UDDI Registry, Programming with UDDI, UDDI data structures, Publishing API, Publishing, searching and deleting information in a UDDI Registry, limitations of UDDI.

**UNIT- V**

**Web Services Interoperability** – Means of ensuring Interoperability, Overview of .NET, Creating a .NET client for an Axis Web Service, creating Java client for a Web service, Challenges in Web Services Interoperability.

**Web Services Security** – XML security frame work, Goals of Cryptography, Digital signature, Digital Certificate, XML Encryption.

**TEXT BOOK:**

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India.

**REFERENCE BOOKS:**

1. Java Web Service Architecture, James McGovern, Sameer Tyagi et al., Elsevier
2. Building Web Services with Java, 2<sup>nd</sup> Edition, S. Graham and others, Pearson Edn.
3. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly,SPD.
4. Web Services, G. Alonso, F. Casati and others, Springer.

**Outcomes:**

- Basic details of WSDL, UDDI, SOAP
- Implement WS client and server with interoperable systems

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>IV Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A80538) SEMANTIC WEB AND SOCIAL NETWORKS****(Elective – III)****Objectives:**

- To learn Web Intelligence
- To learn Knowledge Representation for the Semantic Web
- To learn Ontology Engineering
- To learn Semantic Web Applications, Services and Technology
- To learn Social Network Analysis and semantic web

**UNIT- I**

Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of Today's Web, The Next Generation Web.

Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

**UNIT- II**

Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web –Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL),UML,XML/XML Schema.

Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping.

**UNIT- III**

Logic, Rule and Inference Engines. Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base.

**UNIT- IV**

XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods, What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks.

**UNIT- V**

Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

**TEXT BOOKS:**

1. Thinking on the Web - Berners Lee, Godel and Turing, Wiley interscience,2008.
2. Social Networks and the Semantic Web, Peter Mika, Springer,2007.

**REFERENCE BOOKS:**

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J.Davies, Rudi Studer, Paul Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers,(Taylor & Francis Group)
3. Information Sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
4. Programming the Semantic Web, T.Segaran, C.Evans, J.Taylor,O'Reilly, SPD.

**Outcomes:**

- Ability to understand and knowledge representation for the semantic web.
- Ability to create ontology.
- Ability to build a blogs and social networks.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-II Sem****L T/P/D C****4 -/- 4****(A80537) SCRIPTING LANGUAGES****(Elective – III)****Objectives:**

The course demonstrates an in depth understanding of the tools and the scripting languages necessary for design and development of applications dealing with Bio-information/ Bio-data. The instructor is advised to discuss examples in the context of Bio-data/ Bio-information application development.

**UNIT – I**

**Introduction to PERL and Scripting:** Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

**UNIT – II**

**Advanced perl:** Finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

**PHP Basics :** PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Data types, Variables, Constants, expressions, string interpolation, control structures, Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

**UNIT – III**

**Advanced PHP Programming:** PHP and Web Forms, Files, PHP Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World.

**UNIT - IV**

**TCL :** TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures , strings , patterns, files, Advance TCL-eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.

Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding , Perl-Tk.

#### **UNIT – V**

**Python:** Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling.

Integrated Web Applications in Python – Building Small, Efficient Python Web Systems, Web Application Framework.

#### **TEXT BOOKS:**

1. The World of Scripting Languages , David Barron, Wiley Publications.
2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL, 3<sup>rd</sup> Edition, Jason Gilmore, Apress Publications (Dream tech.).

#### **REFERENCE BOOKS:**

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware(Addison Wesley) Pearson Education.
2. Programming Python,M.Lutz,SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1,I.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.
6. Guide to Programming with Python, M.Dawson, Cengage Learning.
7. Perl by Example, E.Quigley, Pearson Education.
8. Programming Perl,Larry Wall, T.Christiansen and J.Orwant,O'Reilly, SPD.
9. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
10. PHP and MySQL by Example, E.Quigley, Prentice Hall(Pearson).
11. Perl Power, J.P.Flynt, Cengage Learning.
12. PHP Programming solutions, V.Vaswani, TMH.

#### **Outcomes:**

- Ability to understand the differences between scripting languages.
- Ability to apply your knowledge of the weaknesses of scripting languages to select implementation..
- Master an understanding of python especially the object oriented concepts.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-II Sem****L T/P/D C****4 -/-/ 4****(A 80547) MULTIMEDIA & RICH INTERNET APPLICATIONS****(Elective – III)****Objectives:**

This course aims to further develop students' competency in producing dynamic and creative graphic solutions for multimedia productions. It provides students with the basic concepts and techniques of interactive authoring. It also introduces students with the advanced scripting skills necessary for implementing highly interactive, rich internet applications using multimedia technologies and authoring tools. Students will develop aesthetic value and competencies in multimedia authoring. Artistic visual style and layout design are stressed, as well as the editing and integration of graphic images, animation, video and audio files. The course allows students to master industry-wide software and technologies to create highly interactive, rich internet applications.

**UNIT - I**

Fundamental concepts in Text and Image: Multimedia and hypermedia, World Wide Web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

**UNIT- II**

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

Multimedia Data Compression: Lossless compression algorithms, Lossy compression algorithms, Image compression standards.

**UNIT III**

Basic Video compression techniques, Case study: MPEG Video Coding I, Basic Audio compression techniques, Case study: MPEG Audio compression.

**Web 2.0** : What is web 2.0, Search, Content Networks, User Generated Content, Blogging, Social Networking, Social Media, Tagging, Social Marking, Rich Internet Applications, Web Services, Mashups, Location Based Services, XML, RSS, Atom, JSON, and VoIP, Web 2.0 Monetization and Business Models, Future of the Web.

**UNIT - IV**

**Rich Internet Applications(RIAs) with Adobe Flash** : Adobe Flash-Introduction, Flash Movie Development, Learning Flash with Hands-on

Examples, Publish your flash movie, Creating special effects with Flash, Creating a website splash screen, action script, web sources.

**Rich Internet Applications(RIAs) with Flex 3** - Introduction, Developing with Flex 3, Working with Components, Advanced Component Development, Visual Effects and Multimedia,

#### **UNIT - V**

**Ajax- Enabled Rich Internet Application** : Introduction, Traditional Web Applications vs Ajax Applications, Rich Internet Application with Ajax, History of Ajax, Raw Ajax example using xmlhttprequest object, Using XML, Creating a full scale Ajax Enabled application, Dojo ToolKit.

#### **TEXT BOOKS:**

1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHI Learning, 2004
2. Professional Adobe Flex 3, Joseph Balderson, Peter Ent, et al, Wrox Publications, Wiley India, 2009.
3. AJAX, Rich Internet Applications, and Web Development for Programmers, Paul J Deitel and Harvey M Deitel, Deitel Developer Series, Pearson Education.

#### **REFERENCE BOOKS:**

1. Multimedia Communications: Applications, Networks, Protocols and Standards, Fred Halsall, Pearson Education, 2001, rp 2005.
2. Multimedia Making it work, Tay Vaughan, 7<sup>th</sup> edition, TMH, 2008.
3. Introduction to multimedia communications and Applications, Middleware, Networks, K.R.Rao, Zoran, Dragored, Wiley India, 2006, rp. 2009.
4. Multimedia Computing, Communications & Applications, Ralf Steinmetz and Klara Nahrstedt, Pearson Education, 2004
5. Principles of Multimedia, Ranjan Parekh, TMH, 2006.
6. Multimedia in Action, James E.Shuman, Cengage Learning, 198, rp 2008.
7. Multimedia Systems design, Prabhat K. Andleigh, Kiran Thakrar, PHI, 1986.
8. Multimedia and Communications Technology, Steve Heath, Elsevier, 1999, rp 2003.
9. Adobe Flash CS3 Professional, Adobe press, Pearson Education, 2007.
10. Flash CS3 Professional Advanced, Russel Chun, Pearson Education, 2007.



11. Flash CS5, Chris Grover, O'Reilly, SPD, 2010.
12. SAMS Teach yourself Adobe flash CS3, Pearson Education, 2007.
13. Flex 4 Cookbook, Joshua Noble, et.al, O'Reilly,SPD 2010.
14. Flex3 – A beginner's guide, Michele E.Davis, Jon A.Phillips, TMH, 2008.
15. Mastering Dojo,R.Gill,C.Riecke and A.Russell,SPD.

**Outcomes:**

- Ability to create and design rich internet applications.
- Ability to develop different multimedia tools to produce web based and independent user interfaces.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

IV Year B.Tech. CSE-II Sem

L T/P/D C

4 -/-/ 4

**(A80542) AD HOC AND SENSOR NETWORKS****(Elective – IV)****Objectives:**

- To understand the concepts of sensor networks
- To understand the MAC and transport protocols for adhoc networks
- To understand the security of sensor networks
- To understand the applications of adhoc and sensor networks

**UNIT- I**

**Introduction to Ad Hoc Wireless Networks:** Characteristics of MANETs, Applications of MANETs, Challenges.

**Routing in MANETs:** Topology-based versus Position-based approaches, Topology based routing protocols, Position based routing, Other Routing Protocols.

**UNIT- II**

**Data Transmission in MANETs:** The Broadcast Storm, Multicasting, Geocasting

**TCP over Ad Hoc Networks:** TCP Protocol overview, TCP and MANETs, Solutions for TCP over Ad Hoc

**UNIT- III**

**Basics of Wireless Sensors and Applications:** The Mica Mote, Sensing and Communication Range, Design Issues, Energy consumption, Clustering of Sensors, Applications

**Data Retrieval in Sensor Networks:** Classification of WSNs, MAC layer, Routing layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

**UNIT- IV**

**Security :** Security in Ad hoc Wireless Networks, Key Management, Secure Routing, Cooperation in MANETs, Intrusion Detection Systems.

**Sensor Network Platforms and Tools:** Sensor Network Hardware, Sensor Network Programming Challenges, Node-Level Software Platforms

**UNIT- V**

**Operating System – TinyOS**

**Imperative Language:** nesC, Dataflow style language: TinyGALS, Node-Level Simulators, ns-2 and its sensor network extension, TOSSIM

**TEXT BOOKS:**

1. Ad Hoc and Sensor Networks – Theory and Applications, *Carlos Corderio Dharma P. Aggarwal*, World Scientific Publications / Cambridge University Press, March 2006
2. Wireless Sensor Networks: An Information Processing Approach, *Feng Zhao, Leonidas Guibas*, Elsevier Science imprint, Morgan Kaufman Publishers, 2005, rp2009.

**REFERENCE BOOKS:**

1. Adhoc Wireless Networks – Architectures and Protocols, C.Siva Ram Murthy, B.S.Murthy, Pearson Education, 2004
2. Wireless Sensor Networks – Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010
3. Wireless Ad hoc Mobile Wireless Networks – Principles, Protocols and Applications, Subir Kumar Sarkar, et al., Auerbach Publications, Taylor & Francis Group, 2008.
4. Ad hoc Networking, *Charles E.Perkins*, Pearson Education, 2001.
5. Wireless Ad hoc Networking, *Shih-Lin Wu, Yu-Chee Tseng*, Auerbach Publications, Taylor & Francis Group, 2007
6. Wireless Ad hoc and Sensor Networks – Protocols, Performance and Control, Jagannathan Sarangapani, CRC Press, Taylor & Francis Group, 2007, rp 2010.
7. Security in Ad hoc and Sensor Networks, Raheem Beyah, et al., World Scientific Publications / Cambridge University Press, 2010
8. Ad hoc Wireless Networks – A communication-theoretic perspective, Ozan K.Tonguz, Gialuigi Ferrari, Wiley India, 2006, rp2009.
9. Wireless Sensor Networks – Signal processing and communications perspectives, Ananthram Swami, et al., Wiley India, 2007, rp2009.

**Outcomes:**

- Ability to understand the concept of ad-hoc and sensor networks.
- Ability to design and implement sensor network protocols.
- Ability to set up and evaluate measurements of protocol performance in sensor networks..

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-II Sem****L T/P/D C****4 -/- 4****(A80550) STORAGE AREA NETWORKS****(Elective – IV)****Objectives:**

- Understand Storage Area Networks characteristics and components.
- Become familiar with the SAN vendors and their products
- Learn Fibre Channel protocols and how SAN components use them to communicate with each other
- Become familiar with Cisco MDS 9000 Multilayer Directors and Fabric Switches Thoroughly learn Cisco SAN-OS features.
- Understand the use of all SAN-OS commands. Practice variations of SANOS features

**UNIT- I**

Review data creation and the amount of data being created and understand the value of data to a business, challenges in data storage and data management, Solutions available for data storage, Core elements of a data center infrastructure, role of each element in supporting business activities

Hardware and software components of the host environment, Key protocols and concepts used by each component ,Physical and logical components of a connectivity environment ,Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications.

**UNIT- II**

Concept of RAID and its components , Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Compare and contrast integrated and modular storage systems ,High-level architecture and working of an intelligent storage system

Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN , Benefits of the different networked storage options, Understand the need for long-term archiving solutions and describe how CAS fulfills the need , Understand the appropriateness of the different networked storage options for different application environments

**UNIT- III**

List reasons for planned/unplanned outages and the impact of downtime,

Impact of downtime, Differentiate between business continuity (BC) and disaster recovery (DR) ,RTO and RPO, Identify single points of failure in a storage infrastructure and list solutions to mitigate these failures.

**UNIT- IV**

Architecture of backup/recovery and the different backup/recovery topologies , replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities

**UNIT- V**

Identify key areas to monitor in a data center, Industry standards for data center monitoring and management, Key metrics to monitor for different components in a storage infrastructure, Key management tasks in a data center. Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain

Virtualization technologies, block-level and file-level virtualization technologies and processes.

**Case Studies:**

The technologies described in the course are reinforced with EMC examples of actual solutions.

Realistic case studies enable the participant to design the most appropriate solution for given sets of criteria.

**TEXT BOOK:**

1. EMC Corporation, Information Storage and Management, Wiley.

**REFERENCE BOOKS:**

1. Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, Osborne, 2003.
2. Marc Farley, "Building Storage Networks", Tata McGraw Hill, Osborne, 2001.
3. Meeta Gupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002.

**Outcomes:**

- Ability to demonstrate the storage area networks and their products
- Ability to provide the mechanisms for the backup/recovery.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>IV Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A80543) DATABASE SECURITY****(Elective-IV)****Objectives:**

- To learn the security of databases
- To learn the design techniques of database security
- To learn the secure software design

**UNIT- I**

**Introduction:** Introduction to Databases Security Problems in Databases Security Controls Conclusions

**Security Models -1:** Introduction Access Matrix Model Take-Grant Model Acten Model PN Model Hartson and Hsiao's Model Fernandez's Model Bussolati and Martella's Model for Distributed databases

**UNIT- II**

**Security Models -2:** Bell and LaPadula's Model Biba's Model Dion's Model Sea View Model Jajodia and Sandhu's Model The Lattice Model for the Flow Control conclusion

**Security Mechanisms :** Introduction User Identification/Authentication Memory Protection Resource Protection Control Flow Mechanisms Isolation Security Functionalities in Some Operating Systems Trusted Computer System Evaluation Criteria

**UNIT- III**

**Security Software Design :** Introduction A Methodological Approach to Security Software Design Secure Operating System Design Secure DBMS Design Security Packages Database Security Design

**Statistical Database Protection & Intrusion Detection Systems:** Introduction Statistics Concepts and Definitions Types of Attacks Inference Controls evaluation Criteria for Control Comparison. Introduction IDES System RETISS System ASES System Discovery

**UNIT- IV**

**Models For The Protection Of New Generation Database Systems -1:** Introduction A Model for the Protection of Frame Based Systems A Model for the Protection of Object-Oriented Systems SORION Model for the Protection of Object-Oriented Databases

**UNIT- V**

**Models For The Protection Of New Generation Database Systems -2: A**

Model for the Protection of New Generation Database Systems: the Orion Model  
Model Jajodia and Kogan's Model A Model for the Protection of Active Databases  
Conclusions

**TEXT BOOKS:**

1. Database Security by Castano *Pearson Edition (1/e)*
2. Database Security and Auditing: Protecting Data Integrity and Accessibility, 1st Edition, Hassan Afyouni, THOMSON Edition.

**REFERENCE BOOK:**

1. Database security by alfred basta, melissa zgola, CENGAGE learning.

**Outcomes:**

- Ability to carry out a risk analysis for large database.
- Ability to set up, and maintain the accounts with privileges and roles.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

IV Year B.Tech. CSE-II Sem

L	T/P/D	C
4	-/-	4

**(A80439) EMBEDDED SYSTEMS****(Elective –IV)****Objectives:**

- Design embedded computer system hardware
- Design, implement, and debug multi-threaded application software that operates under real-time constraints on embedded computer systems
- Use and describe the implementation of a real-time operating system on an embedded computer system
- Formulate an embedded computer system design problem including multiple constraints, create a design that satisfies the constraints, \*implement the design in hardware and software, and measure performance against the design constraints
- Create computer software and hardware implementations that operate according to well-known standards
- Organize and write design documents and project reports
- Organize and make technical presentations that describe a design.

**UNIT - I**

**Embedded Computing** : Introduction, Complex Systems and Microprocessor, The Embedded System Design Process, Formalisms for System Design, Design Examples. **(Chapter I from Text Book 1, Wolf).**

**The 8051 Architecture** : Introduction, 8051 Micro controller Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts. **(Chapter 3 from Text Book 2, Ayala).**

**UNIT - II**

**Basic Assembly Language Programming Concepts** : The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051. Data Transfer and Logical Instructions.

**(Chapters 4,5 and 6 from Text Book 2, Ayala).**

Arithmetic Operations, Decimal Arithmetic. Jump and Call Instructions, Further Details on Interrupts.

**(Chapter 7 and 8 from Text Book 2, Ayala)**

**UNIT - III**

**Applications** : Interfacing with Keyboards, Displays, D/A and A/D



Conversions, Multiple Interrupts, Serial Data Communication. (Chapter 10 and 11 from Text Book 2, Ayala).

**Introduction to Real – Time Operating Systems** : Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment. (Chapter 6 and 7 from Text Book 3, Simon).

#### UNIT - IV

**Basic Design Using a Real-Time Operating System** : Principles, Semaphores and Queues, HardReal-Time Scheduling Considerations, Saving Memory and Power, An example RTOS like uC-OS (Open Source); Embedded Software Development Tools: Host and Target machines, Linker/ Locators for Embedded

Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System. (Chapter 8,9,10 & 11 from Text Book 3, Simon).

#### UNIT – V

**Introduction to advanced architectures** : ARM and SHARC, Processor and memory organization and Instruction level parallelism; Networked embedded systems: Bus protocols, I2C bus and CAN bus; Internet-Enabled Systems, Design Example-Elevator Controller. (Chapter 8 from Text Book 1, Wolf).

#### TEXT BOOKS :

1. Computers and Components, Wayne Wolf, Elsevier.
2. The 8051 Microcontroller , Kenneth J.Ayala, Thomson.

#### REFERENCE BOOKS :

1. Embedding system building blocks, Labrosse, via CMP publishers.
2. Embedded Systems, Raj Kamal, TMH.
3. Micro Controllers, Ajay V Deshmukhi, TMH.
4. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley.
5. Microcontrollers, Raj kamal, Pearson Education.
6. An Embedded Software Primer, David E. Simon, Pearson Education.

#### Outcomes:

- Ability to understanding of general system theory and how this applies to embedded system.
- Ability to build a prototype circuit on breadboard using 8051 microcontroller.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>IV Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	-	-/-	2

**(A80087) INDUSTRY ORIENTED MINI PROJECT**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>IV Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	-	-/6/-	2

**(A80089) SEMINAR**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>IV Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	-	-/15/-	10

**(A80088) PROJECT WORK**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>IV Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	-	-/-	2

**(A80090) COMPREHENSIVE VIVA**

## BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY

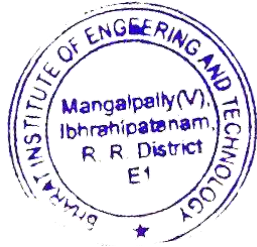
Mangalpally (Village), Ibrahimpatnam (Mandal), Ranga Reddy (District), Telangana-501510

1.3.2. Average percentage of courses that include experiential learning through project work/field work/internship during last five years

### B.Tech-COMPUTER SCIENCE ENGINEERING

2016-17

S. No.	Regulations	No. of Course	Year of Study
1.	R16	4	I year I & II semester
2.	R15	3	II Year I & II Semesters
3.	R13	6	III & IV year I & II Semesters



*Vatthara Subu*  
**PRINCIPAL**  
Principal  
Bharat Institute of Engg. and Tech  
Mangalpally(V), Ibrahimpatnam(M)  
Ranga Reddy (Dist)-Telangana-501510

With effect from 02/08/2016

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B.Tech COURSE STRUCTURE (2016-17)**

(Common for EEE, ECE, CSE, EIE, BME, IT, ETE, ECM, ICE)

**I YEAR I SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics-I	3	1	0	3
2	CH102BS	Engineering Chemistry	4	0	0	4
3	PH103BS	Engineering Physics-I	3	0	0	3
4	EN104HS	Professional Communication in English	3	0	0	3
5	ME105ES	Engineering Mechanics	3	0	0	3
6	EE106ES	Basic Electrical and Electronics Engineering	4	0	0	4
7	EN107HS	English Language Communication Skills Lab	0	0	3	2
8	ME108ES	Engineering Workshop	0	0	3	2
9	*EA109MC	NSS	0	0	0	0
		<b>Total Credits</b>	<b>20</b>	<b>1</b>	<b>6</b>	<b>24</b>

**I YEAR II SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	PH201BS	Engineering Physics-II	3	0	0	3
2	MA202BS	Mathematics-II	4	1	0	4
3	MA203BS	Mathematics-III	4	1	0	4
4	CS204ES	Computer Programming in C	3	0	0	3
5	ME205ES	Engineering Graphics	2	0	4	4
6	CH206BS	Engineering Chemistry Lab	0	0	3	2
7	PH207BS	Engineering Physics Lab	0	0	3	2
8	CS208ES	Computer Programming in C Lab	0	0	3	2
9	*EA209MC	NCC/NSO	0	0	0	0
		<b>Total Credits</b>	<b>16</b>	<b>2</b>	<b>13</b>	<b>24</b>

\*Mandatory Course.

**MATHEMATICS- I**  
**(Linear Algebra and Differential Equations)**

**B.Tech. I Year I Sem.**

Course Code: **MA101BS**

**L T/P/D C**

**3 1/0/0 3**

**Prerequisites:** Foundation course (No prerequisites).

**Course Objectives:**

To learn

- types of matrices and their properties
- the concept of rank of a matrix and applying the same to understand the consistency
- solving the linear systems
- the concepts of eigen values and eigen vectors and reducing the quadratic forms into their canonical forms
- partial differentiation, concept of total derivative
- finding maxima and minima of functions of two variables
- methods of solving the linear differential equations of first and higher order
- the applications of the differential equations
- formation of the partial differential equations and solving the first order equations.

**Course Outcomes:**

After learning the contents of this paper the student must be able to

- write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
- find the Eigen values and Eigen vectors which come across under linear transformations
- find the extreme values of functions of two variables with/ without constraints.
- identify whether the given first order DE is exact or not
- solve higher order DE's and apply them for solving some real world problems

**UNIT-I**

**Initial Value Problems and Applications**

Exact differential equations - Reducible to exact.

Linear differential equations of higher order with constant coefficients: Non homogeneous terms with RHS term of the type  $e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ , polynomials in  $x$ ,  $e^{ax}V(x)$ ,  $xV(x)$ - Operator form of the differential equation, finding particular integral using inverse operator, Wronskian of functions, method of variation of parameters.

Applications: Newton's law of cooling, law of natural growth and decay, orthogonal trajectories, Electrical circuits.

**UNIT-II**

**Linear Systems of Equations**

Types of real matrices and complex matrices, rank, echelon form, normal form, consistency and solution of linear systems (homogeneous and Non-homogeneous) - Gauss elimination, Gauss Jordan and LU decomposition methods- Applications: Finding current in the electrical circuits.

### **UNIT–III**

#### **Eigen values, Eigen Vectors and Quadratic Forms**

Eigen values, Eigen vectors and their properties, Cayley - Hamilton theorem (without proof), Inverse and powers of a matrix using Cayley - Hamilton theorem, Diagonalization, Quadratic forms, Reduction of Quadratic forms into their canonical form, rank and nature of the Quadratic forms – Index and signature.

### **UNIT–IV**

#### **Partial Differentiation**

Introduction of partial differentiation, homogeneous function, Euler's theorem, total derivative, Chain rule, Taylor's and McLaurin's series expansion of functions of two variables, functional dependence, Jacobian.

Applications: maxima and minima of functions of two variables without constraints and Lagrange's method (with constraints)

### **UNIT-V**

#### **First Order Partial Differential Equations**

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Lagranges method to solve the first order linear equations and the standard type methods to solve the non linear equations.

#### **Text Books:**

1. A first course in differential equations with modeling applications by Dennis G. Zill, Cengage Learning publishers.
2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers.

#### **References:**

1. Advanced Engineering Mathematics by E. Kreyszig, John Wiley and Sons Publisher.
2. Engineering Mathematics by N. P. Bali, Lakshmi Publications.

## ENGINEERING CHEMISTRY

**B.Tech. I Year I Sem.**

Course Code: **CH102BS/CH202BS**

**L T/P/D C**

**4 0/0/0 4**

### Course Objectives:

- 1) To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
- 2) To include the importance of water in industrial usage, significance of corrosion control to protect the structures, polymers and their controlled usage.
- 3) To acquire knowledge of engineering materials and about fuels and batteries.
- 4) To acquire required knowledge about engineering materials like cement, refractories and composites.

### Course Outcomes:

Students will gain the basic knowledge of electrochemical procedures related to corrosion and its control. They can understand the basic properties of water and its usage in domestic and industrial purposes. They learn the use of fundamental principles to make predictions about the general properties of materials. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

## UNIT-I

**Water and its treatment:** Introduction – hardness of water – causes of hardness – types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Numerical problems. Potable water and its specifications- Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and Ozonization. Defluoridation – Nalgonda technique - Determination of F<sup>-</sup> ion by ion- selective electrode method.

### Boiler troubles:

Sludges, scales and Caustic embrittlement. Internal treatment of Boiler feed water – Calgon conditioning – Phosphate conditioning - Colloidal conditioning – Softening of water by ion-exchange processes. Desalination of water – Reverse osmosis. Numerical problems – Sewage water - Steps involved in treatment of sewage.

## UNIT-II

### Electrochemistry and Batteries:

**Electrochemistry:** Electrode- electrode potential, standard electrode potential, types of electrodes – Construction and functioning of Standard hydrogen electrode, calomel and glass electrode. Nernst equation - electrochemical series and its applications. Electrochemical cells: Daniel cell – cell notation, cell reaction and cell emf – Concept of concentration cells – Electrolyte concentration cell – Numerical problems.

**Batteries:** Cell and battery - Primary battery (dry cell, alkaline cell and Lithium cell) and Secondary battery (lead acid, Ni-Cd and lithium ion cell),

**Fuel cells:** Hydrogen –oxygen and methanol-oxygen fuel cells – Applications.

### UNIT-III

**Polymers:** Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples.

**Plastics:** Definition and characteristics- thermoplastic and thermosetting plastics, compounding and fabrication of plastics (compression and injection moulding). Preparation, Properties and engineering applications of PVC and Bakelite.

**Fibers:** Characteristics of fibers – preparation, properties and applications of Nylon-6, 6 and Dacron. Fiber reinforced plastics (FRP) – Applications.

**Rubbers:** Natural rubber and its vulcanization - compounding of rubber.

**Elastomers:** Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.

**Conducting polymers:** Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

**Biodegradable polymers:** Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.

### UNIT-IV

**Fuels and Combustion:** Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking – types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG.

**Combustion:** Definition, Calorific value of fuel – HCV, LCV; Calculation of air quantity required for combustion of a fuel.

### UNIT-V

#### **Cement, Refractories, Lubricants and Composites:**

**Cement:** Portland cement, its composition, setting and hardening of Portland cement.

**Special cements:** White cement, water proof cement, High alumina cement and Acid resistant cement.

**Refractories:** Classification, characteristics of good refractories, Refractoriness, refractoriness under load, porosity and chemical inertness – applications of refractories.

**Lubricants:** Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.

**Composites:** Introduction- Constituents of composites – advantages, classification and constituents of composites. Applications of composites.

#### **Text books:**

- 1) Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, New Delhi (2010)
- 2) Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, New Delhi. (2016)



**Reference Books:**

- 1) Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
- 2) Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)
- 3) Engineering Chemistry by Thirumala Chary and Laxminarayana, Scitech Publishers, Chennai (2016).

## ENGINEERING PHYSICS/ENGINEERING PHYSICS - I

**B.Tech. I Year I Sem.**

Course Code: **PH103BS**

**L T/P/D C**

**3 0/0/0 3**

### Course Objectives:

- To understand interaction of light with matter through interference, diffraction and polarization.
- To able to distinguish ordinary light with a laser light and to realize propagation of light through optical fibers.
- To understand various crystal systems and there structures elaborately.
- To study various crystal imperfections and probing methods like X-RD.

**Course outcomes:** after completion of this course the student is able to

- Realize the importance of light phenomena in thin films and resolution.
- Learn principle, working of various laser systems and light propagation through optical fibers.
- Distinguish various crystal systems and understand atomic packing factor.
- Know the various defects in crystals.

### UNIT-I

**Interference:** Coherence, division of amplitude and division of wave front, interference in thin films (transmitted and reflected light), Newton's rings experiment.

**Diffraction:** Distinction between Fresnel and Fraunhofer diffraction, diffraction due to single slit, N-slits, Diffraction grating experiment.

### UNIT-II

**Polarization:** Introduction, Malus's law, double refraction, Nicol prism, Quarter wave and half wave plates.

**Lasers:** Characteristics of lasers, spontaneous and stimulated emission of radiation, Einstein coefficients, population inversion, ruby laser, helium – neon laser, semi conductor laser, applications of lasers

### UNIT-III

**Fiber Optics:** Principle of optical fiber, construction of fiber, acceptance angle and acceptance cone, numerical aperture, types of optical fibers: step index and graded index fibers, attenuation in optical fibers, applications of optical fibers in medicine and sensors.

### UNIT-IV

**Crystallography:** Space lattice, unit cell and lattice parameters, crystal systems, Bravais lattices, atomic radius, co-ordination number and packing factor of SC, BCC, FCC, HCP and diamond, Miller indices, crystal planes and directions, inter planar spacing of orthogonal crystal systems.

### UNIT-V

**X-ray Diffraction and Defects in Crystals:** Bragg's law, X-ray diffraction methods: Laue method, powder method; point defects: vacancies, substitutional, interstitial, Frenkel and

Schottky defects, line defects (qualitative) and Burger's vector, surface defects: stacking faults, twin, tilt and grain boundaries.

**Text Books:**

1. Physics Vol. 2, Halliday, Resnick and Kramer John Wiley and Sons, Edition 4.
2. Modern Engineering Physics, K. Vijaya Kumar and S. Chandra Lingam, S. Chand and Co. Pvt. Ltd.
3. Introduction to Solid State Physics, Charles Kittel, Wiley Student edition.

**Reference Books:**

1. X-Ray Crystallography, Phillips, John Wiley publishers.
2. Waves, Frank S Crawford Jr, Berkeley Physics course, Volume 3.
3. Solid State Physics, AJ Dekker, MacMilan Publishers.
4. Introduction to Crystallography, Phillips, John Wiley publishers.

## PROFESSIONAL COMMUNICATION IN ENGLISH

**B.Tech. I Year I Sem.**

Course Code: **EN104HS/EN204HS**

**L T/P/D C**

**3 0/0/0 3**

### INTRODUCTION

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic and communicative competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text book for detailed study. The students should be encouraged to read the texts/poems silently leading to reading comprehension. Reading comprehension passages are given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, from newspaper articles, advertisements, promotional material, etc. *The focus in this syllabus is on skill development, fostering ideas and practice of language skills.*

### Course Objectives:

The course will help students to:

- a. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
- b. Equip students to study academic subjects more effectively using the theoretical and Practical components of English syllabus.
- c. Develop study skills and communication skills in formal and informal situations.

### Course Outcomes:

Students will be able to:

1. Use English Language effectively in spoken and written forms.
2. Comprehend the given texts and respond appropriately.
3. Communicate confidently in formal and informal contexts.

### SYLLABUS

#### Reading Skills:

#### Objectives:

1. To develop an awareness in students about the significance of silent reading and comprehension.
2. To develop students' ability to guess meanings of words from the context and grasp the overall message of the text, draw inferences, etc., by way of:
  - Skimming and Scanning the text
  - Intensive and Extensive Reading
  - Reading for Pleasure
  - Identifying the topic sentence

- Inferring lexical and contextual meaning
- Recognizing Coherence/Sequencing of Sentences

**NOTE:** The students will be trained in reading skills using the prescribed texts for detailed study. They will be tested in reading comprehension of different ‘unseen’ passages which may be taken from authentic texts, such as magazines/newspaper articles.

### Writing Skills:

#### Objectives:

1. To develop an awareness in the students about writing as an exact and formal skill
2. To create an awareness in students about the components of different forms of writing, beginning with the lower order ones through;
  - Writing of sentences
  - Use of appropriate vocabulary
  - Paragraph writing
  - Coherence and cohesiveness
  - Narration / description
  - Note Making
  - Formal and informal letter writing
  - Describing graphs using expressions of comparison

In order to improve the proficiency of the students in the acquisition of language skills mentioned above, the following text and course contents, divided into Five Units, are prescribed:

#### Text Books:

1. ***“Fluency in English – A Course book for Engineering Students”*** by Board of Editors: **Hyderabad: Orient BlackSwan Pvt. Ltd. 2016. Print.**
2. Raman, Meenakshi and Sharma, Sangeeta. ***“Technical Communication- Principles and Practice”***. Third Edition. **New Delhi: Oxford University Press. 2015. Print.**

The course content / study material is divided into **Five Units**.

**Note:** *Listening and speaking skills are covered in the syllabus of ELCS Lab.*

#### UNIT –I:

Chapter entitled ‘*Presidential Address*’ by **Dr. A.P.J. Kalam** from ***“Fluency in English– A Course book for Engineering Students”*** published by Orient BlackSwan, Hyderabad.

**Vocabulary:** Word Formation -- Root Words --The Use of Prefixes and Suffixes-- Collocations-- Exercises for Practice.

**Grammar:** Punctuation – Parts of Speech- Articles -Exercises for Practice.

**Reading:** ***Double Angels*** by David Scott-Reading and Its Importance- Techniques for Effective Reading- Signal Words- Exercises for Practice

**Writing:** Writing Sentences- Techniques for Effective Writing-- Paragraph Writing-Types, Structure and Features of a Paragraph-Coherence and Cohesiveness: Logical, Lexical and Grammatical Devices - Exercises for Practice

## UNIT –II:

Chapter entitled *Satya Nadella: Email to Employees on his First Day as CEO* from “*Fluency in English– A Course book for Engineering Students*” Published by Orient BlackSwan, Hyderabad.

**Vocabulary:** Synonyms and Antonyms – Homonyms, Homophones, Homographs- Exercises for Practice (Chapter 17 ‘*Technical Communication- Principles and Practice*’. *Third Edition* published by Oxford University Press may also be followed.)

**Grammar:** Verbs-Transitive, Intransitive and Non-finite Verbs – Mood and Tense— Gerund – Words with Appropriate Prepositions – Phrasal Verbs - Exercises for Practice

**Reading:** Sub-skills of Reading- Skimming, Scanning, Extensive Reading and Intensive Reading - *The Road Not Taken* by **Robert Frost** -- Exercises for Practice

**Writing:** Letter Writing –Format, Styles, Parts, Language to be used in Formal Letters- Letter of Apology – Letter of Complaint-Letter of Inquiry with Reply – Letter of Requisition -- Exercises for Practice

## UNIT –III:

From the book entitled ‘*Technical Communication- Principles and Practice*’. *Third Edition* published by Oxford University Press.

**Vocabulary:** Introduction- A Brief History of Words – Using the Dictionary and Thesaurus– Changing Words from One Form to Another – Confusables (From Chapter 17 entitled ‘*Grammar and Vocabulary Development*’)

**Grammar:** Tenses: Present Tense- Past Tense- Future Tense- Active Voice – Passive Voice- Conditional Sentences – Adjective and Degrees of Comparison. (From Chapter 17 entitled ‘*Grammar and Vocabulary Development*’)

**Reading:** Improving Comprehension Skills – Techniques for Good Comprehension- Skimming and Scanning- Non-verbal Signals – Structure of the Text – Structure of Paragraphs – Punctuation – Author’s viewpoint (Inference) – Reader Anticipation: Determining the Meaning of Words – Summarizing- Typical Reading Comprehension Questions. (From Chapter 10 entitled ‘*Reading Comprehension*’)

**Writing:** Introduction- Letter Writing-Writing the Cover Letter- Cover Letters Accompanying Resumes- Emails. (From Chapter 15 entitled ‘*Formal Letters, Memos, and Email*’)

## UNIT –IV:

Chapter entitled ‘*Good Manners*’ by **J.C. Hill** from *Fluency in English – A Course book for Engineering Students*” published by Orient Blackswan, Hyderabad.

**Vocabulary:** Idiomatic Expressions –One- word Substitutes --- Exercises for Practice (Chapter 17 ‘*Technical Communication- Principles and Practice*’. *Third Edition* published by Oxford University Press may also be followed.)

**Grammar:** Sequence of Tenses- Concord (Subject in Agreement with the Verb) – Exercises for Practice

**Reading:** ‘*If*’ poem by **Rudyard Kipling**--Tips for Writing a Review --- Author’s Viewpoint – Reader’s Anticipation-- Herein the Students will be required to Read and Submit a Review of a Book (Literary or Non-literary) of their choice – Exercises for Practice.

**Writing:** Information Transfer-Bar Charts-Flow Charts-Tree Diagrams etc., -- Exercises for Practice.  
Introduction - Steps to Effective Precis Writing – Guidelines- Samples (Chapter 12 entitled ‘*The Art of Condensation*’ from ***Technical Communication- Principles and Practice. Third Edition*** published by Oxford University Press)

**UNIT –V:**

Chapter entitled ‘*Father Dear Father*’ by **Raj Kinger** from ***Fluency in English – A Course book for Engineering Students***” Published by Orient BlackSwan, Hyderabad

**Vocabulary:** Foreign Words—Words borrowed from other Languages- Exercises for Practice

**Grammar:** Direct and Indirect Speech- Question Tags- Exercises for Practice

**Reading:** Predicting the Content- Understanding the Gist – SQ3R Reading Technique- Study Skills – Note Making - Understanding Discourse Coherence – Sequencing Sentences. (From Chapter 10 entitled ‘**Reading Comprehension**’ - ***Technical Communication- Principles and Practice. Third Edition*** published by Oxford University Press.)

**Writing:** Technical Reports- Introduction – Characteristics of a Report – Categories of Reports –Formats- Prewriting – Structure of Reports (Manuscript Format) - Types of Reports - Writing the Report. (From Chapter 13 entitled ‘**Technical Reports**’ - ***Technical Communication- Principles and Practice. Third Edition*** published by Oxford University Press.)

 **Exercises from both the texts not prescribed shall be used for classroom tasks.**

**References**

- 1 Green, David. *Contemporary English Grammar –Structures and Composition*. MacMillan India. 2014 (Print)
2. Rizvi, M. Ashraf. *Effective Technical Communication*. Tata Mc Graw –Hill. 2015 (Print).

## ENGINEERING MECHANICS

**B.Tech. I Year I Sem.**  
Course Code: **ME105ES**

**L T/P/D C**  
**3 0/0/0 3**

**Pre Requisites:** None

### **Course Objectives:**

- To understand the resolving forces and moments for a given force system
- To analyze the types of friction for moving bodies and problems related to friction.
- To determine the centroid and second moment of area

### **UNIT-I**

**Introduction to Mechanics:** Basic Concepts, system of Forces Coplanar Concurrent Forces - Components in Space Resultant -Moment of Forces and its Application - Couples and Resultant of Force Systems. Equilibrium of system of Forces: Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems.

### **UNIT-II**

**Friction:** Types of friction -Limiting friction -Laws of Friction -static and Dynamic Frictions - Motion of Bodies –Wedge Screw, Screw-jack and differential screw –jack.

### **UNIT-III**

**Centroid and Center of Gravity:** Introduction – Centroids of lines – Centroids of area - Centroids of Composite figures - Theorem of Pappus -Centre of Gravity of Bodies – Centroids of Volumes – Center of gravity of composite bodies.

**Area moments of Inertia:** Introduction – Definition of Moment of Inertia -Polar Moment of Inertia – Radius of gyration. Transfer Theorem for moment of inertia – Moments of inertia by integration - Moments of Inertia of Composite Figures, Product of Inertia, Transfer Formula for Product of Inertia.

### **UNIT-IV**

**Mass Moment of Inertia:** Introduction - Moment of Inertia of Masses – Radius of gyration - Transfer Formula for Mass Moments of Inertia – Mass moments of inertia by integration - Mass moment of inertia of composite bodies.

**Virtual Work:** Theory of virtual work-Application.

### **UNIT-V**

**Kinetics:** Kinetics of a particle-D'Alemberts principle-Motion in a curved path – work, energy and power. Principle of conservation of energy- Kinetics of rigid body in translation, rotation-work done-Principle of work-energy-Impulse-momentum.

**Mechanical Vibrations:** Definitions, Concepts-Simple Harmonic motion- free vibrations-Simple and compound pendulums

### **Text Books:**

1. Singer's Engineering Mechanics Statics and Dynamics/ K. Vijaya Kumar Reddy, J. Suresh Kumar/ BSP



2. Engineering Mechanics/ Irving Shames, G. Krishna Mohan Rao / Prentice Hall
3. Foundations and applications of Engineering Mechanics by HD Ram and AK Chouhan, Cambridge publications.

**References:**

1. A Text of Engineering Mechanics /YVD Rao/ K. Govinda Rajulu/ M. Manzoor Hussain / Academic Publishing Company
2. Engineering Mechanics / Bhattacharyya/ Oxford.

## BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

**B.Tech. I Year I Sem.**

Course Code: **EE106ES/EE205ES:**

**L T/P/D C**

**4 0/0/0 4**

**Pre-requisite: None**

**Course Objectives:** Objectives of this course are

- To introduce the concept of electrical circuits and its components
- To introduce the concepts of diodes and transistors, and
- To impart the knowledge of various configurations, characteristics and applications.

**Course Outcomes:** After this course, the student will be able

- To analyze and solve problems of electrical circuits using network laws and theorems.
- To identify and characterize diodes and various types of transistors.

### UNIT- I

**Electrical Circuits:** R-L-C Parameters, Voltage and Current, Independent and Dependent Sources, Source Transformation – V-I relationship for passive elements, Kirchhoff's Laws, Network reduction techniques – series, parallel, series-parallel, star-to-delta, delta-to-star transformation, Nodal Analysis,

**Single Phase AC Circuits:** R.M.S. and Average values, Form Factor, steady state analysis of series, parallel and series-parallel combinations of R, L and C with sinusoidal excitation, concept of reactance, impedance, susceptance and admittance – phase and phase difference, Concept of power factor, j-notation, complex and polar forms of representation.

### UNIT-II

**Resonance:** Series resonance and Parallel resonance circuits, concept of bandwidth and Q factor, Locus Diagrams for RL, RC and RLC Combinations for Various Parameters.

**Network Theorems:** Thevenin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity, Tellegen's, Millman's and Compensation theorems for DC and AC excitations.

### UNIT- III

**P-N Junction Diode:** Diode equation, Energy Band diagram, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Load line analysis, Diffusion and Transition Capacitances.

**Rectifiers and Filters:** P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L- section Filters,  $\pi$ - section Filters.

### UNIT- IV

**Bipolar Junction Transistor (BJT):** Construction, Principle of Operation, Symbol, Amplifying Action, Common Emitter, Common Base and Common Collector configurations.

Transistor Biasing And Stabilization - Operating point, DC and AC load lines, Biasing - Fixed Bias, Emitter Feedback Bias, Collector to Emitter feedback bias, Voltage divider bias, Bias

stability, Stabilization against variations in  $V_{BE}$  and  $\beta$ , Bias Compensation using Diodes and Transistors.

**Transistor Configurations:** BJT modeling, Hybrid model, Determination of h-parameters from transistor characteristics, Analysis of CE, CB and CC configurations using h-parameters, Comparison of CE, CB and CC configurations.

#### **UNIT- V**

**Junction Field Effect Transistor:** Construction, Principle of Operation, Symbol, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET, Small Signal Model, Biasing FET.

**Special Purpose Devices:** Breakdown Mechanisms in Semi-Conductor Diodes, Zener diode characteristics, Use of Zener diode as simple regulator, Principle of operation and Characteristics of Tunnel Diode (With help of Energy band diagram) and Varactor Diode, Principle of Operation of SCR.

#### **Text books:**

- 1) Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar Oxford University
- 2) Basic Electrical and electronics Engineering-D P Kothari. I J Nagarath Mc Graw Hill Education

#### **References:**

- 1) Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, PEI/PHI, 9<sup>th</sup> Ed, 2006.
- 2) Millman's Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabratajit, TMH, 2/e, 1998.
- 3) Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6<sup>th</sup> edition.
- 4) Linear circuit analysis (time domain phasor and Laplace transform approaches)- 2<sup>nd</sup> edition by Raymond A. DeCarlo and Pen-Min-Lin, Oxford University Press-2004.
- 5) Network Theory by N. C. Jagan and C. Lakshminarayana, B.S. Publications.
- 6) Network Theory by Sudhakar, Shyam Mohan Palli, TMH.

## ENGLISH LANGUAGE COMMUNICATION SKILLS (ELCS) LAB

**B.Tech. I Year I Sem.**

Course Code: EN107HS/EN207HS

**L T/P/D C**

**0 0/3/0 2**

The **English Language Communication Skills (ELCS) Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

### Course Objectives:

- To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
- To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency of students in spoken English and neutralize their mother tongue influence
- To train students to use language appropriately for public speaking, group discussions and interviews

### Course Outcomes:

Students will be able to attain:

- Better understanding of nuances of English language through audio- visual experience and group activities
- Neutralization of accent for intelligibility
- Speaking skills with clarity and confidence which in turn enhances their employability skills.

**Syllabus: English Language Communication Skills Lab (ELCS) shall have two parts:**

- **Computer Assisted Language Learning (CALL) Lab**
- **Interactive Communication Skills (ICS) Lab**

### Listening Skills:

Objectives

- To enable students develop their listening skills so that they may appreciate the role in the LSRW skills approach to language and improve their pronunciation
- To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds and regions.

*Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.*

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

## **Speaking Skills:**

### Objectives

- To involve students in speaking activities in various contexts
- To enable students express themselves fluently and appropriately in social and professional contexts :
  - Oral practice
  - Describing objects/situations/people
  - Role play – Individual/Group activities
  - Just A Minute (JAM) Sessions.

The following course content is prescribed for the **English Language Communication Skills Lab**.

### **Exercise – I**

#### **CALL Lab:**

*Understand:* Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening.

*Practice:* Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs- Consonant Clusters- Past Tense Marker and Plural Marker.

*Testing Exercises*

#### **ICS Lab:**

*Understand:* Spoken vs. Written language- Formal and Informal English.

*Practice:* Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

### **Exercise – II**

#### **CALL Lab:**

*Understand:* Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Sentence Stress – Intonation.

*Practice:* Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Sentence Stress – Intonation.

*Testing Exercises*

#### **ICS Lab:**

*Understand:* Features of Good Conversation – Strategies for Effective Communication.

*Practice:* Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

### **Exercise - III**

#### **CALL Lab:**

*Understand:* Errors in Pronunciation-the Influence of Mother Tongue (MTI).

*Practice:* Common Indian Variants in Pronunciation – Differences between British and American Pronunciation.

*Testing Exercises*

**ICS Lab:**

*Understand:* Descriptions- Narrations- Giving Directions and Guidelines.

*Practice:* Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

**Exercise – IV**

**CALL Lab:**

*Understand:* Listening for General Details.

*Practice:* Listening Comprehension Tests.

*Testing Exercises*

**ICS Lab:**

*Understand:* Public Speaking – Exposure to Structured Talks - Non-verbal Communication- Presentation Skills.

*Practice:* Making a Short Speech – Extempore- Making a Presentation.

**Exercise – V**

**CALL Lab:**

*Understand:* Listening for Specific Details.

*Practice:* Listening Comprehension Tests.

*Testing Exercises*

**ICS Lab:**

*Understand:* Group Discussion- Interview Skills.

*Practice:* Group Discussion- Mock Interviews.

**Minimum Requirement of infrastructural facilities for ELCS Lab:**

**1. Computer Assisted Language Learning (CALL) Lab:**

**The Computer Assisted Language Learning Lab** has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

**System Requirement (Hardware component):**

*Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:*

Computers with Suitable Configuration

High Fidelity Headphones

**2. Interactive Communication Skills (ICS) Lab:**

**The Interactive Communication Skills Lab:** A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V. or LCD, a digital stereo –audio and video system and camcorder etc.

**Lab Manuals:**

- 1) A book entitled “*ELCS Lab Manual – A Workbook for CALL and ICS Lab Activities*” by Board of Editors: Hyderabad: Orient BlackSwan Pvt. Ltd. 2016. Print.
- 2) Hart, Steve; Nair, Aravind R.; Bhambhani, Veena. “*EMBARK- English for undergraduates*” Delhi: Cambridge University Press. 2016. Print.

**Suggested Software:**

- 1) Cambridge Advanced Learners’ English Dictionary with CD.
- 2) Grammar Made Easy by Darling Kindersley.
- 3) Punctuation Made Easy by Darling Kindersley.
- 4) Oxford Advanced Learner’s Compass, 8<sup>th</sup> Edition.
- 5) English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- 6) English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- 7) TOEFL and GRE (KAPLAN, AARCO and BARRONS, USA, Cracking GRE by CLIFFS).

**References:**

- 1) Jayashree Mohanraj. *Let Us Hear Them Speak*. New Delhi: Sage Texts. 2015. Print.  
Hancock, M. *English Pronunciation in Use. Intermediate Cambridge*: Cambridge University Press. 2009. Print.

## ENGINEERING WORKSHOP

**B.Tech. I Year I Sem.**

Course Code: **ME108ES/ME208ES**

**L T/P/D C**

**0 0/3/0 2**

**Pre-requisites:** Practical skill

### **Course Objective:**

- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, equipment and machines.
- To study commonly used carpentry joints.
- To have practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

**Course Outcomes:** At the end of the course, the student will be able to:

- Study and practice on machine tools and their operations
- Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.
- Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
- Apply basic electrical engineering knowledge for house wiring practice.

### **1. TRADES FOR EXERCISES:**

**At least two exercises from each trade:**

- 1) Carpentry
- 2) Fitting
- 3) Tin-Smithy and Development of jobs carried out and soldering.
- 4) Black Smithy
- 5) House-wiring
- 6) Foundry
- 7) Welding
- 8) Power tools in construction, wood working, electrical engineering and mechanical engineering.

### **2. TRADES FOR DEMONSTRATION and EXPOSURE:**

- Plumbing, Machine Shop, Metal Cutting (Water Plasma)

### **Text books:**

- 1) Workshop Practice /B. L. Juneja / Cengage
- 2) Workshop Manual / K.Venugopal / Anuradha.

### **Reference books:**

- 1) Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech
- 2) Workshop Manual / Venkat Reddy/ BSP



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech COURSE STRUCTURE (2016-17)**

(Common for EEE, ECE, CSE, EIE, BME, IT, ETE, ECM, ICE)

**I YEAR II SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	PH201BS	Engineering Physics-II	3	0	0	3
2	MA202BS	Mathematics-II	4	1	0	4
3	MA203BS	Mathematics-III	4	1	0	4
4	CS204ES	Computer Programming in C	3	0	0	3
5	ME205ES	Engineering Graphics	2	0	4	4
6	CH206BS	Engineering Chemistry Lab	0	0	3	2
7	PH207BS	Engineering Physics Lab	0	0	3	2
8	CS208ES	Computer Programming in C Lab	0	0	3	2
9	*EA209MC	NCC/NSO	0	0	0	0
		<b>Total Credits</b>	<b>16</b>	<b>2</b>	<b>13</b>	<b>24</b>

\*Mandatory Course.

## PH201BS: ENGINEERING PHYSICS - II

**B.Tech. I Year II Sem.**

**L T/P/D C**

**3 0/0/0 3**

### Course Objectives:

- To understand the behavior of a particle quantum mechanically.
- To be able to distinguish pure and impure semi conductors and understand formation of P-N Junction.
- To understand various magnetic and dielectric properties of materials.
- To study super conductor behavior of materials.

### Course Outcomes: After completion of this course the student is able to

- Realize the importance of behavior of a particle quantum mechanically.
- Learn concentration estimation of charge carriers in semi conductors.
- Learn various magnetic dielectric properties and apply them in engineering applications.
- Know the basic principles and applications of super conductors.

### UNIT - I

**Principles of Quantum Mechanics:** Waves and particles, de-Broglie hypothesis, matter waves, Davisson and Germer experiment, Heisenberg uncertainty principle, Schrodinger time independent wave equation, physical significance of wave function, particle in 1-D potential box, electron in periodic potential, Kronig-Penny model (qualitative treatment), E-K curve, origin of energy band formation in solids.

### UNIT - II

**Semiconductor Physics:** Fermi level in intrinsic and extrinsic semiconductors, calculation of carrier concentration in intrinsic & extrinsic semiconductors, direct and indirect band gap semiconductors, formation of PN junction, open circuit PN junction, energy diagram of PN junction diode, solar cell: I-V characteristics and applications.

### UNIT - III

**Dielectric Properties:** Electric dipole, dipole moment, dielectric constant, polarizability, electric susceptibility, displacement vector, electronic, ionic and orientation polarizations and calculation of their polarizabilities, internal field, Clausius-Mossotti relation, Piezoelectricity, pyroelectricity and ferroelectricity-BaTiO<sub>3</sub> structure.

### UNIT - IV

**Magnetic Properties & Superconductivity:** Permeability, field intensity, magnetic field induction, magnetization, magnetic susceptibility, origin of magnetic moment, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, hysteresis curve based on domain theory, soft and hard magnetic materials, properties of anti-ferro and ferri magnetic materials,

**Superconductivity:** Superconductivity phenomenon, Meissner effect, applications of superconductivity.

## **UNIT - V**

**Introduction to nanoscience:** Origin of nanoscience, nanoscale, surface to volume ratio, quantum confinement, dominance of electromagnetic forces, random molecular motion, bottom-up fabrication: Sol-gel, CVD and PVD techniques, top-down fabrication: ball mill method, characterization by XRD, SEM and TEM.

### **Text Books:**

1. Solid State Physics, A. J. Dekkar, Macmillan publishers Ind. Ltd.,
2. Solid State Physics, Chales Kittel, Wiley student edition.
3. Fundamentals of Physics, Alan Giambattisa, BM Richardson and Robert C Richardson, Tata McGraw hill Publishers.

### **Reference Books:**

1. Modern Engineering Physics, K. Vijaya Kumar, S. Chandralingam S. Chand & Co. Pvt. Ltd.,
2. University Physics, Francis W. Sears, Hugh D. Young, Marle Zeemansky and Roger A Freedman, Pearson Education.
3. Fundamentals of Acoustics, Kinster and Frey, John Wiley and Sons.
4. Introduction to Quantum Mechanics Leonard I. Schiff McGraw-Hill

**MA102BS/MA202BS: MATHEMATICS - II**  
**(Advanced Calculus)**

**B.Tech. I Year II Sem.**

**L T/P/D C**  
**4 1/0/0 4**

**Prerequisites:** Foundation course (No prerequisites).

**Course Objectives:** To learn

- concepts & properties of Laplace Transforms
- solving differential equations using Laplace transform techniques
- evaluation of integrals using Beta and Gamma Functions
- evaluation of multiple integrals and applying them to compute the volume and areas of regions
- the physical quantities involved in engineering field related to the vector valued functions.
- the basic properties of vector valued functions and their applications to line, surface and volume integrals.

**Course Outcomes:** After learning the contents of this course the student must be able to

- use Laplace transform techniques for solving DE's
- evaluate integrals using Beta and Gamma functions
- evaluate the multiple integrals and can apply these concepts to find areas, volumes, moment of inertia etc of regions on a plane or in space
- evaluate the line, surface and volume integrals and converting them from one to another

**UNIT – I**

**Laplace Transforms:** Laplace transforms of standard functions, Shifting theorems, derivatives and integrals, properties- Unit step function, Dirac's delta function, Periodic function, Inverse Laplace transforms, Convolution theorem (without proof).

Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.

**UNIT - II**

**Beta and Gamma Functions:** Beta and Gamma functions, properties, relation between Beta and Gamma functions, evaluation of integrals using Beta and Gamma functions.

Applications: Evaluation of integrals.

**UNIT – III**

**Multiple Integrals:** Double and triple integrals, Change of variables, Change of order of integration. **Applications:** Finding areas, volumes & Center of gravity (evaluation using Beta and Gamma functions).

**UNIT – IV**

**Vector Differentiation:** Scalar and vector point functions, Gradient, Divergence, Curl and their physical and geometrical interpretation, Laplacian operator, Vector identities.

## **UNIT – V**

**Vector Integration:** Line Integral, Work done, Potential function, area, surface and volume integrals, Vector integral theorems: Greens, Stokes and Gauss divergence theorems (without proof) and related problems.

### **Text Books:**

1. Advanced Engineering Mathematics by R K Jain & S R K Iyengar, Narosa Publishers
2. Engineering Mathematics by Srimanthapal and Subodh C. Bhunia, Oxford Publishers

### **References:**

1. Advanced Engineering Mathematics by Peter V. O. Neil, Cengage Learning Publishers.
2. Advanced Engineering Mathematics by Lawrence Turyn, CRC Press

**MA203BS: Mathematics - III**  
**(Statistical and Numerical Methods)**

**B.Tech. I Year II Sem.**

**L T/P/D C**  
**4 1/0/0 4**

**Prerequisites:** Foundation course (No prerequisites).

**Course Objectives:** To learn

- random variables that describe randomness or an uncertainty in certain realistic situation
- binomial geometric and normal distributions
- sampling distribution of mean, variance, point estimation and interval estimation
- the testing of hypothesis and ANOVA
- the topics those deals with methods to find roots of an equation
- to fit a desired curve by the method of least squares for the given data
- solving ordinary differential equations using numerical techniques

**Course Outcomes:** After learning the contents of this course the student must be able to

- differentiate among random variables involved in the probability models which are useful for all branches of engineering
- calculate mean, proportions and variances of sampling distributions and to make important decisions s for few samples which are taken from a large data
- solve the tests of ANOVA for classified data
- find the root of a given equation and solution of a system of equations
- fit a curve for a given data
- find the numerical solutions for a given first order initial value problem

**UNIT – I**

**Random variables and Distributions:**

Introduction, Random variables, Discrete random variable, Continuous random variable, Probability distribution function, Probability density function, Expectation, Moment generating function, Moments and properties. Discrete distributions: Binomial and geometric distributions. Continuous distribution: Normal distributions.

**UNIT – II**

**Sampling Theory:** Introduction, Population and samples, Sampling distribution of means ( $\sigma$  Known)-Central limit theorem, t-distribution, Sampling distribution of means ( $\sigma$  unknown)- Sampling distribution of variances –  $\chi^2$  and F- distributions, Point estimation, Maximum error of estimate, Interval estimation.

**UNIT – III**

**Tests of Hypothesis:** Introduction, Hypothesis, Null and Alternative Hypothesis, Type I and Type II errors, Level of significance, One tail and two-tail tests, Tests concerning one mean and proportion, two means-proportions and their differences-ANOVA for one-way classified data.

#### **UNIT – IV**

**Algebraic and Transcendental Equations & Curve Fitting:** Introduction, Bisection Method, Method of False position, Iteration methods: fixed point iteration and Newton Raphson methods. Solving linear system of equations by Gauss-Jacobi and Gauss-Seidal Methods.

**Curve Fitting:** Fitting a linear, second degree, exponential, power curve by method of least squares.

#### **UNIT – V**

**Numerical Integration and solution of Ordinary Differential equations:** Trapezoidal rule- Simpson's  $1/3^{\text{rd}}$  and  $3/8^{\text{th}}$  rule- Solution of ordinary differential equations by Taylor's series, Picard's method of successive approximations, Euler's method, Runge-Kutta method (second and fourth order)

#### **Text Books:**

1. Probability and Statistics for Engineers by Richard Arnold Johnson, Irwin Miller and John E. Freund, New Delhi, Prentice Hall.
2. Probability and Statistics for Engineers and Sciences by Jay L. Devore, Cengage Learning.
3. Numerical Methods for Scientific and Engineering Computation by M. K. Jain, S. R. K. Iyengar and R. K. Jain, New Age International Publishers

#### **References:**

1. Fundamentals of Mathematical Statistics by S. C. Gupta & V. K. Kapoor, S. Chand.
2. Introductory Methods of Numerical Analysis by S. S. Sastry, PHI Learning Pvt. Ltd.
3. Mathematics for engineers and scientists by Alan Jeffrey, 6<sup>th</sup> edition, CRC press.

## CS104ES/CS204ES: COMPUTER PROGRAMMING IN C

**B.Tech. I Year II Sem.**

**L T/P/D C**  
**3 0/0/0 3**

### **Course Objectives:**

- To learn the fundamentals of computers.
- To understand the various steps in Program development.
- To learn the syntax and semantics of C Programming Language.
- To learn how to write modular and readable C Programs.
- To learn to write programs using structured programming approach in C to solve problems.

### **Course Outcomes:**

- Demonstrate the basic knowledge of computer hardware and software.
- Ability to write algorithms for solving problems.
- Ability to draw flowcharts for solving problems.
- Ability to code a given logic in C programming language.
- Gain knowledge in using C language for solving problems.

### **UNIT - I**

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development, algorithms and flowcharts , Number systems-Binary, Decimal, Hexadecimal and Conversions, storing integers and real numbers.

Introduction to C Language – Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Operators(Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements- Selection Statements(making decisions) – if and switch statements, Repetition statements ( loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Program examples.

### **UNIT - II**

Functions-Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Limitations of recursion, example C programs.

Arrays – Concepts, using arrays in C, inter function communication, array applications- linear search, binary search and bubble sort, two – dimensional arrays, multidimensional arrays, C program examples.

### **UNIT - III**

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and



arrays, Passing an array to a function, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

#### **UNIT - IV**

Enumerated, Structure and Union Types – The Type Definition (typedef), Enumerated types, Structures –Declaration, initialization, accessing structures, operations on structures, Complex structures-Nested structures, structures containing arrays, structures containing pointers, arrays of structures, structures and functions, Passing structures through pointers, self referential structures, unions, bit fields, C programming examples, command–line arguments, Preprocessor commands.

#### **UNIT – V**

Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling), Positioning functions (fseek ,rewind and ftell), C program examples.

#### **Text Books:**

1. Computer Science: A Structured Programming Approach Using C, B. A. Forouzan and R. F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh , Second Edition, Oxford University Press.

#### **Reference Books:**

1. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, Second Edition, Pearson education.
2. Programming with C, B. Gottfried, 3<sup>rd</sup> edition, Schaum's outlines, McGraw Hill Education (India) Pvt Ltd.
3. C From Theory to Practice, G S. Tselikis and N D. Tselikas, CRC Press.
4. Basic computation and Programming with C, Subrata Saha and S. Mukherjee, Cambridge University Press.

## ME106ES/ME205ES: ENGINEERING GRAPHICS

**B.Tech. I Year II Sem.**

**L T/P/D C**  
**2 0/0/4 4**

**Pre-requisites:** None

### **Course objectives:**

- To provide basic concepts in engineering drawing.
- To impart knowledge about standard principles of orthographic projection of objects.
- To draw sectional views and pictorial views of solids.

### **Course Outcomes:**

- Ability to prepare working drawings to communicate the ideas and information.
- Ability to read, understand and interpret engineering drawings.

### **UNIT – I**

**Introduction To Engineering Drawing:** Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid Involute. Scales – Plain, Diagonal, and Vernier Scales.

### **UNIT - II**

**Orthographic Projections:** Principles of Orthographic Projections – Conventions – Projections of Points and Lines Projections of Plane regular geometric figures.—Auxiliary Planes.

### **UNIT – III**

Projections of Regular Solids – Auxiliary Views.

### **UNIT – IV**

Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere. Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid, and Cone

### **UNIT – V**

**Isometric Projections:** Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions Auto CAD: Basic principles only.

### **Text Books:**

1. Engineering Drawing / Basant Agrawal and Mc Agrawal/ Mc Graw Hill
2. Engineering Drawing/ M.B. Shah, B.C. Rane / Pearson.

**Reference Books:**

1. Engineering Drawing / N.S. Parthasarathy and Vela Murali/ Oxford
2. Engineering Drawing N.D. Bhatt / Charotar

**LIST OF EXPERIMENTS**

**Volumetric Analysis:**

1. Estimation of Ferrous ion by Dichrometry.
2. Estimation of hardness of water by Complexometric method using EDTA.
3. Estimation of Ferrous and Ferric ions in a given mixture by Dichrometry.
4. Estimation Ferrous ion by Permanganometry.
5. Estimation of copper by Iodomery.
6. Estimation of percentage of purity of  $MnO_2$  in pyrolusite
7. Determination of percentage of available chlorine in bleaching powder.
8. Determination of salt concentration by ion- exchange resin.

**Instrumental methods of Analysis:**

1. Estimation of HCl by Conductometry.
2. Estimation of Ferrous ion by Potentiometry.
3. Determination of Ferrous iron in cement by Colorimetric method.
4. Determination of viscosity of an oil by Redwood / Oswald's Viscometer.
5. Estimation of manganese in  $KMnO_4$  by Colorimetric method.
6. Estimation of HCl and Acetic acid in a given mixture by Conductometry.
7. Estimation of HCl by Potentiometry.

**Preparation of Polymers:**

1. Preparation of Bakelite and urea formaldehyde resin.

**Note:** All the above experiments must be performed.

**Text Books:**

1. Vogel's Text Book of Quantitative Chemical Analysis, 5<sup>th</sup> Edition (2015)
2. G. H. Jeffery, J. Bassett, J. Mendham and R. C. Denney.
3. A Text Book on experiments and calculations in Engineering Chemistry by S.S. Dara S. Chand & Company Ltd., Delhi (2003).

**B.Tech. I Year II Sem.**

**L T/P/D C**  
**0 0/3/0 2**

**LIST OF EXPERIMENTS**

1. Dispersive power of the material of a prism – Spectrometer.
2. Determination of wavelengths of white source – Diffraction grating.
3. Newton's Rings – Radius of curvature of Plano convex lens.
4. Melde's experiment – Transverse and longitudinal modes.
5. Charging, discharging and time constant of an R-C circuit.
6. L-C-R circuit – Resonance & Q-factor.
7. Magnetic field along the axis of current carrying coil – Stewart and Gees method and to verify Biot – Savart's law.
8. Study the characteristics of LED and LASER diode.
9. Bending losses of fibres & Evaluation of numerical aperture of a given fibre.
10. Energy gap of a material of p-n junction.
11. Torsional pendulum – Rigidity modulus.
12. Wavelength of light, resolving power and dispersive power of a diffraction grating using laser.
13. V-I characteristics of a solar cell.

**Note:** Minimum 10 experiments must be performed.

## CS108ES/CS208ES: COMPUTER PROGRAMMING IN C LAB

**B.Tech. I Year II Sem.**

**L T/P/D C**  
**0 0/3/0 2**

### Course Objective:

- To write programs in C using structured programming approach to solve the problems.

### Course Outcomes:

- Ability to design and test programs to solve mathematical and scientific problems.
- Ability to write structured programs using control structures and functions.

### Recommended Systems/Software Requirements:

- Intel based desktop PC
- GNU C Compiler

- a) Write a C program to find the factorial of a positive integer.
  - b) Write a C program to find the roots of a quadratic equation.
- a) Write a C program to determine if the given number is a prime number or not.
  - b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- a) Write a C program to construct a pyramid of numbers.
  - b) Write a C program to calculate the following Sum:  
$$\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$$
- a) The least common multiple (LCM) of two positive integers a and b is the smallest integer that is evenly divisible by both a and b. Write a C program that reads two integers and calls LCM (a, b) function that takes two integer arguments and returns their LCM. The LCM (a, b) function should calculate the least common multiple by calling the GCD (a, b) function and using the following relation:  
$$\text{LCM}(a, b) = ab / \text{GCD}(a, b)$$
  - b) Write a C program that reads two integers n and r to compute the ncr value using the following relation:  
$$n_{c_r}(n, r) = n! / r! (n-r)! .$$
 Use a function for computing the factorial value of an integer.
- a) Write C program that reads two integers x and n and calls a recursive function to compute  $x^n$
  - b) Write a C program that uses a recursive function to solve the Towers of Hanoi problem.
  - c) Write a C program that reads two integers and calls a recursive function to compute  $n_{c_r}$  value.

6.
  - a) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user using Sieve of Eratosthenes algorithm.
  - b) Write a C program that uses non recursive function to search for a Key value in a given list of integers. Use linear search method.
  
7.
  - a) Write a menu-driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.
  - b) Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers. Use binary search method.
  
8.
  - a) Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.
  - b) Write a C program that reads two matrices and uses functions to perform the following:
    1. Addition of two matrices
    2. Multiplication of two matrices
  
9.
  - a) Write a C program that uses functions to perform the following operations:
    1. to insert a sub-string into a given main string from a given position.
    2. to delete n characters from a given position in a given string.
  - b) Write a C program that uses a non recursive function to determine if the given string is a palindrome or not.
  
10.
  - a) Write a C program to replace a substring with another in a given line of text.
    - b) Write a C program that reads 15 names each of up to 30 characters, stores them in an array, and uses an array of pointers to display them in ascending (ie. alphabetical) order.
  
11.
  - a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
  - b) Write a C program to convert a positive integer to a roman numeral. Ex. 11 is converted to XI.
  
12.
  - a) Write a C program to display the contents of a file to standard output device.
  - b) Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
  
13.
  - a) Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command-line arguments.
  - b) Write a C program to compare two files, printing the first line where they differ.
  
14.
  - a) Write a C program to change the nth character (byte) in a text file. Use fseek function.

- b) Write a C program to reverse the first n characters in a file. The file name and n are specified on the command line. Use fseek function.
15. a) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).
- b) Define a macro that finds the maximum of two numbers. Write a C program that uses the macro and prints the maximum of two numbers.

**Reference Books:**

1. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.
2. Computer Programming in C, V. Rajaraman, PHI.
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4. C++: The complete reference, H. Schildt, TMH Publishers.



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD.****B. TECH. COMPUTER SCIENCE AND ENGINEERING****I YEAR**

Code	Subject	L	T/P/D	C
A10001	English	2	-	4
A10002	Mathematics – I	3	1	6
A10003	Mathematical Methods	3	-	6
A10004	Engineering Physics	3	-	6
A10005	Engineering Chemistry	3	-	6
A10501	Computer Programming	3	-	6
A10301	Engineering Drawing	2	3	6
A10581	Computer Programming Lab.	-	3	4
A10081	Engineering Physics / Engineering Chemistry Lab.	-	3	4
A10083	English Language Communication Skills Lab.	-	3	4
A10082	IT Workshop / Engineering Workshop	-	3	4
	<b>Total</b>	<b>19</b>	<b>16</b>	<b>56</b>

**II YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A30008	Probability and Statistics	4	-	4
A30504	Mathematical Foundations of Computer Science	4	-	4
A30502	Data Structures	4	-	4
A30401	Digital Logic Design	4	-	4
A30404	Electronic Devices and Circuits	4	-	4
A30202	Basic Electrical Engineering	4	-	4
A30282	Electrical and Electronics Lab	-	3	2
A30582	Data Structures Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**II YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A40506	Computer Organization	4	-	4
A40507	Database Management Systems	4	-	4
A40503	Java Programming	4	-	4
A40009	Environmental studies	4	-	4
A40509	Formal Languages and Automata Theory	4	-	4
A40508	Design and Analysis of Algorithms	4	-	4
A40585	Java Programming Lab	-	3	2
A40584	Database Management Systems Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A50511	Principles of Programming Languages	4	-	4
	<b>OPEN ELECTIVE</b>	4	-	4
A50018	Human Values and Professional Ethics			
A50017	Intellectual Property Rights			
A50117	Disaster Management			
A50518	Software Engineering	4	-	4
A50514	Compiler Design	4	-	4
A50510	Operating Systems	4	-	4
A50515	Computer Networks	4	-	4
A50589	Operating Systems Lab	-	3	2
A50587	Compiler Design Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A60521	Distributed Systems	4	-	4
A60522	Information Security	4	-	4
A60524	Object Oriented Analysis and Design	4	-	4
A60525	Software Testing Methodologies	4	-	4
A60010	Managerial Economics and Financial Analysis	4	-	4
A60512	Web Technologies	4	-	4
A60591	Case Tools and Web Technologies Lab	-	3	2
A60086	Advanced Communication Skills Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>II Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A30008) PROBABILITY AND STATISTICS**

Objectives: To learn

- Understand a random variable that describes randomness or an uncertainty in certain realistic situation. It can be of either discrete or continuous type.
- In the discrete case, study of the binomial and the Poisson random variables and the Normal random variable for the continuous case predominantly describe important probability distributions. Important statistical properties for these random variables provide very good insight and are essential for industrial applications.
- Most of the random situations are described as functions of many single random variables. In this unit, the objective is to learn functions of many random variables through joint distributions.
- The types of sampling, Sampling distribution of means, Sampling distribution of variance, Estimations of statistical parameters, Testing of hypothesis of few unknown statistical parameters.
- The mechanism of queuing system, The characteristics of queue, The mean arrival and service rates
- The expected queue length, The waiting line
- The random processes, The classification of random processes, Markov chain, Classification of states
- Stochastic matrix ( transition probability matrix), Limiting probabilities, Applications of Markov chains

**UNIT-I**

**Single Random variables and probability distributions:** Random variables – Discrete and continuous. Probability distributions, mass function/ density function of a probability distribution. Mathematical Expectation, Moment about origin, Central moments Moment generating function of probability distribution.

Binomial, Poisson & normal distributions and their properties. Moment generating functions of the above three distributions, and hence finding the mean and variance.

**UNIT-II**

**Multiple Random variables, Correlation & Regression:** Joint probability distributions- Joint probability mass / density function, Marginal probability

mass / density functions, Covariance of two random variables, Correlation - Coefficient of correlation, The rank correlation.

Regression- Regression Coefficient, The lines of regression and multiple correlation & regression.

### UNIT-III

Sampling Distributions and Testing of Hypothesis

**Sampling:** Definitions of population, sampling, statistic, parameter. Types of sampling, Expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of variance.

**Parameter estimations** – likelihood estimate, interval estimations.

**Testing of hypothesis:** Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, Level of significance. One sided test, two sided test,

#### Large sample tests:

- (i) Test of Equality of means of two samples equality of sample mean and population mean (cases of known variance & unknown variance, equal and unequal variances)
- (ii) Tests of significance of difference between sample S.D and population S.D.
- (iii) Tests of significance difference between sample proportion and population proportion & difference between two sample proportions.

#### Small sample tests:

Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples

Snedecor's F- distribution and its properties. Test of equality of two population variances

Chi-square distribution, its properties, Chi-square test of goodness of fit

### UNIT-IV

**Queuing Theory:** Structure of a queuing system, Operating Characteristics of queuing system, Transient and steady states, Terminology of Queuing systems, Arrival and service processes- Pure Birth-Death process Deterministic queuing models- M/M/1 Model of infinite queue, M/M/1 model of finite queue .

### UNIT-V

**Stochastic processes:** Introduction to Stochastic Processes –Classification of Random processes, Methods of description of random processes,

Stationary and non-stationary random process, Average values of single random process and two or more random processes. Markov process, Markov chain, classification of states – Examples of Markov Chains, Stochastic Matrix.

**TEXT BOOKS:**

- 1) Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers
- 2) Probability and Statistics for Engineers and Scientists by Sheldon M.Ross, Academic Press
- 3) Operations Research by S.D. Sarma,

**REFERENCE BOOKS:**

1. Mathematics for Engineers by K.B.Datta and M.A S.Srinivas,Cengage Publications
2. Probability and Statistics by T.K.V.Iyengar & B.Krishna Gandhi Et
3. Fundamentals of Mathematical Statistics by S C Gupta and V.K.Kapoor
4. Probability and Statistics for Engineers and Scientists by Jay I.Devore.

**Outcomes:**

- Students would be able to identify distribution in certain realistic situation. It is mainly useful for circuit as well as non-circuit branches of engineering. Also able to differentiate among many random variable involved in the probability models. It is quite useful for all branches of engineering.
- The student would be able to calculate mean and proportions (small and large sample) and to make important decisions from few samples which are taken out of unmanageably huge populations .It is Mainly useful for non-circuit branches of engineering.
- The students would be able to find the expected queue length, the ideal time, the traffic intensity and the waiting time. These are very useful tools in many engineering and data management problems in the industry. It is useful for all branches of engineering.
- The student would able to understand about the random process, Markov process and Markov chains which are essentially models of many time dependent processes such as signals in communications, time series analysis, queuing systems. The student would be able to find the limiting probabilities and the probabilities in nth state. It is quite useful for all branches of engineering

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>II Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A30504) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE****Objectives:**

- To explain with examples the basic terminology of functions, relations, and sets.
- To perform the operations associated with sets, functions, and relations.
- To relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.
- To describe the importance and limitations of predicate logic.
- To relate the ideas of mathematical induction to recursion and recursively defined structures.
- To use Graph Theory for solving problems.

**UNIT-I**

**Mathematical Logic** : Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Quantifiers, universal quantifiers. Predicates : Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

**UNIT-II**

**Relations**: Properties of Binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram. Functions: Inverse Function Composition of functions, recursive Functions, Lattice and its Properties, Algebraic structures : Algebraic systems Examples and general properties, Semi groups and monads, groups sub groups' homomorphism, Isomorphism.

**UNIT-III**

**Elementary Combinatorics**: Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion. Pigeon hole principles and its application.

**UNIT-IV**

**Recurrence Relation** : Generating Functions, Function of Sequences Calculating Coefficient of generating function, Recurrence relations, Solving recurrence relation by substitution and Generating funds. Characteristics

roots solution of In homogeneous Recurrence Relation.

#### **UNIT-V**

**Graph Theory :** Representation of Graph, DFS, BFS, Spanning Trees, planar Graphs. Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers.

#### **TEXT BOOKS :**

1. Elements of DISCRETE MATHEMATICS- A computer Oriented Approach- C L Liu, D P Mohapatra. Third Edition, Tata McGraw Hill.
2. Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker, PHI.

#### **REFERENCE BOOKS :**

1. Discrete Mathematics and its Applications, Kenneth H. Rosen, Fifth Edition.TMH.
2. Discrete Mathematical structures Theory and application-Malik & Sen, Cengage.
3. Discrete Mathematics with Applications, Thomas Koshy, Elsevier.
4. Logic and Discrete Mathematics, Grass Man & Trembley, Pearson Education.

#### **Outcomes:**

- Ability to Illustrate by examples the basic terminology of functions, relations, and sets and demonstrate knowledge of their associated operations.
- Ability to Demonstrate in practical applications the use of basic counting principles of permutations, combinations, inclusion/exclusion principle and the pigeonhole methodology.
- Ability to represent and Apply Graph theory in solving computer science problems.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

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	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A30502) DATA STRUCTURES****Objectives:**

- To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
- To understand the notations used to analyze the Performance of algorithms.
- To understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
- To choose the appropriate data structure for a specified application.
- To understand and analyze various searching and sorting algorithms.
- To write programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables, search trees.

**UNIT- I**

Basic concepts- Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations, Introduction to Linear and Non Linear data structures.

Singly Linked Lists-Operations-Insertion, Deletion, Concatenating singly linked lists, Circularly linked lists-Operations for Circularly linked lists, Doubly Linked Lists- Operations- Insertion, Deletion.

Representation of single, two dimensional arrays, sparse matrices-array and linked representations.

**UNIT- II**

Stack ADT, definition, operations, array and linked implementations in C, applications-infix to postfix conversion, Postfix expression evaluation, recursion implementation, Queue ADT, definition and operations ,array and linked Implementations in C, Circular queues-Insertion and deletion operations, Deque (Double ended queue)ADT, array and linked implementations in C.

**UNIT- III**

Trees – Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals, Threaded binary trees, Max Priority Queue ADT-implementation-Max Heap-Definition, Insertion into a Max Heap,



Deletion from a Max Heap.

Graphs – Introduction, Definition, Terminology, Graph ADT, Graph Representations- Adjacency matrix, Adjacency lists, Graph traversals- DFS and BFS.

#### **UNIT- IV**

Searching- Linear Search, Binary Search, Static Hashing-Introduction, hash tables, hash functions, Overflow Handling.

Sorting-Insertion Sort, Selection Sort, Radix Sort, Quick sort, Heap Sort, Comparison of Sorting methods.

#### **UNIT- V**

Search Trees-Binary Search Trees, Definition, Operations- Searching, Insertion and Deletion, AVL Trees-Definition and Examples, Insertion into an AVL Tree ,B-Trees, Definition, B-Tree of order m, operations-Insertion and Searching, Introduction to Red-Black and Splay Trees(Elementary treatment-only Definitions and Examples), Comparison of Search Trees.

Pattern matching algorithm- The Knuth-Morris-Pratt algorithm, Tries (examples only).

#### **TEXT BOOKS:**

1. Fundamentals of Data structures in C, 2nd Edition, E.Horowitz, S.Sahni and Susan Anderson-Freed, Universities Press.
2. Data structures A Programming Approach with C, D.S.Kushwaha and A.K.Misra, PHI.

#### **REFERENCE BOOKS:**

1. Data structures: A Pseudocode Approach with C, 2nd edition, R.F.Gilberg And B.A.Forouzan, Cengage Learning.
2. Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
3. Data Structures using C, A.M.Tanenbaum,Y. Langsam, M.J.Augenstein, Pearson.
4. Data structures and Program Design in C, 2nd edition, R.Kruse, C.L.Tondo and B.Leung,Pearson.
5. Data Structures and Algorithms made easy in JAVA, 2nd Edition, Narsimha Karumanchi, CareerMonk Publications.
6. Data Structures using C, R.Thareja, Oxford University Press.
7. Data Structures, S.Lipscutz,Schaum's Outlines, TMH.
8. Data structures using C, A.K.Sharma, 2nd edition, Pearson..
9. Data Structures using C &C++, R.Shukla, Wiley India.
10. Classic Data Structures, D.Samanta, 2nd edition, PHI.

11. Advanced Data structures, Peter Brass, Cambridge.

**Outcomes:**

- Learn how to use data structure concepts for realistic problems.
- Ability to identify appropriate data structure for solving computing problems in respective language.
- Ability to solve problems independently and think critically.

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**(A30401) DIGITAL LOGIC DESIGN****Objectives:**

- To understand basic number systems codes and logical gates.
- To understand the Boolean algebra and minimization logic.
- To understand the design of combinational sequential circuits.
- To understand the basic s of various memory.

**UNIT-I**

**Digital Systems:** Binary Numbers, Octal, Hexa Decimal and other base numbers, Number base conversions, complements, signed binary numbers, Floating point number representation, binary codes, error detecting and correcting codes, digital logic gates(AND, NAND,OR,NOR, Ex-OR, Ex-NOR), Boolean algebra , basic theorems and properties, Boolean functions, canonical and standard forms.

**UNIT-II**

Gate –Level Minimization and combination circuits, The K-Maps Methods, Three Variable, Four Variable, Five Variable , sum of products, product of sums Simplification, Don't care conditions , NAND and NOR implementation and other two level implantation.

**UNIT-III**

**Combinational Circuits (CC):** Design Procedure, Combinational circuit for different code converters and other problems, Binary Adder, subtractor, Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, Demultiplexers.

**UNIT-IV**

**Synchronous Sequential Circuits:** Latches, Flip-flops, analysis of clocked sequential circuits, design of counters, Up-down counters, Ripple counters , Registers, Shift registers, Synchronous Counters.

Asynchronous Sequential Circuits: Reduction of state and follow tables, Role free Conditions.

**UNIT-V:**

**Memory:** Random Access memory, types of ROM, Memory decoding, address and data bus, Sequential Memory, Cache Memory, Programmable Logic Arrays, memory Hierarchy in terms of capacity and access time.

**TEXT BOOK:**

- 1) Digital Design- M. Morris Mano.

**REFERENCE BOOKS:**

- 1) Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.
- 2) Switching and Logic Design, C.V.S. Rao, Pearson Education.
- 3) Digital Principles and Design – Donald D.Givone, Tata McGraw Hill, Edition.
- 4) Fundamentals of Digital Logic & Micro Computer Design , 5TH Edition, M. Rafiqzaman John Wiley.

**Outcomes:**

After this course student could able to design, understand the number systems, combinational sequential circuits. And they should be in a position to continue with computer organization.

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**(A30404) ELECTRONIC DEVICES AND CIRCUITS****Objectives:**

This is a fundamental course, basic knowledge of which is required by all the circuit branch engineers. This course focuses:

- To familiarize the student with the principle of operation, analysis and design of Junction diode, BJT and FET amplifier circuits, transistors and field effect transistors.
- To understand diode as rectifier.
- To study basic principle of filter circuits and various types.

**UNIT -I**

**P-N Junction Diode:** Qualitative Theory of P-N Junction, P-N Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis, Breakdown Mechanisms in Semiconductor Diodes, Zener Diode Characteristics.

**Special Purpose Electronic Devices:** Principle of Operation and Characteristics of Tunnel Diode (with the help of Energy Band Diagram), Varactor Diode, SCR and Semiconductor Photo Diode.

**UNIT -II**

**Rectifiers and Filters :** The P-N junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L- Section Filters,  $\pi$ - Section Filters, Comparison of Filters, Voltage Regulation using Zener Diode.

**UNIT -III**

**Bipolar Junction Transistor and UJT:** The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, BJT Operation, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, Limits of Operation , BJT Specifications, BJT Hybrid Model, Determination of h-parameters from Transistor Characteristics, Comparison of CB, CE, and CC Amplifier Configurations, UJT and Characteristics.

**UNIT -IV**

**Transistor Biasing and Stabilization:** Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector - Emitter Feedback Bias, Voltage Divider Bias,

Bias Stability, Stabilization Factors, Stabilization against variations in  $V_{BE}$  and  $\beta$ , Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability, Analysis of a Transistor Amplifier Circuit using h-Parameters.

#### **UNIT -V**

##### **Field Effect Transistor and FET Amplifiers**

**Field Effect Transistor:** The Junction Field Effect Transistor (Construction, principle of operation, symbol) – Pinch-off Voltage - Volt-Ampere characteristics, The JFET Small Signal Model, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes.

**FET Amplifiers:** FET Common Source Amplifier, Common Drain Amplifier, Generalized FET Amplifier, Biasing FET, FET as Voltage Variable Resistor, Comparison of BJT and FET.

##### **TEXT BOOKS:**

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2 Ed.,1998, TMH.
2. Electronic Devices and Circuits – Mohammad Rashid, Cengage Learning, 2013
3. Electronic Devices and Circuits – David A. Bell, 5 Ed, Oxford.

##### **REFERENCE BOOKS:**

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 Ed., 2008, TMH.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 Ed., 2006, PEI/PHI.
3. Electronic Devices and Circuits – B. P. Singh, Rekha Singh, Pearson, 2 Ed, 2013.
4. Electronic Devices and Circuits --K. Lal Kishore, 2 Ed., 2005, BSP.
5. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal, 1 Ed., 2009, Wiley India Pvt. Ltd.
6. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 Ed., 2008, TMH.

##### **Outcomes:**

- Understand and Analyse the different types of diodes, operation and its characteristics.
- Design and analyse the DC bias circuitry of BJT and FET.
- Design biasing circuits using diodes and transistors.
- To analyze and design diode application circuits, amplifier circuits and oscillators employing BJT, FET devices.

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**(A30202) BASIC ELECTRICAL ENGINEERING****Objectives:**

This course introduces the concepts of basic electrical engineering parameters, quantities, analysis of AC and DC circuits, the construction operation and analysis of transformers, DC and AC machines. It also gives knowledge about measuring instruments operation in detail.

**UNIT – I**

**Introduction to Electrical Engineering:** Ohm's law, basic circuit components, Kirchhoff's laws. Simple problems.

**Network Analysis:** Basic definitions, types of elements, types of sources, resistive networks, inductive networks, capacitive networks, and series parallel circuits, star delta and delta star transformation. , Network theorems- Superposition, Thevenin's, Maximum power transfer theorems and simple problems.

**UNIT-II**

**Alternating Quantities:** Principle of ac voltages, waveforms and basic definitions, root mean square and average values of alternating currents and voltage, form factor and peak factor, phasor representation of alternating quantities, the J operator and phasor algebra, analysis of ac circuits with single basic network element, single phase series circuits.

**UNIT-III**

**Transformers :** Principles of operation, Constructional Details, Ideal Transformer and Practical Transformer, Losses, Transformer Test, Efficiency and Regulation Calculations (All the above topics are only elementary treatment and simple problems).

**UNIT-IV****D.C. and A.C. Machines:**

**D.C generators:** Principle of operation of dc machines, types of D.C generators, EMF equation in D.C generator. **D.C motors:** Principle of operation of dc motors, types of D.C motors, losses and torque equation, losses and efficiency calculation in D.C generator. **A.C Machines:** Three phase induction motor, principle of operation, slip and rotor frequency, torque (simple problems).

**UNIT V**

**Basic Instruments:** Introduction, classification of instruments, operating

principles, essential features of measuring instruments, Moving coil permanent magnet (PMMC) instruments, Moving Iron of Ammeters and Voltmeters (elementary Treatment only).

**TEXT BOOKS:**

1. Basic concepts of Electrical Engineering, PS Subramanyam, BS Publications.
2. Basic Electrical Engineering, S.N. Singh, PHI.

**REFERENCE BOOKS:**

1. Basic Electrical Engineering, Abhijit Chakrabarthy, Sudipta nath, Chandrakumar Chanda, Tata-McGraw-Hill.
2. Principles of Electrical Engineering, V.K Mehta, Rohit Mehta, S.Chand Publications.
3. Basic Electrical Engineering, T.K.Nagasarkar and M.S. Sukhija, Oxford University Press.
4. Fundamentals of Electrical Engineering, RajendraPrasad, PHI.
5. Basic Electrical Engineering by D.P.Kothari , I.J. Nagrath, McGraw-Hill.

**Outcomes:**

After going through this course the student gets a thorough knowledge on basic electrical circuits, parameters, and operation of the transformers in the energy conversion process, electromechanical energy conversion, construction operation characteristics of DC and AC machines and the constructional features and operation of operation measuring instruments like voltmeter, ammeter, wattmeter etc...With which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.



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**(A30282) ELECTRICAL AND ELECTRONICS LAB****PART - A**

1. Verification of Superposition and Reciprocity theorems.
2. Verification of Maximum power transfer theorem.
3. Verification of Thevenin's and Norton's theorems.
4. Magnetization characteristics of D.C. Shunt generator.
5. Swinburne's Test on DC shunt machine.
6. Brake test on DC shunt motor.
7. OC and SC tests on Single-phase transformer.
8. Brake test on 3-phase Induction motor.

**PART - B**

1. PN Junction Diode Characteristics (Forward bias, Reverse bias).
2. Zener Diode Characteristics.
3. Transistor CE Characteristics (Input and Output).
4. Rectifier without Filters (Full wave & Half wave).
5. Rectifier with Filters (Full wave & Half wave).

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	-	-/3/-	2

**(A30582) DATA STRUCTURES LAB****Objectives:**

- To write and execute programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees.
- To write and execute write programs in C to implement various sorting and searching methods.

**Recommended Systems/Software Requirements:**

- Intel based desktop PC with minimum of 166 MHZ or faster processor with at least 64 MB RAM and 100 MB free disk space.
- C compiler.

**Week1:**

Write a C program that uses functions to perform the following:

- Create a singly linked list of integers.
- Delete a given integer from the above linked list.
- Display the contents of the above list after deletion.

**Week2:**

Write a C program that uses functions to perform the following:

- Create a doubly linked list of integers.
- Delete a given integer from the above doubly linked list.
- Display the contents of the above list after deletion.

**Week3:**

Write a C program that uses stack operations to convert a given infix expression into its postfix Equivalent, Implement the stack using an array.

**Week 4:**

Write C programs to implement a double ended queue ADT using i)array and ii)doubly linked list respectively.

**Week 5 :**

Write a C program that uses functions to perform the following:

- Create a binary search tree of characters.
- Traverse the above Binary search tree recursively in Postorder.

**Week 6 :**

Write a C program that uses functions to perform the following:

- a) Create a binary search tree of integers.
- b) Traverse the above Binary search tree non recursively in inorder.

**Week 7:**

Write C programs for implementing the following sorting methods to arrange a list of integers in Ascending order :

- a) Insertion sort
- b) Merge sort

**Week 8 :**

Write C programs for implementing the following sorting methods to arrange a list of integers in ascending order:

- a) Quick sort
- b) Selection sort

**Week 9:**

i) Write a C program to perform the following operation:

- a) Insertion into a B-tree.

ii) Write a C program for implementing Heap sort algorithm for sorting a given list of integers in ascending order.

**Week 10:**

Write a C program to implement all the functions of a dictionary (ADT) using hashing.

**Week 11:**

Write a C program for implementing Knuth-Morris- Pratt pattern matching algorithm.

**Week 12:**

Write C programs for implementing the following graph traversal algorithms:

- a) Depth first traversal
- b) Breadth first traversal

**TEXT BOOKS:**

1. C and Data Structures, Third Edition, P.Padmanabham, BS Publications.
2. C and Data Structures, Prof. P.S.Deshpande and Prof. O.G. Kakde, Dreamtech Press.
3. Data structures using C, A.K.Sharma, 2nd edition, Pearson.
4. Data Structures using C, R.Thareja, Oxford University Press.
5. C and Data Structures, N.B.Venkateswarlu and E.V.Prasad,S.Chand.

6. C Programming and Data Structures, P.Radha Krishna, Hi-Tech Publishers.

**Outcomes:**

- Ability to identify the appropriate data structure for given problem.
- Graduate able to design and analyze the time and space complexity of algorithm or program.
- Ability to effectively use compilers includes library functions, debuggers and trouble shooting.

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**(A40506) COMPUTER ORGANIZATION****Objectives:**

- To understand basic components of computers.
- To explore the I/O organizations in depth.
- To explore the memory organization.
- To understand the basic chip design and organization of 8086 with assembly language programming.

**UNIT-I****Basic Computer Organization – Functions of CPU, I/O Units, Memory:**

**Instruction:** Instruction Formats- One address, two addresses, zero addresses and three addresses and comparison; addressing modes with numeric examples: Program Control- Status bit conditions, conditional branch instructions, Program Interrupts: Types of Interrupts.

**UNIT-II****Input-Output Organizations- I/O Interface, I/O Bus and Interface**

**modules:** I/O Vs memory Bus, Isolated Vs Memory-Mapped I/O, Asynchronous data Transfer- Strobe Control, Hand Shaking: Asynchronous Serial transfer- Asynchronous Communication interface, Modes of transfer- Programmed I/O, Interrupt Initiated I/O, DMA; DMA Controller, DMA Transfer, IOP-CPU-IOP Communication, Intel 8089 IOP.

**UNIT-III****Memory Organizations**

Memory hierarchy, Main Memory, RAM, ROM Chips, Memory Address Map, Memory Connection to CPU, associate memory, Cache Memory, Data Cache, Instruction cache, Miss and Hit ratio, Access time, associative, set associative, mapping, waiting into cache, Introduction to virtual memory.

**UNIT-IV**

8086 CPU Pin Diagram- Special functions of general purpose registers, Segment register, concept of pipelining, 8086 Flag register, Addressing modes of 8086.

**UNIT-V**

**8086-Instruction formats:** assembly Language Programs involving branch & Call instructions, sorting, evaluation of arithmetic expressions.

**TEXT BOOKS:**

- 1) Computer system Architecture: Morris Mano (UNIT-1,2,3).
- 2) Advanced Micro Processor and Peripherals- Hall/ A K Ray(UNIT-4,5).

**REFERENCE BOOKS:**

- 1) Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
- 2) Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson.
- 3) Fundamentals of Computer Organization and Design, - Sivarama Dandamudi Springer Int. Edition.
- 4) Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier.
- 5) Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

**Outcomes:**

After this course students understand in a better way the I/O and memory organization in depth. They should be in a position to write assembly language programs for various applications.

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**(A40507) DATABASE MANAGEMENT SYSTEMS****Objectives:**

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- To understand the relational database design principles.
- To become familiar with the basic issues of transaction processing and concurrency control.
- To become familiar with database storage structures and access techniques.

**UNIT- I**

Introduction-Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction, Instances and Schemas, Data Models, Database Languages – DDL, DML, Database Access from Application Programs, Transaction Management, Data Storage and Querying, Database Architecture, Database Users and Administrators, History of Data base Systems.

Introduction to Data base design, ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises. Relational Model: Introduction to the Relational Model – Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views – Destroying /altering Tables and Views.

**UNIT- II**

**Relational Algebra and Calculus:** Relational Algebra – Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

Form of Basic SQL Query – Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries, Set – Comparison Operators, Aggregate Operators, NULL values – Comparison using Null values – Logical connectives – AND, OR and NOT – Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active Data bases.

**UNIT- III**

Introduction to Schema Refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF –Properties of Decompositions- Loss less-join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form, Join Dependencies, FIFTH Normal form, Inclusion Dependencies.

**UNIT- IV**

Transaction Management-Transaction Concept- Transaction State-Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability.

Concurrency Control- Lock –Based Protocols – Timestamp Based Protocols-Validation- Based Protocols – Multiple Granularity.

Recovery System-Failure Classification-Storage Structure-Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- Remote Backup systems.

**UNIT- V**

**Overview of Storage and Indexing:** Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing, Comparison of File Organizations.

**Tree Structured Indexing:** Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM) B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

**Hash Based Indexing:** Static Hashing, Extendable hashing, Linear Hashing, Extendible vs. Linear Hashing.

**TEXT BOOKS:**

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3rd Edition, 2003.
2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw hill, VI edition, 2006.

**REFERENCE BOOKS:**

1. Database Systems, 6th edition, Ramez Elmasri, Shamkant B.Navathe, Pearson Education, 2013.
2. Database Principles, Programming, and Performance, P.O'Neil, E.O'Neil, 2nd ed., ELSEVIER.



3. Database Systems, A Practical approach to Design Implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.
4. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.
5. Fundamentals of Relational Database Management Systems, S.Sumathi, S.Esakkirajan, Springer.
6. Database Management System Oracle SQL and PL/SQL, P.K.Das Gupta, PHI.
7. Introduction to Database Management, M.L.Gillenson and others, Wiley Student Edition.
8. Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.
9. Introduction to Database Systems, C.J.Date, Pearson Education.
10. Database Management Systems, G.K.Gupta, TMH.

**Outcomes:**

- Demonstrate the basic elements of a relational database management system.
- Ability to identify the data models for relevant problems.
- Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data.
- Apply normalization for the development of application software's.

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**(A40503) JAVA PROGRAMMING****Objectives:**

- To understand object oriented programming concepts, and apply them in problem solving.
- To learn the basics of java Console and GUI based programming.

**UNIT- I**

**OOP concepts** – Data abstraction, encapsulation, inheritance, benefits of inheritance, polymorphism, classes and objects, Procedural and object oriented programming paradigms

**Java programming** - History of Java, comments, data types, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow - block scope, conditional statements, loops, break and continue statements, simple java stand alone programs, arrays, console input and output, formatting output, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection, building strings, exploring string class.

**UNIT- II**

**Inheritance** - Inheritance hierarchies, super and sub classes, Member access rules, super keyword, preventing inheritance: final classes and methods, the Object class and its methods

**Polymorphism**- dynamic binding, method overriding, abstract classes and methods.

**Interfaces** – Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface.

**Inner classes** – Uses of inner classes, local inner classes, anonymous inner classes, static inner classes, examples.

**Packages**-Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

**UNIT- III**

**Exception handling** – Dealing with errors, benefits of exception handling, the classification of exceptions- exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, re-throwing exceptions, exception specification, built in exceptions, creating

own exception sub classes.

**Multithreading** - Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, producer consumer pattern.

#### **UNIT- IV**

**Collection Framework in Java** – Introduction to Java Collections, Overview of Java Collection frame work, Generics, Commonly used Collection classes– Array List, Vector, Hash table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, calendar and Properties

**Files** – streams- byte streams, character streams, text Input/output, binary input/output, random access file operations, File management using File class.

**Connecting to Database** - JDBC Type 1 to 4 drivers, connecting to a database, querying a database and processing the results, updating data with JDBC.

#### **UNIT- V**

**GUI Programming with Java** - The AWT class hierarchy, Introduction to Swing, Swing vs. AWT, Hierarchy for Swing components, Containers – JFrame, JApplet, JDialog, JPanel, Overview of some swing components- JButton, JLabel, JTextField, JTextArea, simple swing applications, Layout management - Layout manager types – border, grid and flow

**Event handling** - Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listeners, Delegation event model, Examples: handling a button click, handling mouse events, Adapter classes.

**Applets** – Inheritance hierarchy for applets, differences between applets and applications, life cycle of an applet, passing parameters to applets, applet security issues.

#### **TEXT BOOK:**

1. Java Fundamentals – A comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

#### **REFERENCE BOOKS:**

1. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education (OR) Java: How to Program P.J.Deitel and H.M.Deitel, PHI.
2. Object Oriented Programming through Java, P.Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, Pearson Education
4. Programming in Java, S.Malhotra and S.Choudhary, Oxford Univ. Press.

**Outcomes:**

- Understanding of OOP concepts and basics of java programming (Console and GUI based).
- The skills to apply OOP and Java programming in problem solving.
- Should have the ability to extend his/her knowledge of Java programming further on his/her own.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****II Year B.Tech. CSE-II Sem****L T/P/D C****4 -/- 4****(A40009) ENVIRONMENTAL STUDIES****Objectives:**

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding of environmental policies and regulations

**UNIT-I :**

**Ecosystems:** Definition, Scope and Importance of ecosystem. Classification, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

**UNIT-II:**

**Natural Resources: Classification of Resources:** Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

**UNIT-III:**

**Biodiversity and Biotic Resources:** Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

**UNIT-IV:**

**Environmental Pollution and Control Technologies: Environmental Pollution:** Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and

characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary, Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Problems And Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

#### **UNIT-V:**

**Environmental Policy, Legislation & EIA:** Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. **EIA:** EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

#### **SUGGESTED TEXT BOOKS:**

- 1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
- 2 Environmental Studies by R. Rajagopalan, Oxford University Press.

#### **REFERENCE BOOKS:**

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B.Botkin & Edward A.Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

#### **Outcomes:**

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which inturn helps in sustainable development.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>II Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A40509) FORMAL LANGUAGES AND AUTOMATA THEORY****Objectives:**

The purpose of this course is to acquaint the student with an overview of the theoretical foundations of computer science from the perspective of formal languages.

- Classify machines by their power to recognize languages.
- Employ finite state machines to solve problems in computing.
- Explain deterministic and non-deterministic machines.
- Comprehend the hierarchy of problems arising in the computer sciences.

**UNIT- I**

**Fundamentals** : Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings, and languages, deterministic finite automaton and non deterministic finite automaton, transition diagrams and Language recognizers. **Finite Automata** : NFA with  $\epsilon$  transitions - Significance, acceptance of languages. Conversions and Equivalence : Equivalence between NFA with and without  $\epsilon$ -transitions, NFA to DFA conversion, minimisation of FSM, equivalence between two FSM's, Finite Automata with output- Moore and Melay machines.

**UNIT-II**

**Regular Languages** : Regular sets, regular expressions, identity rules, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions. Pumping lemma of regular sets, closure properties of regular sets (proofs not required) **Grammar Formalism** : Regular grammars-right linear and left linear grammars, equivalence between regular linear grammar and FA, inter conversion, Context free grammar, derivation trees, sentential forms. Right most and leftmost derivation of strings.

**UNIT- III**

**Context Free Grammars** : Ambiguity in context free grammars. Minimisation of Context Free Grammars. Chomsky normal form, Greiback normal form, Pumping Lemma for Context Free Languages. Enumeration of properties of CFL (proofs omitted). **Push Down Automata** : Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, interconversion. (Proofs not required). Introduction to DCFL and DPDA.

**UNIT- IV**

**Turing Machine** : Turing Machine, definition, model, design of TM, Computable functions, recursively enumerable languages. Church's hypothesis, counter machine, types of Turing machines (proofs not required). linear bounded automata and context sensitive language.

**UNIT- V**

**Computability Theory** : Chomsky hierarchy of languages, decidability of, problems, Universal Turing Machine, undecidability of posts. Correspondence problem, Turing reducibility, Definition of P and NP problems, NP complete and NP hard problems.

**TEXT BOOKS :**

1. "Introduction to Automata Theory Languages and Computation". Hopcroft H.E. and Ullman J. D. Pearson Education.
2. Introduction to Theory of Computation –Sipser 2nd edition Thomson.

**REFERENCE BOOKS :**

1. Introduction to Formal languages Automata Theory and Computation Kamala Krithivasan Rama R.
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
3. Theory Of Computation: A Problem-Solving Approach, Kavi Mahesh, Wiley India Pvt. Ltd.
4. "Elements of Theory of Computation", Lewis H.P. & Papadimition C.H. Pearson /PHI.
5. Theory of Computer Science – Automata languages and computation -Mishra and Chandrashekaran, 2nd edition, PHI.

**Outcomes:**

- Graduate should be able to understand the concept of abstract machines and their power to recognize the languages.
- Attains the knowledge of language classes & grammars relationship among them with the help of Chomsky hierarchy.
- Graduate will be able to understanding the pre-requisites to the course compiler or advanced compiler design.



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>II Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A40508) DESIGN AND ANALYSIS OF ALGORITHMS****Objectives:**

- To analyze performance of algorithms.
- To choose the appropriate data structure and algorithm design method for a specified application.
- To understand how the choice of data structures and algorithm design methods impacts the performance of programs.
- To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
- Prerequisites (Subjects) Data structures, Mathematical foundations of computer science.

**UNIT- I**

**Introduction:** Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized complexity.

**Divide and conquer:** General method, applications-Binary search, Quick sort, Merge sort, Strassen's Matrix Multiplication.

**UNIT- II**

**Searching and Traversal Techniques:** Efficient non-recursive binary tree traversal algorithms, Disjoint set operations, union and find algorithms, Spanning trees, Graph traversals- Breadth first search and Depth first search, AND/OR graphs, game trees, Connected Components, Bi-connected components.

**UNIT- III**

**Greedy method:** General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

**Dynamic Programming:** General method, applications-Multistage graphs, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Traveling sales person problem, Reliability design.

**UNIT- IV**

**Backtracking:** General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

**Branch and Bound:** General method, applications - Traveling sales person problem, 0/1 knapsack problem-LC Branch and Bound solution, FIFO Branch and Bound solution.

#### **UNIT- V**

**NP-Hard and NP-Complete problems:** Basic concepts, Non-deterministic algorithms, NP - Hard and NP- Complete classes, NP-Hard problems, Cook's theorem.

#### **TEXT BOOKS:**

1. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Satraj Sahni and S.Rajasekharan, Universities Press, 2008.
2. Foundations of Algorithms, 4th edition, R.Neapolitan and K.Naimipour, Jones and Bartlett Learning.
3. Design and Analysis of Algorithms, P.H.Dave, H.B.Dave, Pearson Education, 2008.

#### **REFERENCE BOOKS:**

1. Computer Algorithms, Introduction to Design and Analysis, 3rd Edition, Sara Baase, Allen, Van, Gelder, Pearson Education.
2. Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia, John Wiley and sons.
3. Fundamentals of Sequential and Parallel Algorithms, K.A.Berman and J.L.Paul, Cengage Learning.
4. Introduction to the Design and Analysis of Algorithms, A.Levitin, Pearson Education.
5. Introduction to Algorithms, 3rd Edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, PHI Pvt.Ltd.
6. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson Education, 2004.

#### **Outcomes:**

- Be able to analyze algorithms and improve the efficiency of algorithms.
- Apply different designing methods for development of algorithms to realistic problems, such as divide and conquer, greedy and etc.
- Ability to understand and estimate the performance of algorithm.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>II Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	-	-/3/-	2

**(A40585) JAVA PROGRAMMING LAB****Objectives:**

To introduce java compiler and eclipse platform.

To impart hand on experience with java programming.

**Note:**

1. Use Linux and MySQL for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform.
2. The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.
  - 1) Use Eclipse or Netbean platform and acquaint with the various menus. Create a test project, add a test class and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.
  - 2) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, \*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.
  - 3a) Develop an applet in Java that displays a simple message.
    - b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.
  - 4) Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.
  - 5) Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.
  - 6) Write a Java program that connects to a database using JDBC and

does add, delete, modify and retrieve operations.

- 7) Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in selected color. Initially, there is no message shown.
- 8) Write a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea () that prints the area of the given shape.
- 9) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Labels in Grid Layout.
- 10) Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).
- 11) Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).
- 12) Implement the above program with database instead of a text file.
- 13) Write a Java program that takes tab separated data (one record per line) from a text file and inserts them into a database.
- 14) Write a java program that prints the meta-data of a given table

**TEXT BOOK:**

1. Java Fundamentals – A comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

**REFERENCE BOOKS:**

1. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education (OR) Java: How to Program P.J.Deitel and H.M.Deitel, PHI.
2. Object Oriented Programming through Java, P.Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, Pearson Education.
4. Programming in Java, S.Malhotra and S.Choudhary, Oxford Univ. Press.

**Outcomes:**

- Basics of java programming, multi-threaded programs and Exception handling.
- The skills to apply OOP in Java programming in problem solving.
- Ability to access data from a DB with Java programs.
- Use of GUI components (Console and GUI based).

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>II Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	-	-/3/-	2

**(A40584) DATABASE MANAGEMENT SYSTEMS LAB****Objectives:**

This lab enables the students to practice the concepts learnt in the subject DBMS by developing a database for an example company named "Roadway Travels" whose description is as follows. The student is expected to practice the designing, developing and querying a database in the context of example database "Roadway travels". Students are expected to use "Mysql" database.

**Roadway Travels**

"Roadway Travels" is in business since 1997 with several buses connecting different places in India. Its main office is located in Hyderabad.

The company wants to computerize its operations in the following areas:

- Reservations and Ticketing
- Cancellations

**Reservations & Cancellation:**

Reservations are directly handled by booking office. Reservations can be made 30 days in advance and tickets issued to passenger. One Passenger/person can book many tickets (to his/her family).

Cancellations are also directly handed at the booking office.

In the process of computerization of Roadway Travels you have to design and develop a Database which consists the data of Buses, Passengers, Tickets, and Reservation and cancellation details. You should also develop query's using SQL to retrieve the data from the database.

The above process involves many steps like 1. Analyzing the problem and identifying the Entities and Relationships, 2. E-R Model 3. Relational Model 4. Normalization 5. Creating the database 6. Querying. Students are supposed to work on these steps week wise and finally create a complete "Database System" to Roadway Travels. Examples are given at every experiment for guidance to students.

**Experiment 1: E-R Model**

Analyze the carefully and come up with the entities in it. Identify what data has to be persisted in the database. This contains the entities, attributes etc.

Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, if any.

**Example: Entities:**

1. BUS

- 2. Ticket
- 3. Passenger

**Relationships:**

- 1. Reservation
- 2. Cancellation

**PRIMARY KEY ATTRIBUTES:**

- 1. Ticket ID (Ticket Entity)
- 2. Passport ID (Passenger Entity)
- 3. Bus\_NO (Bus Entity)

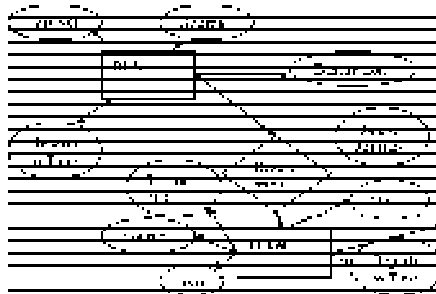
Apart from the above mentioned entities you can identify more. The above mentioned are few.

Note: The student is required to submit a document by writing the Entities and Keys to the lab teacher.

**Experiment 2: Concept design with E-R Model**

Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entities and weak entities (if any). Indicate the type of relationships (total / partial). Try to incorporate generalization, aggregation, specialization etc wherever required.

**Example: E-R diagram for bus**



Note: The student is required to submit a document by drawing the E-R Diagram to the lab teacher.

**Experiment 3: Relational Model**

Represent all the entities (Strong, Weak) in tabular fashion. Represent relationships in a tabular fashion. There are different ways of representing relationships as tables based on the cardinality. Represent attributes as columns in tables or as tables based on the requirement. Different types of attributes (Composite, Multi-valued, and Derived) have different way of representation.

Example: The passenger tables look as below. This is an example. You can

add more attributes based on your E-R model. This is not a normalized table.

Passenger

Name	Age	Sex	Address	Ticket_id	Passport ID

*Note: The student is required to submit a document by Represent relationships in a tabular fashion to the lab teacher.*

**Experiment 4: Normalization**

Database normalization is a technique for designing relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain types of logical or structural problems, namely data anomalies. For example, when multiple instances of a given piece of information occur in a table, the possibility exists that these instances will not be kept consistent when the data within the table is updated, leading to a loss of data integrity. A table that is sufficiently normalized is less vulnerable to problems of this kind, because its structure reflects the basic assumptions for when multiple instances of the same information should be represented by a single instance only.

For the above table in the First normalization we can remove the multi valued attribute Ticket\_id and place it in another table along with the primary key of passenger.

First Normal Form: The above table can be divided into two tables as shown below.

Passenger

Name	Age	Sex	Address	Passport ID

Passport ID	Ticket_id

You can do the second and third normal forms if required. Any how Normalized tables are given at the end.



**Experiment 5: Installation of Mysql and practicing DDL commands**

Installation of MySQL. In this week you will learn Creating databases, How to create tables, altering the database, dropping tables and databases if not required. You will also try truncate, rename commands etc.

Example for creation of a normalized “Passenger” table.

```
CREATE TABLE Passenger (
    Passport_id INTEGER PRIMARY KEY,
    Name VARCHAR (50) Not NULL,
    Age Integer Not NULL,
    Sex Char,
    Address VARCHAR (50) Not NULL);
```

Similarly create all other tables.

**Note: Detailed creation of tables is given at the end.**

**Experiment 6: Practicing DML commands**

DML commands are used to for managing data within schema objects. Some examples:

- SELECT - retrieve data from the a database
- INSERT - insert data into a table
- UPDATE - updates existing data within a table
- DELETE - deletes all records from a table, the space for the records remain

**Inserting values into “Bus” table:**

```
Insert into Bus values (1234,'hyderabad', 'tirupathi');
```

```
Insert into Bus values (2345,'hyderabad','Banglore');
```

```
Insert into Bus values (23,'hyderabad','Kolkata');
```

```
Insert into Bus values (45,'Tirupathi','Banglore');
```

```
Insert into Bus values (34,'hyderabad','Chennai');
```

**Inserting values into “Passenger” table:**

```
Insert into Passenger values (1, 45,'ramesh', 45,'M','abc123');
```

```
Insert into Passenger values (2, 78,'geetha', 36,'F','abc124');
```

```
Insert into Passenger values (45, 90,'ram', 30,'M','abc12');
```

```
Insert into Passenger values (67, 89,'ravi', 50,'M','abc14');
```

```
Insert into Passenger values (56, 22,'seetha', 32,'F','abc55');
```

**Few more Examples of DML commands:**

```
Select * from Bus; (selects all the attributes and display)
```

UPDATE BUS SET Bus No = 1 WHERE BUS NO=2;

### Experiment 7: Querying

In this week you are going to practice queries (along with sub queries) using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.

#### Practice the following Queries:

1. Display unique PNR\_no of all passengers.
2. Display all the names of male passengers.
3. Display the ticket numbers and names of all the passengers.
4. Find the ticket numbers of the passengers whose name start with 'r' and ends with 'h'.
5. Find the names of passengers whose age is between 30 and 45.
6. Display all the passengers names beginning with 'A'
7. Display the sorted list of passengers names

#### Experiment 8 and Experiment 9: Querying (continued...)

You are going to practice queries using Aggregate functions (COUNT, SUM, AVG, and MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

1. Write a Query to display the Information present in the Passenger and cancellation tables. Hint: Use UNION Operator.
2. Display the number of days in a week on which the 9W01 bus is available.
3. Find number of tickets booked for each PNR\_no using GROUP BY CLAUSE. Hint: Use GROUP BY on PNR\_No.
4. Find the distinct PNR numbers that are present.
5. Find the number of tickets booked by a passenger where the number of seats is greater than 1. Hint: Use GROUP BY, WHERE and HAVING CLAUSES.
6. Find the total number of cancelled seats.

#### Experiment 10: Triggers

In this week you are going to work on Triggers. Creation of insert trigger, delete trigger, update trigger. Practice triggers using the above database.

**Eg: CREATE TRIGGER updcheck BEFORE UPDATE ON passenger**

**FOR EACH ROW**

**BEGIN**

**IF NEW.TickentNO > 60 THEN**

**SET New.Tickent no = Ticket no;**

```

ELSE
    SET New.Ticketno = 0;
END IF;
END;

```

**Experiment 11: Procedures**

In this session you are going to learn Creation of stored procedure, Execution of procedure and modification of procedure. Practice procedures using the above database.

```

Eg:CREATE PROCEDURE myProc()
BEGIN
SELECT COUNT(Tickets) FROM Ticket WHERE age>=40;
End;

```

**Experiment 12: Cursors**

In this week you need to do the following: Declare a cursor that defines a result set.

Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done

```

CREATE PROCEDURE myProc(in_customer_id INT)
BEGIN
DECLARE v_id INT;
DECLARE v_name VARCHAR (30);
DECLARE c1 CURSOR FOR SELECT stdId,stdFirstname FROM
students WHERE stdId=in_customer_id;
OPEN c1;
FETCH c1 into v_id, v_name;
Close c1;
END;

```

Tables

**BUS**

Bus No: Varchar: PK (public key)

Source : Varchar

Destination : Varchar

**Passenger**

PPNO: Varchar(15)) : PK

Name: Varchar(15)

Age : int (4)  
 Sex:Char(10) : Male / Female  
 Address: VarChar(20)

**Passenger\_Tickets**

PPNO: Varchar(15)) : PK  
 Ticket\_No: Numeric (9)

**Reservation**

PNR\_No: Numeric(9) : FK  
 Journey\_date : datetime(8)  
 No\_of\_seats : int (8)  
 Address : Varchar (50)  
 Contact\_No: Numeric (9)--> Should not be less than 9 and Should not accept any other character other than Integer  
 Status: Char (2) : Yes / No

**Cancellation**

PNR\_No: Numeric(9) : FK  
 Journey\_date : datetime(8)  
 No\_of\_seats : int (8)  
 Address : Varchar (50)  
 Contact\_No: Numeric (9)--> Should not be less than 9 and Should not accept any other character other than Integer  
 Status: Char (2) : Yes / No

**Ticket**

Ticket\_No: Numeric (9): PK  
 Journey\_date : datetime(8)  
 Age : int (4)  
 Sex:Char(10) : Male / Female  
 Source : Varchar  
 Destination : Varchar  
 Dep\_time : Varchar

**REFERENCE BOOKS:**

1. Introduction to SQL, Rick F.Vander Lans, Pearson education.
2. Oracle PL/SQL, B.Rosenzweig and E.Silvestrova,Pearson education.
3. Oracle PL/SQL Programming,Steven Feuerstein,SPD.
4. SQL & PL/SQL for Oracle 10g, Black Book, Dr.P.S.Deshpande, Dream

Tech.

5. Oracle Database 11g PL/SQL Programming, M.Mc Laughlin, TMH.
6. SQL Fundamentals, J.J.Patrick, Pearson Education.

**Outcomes:**

- Ability to design and implement a database schema for given problem.
- Be capable to Design and build a GUI application.
- Apply the normalization techniques for development of application software to realistic problems.
- Ability to formulate queries using SQL DML/DDDL/DCL commands.

**II YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A40506	Computer Organization	4	-	4
A40507	Database Management Systems	4	-	4
A40503	Java Programming	4	-	4
A40009	Environmental studies	4	-	4
A40509	Formal Languages and Automata Theory	4	-	4
A40508	Design and Analysis of Algorithms	4	-	4
A40585	Java Programming Lab	-	3	2
A40584	Database Management Systems Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A50511	Principles of Programming Languages	4	-	4
	<b>OPEN ELECTIVE</b>	4	-	4
A50018	Human Values and Professional Ethics			
A50017	Intellectual Property Rights			
A50117	Disaster Management			
A50518	Software Engineering	4	-	4
A50514	Compiler Design	4	-	4
A50510	Operating Systems	4	-	4
A50515	Computer Networks	4	-	4
A50589	Operating Systems Lab	-	3	2
A50587	Compiler Design Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A60521	Distributed Systems	4	-	4
A60522	Information Security	4	-	4
A60524	Object Oriented Analysis and Design	4	-	4
A60525	Software Testing Methodologies	4	-	4
A60010	Managerial Economics and Financial Analysis	4	-	4
A60512	Web Technologies	4	-	4
A60591	Case Tools and Web Technologies Lab	-	3	2
A60086	Advanced Communication Skills Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>III Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A50511) PRINCIPLES OF PROGRAMMING LANGUAGES****Objectives:**

- To briefly describe various programming paradigms.
- To provide conceptual understanding of High level language design and implementation.
- To introduce the power of scripting languages.

**UNIT- I**

**Preliminary Concepts:** Reasons for studying, concepts of programming languages, Programming domains, Language Evaluation Criteria, influences on Language design, Language categories, Programming Paradigms – Imperative, Object Oriented, functional Programming , Logic Programming. Programming Language Implementation – Compilation and Virtual Machines, programming environments. Syntax and Semantics: general Problem of describing Syntax and Semantics, formal methods of describing syntax - BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, attribute grammars, denotational semantics and axiomatic semantics for common programming language features.

**UNIT- II**

**Data types:** Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization. Expressions and Statements: Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements, Control Structures – Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements, guarded commands.

**UNIT-III**

**Subprograms and Blocks:** Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions user defined overloaded operators, co routines.

**UNIT- IV**

**Abstract Data types:** Abstractions and encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT,

object oriented programming in small talk, C++, Java, C#, Ada 95

**Concurrency:** Subprogram level concurrency, semaphores, monitors, message passing, Java threads, C# threads.

**Exception handling :** Exceptions, exception Propagation, Exception handler in Ada, C++ and Java.

**Logic Programming Language :** Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

#### **UNIT- V**

**Functional Programming Languages:** Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages.

Scripting Language: Pragmatics, Key Concepts, Case Study : Python – Values and Types, Variables , Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library.

#### **TEXT BOOKS:**

1. Concepts of Programming Languages Robert .W. Sebesta 8/e, Pearson Education,2008.
2. Programming Language Design Concepts, D. A. Watt, Wiley dreamtech,rp-2007.

#### **REFERENCE BOOKS:**

1. Programming Languages, 2nd Edition, A.B. Tucker, R.E. Noonan, TMH.
2. Programming Languages, K. C.Louden, 2nd Edition, Thomson, 2003.
3. LISP, Patric Henry Winston and Paul Horn, Pearson Education.
4. Programming in Prolog, W.F. Clocksin,& C.S.Mellish, 5th Edition, Springer.
5. Programming Python, M.Lutz, 3rd Edition, O'reilly, SPD, rp-2007.
6. Core Python Programming, Chun, II Edition, Pearson Education, 2007.
7. Guide to Programming with Python, Michael Dawson, Thomson, 2008

#### **Outcomes:**

- Ability to express syntax and semantics in formal notation.
- Ability to apply suitable programming paradigm for the application.
- Gain Knowledge and comparison of the features programming languages.



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<b>III Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A50018) HUMAN VALUES AND PROFESSIONAL ETHICS****(Open Elective)**

Objectives : This introductory course input is intended

- To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Value based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

**Unit I:**

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self Exploration-what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

**Unit II:**

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' - Sukh and Savidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

**Unit III:**

**Understanding Harmony in the Family and Society- Harmony in Human**

- **Human Relationship** : Understanding harmony in the Family- the basic unit of human interaction. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; **Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.** Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals. Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha )- from family to world family!

**Unit IV:**

**Understanding Harmony in the Nature and Existence - Whole existence as Co-existence** : Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature-recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

**Unit V:**

**Implications of the above Holistic Understanding of Harmony on Professional Ethics** : Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

- a) Ability to utilize the professional competence for augmenting universal human order,
- b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
- c) Ability to identify and develop appropriate technologies and management patterns for above production systems.

Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order:

- a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers
- b) At the level of society: as mutually enriching institutions and organizations

**TEXT BOOKS**

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in

Human Values and Professional Ethics.

2. Prof. KV Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

#### **REFERENCE BOOKS**

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. A Nagraj, 1998, Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Susan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
5. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A.N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethichs (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.

#### **Relevant CDs, Movies, Documentaries & Other Literature:**

1. Value Education website, <http://www.uptu.ac.in>
2. Story of Stuff, <http://www.storyofstuff.com>
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charlie Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story

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<b>III Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A50017) INTELLECTUAL PROPERTY RIGHTS****(Open Elective)****UNIT – I**

**Introduction to Intellectual property:** Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

**UNIT – II**

**Trade Marks :** Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

**UNIT – III**

**Law of copy rights :** Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents : Foundation of patent law, patent searching process, ownership rights and transfer

**UNIT – IV**

**Trade Secrets :** Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

**Unfair competition :** Misappropriation right of publicity, False advertising.

**UNIT – V**

**New development of intellectual property:** new developments in trade mark law ; copy right law, patent law, intellectual property audits.

International overview on intellectual property, international – trade mark law, copy right law, international patent law, international development in trade secrets law.

**TEXT BOOKS & REFERENCES:**

1. Intellectual property right, Deborah. E. Bouchoux, cengage learning.
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tate Mc Graw Hill Publishing company ltd.,

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	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A50117) DISASTER MANAGEMENT****(Open Elective)****Unit-I**

**Environmental Hazards & Disasters:** Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

**Unit –II**

**Types of Environmental hazards & Disasters:** Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards –

**Unit –III**

Endogenous Hazards - Volcanic Eruption – Earthquakes – Landslides - Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - - Earthquake Hazards in India - - Human adjustment, perception & mitigation of earthquake.

**Unit –IV**

Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters

**Infrequent events:** Cyclones – Lightning – Hailstorms

**Cyclones:** Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes , distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves Floods:- Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & mitigation) Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Palnetary Hazards/ Disasters- Man induced Hazards / Disasters- Physical hazards/ Disasters-Soil Erosion

**Soil Erosion:--** Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion

**Chemical hazards/ disasters:**-- Release of toxic chemicals, nuclear explosion- Sedimentation processes Sedimentation processes:- Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation

**Biological hazards/ disasters:**- Population Explosion.

#### **Unit –V**

Emerging approaches in Disaster Management- Three Stages

1. Pre- disaster stage (preparedness)
2. Emergency Stage
3. Post Disaster stage-Rehabilitation

#### **TEXT BOOKS:**

1. Disaster Mitigation: Experiences And Reflections by Pardeep Sahni
2. Natural Hazards & Disasters by Donald Hyndman & David Hyndman – Cengage Learning

#### **REFERENCES**

1. R.B.Singh (Ed) Environmental Geography, Heritage Publishers New Delhi,1990
2. Savinder Singh Environmental Geography, Prayag Pustak Bhawan, 1997
3. Kates,B.I & White, G.F The Environment as Hazards, oxford, New York, 1978
4. R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
5. H.K. Gupta (Ed) Disaster Management, Universiters Press, India, 2003
6. R.B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994
7. Dr. Satender , Disaster Management t in Hills, Concept Publishing Co., New Delhi, 2003
8. A.S. Arya Action Plan For Earthquake,Disaster, Mitigation in V.K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994
9. R.K. Bhandani An overview on Natural & Man made Disaster & their Reduction,CSIR, New Delhi
10. M.C. Gupta Manuals on Natural Disaster management in India, National Centre for Disaster Management, IIPA, New Delhi, 2001

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III Year B.Tech. CSE-I Sem

L	T/P/D	C
4	-/-/-	4

**(A50518) SOFTWARE ENGINEERING****Objectives:**

- To understanding of software process models such as waterfall and evolutionary models.
- To understanding of software requirements and SRS document.
- To understanding of different software architectural styles.
- To understanding of software testing approaches such as unit testing and integration testing.
- To understanding on quality control and how to ensure good quality software.

**UNIT- I**

**Introduction to Software Engineering:** The evolving role of software, Changing Nature of Software, legacy software, Software myths.

**A Generic view of process:** Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

**Process models:** The waterfall model, Incremental process models, Evolutionary process models, Specialized process models, The Unified process.

**UNIT- II**

**Software Requirements:** Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

**Requirements engineering process:** Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

**System models:** Context Models, Behavioral models, Data models, Object models, structured methods.

**UNIT- III**

**Design Engineering:** Design process and Design quality, Design concepts, the design model, pattern based software design.

**Creating an architectural design:** software architecture, Data design, Architectural styles and patterns, Architectural Design, assessing alternative architectural designs, mapping data flow into a software architecture.

**Modeling component-level design :** Designing class-based components, conducting component-level design, Object constraint language, designing conventional components.

**Performing User interface design:** Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

#### **UNIT- IV**

**Testing Strategies:** A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

**Product metrics:** Software Quality, Frame work for Product metrics, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Metrics for Process and Products: Software Measurement, Metrics for software quality.

#### **UNIT- V**

**Risk management:** Reactive vs Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

**Quality Management:** Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

#### **TEXT BOOKS:**

1. Software Engineering A practitioner's Approach, Roger S Pressman, sixth edition McGrawHill International Edition.
2. Software Engineering, Ian Sommerville, seventh edition, Pearson education.

#### **REFERENCE BOOKS:**

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, Rajib Mall,PHI, 2005
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition 2006.
7. Software Engineering Foundations, Yingxu Wang, Auerbach



Publications,2008.

8. Software Engineering Principles and Practice, Hans Van Vliet,3rd edition, John Wiley & Sons Ltd.
9. Software Engineering 3: Domains, Requirements, and Software Design, D. Bjorner, Springer International Edition.
10. Introduction to Software Engineering, R.J. Leach, CRC Press.

**Outcomes:**

- Ability to identify the minimum requirements for the development of application.
- Ability to develop, maintain, efficient, reliable and cost effective software solutions
- Ability to critically think and evaluate assumptions and arguments.

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	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A50514) COMPILER DESIGN****Objectives:**

- To describe the steps and algorithms used by language translators.
- To discuss the effectiveness of optimization.
- To explain the machine dependent aspects of Compilation

**UNIT – I**

**Overview of Compilation:** Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation – LEX lexical analyzer generator.

**Top down Parsing:** Context free grammars, Top down parsing – Backtracking, LL (1), recursive descent parsing, Predictive parsing, Preprocessing steps required for predictive parsing.

**UNIT – II**

**Bottom up parsing :** Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing , handling ambiguous grammar, YACC – automatic parser generator.

**UNIT – III**

**Semantic analysis :** Intermediate forms of source Programs – abstract syntax tree, polish notation and three address codes. Attributed grammars, Syntax directed translation, Conversion of popular Programming languages language Constructs into Intermediate code forms, Type checker.

**Symbol Tables :** Symbol table format, organization for block structures languages, hashing, tree structures representation of scope information. Block structures and non block structure storage allocation: static, Runtime stack and heap storage allocation, storage allocation for arrays, strings and records.

**UNIT – IV**

**Code optimization :** Consideration for Optimization, Scope of Optimization, local optimization, loop optimization, frequency reduction, folding, DAG representation.

**Data flow analysis :** Flow graph, data flow equation, global optimization, redundant sub expression elimination, Induction variable elements, Live variable analysis, Copy propagation.

**UNIT – V**

**Object code generation** : Object code forms, machine dependent code optimization, register allocation and assignment generic code generation algorithms, DAG for register allocation.

**TEXT BOOKS :**

1. Principles of compiler design -A.V. Aho . J.D.Ullman; Pearson Education.
2. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.

**REFERENCE BOOKS :**

1. lex &yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
2. Modern Compiler Design- Dick Grune, Henry E. Bal, Caryl T. H. Jacobs, Wiley dreamtech.
3. Engineering a Compiler-Cooper & Linda, Elsevier.
4. Compiler Construction, Loudon, Thomson.

**Outcomes:**

- Ability to understand the design of a compiler given features of the languages.
- Ability to implement practical aspects of automata theory.
- Gain Knowledge of powerful compiler generation tools.

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	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A50510) OPERATING SYSTEMS****Objectives:**

- To understand main components of OS and their working
- To study the operations performed by OS as a resource manager
- To understand the scheduling policies of OS
- To understand the different memory management techniques
- To understand process concurrency and synchronization
- To understand the concepts of input/output, storage and file management
- To study different OS and compare their features.

**UNIT- I**

**Operating System Introduction:** Operating Systems objectives and functions, Computer System Architecture, OS Structure, OS Operations, Evolution of Operating Systems - Simple Batch, Multi programmed, time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, Special -Purpose Systems, Operating System services, User OS Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, OS Structure, Virtual Machines.

**UNIT- II**

Process and CPU Scheduling - Process concepts-The Process, Process State, Process Control Block, Threads, Process Scheduling-Scheduling Queues, Schedulers, Context Switch, Preemptive Scheduling, Dispatcher, Scheduling Criteria, Scheduling algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Thread scheduling, Case studies: Linux, Windows.

Process Coordination – Process Synchronization, The Critical Section Problem, Peterson's solution, Synchronization Hardware, Semaphores, and Classic Problems of Synchronization, Monitors, Case Studies: Linux, Windows.

**UNIT- III**

Memory Management and Virtual Memory - Logical & Physical Address Space, Swapping, Contiguous Allocation, Paging, Structure of Page Table, Segmentation, Segmentation with Paging, Virtual Memory, Demand Paging, Performance of Demanding Paging, Page Replacement Page Replacement Algorithms, Allocation of Frames, Thrashing.

**UNIT- IV**

File System Interface - The Concept of a File, Access methods, Directory Structure, File System Mounting, File Sharing, Protection, File System Implementation - File System Structure, File System Implementation, Allocation methods, Free-space Management, Directory Implementation, Efficiency and Performance.

Mass Storage Structure – Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap space Management

**UNIT- V**

Deadlocks - System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

Protection – System Protection, Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, Capability-Based Systems, Language-Based Protection.

**TEXT BOOKS:**

1. Operating System Principles , Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 8th Edition, Wiley Student Edition
2. Operating Systems – Internals and Design Principles, W. Stallings, 6th Edition, Pearson.

**REFERENCE BOOKS:**

1. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, PHI
2. Operating Systems A concept-based Approach, 2nd Edition, D.M.Dhamdhere, TMH.
3. Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.
4. Operating Systems, A.S.Godbole, 2nd Edition, TMH
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6. Operating Systems, S.Haldar and A.A.Aravind, Pearson Education.
7. Operating Systems, R.Elmasri, A,G.Carrick and D.Levine, Mc Graw Hill.
8. Operating Systems in depth, T.W. Doeppner, Wiley.

**Outcomes:**

- Apply optimization techniques for the improvement of system performance.
- Ability to understand the synchronous and asynchronous

communication mechanisms in their respective OS.

- Learn about minimization of turnaround time, waiting time and response time and also maximization of throughput with keeping CPU as busy as possible.
- Ability to compare the different OS

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	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A50515) COMPUTER NETWORKS****Objectives:**

- To introduce the fundamental various types of computer networks.
- To demonstrate the TCP/IP and OSI models with merits and demerits.
- To explore the various layers of OSI Model.
- To introduce UDP and TCP Models.

**UNIT-I**

**Overview of the Internet:** Protocol, Layering Scenario, TCP/IP Protocol Suite: The OSI Model, Internet history standards and administration; Comparison of the OSI and TCP/IP reference model.

**Physical Layer:** Guided transmission media, wireless transmission media.

**Data Link Layer –** design issues, CRC Codes, Elementary Data link Layer protocols, sliding window protocol

**UNIT-II**

**Multiple Access Protocols –**ALOHA, CSMA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer, data link layer switching & use of bridges, learning bridges, spanning tree bridges, repeaters , hubs, bridges , switches, routers and gateways.

**UNIT-III**

**Network Layer:** Network Layer Design issues, store and forward packet switching connection less and connection oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Count to Infinity Problem, Hierarchical Routing, Congestion control algorithms, admission control.

**UNIT-IV**

**Internetworking:** Tunneling, Internetwork Routing, Packet fragmentation, IPv4, Ipv6 Protocol, IP addresses, CIDR, ICMP, ARP, RARP, DHCP.

**Transport Layer:** Services provided to the upper layers elements of transport protocol-addressing connection establishment, connection release, Connection Release, Crash Recovery.

**UNIT-V**

The Internet Transport Protocols UDP-RPC, Real Time Transport Protocols, The Internet Transport Protocols- Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP

Connection Release, The TCP Connection Management Modeling, The TCP Sliding Window, The TCP Congestion Control, The future of TCP.

Application Layer-Introduction ,providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS, SSH

**TEXT BOOKS:**

1. Data Communications and Networking – Behrouz A. Forouzan, Fifth Edition TMH, 2013.
2. Computer Networks -- Andrew S Tanenbaum, 4th Edition, Pearson Education.

**REFERENCE BOOKS:**

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W.A.Shay, Cengage Learning.
3. Introduction to Computer Networks and Cyber Security, Chwan-Hwa (John) Wu, J. David Irwin, CRC Press.
4. Computer Networks, L.L.Peterson and B.S.Davie, 4th edition, ELSEVIER.
5. Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose,K.W.Ross,3rd Edition, Pearson Education.

**Outcomes:**

- Students should be understand and explore the basics of Computer Networks and Various Protocols. He/She will be in a position to understand the World Wide Web concepts.
- Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile and ad hoc networks.



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-I Sem****L T/P/D C****- -/3/- 2****(A50589) OPERATING SYSTEMS LAB****Objectives:**

- To use inux perating system for study of operating system concepts.
- To write the code to mplement nd odify ariousconcepts in operating systems using Linux.

**List of Programs:**

1. Simulate the following CPU scheduling algorithms  
a) Round Robin b) SJF c) FCFS d) Priority
2. Simulate all file allocation strategies  
a) Sequential b) Indexed c) Linked
3. Simulate MVT and MFT
4. Simulat all File Organization Techniques  
a) Single level directory b) Two level c) Hierarchical d) DAG
5. Simulate Bankers Algorithm for Dead Lock Avoidance
6. Simulate Bankers Algorithm for Dead Lock Prevention
7. Simulate all page replacement algorithms  
a) FIF b) LRU c) LFU Etc.
8. Simulate Paging Technique of memory management.

**Outcomes:**

- The course objectives ensure the development of students applied skills in operating systems related areas.
- Students willgin knowledge in writing oftware routines odules or mplementing various concepts of perating systems

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III Year B.Tech. CSE-I Sem

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**(A50587) COMPILER DESIGN LAB****Objectives:**

- To provide an understanding of the language translation peculiarities by designing a complete translator for a mini language.

**Recommended Systems/Software Requirements:**

- Intel based desktop PC with minimum of 166 MHZ or faster processor with atleast 64 MB RAM and 100 MB free disk space
- C++ compiler and JDK kit

Consider the following mini Language, a simple procedural high-level language, only operating on integer

data, with a syntax looking vaguely like a simple C crossed with Pascal. The syntax of the language is

defined by the following BNF grammar:

```
<program> ::= <block>
```

```
<block> ::= { <variabledefinition> <slislist> }
| { <slislist> }
```

```
<variabledefinition> ::= int <vardeflist> ;
```

```
<vardeflist> ::= <vardec> | <vardec> , <vardeflist>
```

```
<vardec> ::= <identifier> | <identifier> [ <constant> ]
```

```
<slislist> ::= <statement> | <statement> ; <slislist>
```

```
<statement> ::= <assignment> | <ifstatement> | <whilestatement>
```

```
| <block> | <printstatement> | <empty>
```

```
<assignment> ::= <identifier> = <expression>
```

```
| <identifier> [ <expression> ] = <expression>
```

```
<ifstatement> ::= if <bexpression> then <slislist> else <slislist> endif
```

```
| if <bexpression> then <slislist> endif
```

```
<whilestatement> ::= while <bexpression> do <slislist> enddo
```

```
<printstatement> ::= print ( <expression> )
```

```
<expression> ::= <expression> <addingop> <term> | <term> | <addingop>
```

```
<term>
```

```
<bexpression> ::= <expression> <relop> <expression>
```

```
<relop> ::= < | <= | == | >= | > | !=
```

```

<addingop> ::= + | -
<term> ::= <term> <multop> <factor> | <factor>
<multop> ::= * | /
<factor> ::= <constant> | <identifier> | <identifier> [ <expression>]
| ( <expression> )
<constant> ::= <digit> | <digit> <constant>
<identifier> ::= <identifier> <letterordigit> | <letter>
<letterordigit> ::= <letter> | <digit>
<letter> ::= a|b|c|d|e|f|g|h|i|j|k|l|m|n|o|p|q|r|s|t|u|v|w|x|y|z
<digit> ::= 0|1|2|3|4|5|6|7|8|9

```

<empty> has the obvious meaning

Comments (zero or more characters enclosed between the standard C/Java-style comment brackets /

\*...\*/) can be inserted. The language has rudimentary support for 1-dimensional arrays. The declaration

int a[3] declares an array of three elements, referenced as a[0], a[1] and a[2]. Note also that you should

worry about the scoping of names.

A simple program written in this language is:

```

{ int a[3],t1,t2;
t1=2;
a[0]=1; a[1]=2; a[t1]=3;
t2=-(a[2]+t1*6)/(a[2]-t1);
if t2>5 then
print(t2);
else {
int t3;
t3=99;
t2=-25;
print(-t1+t2*t3); /* this is a comment
on 2 lines */
} endif }

```

1. Design a Lexical analyzer for the above language. The lexical analyzer should ignore redundant spaces, tabs and newlines. It should also ignore comments. Although the syntax specification states that

identifiers can be arbitrarily long, you may restrict the length to some reasonable value.

2. Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generating tools.
3. Design Predictive parser for the given language
4. Design LALR bottom up parser for the above language.
5. Convert the BNF rules into Yacc form and write code to generate abstract syntax tree.
6. Write program to generate machine code from the abstract syntax tree generated by the parser. The following instruction set may be considered as target code.

The following is a simple register-based machine, supporting a total of 17 instructions. It has three distinct internal storage areas. The first is the set of 8 registers, used by the individual instructions as detailed below, the second is an area used for the storage of variables and the third is an area used for the storage of program. The instructions can be preceded by a label. This consists of an integer in the range 1 to 9999 and the label is followed by a colon to separate it from the rest of the instruction. The numerical label can be used as the argument to a jump instruction, as detailed below.

In the description of the individual instructions below, instruction argument types are specified as follows :

R

specifies a register in the form R0, R1, R2, R3, R4, R5, R6 or R7 (or r0, r1, etc.).

L

specifies a numerical label (in the range 1 to 9999).

V

specifies a "variable location" (a variable number, or a variable location pointed to by a register - see below).

A

specifies a constant value, a variable location, a register or a variable location pointed to by a register (an indirect address). Constant values are specified as an integer value, optionally preceded by a minus sign, preceded by a # symbol. An indirect address is specified by an @ followed by a register.

So, for example, an A-type argument could have the form 4 (variable number 4), #4 (the constant value 4), r4 (register 4) or @r4 (the contents of register 4 identifies the variable location to be accessed).

The instruction set is defined as follows:

LOAD A,R

loads the integer value specified by A into register R.

STORE R,V

stores the value in register R to variable V.

OUT R

outputs the value in register R.

NEG R

negates the value in register R.

ADD A,R

adds the value specified by A to register R, leaving the result in register R.

SUB A,R

subtracts the value specified by A from register R, leaving the result in register R.

MUL A,R

multiplies the value specified by A by register R, leaving the result in register R.

DIV A,R

divides register R by the value specified by A, leaving the result in register R.

JMP L

causes an unconditional jump to the instruction with the label L.

JEQ R,L

jumps to the instruction with the label L if the value in register R is zero.

JNE R,L

jumps to the instruction with the label L if the value in register R is not zero.

JGE R,L

jumps to the instruction with the label L if the value in register R is greater than or equal to zero.

JGT R,L

jumps to the instruction with the label L if the value in register R is greater than zero.

JLE R,L

jumps to the instruction with the label L if the value in register R is less than or equal to zero.

JLT R,L

jumps to the instruction with the label L if the value in register R is less than zero.

NOP

is an instruction with no effect. It can be tagged by a label.

STOP

stops execution of the machine. All programs should terminate by executing a STOP instruction.

**Outcomes:**

- By this laboratory, students will understand the practical approach of how a compiler works.
- This will enable him to work in the development phase of new computer languages in industry.

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	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A60521) DISTRIBUTED SYSTEMS****Objectives:**

- To understand what and why a distributed system is.
- To understand theoretical concepts, namely, virtual time, agreement and consensus protocols.
- To understand IPC, Group Communication & RPC Concepts.
- To understand the DFS and DSM Concepts.
- To understand the concepts of transaction in distributed environment and associated concepts, namely, concurrency control, deadlocks and error recovery.

**UNIT-I**

**Characterization of Distributed Systems:** Introduction, Examples of Distributed Systems, Resource Sharing and the Web, Challenges.

**System Models:** Introduction, Architectural Models, Fundamental Models.

**UNIT-II**

**Time and Global States:** Introduction, Clocks Events and Process States, Synchronizing Physical Clocks, Logical Time and Logical Clocks, Global States, Distributed Debugging.

**Coordination and Agreement:** Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication, Consensus and Related Problems.

**UNIT-III**

**InterProcess Communication:** Introduction, The API for the Internet Protocols, External Data Representation and Marshalling, Client-Server Communication, Group Communication, Case Study: IPC in **UNIX**.

**Distributed Objects and Remote Invocation:** Introduction, Communication between Distributed Objects, Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI.

**UNIT-IV**

**Distributed File Systems:** Introduction, File Service Architecture, Case Study 1: Sun Network File System, Case Study 2: The Andrew File System.

**Name Services:** Introduction, Name Services and the Domain Name System, Directory Services, Case Study of the Global Name Services.

**Distributed Shared Memory:** Introduction, Design and Implementation Issues, Sequential Consistency and IVY case study, Release Consistency,

Munin Case Study, Other Consistency Models.

**UNIT- V**

**Transactions and Concurrency Control:** Introduction, Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Timestamp Ordering, Comparison of Methods for Concurrency Control.

**Distributed Transactions:** Introduction, Flat and Nested Distributed Transactions, Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Deadlocks, Transaction Recovery.

**TEXT BOOK:**

- 1) Distributed Systems, Concepts and Design, George Coulouris, J Dollimore and Tim Kindberg, Pearson Education, 4<sup>th</sup> Edition, 2009.

**REFERENCE BOOKS:**

- 1) Distributed Systems, Principles and Paradigms, Andrew S. Tanenbaum, Maarten Van Steen, 2<sup>nd</sup> Edition, PHI.
- 2) Distributed Systems, An Algorithm Approach, Sukumar Ghosh, Chapman&Hall/CRC, Taylor & Fransis Group, 2007.

**Outcomes:**

- Able to comprehend and design a new distributed system with the desired features.
- Able to start literature survey leading to further research in any subarea.
- Able to develop new distributed applications.



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**(A60522) INFORMATION SECURITY****Objectives:**

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- Understand various cryptographic algorithms.
- Understand the basic categories of threats to computers and networks
- Describe public-key cryptosystem.
- Describe the enhancements made to IPv4 by IPsec
- Understand Intrusions and intrusion detection
- Discuss the fundamental ideas of public-key cryptography.
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
- Discuss Web security and Firewalls

**UNIT – I**

**Attacks on Computers and Computer Security:** Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

**Cryptography: Concepts and Techniques:** Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

**UNIT – II**

**Symmetric key Ciphers:** Block Cipher principles & Algorithms(DES, AES, Blowfish), Differential and Linear Cryptanalysis, Block cipher modes of operation, Stream ciphers, RC4, Location and placement of encryption function, Key distribution  
**Asymmetric key Ciphers:** Principles of public key cryptosystems, Algorithms(RSA, Diffie-Hellman, ECC), Key Distribution.

**UNIT – III**

**Message Authentication Algorithms and Hash Functions:** Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm  
**Authentication Applications:** Kerberos, X.509

Authentication Service, Public – Key Infrastructure, Biometric Authentication

#### **UNIT – IV**

**E-Mail Security:** Pretty Good Privacy, S/MIME **IP Security:** IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, key management

#### **UNIT – V**

**Web Security:** Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction **Intruders, Virus and Firewalls:** Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls **Case Studies on Cryptography and security:** Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability, Virtual Elections

#### **TEXT BOOKS:**

1. Cryptography and Network Security : William Stallings, Pearson Education, 4<sup>th</sup> Edition
2. Cryptography and Network Security : Atul Kahate, Mc Graw Hill, 2<sup>nd</sup> Edition

#### **REFERENCE BOOKS:**

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1<sup>st</sup> Edition.
2. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 2<sup>nd</sup> Edition
3. Information Security, Principles and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM.Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

#### **Outcomes:**

- Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
- Ability to identify information system requirements for both of them such as client and server.
- Ability to understand the current legal issues towards information security.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-II Sem****L T/P/D C****4 -/- 4****(A60524) OBJECT ORIENTED ANALYSIS AND DESIGN****Objectives:**

- Concisely define the following key terms: class, object, state, behavior, object class, class diagram, object diagram, operation, encapsulation, constructor operation, query operation, update operation, scope operation, association, association role, multiplicity, association class, abstract class, concrete class, class-scope attribute, abstract operation, method, polymorphism, overriding, multiple classification, aggregation, and composition.
- Describe the activities in the different phases of the object-oriented development life cycle.
- State the advantages of object-oriented modeling vis-à-vis structured approaches.
- Compare and contrast the object-oriented model with the E-R and EER models.
- Model a real-world application by using a UML class diagram.
- Provide a snapshot of the detailed state of a system at a point in time using a UML (Unified Modeling Language) object diagram.
- Recognize when to use generalization, aggregation, and composition relationships.
- Specify different types of business rules in a class diagram.

**UNIT- I**

**Introduction to UML:** Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

**UNIT- II**

**Basic Structural Modeling:** Classes, Relationships, common Mechanisms, and diagrams.

Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

**UNIT- III**

Basic Behavioral Modeling-I: Interactions, Interaction diagrams.

Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity

Diagrams.

#### **UNIT- IV**

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

#### **UNIT- V**

Patterns and Frameworks, Artifact Diagrams. Case Study: The Unified Library application

#### **TEXT BOOKS:**

1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education 2nd Edition.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

#### **REFERENCE BOOKS:**

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML, TMH.
5. Applying UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
6. Object-Oriented Analysis and Design with the Unified Process By John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.
7. UML and C++, R.C.Lee, and W.M.Tepfenhart, PHI.
8. Object Oriented Analysis, Design and Implementation, B.Dathan, S.Ramnath, Universities Press.
9. OODesign with UML and Java, K.Barclay, J.Savage, Elsevier.
10. Learning UML 2.0, Russ Miles and Kim Hamilton, O'Reilly, SPD.

**Outcomes:** Graduate can able to take up the case studies and model it in different views with respect user requirement such as use case, logical, component and deployment and etc, and preparation of document of the project for the unified Library application.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-II Sem****L T/P/D C****4 -/-/ 4****(A60525) SOFTWARE TESTING METHODOLOGIES****Objectives:**

To understand the software testing methodologies such as flow graphs and path testing, transaction flows testing, data flow testing, domain testing and logic base testing.

**UNIT - I**

Introduction:- Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs.

Flow graphs and Path testing:- Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

**UNIT - II**

Transaction Flow Testing:-transaction flows, transaction flow testing techniques.

Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

**UNIT - III**

Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

**UNIT-IV**

Paths, Path products and Regular expressions:- path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

Logic Based Testing:- overview, decision tables, path expressions, kv charts, specifications.

**UNIT - V**

State, State Graphs and Transition testing:- state graphs, good & bad state graphs, state testing, Testability tips.

Graph Matrices and Application:-Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter or Win-runner).

**TEXT BOOKS:**

1. Software Testing techniques – Boris Beizer, Dreamtech, second

edition.

2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

**REFERENCE BOOKS:**

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing, 3<sup>rd</sup> edition, P.C. Jorgensen, Aurbach Publications (Dist. by SPD).
3. Software Testing, N.Chauhan, Oxford University Press.
4. Introduction to Software Testing, P.Ammann&J.Offutt, Cambridge Univ.Press.
5. Effective methods of Software Testing, Perry, John Wiley, 2<sup>nd</sup> Edition, 1999.
6. Software Testing Concepts and Tools, P.Nageswara Rao, dreamtech Press.
7. Software Testing, M.G.Limaye, TMH.
8. Software Testing, S.Desikan, G.Ramesh, Pearson.
9. Foundations of Software Testing, D.Graham & Others, Cengage Learning.
10. Foundations of Software Testing, A.P.Mathur, Pearson.

**Outcomes:**

- Ability to apply the process of testing and various methodologies in testing for developed software.
- Ability to write test cases for given software to test it before delivery to the customer.

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	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A60010) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS****Objectives:**

To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations namely: demand and supply, production function, cost analysis, markets, forms of business organisations, capital budgeting and financial accounting and financial analysis.

**Unit I**

**Introduction & Demand Analysis:** Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. *Elasticity of Demand:* Definition, Types, Measurement and Significance of Elasticity of Demand. *Demand Forecasting,* Factors governing demand forecasting, methods of demand forecasting.

**Unit II**

**Production & Cost Analysis:** *Production Function* – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. *Cost Analysis:* Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

**Unit III**

**Markets & New Economic Environment:** Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. *Pricing:* Objectives and Policies of Pricing. Methods of Pricing. *Business:* Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, *New Economic Environment:* Changing Business Environment in Post-liberalization scenario.

**Unit IV**

**Capital Budgeting:** Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital - Trading Forecast, Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

**Unit V**

**Introduction to Financial Accounting & Financial Analysis:** Accounting concepts and Conventions - Introduction IFRS - Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). *Financial Analysis:* Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios. Du Pont Chart.

**TEXT BOOKS:**

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2013.
3. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, 2012.

**REFERENCES:**

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2012.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey & Chrystel, Economics, Oxford University Press, 2012
5. Domnick Salvatore: Managerial Economics in a Global Economy, Thomson, 2012.
6. Narayanaswamy: Financial Accounting—A Managerial Perspective, Pearson, 2012.
7. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2012.
8. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2012.
9. Dwivedi: Managerial Economics, Vikas, 2012.
10. Shailaja & Usha : MEFA, University Press, 2012.
11. Aryasri: Managerial Economics and Financial Analysis, TMH, 2012.
12. Vijay Kumar & Appa Rao, Managerial Economics & Financial Analysis, Cengage 2011.
13. J. V. Prabhakar Rao & P.V. Rao, Managerial Economics & Financial Analysis, Maruthi Publishers, 2011.

**Outcomes:**

At the end of the course, the student will

- Understand the market dynamics namely, demand and supply, demand forecasting , elasticity of demand and supply, pricing methods and pricing in different market structures.



- Gain an insight into how production function is carried out to achieve least cost combination of inputs and cost analysis
- Develop an understanding of
- Analyse how capital budgeting decisions are carried out
- Understand the framework for both manual and computerised accounting process
- Know how to analyse and interpret the financial statements through ratio analysis.

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	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A60512) WEB TECHNOLOGIES****Objectives:**

- To introduce PHP language for server side scripting
- To introduce XML and processing of XML Data with Java
- To introduce Server side programming with Java Servlets and JSP
- To introduce Client side scripting with Javascript and AJAX.

**UNIT- I**

**Introduction to PHP:** Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads, Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies

**File Handling in PHP:** File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories

**UNIT- II**

**XML:** Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemas, Document Object Model, XHTML

**Parsing XML Data** - DOM and SAX Parsers in java.

**UNIT- III**

**Introduction to Servlets:** Common Gateway Interface (CGI), Lifecycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions, connecting to a database using JDBC.

**UNIT- IV**

**Introduction to JSP:** The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session for session tracking, connecting to database in JSP.

**UNIT- V**

**Client side Scripting:** Introduction to Javascript: Javascript language - declaring variables, scope of variables, functions, event handlers (onclick, onsubmit etc.), Document Object Model, Form validation.

Simple AJAX application.

**TEXT BOOKS:**

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill

**REFERENCE BOOKS:**

1. Web Programming, building internet applications, Chris Bates 2<sup>nd</sup> edition, Wiley Dreamtech
2. Java Server Pages –Hans Bergsten, SPD O'Reilly
3. Java Script, D.Flanagan, O'Reilly,SPD.
4. Beginning Web Programming–Jon Duckett WROX.
5. Programming world wide web, R.W.Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

**Outcomes:**

- gain knowledge of client side scripting, validation of forms and AJAX programming
- have understanding of server side scripting with PHP language
- have understanding of what is XML and how to parse and use XML Data with Java
- To introduce Server side programming with Java Servlets and JSP

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-II Sem****L T/P/D C****- -/3/- 2****(A60591) CASE TOOLS and WEB TECHNOLOGIES LAB****CASE TOOLS LAB****Objectives:**

- Understand how UML supports the entire OOAD process.
  - Become familiar with all phases of OOAD.
  - Understand different software testing tools and their features
- I. Students are divided into batches of 5 each and each batch has to draw the following diagrams using UML for an ATM system whose description is given below.

UML diagrams to be developed are:

1. Use Case Diagram.
2. Class Diagram.
3. Sequence Diagram.
4. Collaboration Diagram.
5. State Diagram
6. Activity Diagram.
7. Component Diagram
8. Deployment Diagram.
9. Test Design.

**Description for an ATM System**

The software to be designed will control a simulated automated teller machine (ATM) having a magnetic stripe reader for reading an ATM card, a customer console (keyboard and display) for interaction with the customer, a slot for depositing envelopes, a dispenser for cash (in multiples of Rs. 100, Rs. 500 and Rs. 1000), a printer for printing customer receipts, and a key-operated switch to allow an operator to start or stop the machine. The ATM will communicate with the bank's computer over an appropriate communication link. (The software on the latter is not part of the requirements for this problem.)

The ATM will service one customer at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN) - both of which will be sent to the bank for validation as part of each transaction. The customer will then be able to perform one or more transactions. The card will be retained in the machine until the customer indicates that he/she

desires no further transactions, at which point it will be returned - except as noted below.

The ATM must be able to provide the following services to the customer:

1. A customer must be able to make a cash withdrawal from any suitable account linked to the card, in multiples of Rs. 100 or Rs. 500 or Rs. 1000. Approval must be obtained from the bank before cash is dispensed.
2. A customer must be able to make a deposit to any account linked to the card, consisting of cash and/or checks in an envelope. The customer will enter the amount of the deposit into the ATM, subject to manual verification when the envelope is removed from the machine by an operator. Approval must be obtained from the bank before physically accepting the envelope.
3. A customer must be able to make a transfer of money between any two accounts linked to the card.
4. A customer must be able to make a balance inquiry of any account linked to the card.
5. A customer must be able to abort a transaction in progress by pressing the Cancel key instead of responding to a request from the machine.

The ATM will communicate each transaction to the bank and obtain verification that it was allowed by the bank. Ordinarily, a transaction will be considered complete by the bank once it has been approved. In the case of a deposit, a second message will be sent to the bank indicating that the customer has deposited the envelope. (If the customer fails to deposit the envelope within the timeout period, or presses cancel instead, no second message will be sent to the bank and the deposit will not be credited to the customer.)

If the bank determines that the customer's PIN is invalid, the customer will be required to re-enter the PIN before a transaction can proceed. If the customer is unable to successfully enter the PIN after three tries, the card will be permanently retained by the machine, and the customer will have to contact the bank to get it back.

If a transaction fails for any reason other than an invalid PIN, the ATM will display an explanation of the problem, and will then ask the customer whether he/she wants to do another transaction.

The ATM will provide the customer with a printed receipt for each successful transaction

The ATM will have a key-operated switch that will allow an operator to start and stop the servicing of customers. After turning the switch to the "on" position, the operator will be required to verify and enter the total cash on hand. The machine can only be turned off when it is not servicing a customer.

When the switch is moved to the “off” position, the machine will shut down, so that the operator may remove deposit envelopes and reload the machine with cash, blank receipts, etc.

- II. Study of any testing tool (e.g. Win runner)
- III. Study of any web testing tool (e.g. Selenium)
- IV. Study of any bug tracking tool (e.g. Bugzilla, bugbit)
- V. Study of any test management tool (e.g. Test Director)
- VI. Study of any open source-testing tool (e.g. Test Link)

**Outcomes:**

Ability to understand the history, cost of using and building CASE tools.

Ability to construct and evaluate hybrid CASE tools by integrating existing tools.

**WEB TECHNOLOGIES LAB**

**Objectives:**

- To enable the student to program web applications using the following technologies HTML ,Javascript ,AJAX ,PHP ,Tomcat Server, Servlets ,JSP

**Note:**

1. **Use LAMP Stack (Linux, Apache, MySQL and PHP) for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform wherever applicable**
2. **The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed**
  1. Install the following on the local machine
    - Apache Web Server (if not installed)
    - Tomcat Application Server locally
    - Install MySQL (if not installed)
    - Install PHP and configure it to work with Apache web server and MySQL (if not already configured)
  2. Write an HTML page including any required Javascript that takes a number from one text field in the range of 0 to 999 and shows it in another text field in words. If the number is out of range, it should show “out of range” and if it is not a number, it should show “not a number” message in the result box.
  3. Write an HTML page that has one input, which can take multi-line

text and a submit button. Once the user clicks the submit button, it should show the number of characters, words and lines in the text entered using an alert message. Words are separated with white space and lines are separated with new line character.

4. Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).
5. Create an XML document that contains 10 users information. Write a Java program, which takes User Id as input and returns the user details by taking the user information from the XML document using (a) DOM Parser and (b) SAX parser
6. Implement the following web applications using (a) PHP, (b) Servlets and (c) JSP:
  - i. A user validation web application, where the user submits the login name and password to the server. The name and password are checked against the data already available in Database and if the data matches, a successful login page is returned. Otherwise a failure message is shown to the user.
  - ii. Modify the above program to use an xml file instead of database.
  - iii. Modify the above program to use AJAX to show the result on the same page below the submit button.
  - iv. A simple calculator web application that takes two numbers and an operator (+, -, /, \* and %) from an HTML page and returns the result page with the operation performed on the operands.
  - v. Modify the above program such that it stores each query in a database and checks the database first for the result. If the query is already available in the DB, it returns the value that was previously computed (from DB) or it computes the result and returns it after storing the new query and result in DB.
  - vi. A web application takes a name as input and on submit it shows a hello <name> page where <name> is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, it should show a logout page with Thank You <name> message with the duration of usage (hint: Use session to store name and time).
  - vii. A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with "Hello <name>, you are not authorized to visit this site" message, where <name> should be replaced with the entered name. Otherwise it should send "Welcome <name> to this site" message.

viii. A web application for implementation:

The user is first served a login page which takes user's name and password. After submitting the details the server checks these values against the data from a database and takes the following decisions.

If name and password matches, serves a welcome page with user's full name.

If name matches and password doesn't match, then serves "password mismatch" page

If name is not found in the database, serves a registration page, where user's full name is asked and on submitting the full name, it stores, the login name, password and full name in the database (hint: use session for storing the submitted login name and password)

ix. A web application that lists all cookies stored in the browser on clicking "List Cookies" button. Add cookies if necessary.

**TEXT BOOKS:**

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill

**REFERENCE BOOKS:**

1. Web Programming, building internet applications, Chris Bates 2<sup>nd</sup> edition, Wiley Dreamtech
2. Java Server Pages –Hans Bergsten, SPD O'Reilly
3. Java Script, D.Flanagan, O'Reilly, SPD.
4. Beginning Web Programming-Jon Duckett WROX.
5. Programming world wide web, R.W.Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

**Outcomes:**

- Use LAMP Stack for web applications
- Use Tomcat Server for Servlets and JSPs
- Write simple applications with Technologies like HTML, Javascript, AJAX, PHP, Servlets and JSPs
- Connect to Database and get results
- Parse XML files using Java (DOM and SAX parsers)



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-II Sem****L T/P/D C****- -/3/- 2****(A60086) ADVANCED COMMUNICATION SKILLS (ACS) LAB****Introduction**

The introduction of the Advanced Communication Skills Lab is considered essential at 3<sup>rd</sup> year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organise ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

**Objectives:**

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

**Syllabus:**

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

1. **Activities on Fundamentals of Inter-personal Communication and Building Vocabulary** - Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.
2. **Activities on Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
3. **Activities on Writing Skills** – Structure and presentation of different types of writing – *letter writing/Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing* – planning for writing – improving one's writing.
4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/**PPTs** and written presentations through posters/projects/reports/ e-mails/assignments etc.
5. **Activities on Group Discussion and Interview Skills** – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

**Minimum Requirement:**

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- **Spacious room with appropriate acoustics.**
- **Round Tables with movable chairs**
- **Audio-visual aids**
- **LCD Projector**
- **Public Address system**
- **P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ**
- **T. V, a digital stereo & Camcorder**
- **Headphones of High quality**

**Prescribed Lab Manual:** A book titled *A Course Book of Advanced*

**Communication Skills (ACS) Lab** published by Universities Press, Hyderabad.

**Suggested Software:**

The software consisting of the prescribed topics elaborated above should be procured and used.

- **Oxford Advanced Learner's Compass**, 7<sup>th</sup> Edition
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE**( KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- **The following software from 'train2success.com'**
  - **Preparing for being Interviewed**
  - **Positive Thinking**
  - **Interviewing Skills**
  - **Telephone Skills**
  - **Time Management**

**Books Recommended:**

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
3. Technical Communication by Paul V. Anderson. 2007. Cengage Learning Pvt. Ltd. New Delhi.
4. Business and Professional Communication: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.
5. The Basics of Communication: A Relational Perspective. Steve Duck & David T. McMahan. Sage South Asia Edition. Sage Publications. 2012.
6. English Vocabulary in Use series, Cambridge University Press 2008.
7. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
8. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
9. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.

10. Handbook for Technical Writing by David A McMurrey & Joanne Buckley CENGAGE Learning 2008.
11. Job Hunting by Colm Downes, Cambridge University Press 2008.
12. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
13. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.
14. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/ Cambridge University Press.
15. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

**DISTRIBUTION AND WEIGHTAGE OF MARKS:*****Advanced Communication Skills Lab Practicals:***

1. The practical examinations for the ACS Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

**Mini Project: As a part of Internal Evaluation**

1. **Seminar/ Professional Presentation**
  2. **A Report on the same has to be prepared and presented.**
- \* ***Teachers may use their discretion to choose topics relevant and suitable to the needs of students.***
  - \* ***Not more than two students to work on each mini project.***
  - \* ***Students may be assessed by their performance both in oral presentation and written report.***

**Outcomes**

- ☞ Accomplishment of sound vocabulary and its proper use contextually.
- ☞ Flair in Writing and felicity in written expression.
- ☞ Enhanced job prospects.
- ☞ Effective Speaking Abilities

**IV YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A70511	Linux Programming	4	-	4
A70530	Design Patterns	4	-	4
A70520	Data Warehousing and Data Mining	4	-	4
A70519	Cloud Computing	4	-	4
	<b>ELECTIVE – I</b>	4	-	4
A70540	Software Project Management			
A70532	Image processing and Pattern Recognition			
A70536	Mobile Computing			
A70529	Computer Graphics			
A70352	Operations Research			
	<b>ELECTIVE – II</b>	4	-	4
A70534	Machine Learning			
A70539	Soft Computing			
A70533	Information Retrieval Systems			
A70526	Artificial Intelligence			
A70628	Computer Forensics			
A70596	Linux Programming Lab	-	3	2
A70595	Data Warehousing and Mining Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**IV YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A80014	Management Science	4	-	4
	<b>ELECTIVE III</b>	4	-	4
A80551	Web Services			
A80538	Semantic Web and Social Networks			
A80537	Scripting Languages			
A80547	Multimedia & Rich Internet Applications			
	<b>ELECTIVE – IV</b>	4	-	4
A80542	Ad hoc and Sensor Networks			
A80550	Storage Area Networks			
A80543	Database Security			
A80439	Embedded Systems			
A80087	Industry Oriented Mini Project	-	-	2
A80089	Seminar	-	6	2
A80088	Project Work	-	15	10
A80090	Comprehensive Viva	-	-	2
	<b>Total</b>	<b>12</b>	<b>21</b>	<b>28</b>

**Note:** All End Examinations (Theory and Practical) are of three hours duration.

**T-Tutorial L – Theory P – Practical D-Drawing C – Credits**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem**

<b>L</b>	<b>T/P/D</b>	<b>C</b>
<b>4</b>	<b>-/-</b>	<b>4</b>

**(A70517) LINUX PROGRAMMING****Objectives:**

- To understand and make effective use of Linux utilities and Shell scripting language (bash) to solve Problems.
- To implement in C some standard Linux utilities such as ls,mv,cp etc.using system calls.
- To develop the skills necessary for systems programming including file system programming, process and signal management, and interprocess communication.
- To develop the basic skills required to write network programs using Sockets.

**UNIT- I**

Linux Utilities-File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities.

Sed-Scripts, Operation, Addresses, Commands, Applications, awk-Execution, Fields and Records, Scripts, Operation, Patterns, Actions, Associative Arrays, String and Mathematical functions, System commands in awk, Applications.

Shell programming with Bourne again shell(bash)- Introduction, shell responsibilities, pipes and Redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts.

**UNIT- II**

Files and Directories- File Concept, File types, File System Structure,file metadata-Inodes, kernel support for files, system calls for file I/O operations-open, creat, read, write, close, lseek, dup2,file status information-stat family, file and record locking- fcntl function, file permissions - chmod, fchmod,file ownership-chown,lchown, fchown, links-soft links and hard links – symlink, link, unlink.

Directories-Creating, removing and changing Directories-mkdir, rmdir, chdir, obtaining current working directory-getcwd, Directory contents, Scanning Directories-opendir, readdir, closedir, rewinddir functions.

**UNIT- III**

Process – Process concept, Layout of a C program image in main

memory, Process environment-environment list, environment variables, getenv, setenv, Kernel support for process, process identification, process control - process creation, replacing a process image, waiting for a process, process termination, zombie process, orphan process, system call interface for process management-fork, vfork, exit, wait, waitpid, exec family, Process Groups, Sessions and Controlling Terminal, Differences between threads and processes.

Signals – Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise, alarm, pause, abort, sleep functions.

#### **UNIT- IV**

Interprocess Communication - Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, pipes-creation, IPC between related processes using unnamed pipes, FIFOs-creation, IPC between unrelated processes using FIFOs(Named pipes), differences between unnamed and named pipes, popen and pclose library functions.

Message Queues- Kernel support for messages, APIs for message queues, client/server example.

Semaphores-Kernel support for semaphores, APIs for semaphores, file locking with semaphores.

#### **UNIT- V**

Shared Memory- Kernel support for shared memory, APIs for shared memory, shared memory example.

Sockets- Introduction to Berkeley Sockets, IPC over a network, Client-Server model, Socket address structures (Unix domain and Internet domain), Socket system calls for connection oriented protocol and connectionless protocol, example-client/server programs-Single Server-Client connection, Multiple simultaneous clients, Socket options-setsockopt and fcntl system calls, Comparison of IPC mechanisms.

#### **TEXT BOOKS:**

1. Unix System Programming using C++, T.Chan, PHI.
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH.
3. Unix Network Programming , W.R.Stevens, PHI.

#### **REFERENCE BOOKS:**

1. Beginning Linux Programming, 4<sup>th</sup> Edition, N.Matthew, R.Stones, Wrox, Wiley India Edition.
2. Unix for programmers and users, 3<sup>rd</sup> Edition, Graham Glass, King Ables, Pearson.

3. System Programming with C and Unix, A.Hoover, Pearson.
4. Unix System Programming, Communication, Concurrency and Threads, K.A.Robbins and S.Robbins, Pearson Education.
5. Unix shell Programming, S.G.Kochan and P.Wood,3<sup>rd</sup> edition, Pearson Education.
6. Shell Scripting, S.Parker, Wiley India Pvt. Ltd.
7. Advanced Programming in the Unix Environment,2<sup>nd</sup> edition, W.R.Stevens and S.A.Rago, Pearson Education.
8. Unix and Shell programming, B.A.Forouzan and R.F.Gilberg, Cengage Learning.
9. Linux System Programming, Robert Love, O'Reilly, SPD.
10. C Programming Language, Kernighan and Ritchie, PHI

**Outcomes:**

- Work confidently in Linux environment.
- Work with shell script to automate different tasks as Linux administration.



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>IV Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A70530) DESIGN PATTERNS****Objectives:**

- Understand the design patterns that are common in software applications.
- Understand how these patterns are related to Object Oriented design.

**UNIT-I**

Introduction: What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

**UNIT-II**

A Case Study: Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary.

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

**UNIT-III**

Structural Pattern Part-I: Adapter, Bridge, Composite.

Structural Pattern Part-II: Decorator, façade, Flyweight, Proxy.

**UNIT-IV**

Behavioral Patterns Part-I: Chain of Responsibility, Command, Interpreter, Iterator.

Behavioral Patterns Part-II: Mediator, Memento, Observer.

**UNIT-V**

Behavioral Patterns Part-II (cont'd): State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns.

What to Expect from Design Patterns, A Brief History, The Pattern Community An Invitation, A Parting Thought.

**TEXT BOOK:**

1. Design Patterns By Erich Gamma, Pearson Education

**REFERENCE BOOKS :**

1. Pattern's in JAVA Vol-I By Mark Grand, Wiley DreamTech.

2. Pattern's in JAVA Vol-II By Mark Grand, Wiley DreamTech.
3. JAVA Enterprise Design Patterns Vol-III By Mark Grand, Wiley DreamTech.
4. Head First Design Patterns By Eric Freeman-Oreilly-spd.
5. Peeling Design Patterns, Prof. Meda Srinivasa Rao, Narsimha Karumanchi, CareerMonk Publications.
6. Design Patterns Explained By Alan Shalloway, Pearson Education.
7. Pattern Oriented Software Architecture, F.Buschmann&others, John Wiley & Sons.

**Outcomes:**

- Ability to understand and apply common design patterns to incremental / iterative development.
- Ability to identify appropriate patterns for design of given problem.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem**

L	T/P/D	C
4	-/-	4

**(A70520) DATA WAREHOUSING AND DATA MINING****Objectives:**

Study data warehouse principles and its working learn data mining concepts understand association rules mining. Discuss classification algorithms learn how data is grouped using clustering techniques.

**UNIT-I**

**Data warehouse:** Introduction to Data warehouse, Difference between operational database systems and data warehouses, Data warehouse Characteristics, Data warehouse Architecture and its Components, Extraction-Transformation-Loading, Logical(Multi-Dimensional), Data Modeling, Schema Design, Star and Snow-Flake Schema, Fact Consultation, Fact Table, Fully Addictive, Semi-Addictive, Non Addictive Measures; Fact-Less-Facts, Dimension Table Characteristics; OLAP Cube, OLAP Operations, OLAP Server Architecture-ROLAP, MOLAP and HOLAP.

**UNIT-II**

**Introduction to Data Mining:** Introduction, What is Data Mining, Definition, KDD, Challenges, Data Mining Tasks, Data Preprocessing, Data Cleaning, Missing data, Dimensionality Reduction, Feature Subset Selection, Discretization and Binaryzation, Data Transformation; Measures of Similarity and Dissimilarity- Basics.

**UNIT-III**

**Association Rules:** Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation; APRIORI Algorithm, The Partition Algorithms, FP-Growth Algorithms, Compact Representation of Frequent Item Set- Maximal Frequent Item Set, Closed Frequent Item Set.

**UNIT-IV**

**Classification:** Problem Definition, General Approaches to solving a classification problem , Evaluation of Classifiers , Classification techniques, Decision Trees-Decision tree Construction , Methods for Expressing attribute test conditions, Measures for Selecting the Best Split, Algorithm for Decision tree Induction ; Naive-Bayes Classifier, Bayesian Belief Networks; K- Nearest neighbor classification-Algorithm and Characteristics.

**UNIT-V**

**Clustering:** Problem Definition, Clustering Overview, Evaluation of Clustering Algorithms, Partitioning Clustering-K-Means Algorithm, K-Means Additional

issues, PAM Algorithm; Hierarchical Clustering-Agglomerative Methods and divisive methods, Basic Agglomerative Hierarchical Clustering Algorithm, Specific techniques, Key Issues in Hierarchical Clustering, Strengths and Weakness; Outlier Detection.

**TEXT BOOKS:**

- 1) Data Mining- Concepts and Techniques- Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition, 2006.
- 2) Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbanch, Pearson Education.

**REFERENCE BOOKS:**

- 1) Data Mining Techniques, Arun K Pujari, 3<sup>rd</sup> Edition, Universities Press.
- 2) Data Warehousing Fundamentals, Pualraj Ponnaiah, Wiley Student Edition.
- 3) The Data Warehouse Life Cycle Toolkit – Ralph Kimball, Wiley Student Edition.
- 4) Data Mining, Vikaram Pudi, P Radha Krishna, Oxford University Press

**Outcomes:**

- Student should be able to understand why the data warehouse in addition to database systems.
- Ability to perform the preprocessing of data and apply mining techniques on it.
- Ability to identify the association rules, classification and clusters in large data sets.
- Ability to solve real world problems in business and scientific information using data mining

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

IV Year B.Tech. CSE-I Sem

**L T/P/D C****4 -/- 4****(A70519) CLOUD COMPUTING****Objectives:**

- To explain the evolving computer model called cloud computing.
- To introduce the various levels of services that can be achieved by cloud.
- To describe the security aspects in cloud.

**UNIT- I**

**Systems Modeling, Clustering and Virtualization:** Distributed System Models and Enabling Technologies, Computer Clusters for Scalable Parallel Computing, Virtual Machines and Virtualization of Clusters and Data centers.

**UNIT- II**

**Foundations:** Introduction to Cloud Computing, Migrating into a Cloud, Enriching the 'Integration as a Service' Paradigm for the Cloud Era, The Enterprise Cloud Computing Paradigm.

**UNIT- III**

**Infrastructure as a Service (IAAS) & Platform and Software as a Service (PAAS / SAAS):** Virtual machines provisioning and Migration services, On the Management of Virtual machines for Cloud Infrastructures, Enhancing Cloud Computing Environments using a cluster as a Service, Secure Distributed Data Storage in Cloud Computing.

Aneka, Comet Cloud, T-Systems', Workflow Engine for Clouds, Understanding Scientific Applications for Cloud Environments.

**UNIT- IV**

**Monitoring, Management and Applications:** An Architecture for Federated Cloud Computing, SLA Management in Cloud Computing, Performance Prediction for HPC on Clouds, Best Practices in Architecting Cloud Applications in the AWS cloud, Building Content Delivery networks using Clouds, Resource Cloud Mashups.

**UNIT- V**

**Governance and Case Studies:** Organizational Readiness and Change management in the Cloud age, Data Security in the Cloud, Legal Issues in Cloud computing, Achieving Production Readiness for Cloud Services.

**TEXT BOOKS:**

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.

2. Distributed and Cloud Computing, Kai Hwang, Geoffery C.Fox, Jack J.Dongarra, Elsevier, 2012.

**REFERENCE BOOKS:**

1. Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill, rp2011.
2. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010.
3. Cloud Computing: Implementation, Management and Security, John W. Rittinghouse, James F.Ransome, CRC Press, rp2012.
4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O'Reilly, SPD, rp2011.
5. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

**Outcomes:**

- Ability to understand the virtualization and cloud computing concepts.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem****L T/P/D C****4 -/-/ 4****(A70540) SOFTWARE PROJECT MANAGEMENT****(Elective- I)****Objectives:**

The main goal of software development projects is to create a software system with a predetermined functionality and quality in a given time frame and with given costs. For achieving this goal, models are required for determining target values and for continuously controlling these values. This course focuses on principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience-based creation & improvement of models (process management). The goals of the course can be characterized as follows:

1. Understanding the specific roles within a software organization as related to project and process management
2. Understanding the basic infrastructure competences (e.g., process modeling and measurement)
3. Understanding the basic steps of project planning, project management, quality assurance, and process management and their relationships

**UNIT- I**

Conventional Software Management: The waterfall model, conventional software

Management performance. Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

**UNIT- II**

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

The old way and the new: The principles of conventional software engineering, principles of modern software management, transitioning to an iterative process.

**UNIT- III**

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering

artifacts, programmatic artifacts. Model based software architectures: A Management perspective and technical perspective.

#### **UNIT- IV**

Work Flows of the process: Software process workflows, Inter trans workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic status assessments. Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Interaction planning process, Pragmatic planning.

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.

Process Automation : Automation Building Blocks, The Project Environment.

#### **UNIT- V**

Project Control and Process instrumentation: The server care Metrics, Management indicators, quality indicators, life cycle expectations pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminants, Example.

Future Software Project Management: Modern Project Profiles Next generation

Software economics, modern Process transitions.

Case Study : The Command Center Processing and Display System- Replacement(CCPDS-R).

#### **TEXT BOOKS:**

1. Software Project Management, Walker Royce, Pearson Education.
2. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, Tata McGraw Hill.

#### **REFERENCE BOOKS:**

1. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006
2. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly, 2007
3. Software Engineering Project Management, Richard H. Thayer & Edward Yourdon, second edition, Wiley India, 2004.
4. Agile Project Management, Jim Highsmith, Pearson education, 2004
5. The art of Project management, Scott Berkun, O'Reilly, 2005.
6. Software Project Management in Practice, Pankaj Jalote, Pearson Education, 2002.



**Outcomes:**

- Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- Compare and differentiate organization structures and project structures.
- Implement a project to manage project schedule, expenses and resources with the application of suitable project management tools.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem****L T/P/D C****4 -/- 4****(A70532) IMAGE PROCESSING AND PATTERN RECOGNITION****(Elective - I)****Objectives:**

- Adequate background knowledge about image processing and pattern recognition
- Practical knowledge and skills about image processing and pattern recognition tools
- Necessary knowledge to design and implement a prototype of an image processing and pattern recognition *application*.

**UNIT – I**

Fundamental steps of image processing, components of an image processing of system. The image model and image acquisition, sampling and quantization, relationship between pixels, distance functions, scanner.

Statistical and spatial operations, Intensity functions transformations, histogram processing, smoothing & sharpening – spatial filters Frequency domain filters, homomorphic filtering, image filtering & restoration. Inverse and weiner filtering, FIR weiner filter, Filtering using image transforms, smoothing splines and interpolation.

**UNIT – II**

Morphological and other area operations, basic morphological operations, opening and closing operations, dilation erosion, Hit or Miss transform, morphological algorithms, extension to grey scale images.

Segmentation and Edge detection region operations, basic edge detection, second order detection, crack edge detection, gradient operators, compass and Laplace operators, edge linking and boundary detection, thresholding, region based segmentation, segmentation by morphological watersheds.

**UNIT –III**

Image compression: Types and requirements, statistical compression, spatial compression, contour coding, quantizing compression, image data compression-predictive technique, pixel coding, transfer coding theory, lossy and lossless predictive type coding, Digital Image Water marking.

**UNIT –IV**

Representation and Description: Chain codes, Polygonal approximation, Signature Boundary Segments, Skeltons, Boundary Descriptors, Regional Descriptors, Relational Descriptors, Principal components for Description,

Relational Descriptors

#### **UNIT- V**

**Pattern Recognition Fundamentals:** Basic Concepts of pattern recognition, Fundamental problems in pattern recognition system, design concepts and methodologies, example of automatic pattern recognition systems, a simple automatic pattern recognition model

**Pattern classification:** Pattern classification by distance function: Measures of similarity, Clustering criteria, K-means algorithm, Pattern classification by likelihood function: Pattern classification as a Statistical decision problem, Bayes classifier for normal patterns.

#### **TEXT BOOKS**

1. Digital Image Processing Third edition, Pearson Education, Rafael C. Gonzalez, Richard E. Woods.
2. Pattern recognition Principles: Julius T. Tou, and Rafel C. Gonzalez, Addison-Wesly Publishing Company.
3. Digital Image Processing, M.Anji Reddy, Y.Hari Shankar, BS Publications.

#### **REFERENCE BOOKS:**

1. Image Processing, Analysis and Machine Vision, Second Edition, Milan Sonka, Vaclav Hlavac and Roger Boyle. Thomson learning
2. Digital Image Processing – William k. Prattl –John Wiley edition.
3. Fundamentals of digital image processing – by A.K. Jain, PHI.
4. Pattern classification, Richard Duda, Hart and David strok John Wiley publishers.
5. Digital Image Processing, S.Jayaraman,S. Esakkirajan, T.Veerakumar, TMH.
6. Pattern Recognition, R.Shinghal, Oxford University Press.

#### **Outcomes:**

- Ability to apply computer algorithms to practical problems.
- Ability to image segmentation, reconstruction and restoration.
- Ability to perform the classification of patterns

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**(A70536) MOBILE COMPUTING****(Elective – I)****Objectives:**

- To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
- To understand the typical mobile networking infrastructure through a popular GSM protocol
- To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer
- To understand the database issues in mobile environments & data delivery models.
- To understand the ad hoc networks and related concepts.
- To understand the platforms and protocols used in mobile environment.

**UNIT- I**

**Introduction:** Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.

GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS, CSHSD, DECT.

**UNIT –II**

**(Wireless) Medium Access Control (MAC):** Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

**Mobile Network Layer:** IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

**UNIT –III**

**Mobile Transport Layer:** Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

**Database Issues:** Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

**UNIT- IV**

**Data Dissemination and Synchronization:** Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols

**UNIT- V**

**Mobile Ad hoc Networks (MANETs):** Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc. , Mobile Agents, Service Discovery.

**Protocols and Platforms for Mobile Computing :**WAP, Bluetooth, XML, J2ME, JavaCard, PalmOS, Windows CE, SymbianOS, Linux for Mobile Devices, Android.

**TEXT BOOKS:**

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2009.
2. Raj Kamal, "Mobile Computing", Oxford University Press, 2007, ISBN: 0195686772

**REFERENCE BOOKS:**

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2004.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002, ISBN 0471419028.
3. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, Oct 2004,

**Outcomes:**

- Able to think and develop new mobile application.
- Able to take any new technical issue related to this new paradigm and come up with a solution(s).
- Able to develop new ad hoc network applications and/or algorithms/ protocols.
- Able to understand & develop any existing or new protocol related to mobile environment

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**(A70529) COMPUTER GRAPHICS****(Elective- I)****Objectives:**

- To make students understand about fundamentals of Graphics to enable them to design animated scenes for virtual object creations.
- To make the student present the content graphically.

**UNIT- I**

**Introduction:** Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

**Output primitives:** Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

**UNIT- II**

**2-D Geometrical transforms:** Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

**2-D Viewing:** The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.

**UNIT- III**

**3-D Object representation:** Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces, sweep representations, octrees BSP Trees,

**3-D Geometric transformations:** Translation, rotation, scaling, reflection and shear transformations, composite transformations, 3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

**UNIT- IV**

**Visible surface detection methods:** Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods

**Illumination Models and Surface rendering Methods:** Basic illumination

models, polygon rendering methods

#### **UNIT- V**

**Computer animation:** Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications

#### **TEXT BOOKS:**

1. "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson education.
2. "Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc Graw hill edition.

#### **REFERENCE BOOKS:**

1. "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.
2. "Procedural elements for Computer Graphics", David F Rogers, Tata Mc Graw hill, 2nd edition.
3. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
4. "Principles of Computer Graphics", Shalini, Govil-Pai, Springer.
5. "Computer Graphics", Steven Harrington, TMH
6. Computer Graphics, F.S.Hill, S.M.Kelley, PHI.
7. Computer Graphics, P.Shirley, Steve Marschner & Others, Cengage Learning.
8. Computer Graphics & Animation, M.C.Trivedi, Jaico Publishing House.
9. An Integrated Introduction to Computer Graphics and Geometric Modelling, R.Goldman, CRC Press, Taylor&Francis Group.
10. Computer Graphics, Rajesh K.Maurya, Wiley India.

#### **Outcomes:**

- Students can animate scenes entertainment.
- Will be able work in computer aided design for content presentation..
- Better analogy data with pictorial representation.

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**(A70352) OPERATIONS RESEARCH****(Elective-I)****Objectives:**

- To introduce the methods of Operations Research.
- Emphasize the mathematical procedures of non linear programming search techniques.
- Introduce advanced topics such as Probabilistic models and dynamic programming.

**UNIT – I**

Development – Definition– Characteristics and Phases – Types of models – Operations Research models – applications.

**Allocation:** Linear Programming Problem Formulation – Graphical solution – Simplex method – Artificial variables techniques: Two–phase method, Big-M method.

**UNIT – II**

**Transportation Problem** – Formulation – Optimal solution, unbalanced transportation problem – Degeneracy.

**Assignment problem** – Formulation – Optimal solution - Variants of Assignment Problem- Traveling Salesman problem.

**UNIT – III**

**Sequencing** – Introduction – Flow –Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines

**Replacement:** Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely- Group Replacement.2

**UNIT – IV**

**Theory of Games:** Introduction –Terminology– Solution of games with saddle points and without saddle points- 2 x 2 games – dominance principle – m x 2 & 2 x n games -graphical method.

**Inventory:** Introduction – Single item, Deterministic models – Purchase inventory models with one price break and multiple price breaks –Stochastic models – demand may be discrete variable or continuous variable – Single Period model and no setup cost.



**UNIT – V**

**Waiting Lines:** Introduction – Terminology-Single Channel – Poisson arrivals and Exponential Service times – with infinite population and finite population models– Multichannel – Poisson arrivals and exponential service times with infinite population.

**Dynamic Programming:** Introduction – Terminology- Bellman’s Principle of Optimality – Applications of dynamic programming- shortest path problem – linear programming problem.

**Simulation:** Introduction, Definition, types of simulation models, Steps involved in the simulation process- Advantages and disadvantages- applications of simulation to queuing and inventory.

**TEXT BOOK :**

1. Operations Research /J.K.Sharma 4e. /MacMilan
2. Introduction to O.R/Hillier & Libermann/TMH

**REFERENCE BOOKS :**

1. Introduction to O.R /Taha/PHI
2. Operations Research/ NVS Raju/ SMS Education/3<sup>rd</sup> Revised Edition
3. Operations Research /A.M.Natarajan, P.Balasubramaniam, A. Tamilarasi/Pearson Education.
4. Operations Research / Wagner/ PHI Publications.
5. Operations Research/M.V. Durga Prasad, K, Vijaya Kumar Reddy, J. Suresh Kumar/ Cengage Learning.

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**(A70534) MACHINE LEARNING****(Elective – II)****Objectives:**

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.

**UNIT – I**

**Introduction:** An illustrative learning task, and a few approaches to it. What is known from algorithms? Theory, Experiment. Biology. Psychology.

**Concept Learning:** Version spaces. Inductive Bias. Active queries. Mistake bound/ PAC model. basic results. Overview of issues regarding data sources, success criteria.

**UNIT –II**

**Decision Tree Learning:** - Minimum Description Length Principle. Occam's razor. Learning with active queries

**Neural Network Learning:** Perceptions and gradient descent back propagation.

**UNIT –III**

**Sample Complexity and Over fitting:** Errors in estimating means. Cross Validation and jackknifing VC dimension. Irrelevant features: Multiplicative rules for weight tuning.

**Bayesian Approaches:** The basics Expectation Maximization. Hidden Markov Models

**UNIT—IV**

**Instance-based Techniques:** Lazy vs. eager generalization. K nearest neighbor, case- based reasoning.

**UNIT—V**

**Genetic Algorithms:** Different search methods for induction - Explanation-based Learning: using prior knowledge to reduce sample complexity.

**TEXT BOOKS:**

1. Tom Michel, Machine Learning, McGraw Hill, 1997

2. Trevor Hastie, Robert Tibshirani & Jerome Friedman. The Elements of Statistical Learning, Springer Verlag, 2001

**REFERENCE BOOKS:**

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.
2. Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc.,2001
3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995

**Outcomes:**

- Student should be able to understand the basic concepts such as decision trees and neural networks.
- Ability to formulate machine learning techniques to respective problems.
- Apply machine learning algorithms to solve problems of moderate complexity

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem****L T/P/D C****4 -/- 4****(A70539) SOFT COMPUTING****(Elective – II)****Objectives:**

- To give students knowledge of soft computing theories fundamentals, i.e. Fundamentals of artificial and neural networks, fuzzy sets and fuzzy logic and genetic algorithms.

**UNIT-I**

AI Problems and Search: AI problems, Techniques, Problem Spaces and Search, Heuristic Search Techniques- Generate and Test, Hill Climbing, Best First Search Problem reduction, Constraint Satisfaction and Means End Analysis. Approaches to Knowledge Representation- Using Predicate Logic and Rules.

**UNIT-II**

Artificial Neural Networks: Introduction, Basic models of ANN, important terminologies, Supervised Learning Networks, Perceptron Networks, Adaptive Linear Neuron, Backpropagation Network. Associative Memory Networks. Training Algorithms for pattern association, BAM and Hopfield Networks.

**UNIT-III**

Unsupervised Learning Network- Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks, Adaptive Resonance Theory Networks. Special Networks-Introduction to various networks.

**UNIT-IV**

Introduction to Classical Sets ( crisp Sets)and Fuzzy Sets- operations and Fuzzy sets. Classical Relations -and Fuzzy Relations- Cardinality, Operations, Properties and composition. Tolerance and equivalence relations.

Membership functions- Features, Fuzzification, membership value assignments, Defuzzification.

**UNIT-V**

Fuzzy Arithmetic and Fuzzy Measures, Fuzzy Rule Base and Approximate Reasoning Fuzzy Decision making

Fuzzy Logic Control Systems. Genetic Algorithm- Introduction and basic operators and terminology. Applications: Optimization of TSP, Internet Search Technique

**TEXT BOOKS:**

1. Principles of Soft Computing- S N Sivanandam, S N Deepa, Wiley India, 2007.
2. Soft Computing and Intelligent System Design -Fakhreddine O Karray, Clarence D Silva, Pearson Edition, 2004.

**REFERENCE BOOKS:**

1. Artificial Intelligence and SoftComputing- Behavioural and Cognitive Modelling of the Human Brain- Amit Konar, CRC press, Taylor and Francis Group.
2. Artificial Intelligence – Elaine Rich and Kevin Knight, TMH, 1991, rp2008.
3. Artificial Intelligence – Patric Henry Winston – Third Edition, Pearson Education.
4. A first course in Fuzzy Logic-Hung T Nguyen and Elbert A Walker, CRC. Press Taylor and Francis Group.
5. Artificial Intelligence and Intelligent Systems, N.P.Padhy, Oxford Univ. Press.

**Outcomes:**

- Student can able to building intelligent systems through soft computing techniques.
- Student should be able to understand the concept of artificial neural networks, fuzzy arithmetic and fuzzy logic with their day to day applications.

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**(A70533) INFORMATION RETRIEVAL SYSTEMS****(Elective – II)****Objectives:**

- To learn the different models for information storage and retrieval
- To learn about the various retrieval utilities
- To understand indexing and querying in information retrieval systems
- To expose the students to the notions of structured and semi structured data
- To learn about web search

**UNIT-I**

Introduction

Retrieval Strategies: Vector space model, Probabilistic retrieval strategies: Simple term weights, Non binary independence model Language Models.

**UNIT-II**

Retrieval Utilities: Relevance feedback, Clustering, N-grams, Regression analysis, Thesauri.

**UNIT-III**

Retrieval Utilities: Semantic networks, Parsing.

Cross-Language Information Retrieval: Introduction, Crossing the language barrier.

**UNIT-IV**

Efficiency: Inverted index, Query processing, Signature files, Duplicate document detection

**UNIT-V**

Integrating Structured Data and Text: A Historical progression, Information retrieval as a relational application, Semi-structured search using a relational schema.

Distributed Information Retrieval: A Theoretical model of distributed retrieval, Web search.

**TEXT BOOK:**

1. David A. Grossman, Ophir Frieder, Information Retrieval – Algorithms and Heuristics, Springer, 2<sup>nd</sup> Edition (Distributed by Universities Press), 2004.

**REFERENCE BOOKS:**

1. Gerald J Kowalski, Mark T Maybury. Information Storage and Retrieval Systems, Springer, 2000.
2. Soumen Chakrabarti, Mining the Web : Discovering Knowledge from Hypertext Data, Morgan-Kaufmann Publishers, 2002.
3. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, An Introduction to Information Retrieval, Cambridge University Press, Cambridge, England, 2009.

**Outcomes:**

- Possess the ability to store and retrieve textual documents using appropriate models.
- Possess the ability to use the various retrieval utilities for improving search.
- Possess an understanding of indexing and compressing documents to improve space and time efficiency.
- Possess the skill to formulate SQL like queries for unstructured data.
- Understand issues in web search.

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**(A70526) ARTIFICIAL INTELLIGENCE****(ELECTIVE- II)****Objectives:**

- To learn the difference between optimal reasoning vs human like reasoning
- To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities
- To learn different knowledge representation techniques
- To understand the applications of AI: namely Game Playing, Theorem Proving, Expert Systems, Machine Learning and Natural Language Processing

**UNIT-I**

Introduction, History, Intelligent Systems, Foundations of AI, Sub areas of AI, Applications.

Problem Solving - State-Space Search and Control Strategies: Introduction, General Problem Solving, Characteristics of Problem, Exhaustive Searches, Heuristic Search Techniques, Iterative-Deepening A\*, Constraint Satisfaction. Game Playing, Bounded Look-ahead Strategy and use of Evaluation Functions, Alpha-Beta Pruning

**UNIT-II**

Logic Concepts and Logic Programming: Introduction, Propositional Calculus, Propositional Logic, Natural Deduction System, Axiomatic System, Semantic Tableau System in Propositional Logic, Resolution Refutation in Propositional Logic, Predicate Logic, Logic Programming.

Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR, Knowledge Representation using Frames.

**UNIT-III**

Expert System and Applications: Introduction, Phases in Building Expert Systems, Expert System Architecture, Expert Systems Vs Traditional Systems, Truth Maintenance Systems, Application of Expert Systems, List of Shells and Tools.

Uncertainty Measure - Probability Theory: Introduction, Probability Theory, Bayesian Belief Networks, Certainty Factor Theory, Dempster-Shafer Theory.



**UNIT-IV**

Machine-Learning Paradigms: Introduction. Machine Learning Systems. Supervised and Unsupervised Learning. Inductive Learning. Learning Decision Trees (Text Book 2), Deductive Learning. Clustering, Support Vector Machines.

Artificial Neural Networks: Introduction, Artificial Neural Networks, Single-Layer Feed-Forward Networks, Multi-Layer Feed-Forward Networks, Radial-Basis Function Networks, Design Issues of Artificial Neural Networks, Recurrent Networks.

**UNIT-V**

Advanced Knowledge Representation Techniques: Case Grammars, Semantic Web

Natural Language Processing: Introduction, Sentence Analysis Phases, Grammars and Parsers, Types of Parsers, Semantic Analysis, Universal Networking Knowledge.

**TEXT BOOKS:**

1. Saroj Kaushik. Artificial Intelligence. Cengage Learning, 2011.
2. Russell, Norvig: Artificial intelligence, A Modern Approach, Pearson Education, Second Edition. 2004.

**REFERENCE BOOK:**

1. Rich, Knight, Nair: Artificial intelligence, Tata McGraw Hill, Third Edition 2009.

**Outcomes:**

- Possess the ability to formulate an efficient problem space for a problem expressed in English.
- Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
- Possess the skill for representing knowledge using the appropriate technique.
- Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems, Machine Learning and Natural Language Processing.

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**(A70528) COMPUTER FORENSICS****(Elective-II)****Objectives:**

- A brief explanation of the objective is to provide digital evidences which are obtained from digital media.
- In order to understand the objectives of computer forensics, first of all, people have to recognize the different roles computer plays in a certain crime.
- According to a snippet from the United States Security Service, the functions computer has in different kinds of crimes.

**UNIT – I**

**Computer Forensics Fundamentals:** What is Computer Forensics?, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps taken by Computer Forensics Specialists

**Types of Computer Forensics Technology:** Types of Military Computer Forensic Technology, Types of Law Enforcement – Computer Forensic Technology – Types of Business Computer Forensic Technology

**Computer Forensics Evidence and Capture:** Data Recovery Defined – Data Back-up and Recovery – The Role of Back-up in Data Recovery – The Data-Recovery Solution

**UNIT – II**

**Evidence Collection and Data Seizure:** Why Collect Evidence? Collection Options – Obstacles – Types of Evidence – The Rules of Evidence – Volatile Evidence – General Procedure – Collection and Archiving – Methods of Collection – Artifacts – Collection Steps – Controlling Contamination: The Chain of Custody

**Duplication and Preservation of Digital Evidence:** Preserving the Digital Crime Scene – Computer Evidence Processing Steps – Legal Aspects of Collecting and Preserving Computer Forensic Evidence

**Computer Image Verification and Authentication:** Special Needs of Evidential Authentication – Practical Consideration – Practical Implementation

**UNIT – III**

**Computer Forensics analysis and validation:** Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions

**Network Forensics:** Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, using

network tools, examining the honeynet project.

**Processing Crime and Incident Scenes:** Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtaining a digital hash, reviewing a case

#### **UNIT – IV**

**Current Computer Forensic tools:** evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software

**E-Mail Investigations:** Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools

**Cell phone and mobile device forensics:** Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

#### **UNIT – V**

**Working with Windows and DOS Systems:** understanding file systems, exploring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS startup tasks, virtual machines.

#### **TEXT BOOKS:**

1. Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi.
2. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning

#### **REFERENCE BOOKS:**

1. Real Digital Forensics by Keith J. Jones, Richard Bejtlich, Curtis W. Rose, Addison- Wesley Pearson Education
2. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brian Jenkinson, Springer International edition.
3. Computer Evidence Collection & Presentation by Christopher L.T. Brown, Firewall Media.
4. Homeland Security, Techniques & Technologies by Jesus Mena, Firewall Media.
5. Software Forensics Collecting Evidence from the Scene of a Digital Crime by Robert M.Slade, TMH 2005
6. Windows Forensics by Chad Steel, Wiley India Edition.

#### **Outcomes:**

- Students will understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.
- It gives an opportunity to students to continue their zeal in research in computer forensics.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>IV Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	-	-/3/-	2

**(A70596) LINUX PROGRAMMING LAB****Objectives:**

- To write shell scripts to solve problems.
- To implement some standard Linux utilities such as ls,cp etc using system calls.
- To develop network-based applications using C.

**List of sample problems:****Note: Use Bash for Shell scripts.**

1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
2. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
3. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
4. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
6. Write a shell script to list all of the directory files in a directory.
7. Write a shell script to find factorial of a given integer.
8. Write an awk script to count the number of lines in a file that do not contain vowels.
9. Write an awk script to find the number of characters, words and lines in a file.
10. Write a C program that makes a copy of a file using standard I/O and system calls.
11. Implement in C the following Linux commands using System calls  
a). cat            b) mv
12. Write a C program to list files in a directory.
13. Write a C program to emulate the Unix ls -l command.
14. Write a C program to list for every file in a directory, its inode number and file name.
15. Write a C program that redirects standard output to a file.Ex: ls > f1.
16. Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen.

17. Write a C program to create a Zombie process.
18. Write a C program that illustrates how an orphan is created.
19. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex:- ls -l | sort
20. Write C programs that illustrate communication between two unrelated processes using named pipe(FIFO File).
21. Write a C program in which a parent writes a message to a pipe and the child reads the message.
22. Write a C program (sender.c) to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.
23. Write a C program (receiver.c) that receives the messages (from the above message queue as specified in (22)) and displays them.
24. Write a C program that illustrates suspending and resuming processes using signals.
25. Write Client and Server programs in C for connection oriented communication between Server and Client processes using Unix Domain sockets to perform the following:  
Client process sends a message to the Server Process.The Server receives the message,reverses it and sends it back to the Client.The Client will then display the message to the standard output device.
26. Write Client and Server programs in C for connection oriented communication between Server and Client processes using Internet Domain sockets to perform the following:  
Client process sends a message to the Server Process.The Server receives the message,reverses it and sends it back to the Client.The Client will then display the message to the standard output device.
27. Write C programs to perform the following:  
One process creates a shared memory segment and writes a message("Hello") into it.Another process opens the shared memory segment and reads the message(ie. "Hello").It will then display the message("Hello") to standard output device.

**TEXT BOOKS:**

1. Beginning Linux Programming, 4<sup>th</sup> Edition, N.Matthew, R.Stones,Wrox, Wiley India Edition.
2. Advanced Unix Programming, N.B.Venkateswarulu, BS Publications.
3. Unix and Shell Programming, M.G. Venkatesh Murthy, Pearson Education.
4. Unix Shells by Example, 4th Edition, Ellie Quigley, Pearson Education.
5. Sed and Awk, O.Dougherty&A.Robbins,2<sup>nd</sup> edition, SPD.

**Outcomes:**

- Ability to understand the Linux environment
- Ability to perform the file management and multiple tasks using shell scripts in Linux environment

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-I Sem****L T/P/D C****- -3/- 2****(A70595) DATA WAREHOUSING AND MINING LAB****Objectives:**

Learn how to build a data warehouse and query it (using open source tools like Pentaho Data Integration and Pentaho Business Analytics), Learn to perform data mining tasks using a data mining toolkit (such as open source WEKA), Understand the data sets and data preprocessing, Demonstrate the working of algorithms for data mining tasks such as association rule mining, classification, clustering and regression, Exercise the data mining techniques with varied input values for different parameters.

**UNIT-1. Build Data Warehouse and Explore WEKA**

- A. Build a Data Warehouse/Data Mart (using open source tools like Pentaho Data Integration tool, Pentaho Business Analytics; or other data warehouse tools like Microsoft-SSIS, Informatica, Business Objects, etc.).
  - (i). Identify source tables and populate sample data
  - (ii). Design multi-dimensional data models namely Star, snowflake and Fact constellation schemas for any one enterprise (ex. Banking, Insurance, Finance, Healthcare, Manufacturing, Automobile, etc.).
  - (iii). Write ETL scripts and implement using data warehouse tools
  - (iv). Perform various OLAP operations such as slice, dice, roll up, drill up and pivot
  - (v). Explore visualization features of the tool for analysis like identifying trends etc.
- B. Explore WEKA Data Mining/Machine Learning Toolkit
  - (i). Downloading and/or installation of WEKA data mining toolkit,
  - (ii). Understand the features of WEKA toolkit such as Explorer, Knowledge Flow interface, Experimenter, command-line interface.
  - (iii). Navigate the options available in the WEKA (ex. Select attributes panel, Preprocess panel, Classify panel, Cluster panel, Associate panel and Visualize panel)
  - (iv). Study the arff file format
  - (v). Explore the available data sets in WEKA.
  - (vi). Load a data set (ex. Weather dataset, Iris dataset, etc.)
  - (vii). Load each dataset and observe the following:
    - i. List the attribute names and they types

- ii. Number of records in each dataset
- iii. Identify the class attribute (if any)
- iv. Plot Histogram
- v. Determine the number of records for each class.
- vi. Visualize the data in various dimensions

**Unit 2 Perform data preprocessing tasks and Demonstrate performing association rule mining on data sets**

- A. Explore various options available in Weka for preprocessing data and apply (like Discretization Filters, Resample filter, etc.) on each dataset
- B. Load each dataset into Weka and run Apriori algorithm with different support and confidence values. Study the rules generated.
- C. Apply different discretization filters on numerical attributes and run the Apriori association rule algorithm. Study the rules generated. Derive interesting insights and observe the effect of discretization in the rule generation process.

**Unit 3 Demonstrate performing classification on data sets**

- A. Load each dataset into Weka and run Id3, J48 classification algorithm. Study the classifier output. Compute entropy values, Kappa statistic.
- B. Extract if-then rules from the decision tree generated by the classifier, Observe the confusion matrix and derive Accuracy, F-measure, TPrate, FPrate, Precision and Recall values. Apply cross-validation strategy with various fold levels and compare the accuracy results.
- C. Load each dataset into Weka and perform Naïve-bayes classification and k-Nearest Neighbour classification. Interpret the results obtained.
- D. Plot RoC Curves
- E. Compare classification results of ID3, J48, Naïve-Bayes and k-NN classifiers for each dataset, and deduce which classifier is performing best and poor for each dataset and justify.

**Unit 4 Demonstrate performing clustering on data sets**

- A. Load each dataset into Weka and run simple k-means clustering algorithm with different values of k (number of desired clusters). Study the clusters formed. Observe the sum of squared errors and centroids, and derive insights.
- B. Explore other clustering techniques available in Weka.
- C. Explore visualization features of Weka to visualize the clusters. Derive interesting insights and explain.

**Unit 5 Demonstrate performing Regression on data sets**

- A. Load each dataset into Weka and build Linear Regression model. Study the clusters formed. Use Training set option. Interpret the regression model and derive patterns and conclusions from the regression results.
- B. Use options cross-validation and percentage split and repeat running the Linear Regression Model. Observe the results and derive meaningful results.
- C. Explore Simple linear regression technique that only looks at one variable.

**Resource Sites:**

1. <http://www.pentaho.com/>
2. <http://www.cs.waikato.ac.nz/ml/weka/>

**Outcomes:**

- Ability to understand the various kinds of tools.
- Demonstrate the classification, clusters and etc. in large data sets

**DATA MINING LAB****Objectives:**

- To obtain practical experience using data mining techniques on real world data sets.
- Emphasize hands-on experience working with all real data sets.

**List of Sample Problems:**

Task 1: Credit Risk Assessment

**Description:**

The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.

To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.



2. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

**The German Credit Data:**

Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data.

In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer !)

A few notes on the German dataset

- DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
- owns\_telephone. German phone rates are much higher than in Canada so fewer people own telephones.
- foreign\_worker. There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.
- There are 20 attributes used in judging a loan applicant. The goal is the classify the applicant into one of two categories, good or bad.

**Subtasks: (Turn in your answers to the following tasks)**

1. List all the categorical (or nominal) attributes and the real-valued attributes separately. (5 marks)
2. What attributes do you think might be crucial in making the credit assessment ? Come up with some simple rules in plain English using your selected attributes. (5 marks)
3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training. (10 marks)
4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy? (10 marks)

5. Is testing on the training set as you did above a good idea? Why or Why not ? (10 marks)
6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what is cross-validation briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why? (10 marks)
7. Check to see if the data shows a bias against “foreign workers” (attribute 20), or “personal-status” (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka’s GUI Explorer. Did removing these attributes have any significant effect? Discuss. (10 marks)
8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.) (10 marks)
9. Sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifications equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)? (10 marks)
10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model? (10 marks)
11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase? (10 marks)
12. (Extra Credit): How can you convert a Decision Trees into “if-then-else rules”. Make up your own small Decision Tree consisting of 2-3

levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one ! Can you predict what attribute that might be in this dataset ? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR. (10 marks)

**Task Resources:**

- Mentor lecture on Decision Trees
- Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)
- Decision Trees (Source: Tan, MSU)
- Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)
- Weka resources:
  - Introduction to Weka (html version) (download ppt version)
  - Download Weka
  - Weka Tutorial
  - ARFF format
  - Using Weka from command line

**Task 2: Hospital Management System**

Data Warehouse consists Dimension Table and Fact Table.

REMEMBER The following

Dimension

The dimension object (Dimension):

- \_ Name
- \_ Attributes (Levels) , with one primary key
- \_ Hierarchies

One time dimension is must.

About Levels and Hierarchies

Dimension objects (dimension) consist of a set of levels and a set of hierarchies defined over those levels. The levels represent levels of aggregation. Hierarchies describe parent-child relationships among a set of levels.

For example, a typical calendar dimension could contain five levels. Two

hierarchies can be defined on these levels:

H1: YearL > QuarterL > MonthL > WeekL > DayL

H2: YearL > WeekL > DayL

The hierarchies are described from parent to child, so that Year is the parent of Quarter, Quarter the parent of Month, and so forth.

About Unique Key Constraints

When you create a definition for a hierarchy, Warehouse Builder creates an identifier key for each level of the hierarchy and a unique key constraint on the lowest level (Base Level)

Design a Hospital Management system data warehouse (TARGET) consists of Dimensions Patient, Medicine, Supplier, Time. Where measures are ' NO UNITS', UNIT PRICE.

Assume the Relational database (SOURCE) table schemas as follows

TIME (day, month, year),

PATIENT (patient\_name, Age, Address, etc.,)

MEDICINE ( Medicine\_Brand\_name, Drug\_name, Supplier, no\_units, Uinit\_Price, etc.,)

SUPPLIER :( Supplier\_name, Medicine\_Brand\_name, Address, etc.,)

If each Dimension has 6 levels, decide the levels and hierarchies, Assume the level names suitably.

Design the Hospital Management system data warehouse using all schemas. Give the example 4-D cube with assumption names.

**Outcomes:**

- Ability to add mining algorithms as a component to the exiting tools
- Ability to apply mining techniques for realistic data.

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**(A80014) MANAGEMENT SCIENCE****Objectives:**

This course is intended to familiarise the students with the framework for the managers and leaders available for understanding and making decisions relating to issues related organisational structure, production operations, marketing, Human resource Management, product management and strategy.

**UNIT -I:**

**Introduction to Management and Organisation:** Concepts of Management and organization- nature, importance and Functions of Management, Systems Approach to Management - Taylor's Scientific Management Theory – Fayal's Principles of Management – Maslow's theory of Hierarchy of Human Needs – Douglas McGregor's Theory X and Theory Y – Hertzberg Two Factor Theory of Motivation - Leadership Styles, Social responsibilities of Management. Designing Organisational Structures: Basic concepts related to Organisation - Departmentation and Decentralisation, Types and Evaluation of mechanistic and organic structures of organisation and suitability.

**UNIT -II:**

**Operations and Marketing Management:** Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement – Business Process Reengineering (BPR) - Statistical Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling, TQM, Six Sigma, Deming's contribution to quality. Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records – JIT System, Supply Chain Management, Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

**UNIT -III:**

**Human Resources Management (HRM):** Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating – Capability Maturity Model (CMM) Levels – Performance Management System.

**UNIT -IV:**

**Project Management (PERT/CPM):** Network Analysis, Programme

Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

**UNIT -V:**

**Strategic Management and Contemporary Strategic Issues:** Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

**TEXT BOOKS:**

1. Stoner, Freeman, Gilbert, *Management*, 6th Ed, Pearson Education, New Delhi, 2004
2. P. Vijaya Kumar, N. Appa Rao and Ashima B. Chhalill, Cengage Learning India Pvt Ltd, 2012.

**REFERENCE BOOKS:**

1. Kotler Philip and Keller Kevin Lane: *Marketing Management*, Pearson, 2012.
2. Koontz and Wehrich: *Essentials of Management*, McGraw Hill, 2012.
3. Thomas N. Duening and John M. Ivancevich *Management—Principles and Guidelines*, Biztantra, 2012.
4. Kanishka Bedi, *Production and Operations Management*, Oxford University Press, 2012.
5. Samuel C. Certo: *Modern Management*, 2012.
6. Schermerhorn, Capling, Poole and Wiesner: *Management*, Wiley, 2012.
7. Parnell: *Strategic Management*, Cengage, 2012.
8. Lawrence R Jauch, R. Gupta and William F. Glueck: *Business Policy and Strategic Management*, Frank Bros. 2012.
9. Aryasri: *Management Science*, McGraw Hill, 2012

**Outcomes:**

By the end of the course, the student will be in a position to

- Plan an organisational structure for a given context in the organisation
- carry out production operations through Work study
- understand the markets, customers and competition better and price the given products appropriately.
- ensure quality for a given product or service
- plan and control the HR function better
- plan, schedule and control projects through PERT and CPM
- evolve a strategy for a business or service organisation

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	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A80551) WEB SERVICES****(Elective – III)****Objectives:**

- To understand the details of web services technologies like WSDL, UDDI, SOAP
- To learn how to implement and deploy web service client and server
- To explore interoperability between different frameworks

**UNIT- I**

**Evolution and Emergence of Web Services** - Evolution of distributed computing, Core distributed computing technologies – client/server, CORBA, JAVA RMI, Microsoft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA).

**Introduction to Web Services** – The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

**Web Services Architecture** – Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication models, basic steps of implementing web services.

**UNIT- II**

**Fundamentals of SOAP** – SOAP Message Structure, SOAP encoding, Encoding of different data types, SOAP message exchange models, SOAP communication and messaging, Java and Axis, limitations of SOAP.

**UNIT- III**

**Describing Web Services** – WSDL – WSDL in the world of Web Services, Web Services life cycle, anatomy of WSDL definition document, WSDL bindings, WSDL Tools, limitations of WSDL.

**UNIT- IV**

**Discovering Web Services** – Service discovery, role of service discovery in a SOA, service discovery mechanisms, UDDI – UDDI registries, uses of UDDI Registry, Programming with UDDI, UDDI data structures, Publishing API, Publishing, searching and deleting information in a UDDI Registry, limitations of UDDI.

**UNIT- V**

**Web Services Interoperability** – Means of ensuring Interoperability, Overview of .NET, Creating a .NET client for an Axis Web Service, creating Java client for a Web service, Challenges in Web Services Interoperability.

**Web Services Security** – XML security frame work, Goals of Cryptography, Digital signature, Digital Certificate, XML Encryption.

**TEXT BOOK:**

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India.

**REFERENCE BOOKS:**

1. Java Web Service Architecture, James McGovern, Sameer Tyagi et al., Elsevier
2. Building Web Services with Java, 2<sup>nd</sup> Edition, S. Graham and others, Pearson Edn.
3. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly,SPD.
4. Web Services, G. Alonso, F. Casati and others, Springer.

**Outcomes:**

- Basic details of WSDL, UDDI, SOAP
- Implement WS client and server with interoperable systems



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	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A80538) SEMANTIC WEB AND SOCIAL NETWORKS****(Elective – III)****Objectives:**

- To learn Web Intelligence
- To learn Knowledge Representation for the Semantic Web
- To learn Ontology Engineering
- To learn Semantic Web Applications, Services and Technology
- To learn Social Network Analysis and semantic web

**UNIT- I**

Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of Today's Web, The Next Generation Web.

Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

**UNIT- II**

Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web –Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL),UML,XML/XML Schema.

Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping.

**UNIT- III**

Logic, Rule and Inference Engines. Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base.

**UNIT- IV**

XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods, What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks.

**UNIT- V**

Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

**TEXT BOOKS:**

1. Thinking on the Web - Berners Lee, Godel and Turing, Wiley interscience,2008.
2. Social Networks and the Semantic Web, Peter Mika, Springer,2007.

**REFERENCE BOOKS:**

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J.Davies, Rudi Studer, Paul Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers,(Taylor & Francis Group)
3. Information Sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
4. Programming the Semantic Web, T.Segaran, C.Evans, J.Taylor,O'Reilly, SPD.

**Outcomes:**

- Ability to understand and knowledge representation for the semantic web.
- Ability to create ontology.
- Ability to build a blogs and social networks.

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4	-/-	4

**(A80537) SCRIPTING LANGUAGES****(Elective – III)****Objectives:**

The course demonstrates an in depth understanding of the tools and the scripting languages necessary for design and development of applications dealing with Bio-information/ Bio-data. The instructor is advised to discuss examples in the context of Bio-data/ Bio-information application development.

**UNIT – I**

**Introduction to PERL and Scripting:** Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

**UNIT – II**

**Advanced perl:** Finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

**PHP Basics :** PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Data types, Variables, Constants, expressions, string interpolation, control structures, Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

**UNIT – III**

**Advanced PHP Programming:** PHP and Web Forms, Files, PHP Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World.

**UNIT - IV**

**TCL :** TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures , strings , patterns, files, Advance TCL-eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.

Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding , Perl-Tk.

#### **UNIT – V**

**Python:** Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling.

Integrated Web Applications in Python – Building Small, Efficient Python Web Systems, Web Application Framework.

#### **TEXT BOOKS:**

1. The World of Scripting Languages , David Barron, Wiley Publications.
2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL, 3<sup>rd</sup> Edition, Jason Gilmore, Apress Publications (Dream tech.).

#### **REFERENCE BOOKS:**

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware(Addison Wesley) Pearson Education.
2. Programming Python,M.Lutz,SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1,I.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.
6. Guide to Programming with Python, M.Dawson, Cengage Learning.
7. Perl by Example, E.Quigley, Pearson Education.
8. Programming Perl,Larry Wall, T.Christiansen and J.Orwant,O'Reilly, SPD.
9. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
10. PHP and MySQL by Example, E.Quigley, Prentice Hall(Pearson).
11. Perl Power, J.P.Flynt, Cengage Learning.
12. PHP Programming solutions, V.Vaswani, TMH.

#### **Outcomes:**

- Ability to understand the differences between scripting languages.
- Ability to apply your knowledge of the weaknesses of scripting languages to select implementation..
- Master an understanding of python especially the object oriented concepts.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-II Sem****L T/P/D C****4 -/- 4****(A 80547) MULTIMEDIA & RICH INTERNET APPLICATIONS****(Elective – III)****Objectives:**

This course aims to further develop students' competency in producing dynamic and creative graphic solutions for multimedia productions. It provides students with the basic concepts and techniques of interactive authoring. It also introduces students with the advanced scripting skills necessary for implementing highly interactive, rich internet applications using multimedia technologies and authoring tools. Students will develop aesthetic value and competencies in multimedia authoring. Artistic visual style and layout design are stressed, as well as the editing and integration of graphic images, animation, video and audio files. The course allows students to master industry-wide software and technologies to create highly interactive, rich internet applications.

**UNIT - I**

Fundamental concepts in Text and Image: Multimedia and hypermedia, World Wide Web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

**UNIT- II**

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

Multimedia Data Compression: Lossless compression algorithms, Lossy compression algorithms, Image compression standards.

**UNIT III**

Basic Video compression techniques, Case study: MPEG Video Coding I, Basic Audio compression techniques, Case study: MPEG Audio compression.

**Web 2.0** : What is web 2.0, Search, Content Networks, User Generated Content, Blogging, Social Networking, Social Media, Tagging, Social Marking, Rich Internet Applications, Web Services, Mashups, Location Based Services, XML, RSS, Atom, JSON, and VoIP, Web 2.0 Monetization and Business Models, Future of the Web.

**UNIT - IV**

**Rich Internet Applications(RIAs) with Adobe Flash** : Adobe Flash-Introduction, Flash Movie Development, Learning Flash with Hands-on

Examples, Publish your flash movie, Creating special effects with Flash, Creating a website splash screen, action script, web sources.

**Rich Internet Applications(RIAs) with Flex 3** - Introduction, Developing with Flex 3, Working with Components, Advanced Component Development, Visual Effects and Multimedia,

#### **UNIT - V**

**Ajax- Enabled Rich Internet Application** : Introduction, Traditional Web Applications vs Ajax Applications, Rich Internet Application with Ajax, History of Ajax, Raw Ajax example using xmlhttprequest object, Using XML, Creating a full scale Ajax Enabled application, Dojo ToolKit.

#### **TEXT BOOKS:**

1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHI Learning, 2004
2. Professional Adobe Flex 3, Joseph Balderson, Peter Ent, et al, Wrox Publications, Wiley India, 2009.
3. AJAX, Rich Internet Applications, and Web Development for Programmers, Paul J Deitel and Harvey M Deitel, Deitel Developer Series, Pearson Education.

#### **REFERENCE BOOKS:**

1. Multimedia Communications: Applications, Networks, Protocols and Standards, Fred Halsall, Pearson Education, 2001, rp 2005.
2. Multimedia Making it work, Tay Vaughan, 7<sup>th</sup> edition, TMH, 2008.
3. Introduction to multimedia communications and Applications, Middleware, Networks, K.R.Rao, Zoran, Dragored, Wiley India, 2006, rp. 2009.
4. Multimedia Computing, Communications & Applications, Ralf Steinmetz and Klara Nahrstedt, Pearson Education, 2004
5. Principles of Multimedia, Ranjan Parekh, TMH, 2006.
6. Multimedia in Action, James E.Shuman, Cengage Learning, 198, rp 2008.
7. Multimedia Systems design, Prabhat K. Andleigh, Kiran Thakrar, PHI, 1986.
8. Multimedia and Communications Technology, Steve Heath, Elsevier, 1999, rp 2003.
9. Adobe Flash CS3 Professional, Adobe press, Pearson Education, 2007.
10. Flash CS3 Professional Advanced, Russel Chun, Pearson Education, 2007.

11. Flash CS5, Chris Grover, O'Reilly, SPD, 2010.
12. SAMS Teach yourself Adobe flash CS3, Pearson Education, 2007.
13. Flex 4 Cookbook, Joshua Noble, et.al, O'Reilly,SPD 2010.
14. Flex3 – A beginner's guide, Michele E.Davis, Jon A.Phillips, TMH, 2008.
15. Mastering Dojo,R.Gill,C.Riecke and A.Russell,SPD.

**Outcomes:**

- Ability to create and design rich internet applications.
- Ability to develop different multimedia tools to produce web based and independent user interfaces.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

IV Year B.Tech. CSE-II Sem

L	T/P/D	C
4	-/-	4

**(A80542) AD HOC AND SENSOR NETWORKS****(Elective – IV)****Objectives:**

- To understand the concepts of sensor networks
- To understand the MAC and transport protocols for adhoc networks
- To understand the security of sensor networks
- To understand the applications of adhoc and sensor networks

**UNIT- I**

**Introduction to Ad Hoc Wireless Networks:** Characteristics of MANETs, Applications of MANETs, Challenges.

**Routing in MANETs:** Topology-based versus Position-based approaches, Topology based routing protocols, Position based routing, Other Routing Protocols.

**UNIT- II**

**Data Transmission in MANETs:** The Broadcast Storm, Multicasting, Geocasting

**TCP over Ad Hoc Networks:** TCP Protocol overview, TCP and MANETs, Solutions for TCP over Ad Hoc

**UNIT- III**

**Basics of Wireless Sensors and Applications:** The Mica Mote, Sensing and Communication Range, Design Issues, Energy consumption, Clustering of Sensors, Applications

**Data Retrieval in Sensor Networks:** Classification of WSNs, MAC layer, Routing layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

**UNIT- IV**

**Security :** Security in Ad hoc Wireless Networks, Key Management, Secure Routing, Cooperation in MANETs, Intrusion Detection Systems.

**Sensor Network Platforms and Tools:** Sensor Network Hardware, Sensor Network Programming Challenges, Node-Level Software Platforms

**UNIT- V**

**Operating System – TinyOS**

**Imperative Language:** nesC, Dataflow style language: TinyGALS, Node-Level Simulators, ns-2 and its sensor network extension, TOSSIM



**TEXT BOOKS:**

1. Ad Hoc and Sensor Networks – Theory and Applications, *Carlos Corderio Dharma P. Aggarwal*, World Scientific Publications / Cambridge University Press, March 2006
2. Wireless Sensor Networks: An Information Processing Approach, *Feng Zhao, Leonidas Guibas*, Elsevier Science imprint, Morgan Kaufman Publishers, 2005, rp2009.

**REFERENCE BOOKS:**

1. Adhoc Wireless Networks – Architectures and Protocols, C.Siva Ram Murthy, B.S.Murthy, Pearson Education, 2004
2. Wireless Sensor Networks – Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010
3. Wireless Ad hoc Mobile Wireless Networks – Principles, Protocols and Applications, Subir Kumar Sarkar, et al., Auerbach Publications, Taylor & Francis Group, 2008.
4. Ad hoc Networking, *Charles E. Perkins*, Pearson Education, 2001.
5. Wireless Ad hoc Networking, *Shih-Lin Wu, Yu-Chee Tseng*, Auerbach Publications, Taylor & Francis Group, 2007
6. Wireless Ad hoc and Sensor Networks – Protocols, Performance and Control, Jagannathan Sarangapani, CRC Press, Taylor & Francis Group, 2007, rp 2010.
7. Security in Ad hoc and Sensor Networks, Raheem Beyah, et al., World Scientific Publications / Cambridge University Press, 2010
8. Ad hoc Wireless Networks – A communication-theoretic perspective, Ozan K. Tonguz, Gialuigi Ferrari, Wiley India, 2006, rp2009.
9. Wireless Sensor Networks – Signal processing and communications perspectives, Ananthram Swami, et al., Wiley India, 2007, rp2009.

**Outcomes:**

- Ability to understand the concept of ad-hoc and sensor networks.
- Ability to design and implement sensor network protocols.
- Ability to set up and evaluate measurements of protocol performance in sensor networks..

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****IV Year B.Tech. CSE-II Sem****L T/P/D C****4 -/- 4****(A80550) STORAGE AREA NETWORKS****(Elective – IV)****Objectives:**

- Understand Storage Area Networks characteristics and components.
- Become familiar with the SAN vendors and their products
- Learn Fibre Channel protocols and how SAN components use them to communicate with each other
- Become familiar with Cisco MDS 9000 Multilayer Directors and Fabric Switches Thoroughly learn Cisco SAN-OS features.
- Understand the use of all SAN-OS commands. Practice variations of SANOS features

**UNIT- I**

Review data creation and the amount of data being created and understand the value of data to a business, challenges in data storage and data management, Solutions available for data storage, Core elements of a data center infrastructure, role of each element in supporting business activities

Hardware and software components of the host environment, Key protocols and concepts used by each component ,Physical and logical components of a connectivity environment ,Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications.

**UNIT- II**

Concept of RAID and its components , Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Compare and contrast integrated and modular storage systems ,High-level architecture and working of an intelligent storage system

Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN , Benefits of the different networked storage options, Understand the need for long-term archiving solutions and describe how CAS fulfills the need , Understand the appropriateness of the different networked storage options for different application environments

**UNIT- III**

List reasons for planned/unplanned outages and the impact of downtime,

Impact of downtime, Differentiate between business continuity (BC) and disaster recovery (DR) ,RTO and RPO, Identify single points of failure in a storage infrastructure and list solutions to mitigate these failures.

#### **UNIT- IV**

Architecture of backup/recovery and the different backup/recovery topologies , replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities

#### **UNIT- V**

Identify key areas to monitor in a data center, Industry standards for data center monitoring and management, Key metrics to monitor for different components in a storage infrastructure, Key management tasks in a data center. Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain

Virtualization technologies, block-level and file-level virtualization technologies and processes.

#### **Case Studies:**

The technologies described in the course are reinforced with EMC examples of actual solutions.

Realistic case studies enable the participant to design the most appropriate solution for given sets of criteria.

#### **TEXT BOOK:**

1. EMC Corporation, Information Storage and Management, Wiley.

#### **REFERENCE BOOKS:**

1. Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, Osborne, 2003.
2. Marc Farley, "Building Storage Networks", Tata McGraw Hill, Osborne, 2001.
3. Meeta Gupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002.

#### **Outcomes:**

- Ability to demonstrate the storage area networks and their products
- Ability to provide the mechanisms for the backup/recovery.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>IV Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A80543) DATABASE SECURITY****(Elective-IV)****Objectives:**

- To learn the security of databases
- To learn the design techniques of database security
- To learn the secure software design

**UNIT- I**

**Introduction:** Introduction to Databases Security Problems in Databases Security Controls Conclusions

**Security Models -1:** Introduction Access Matrix Model Take-Grant Model Acten Model PN Model Hartson and Hsiao's Model Fernandez's Model Bussolati and Martella's Model for Distributed databases

**UNIT- II**

**Security Models -2:** Bell and LaPadula's Model Biba's Model Dion's Model Sea View Model Jajodia and Sandhu's Model The Lattice Model for the Flow Control conclusion

**Security Mechanisms :** Introduction User Identification/Authentication Memory Protection Resource Protection Control Flow Mechanisms Isolation Security Functionalities in Some Operating Systems Trusted Computer System Evaluation Criteria

**UNIT- III**

**Security Software Design :** Introduction A Methodological Approach to Security Software Design Secure Operating System Design Secure DBMS Design Security Packages Database Security Design

**Statistical Database Protection & Intrusion Detection Systems:** Introduction Statistics Concepts and Definitions Types of Attacks Inference Controls evaluation Criteria for Control Comparison. Introduction IDES System RETISS System ASES System Discovery

**UNIT- IV**

**Models For The Protection Of New Generation Database Systems -1:** Introduction A Model for the Protection of Frame Based Systems A Model for the Protection of Object-Oriented Systems SORION Model for the Protection of Object-Oriented Databases

**UNIT- V**

**Models For The Protection Of New Generation Database Systems -2: A**

Model for the Protection of New Generation Database Systems: the Orion Model  
Model Jajodia and Kogan's Model A Model for the Protection of Active Databases  
Conclusions

**TEXT BOOKS:**

1. Database Security by Castano *Pearson Edition (1/e)*
2. Database Security and Auditing: Protecting Data Integrity and Accessibility, 1st Edition, Hassan Afyouni, THOMSON Edition.

**REFERENCE BOOK:**

1. Database security by alfred basta, melissa zgola, CENGAGE learning.

**Outcomes:**

- Ability to carry out a risk analysis for large database.
- Ability to set up, and maintain the accounts with privileges and roles.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

IV Year B.Tech. CSE-II Sem

L	T/P/D	C
4	-/-	4

**(A80439) EMBEDDED SYSTEMS****(Elective –IV)****Objectives:**

- Design embedded computer system hardware
- Design, implement, and debug multi-threaded application software that operates under real-time constraints on embedded computer systems
- Use and describe the implementation of a real-time operating system on an embedded computer system
- Formulate an embedded computer system design problem including multiple constraints, create a design that satisfies the constraints, \*implement the design in hardware and software, and measure performance against the design constraints
- Create computer software and hardware implementations that operate according to well-known standards
- Organize and write design documents and project reports
- Organize and make technical presentations that describe a design.

**UNIT - I**

**Embedded Computing** : Introduction, Complex Systems and Microprocessor, The Embedded System Design Process, Formalisms for System Design, Design Examples. **(Chapter I from Text Book 1, Wolf).**

**The 8051 Architecture** : Introduction, 8051 Micro controller Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts. **(Chapter 3 from Text Book 2, Ayala).**

**UNIT - II**

**Basic Assembly Language Programming Concepts** : The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051. Data Transfer and Logical Instructions.

**(Chapters 4,5 and 6 from Text Book 2, Ayala).**

Arithmetic Operations, Decimal Arithmetic. Jump and Call Instructions, Further Details on Interrupts.

**(Chapter 7 and 8 from Text Book 2, Ayala)**

**UNIT - III**

**Applications** : Interfacing with Keyboards, Displays, D/A and A/D

Conversions, Multiple Interrupts, Serial Data Communication. (Chapter 10 and 11 from Text Book 2, Ayala).

**Introduction to Real – Time Operating Systems** : Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment. (Chapter 6 and 7 from Text Book 3, Simon).

#### UNIT - IV

**Basic Design Using a Real-Time Operating System** : Principles, Semaphores and Queues, HardReal-Time Scheduling Considerations, Saving Memory and Power, An example RTOS like uC-OS (Open Source); Embedded Software Development Tools: Host and Target machines, Linker/ Locators for Embedded

Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System. (Chapter 8,9,10 & 11 from Text Book 3, Simon).

#### UNIT – V

**Introduction to advanced architectures** : ARM and SHARC, Processor and memory organization and Instruction level parallelism; Networked embedded systems: Bus protocols, I2C bus and CAN bus; Internet-Enabled Systems, Design Example-Elevator Controller. (Chapter 8 from Text Book 1, Wolf).

#### TEXT BOOKS :

1. Computers and Components, Wayne Wolf, Elseveir.
2. The 8051 Microcontroller , Kenneth J.Ayala, Thomson.

#### REFERENCE BOOKS :

1. Embedding system building blocks, Labrosse, via CMP publishers.
2. Embedded Systems, Raj Kamal, TMH.
3. Micro Controllers, Ajay V Deshmukhi, TMH.
4. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley.
5. Microcontrollers, Raj kamal, Pearson Education.
6. An Embedded Software Primer, David E. Simon, Pearson Education.

#### Outcomes:

- Ability to understanding of general system theory and how this applies to embedded system.
- Ability to build a prototype circuit on breadboard using 8051 microcontroller.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

IV Year B.Tech. CSE-II Sem	L	T/P/D	C
	-	-/-	2

**(A80087) INDUSTRY ORIENTED MINI PROJECT**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

IV Year B.Tech. CSE-II Sem	L	T/P/D	C
	-	-/6/-	2

**(A80089) SEMINAR**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

IV Year B.Tech. CSE-II Sem	L	T/P/D	C
	-	-/15/-	10

**(A80088) PROJECT WORK**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

IV Year B.Tech. CSE-II Sem	L	T/P/D	C
	-	-/-	2

**(A80090) COMPREHENSIVE VIVA**



## BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY

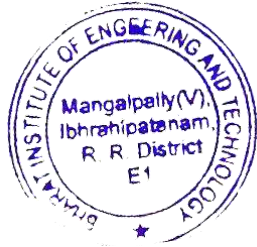
Mangalpally (Village), Ibrahimpatnam (Mandal), Ranga Reddy (District), Telangana-501510

1.3.2. Average percentage of courses that include experiential learning through project work/field work/internship during last five years

### B.Tech-COMPUTER SCIENCE ENGINEERING

2015-16

S. No.	Regulations	No. of Course	Year of Study
1.	R15	9	I year
2.	R13	16	II & III Year I & II Semesters
3.	R09	06	IV year I & II Semesters



*Vatthara Subu*  
**PRINCIPAL**  
Principal  
Bharat Institute of Engg. and Tech  
Mangalpally(V), Ibrahimpatnam(M)  
Ranga Reddy (Dist)-Telangana-501510

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD.****B. TECH. COMPUTER SCIENCE AND ENGINEERING****I YEAR**

Code	Subject	L	T/P/D	C
A10001	English	2	-	4
A10002	Mathematics – I	3	1	6
A10003	Mathematical Methods	3	-	6
A10004	Engineering Physics	3	-	6
A10005	Engineering Chemistry	3	-	6
A10501	Computer Programming	3	-	6
A10301	Engineering Drawing	2	3	6
A10581	Computer Programming Lab.	-	3	4
A10081	Engineering Physics / Engineering Chemistry Lab.	-	3	4
A10083	English Language Communication Skills Lab.	-	3	4
A10082	IT Workshop / Engineering Workshop	-	3	4
	<b>Total</b>	<b>19</b>	<b>16</b>	<b>56</b>

**II YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A30008	Probability and Statistics	4	-	4
A30504	Mathematical Foundations of Computer Science	4	-	4
A30502	Data Structures	4	-	4
A30401	Digital Logic Design	4	-	4
A30404	Electronic Devices and Circuits	4	-	4
A30202	Basic Electrical Engineering	4	-	4
A30282	Electrical and Electronics Lab	-	3	2
A30582	Data Structures Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**II YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A40506	Computer Organization	4	-	4
A40507	Database Management Systems	4	-	4
A40503	Java Programming	4	-	4
A40009	Environmental studies	4	-	4
A40509	Formal Languages and Automata Theory	4	-	4
A40508	Design and Analysis of Algorithms	4	-	4
A40585	Java Programming Lab	-	3	2
A40584	Database Management Systems Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A50511	Principles of Programming Languages	4	-	4
	<b>OPEN ELECTIVE</b>	4	-	4
A50018	Human Values and Professional Ethics			
A50017	Intellectual Property Rights			
A50117	Disaster Management			
A50518	Software Engineering	4	-	4
A50514	Compiler Design	4	-	4
A50510	Operating Systems	4	-	4
A50515	Computer Networks	4	-	4
A50589	Operating Systems Lab	-	3	2
A50587	Compiler Design Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A60521	Distributed Systems	4	-	4
A60522	Information Security	4	-	4
A60524	Object Oriented Analysis and Design	4	-	4
A60525	Software Testing Methodologies	4	-	4
A60010	Managerial Economics and Financial Analysis	4	-	4
A60512	Web Technologies	4	-	4
A60591	Case Tools and Web Technologies Lab	-	3	2
A60086	Advanced Communication Skills Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>I Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>2</b>	<b>-/-</b>	<b>4</b>

**(A10001) ENGLISH****Introduction:**

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

**Objectives:**

- To improve the language proficiency of the students in English with emphasis on LSRW skills.
- To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
- To develop the study skills and communication skills in formal and informal situations.

**SYLLABUS:****Listening Skills:****Objectives**

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation.
2. To equip students with necessary training in listening so that they

can comprehend the speech of people of different backgrounds and regions.

*Students should be given practice in listening to the sounds of the language to be able to recognise them, to distinguish between them to mark stress and recognise and use the right intonation in sentences.*

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

#### **Speaking Skills:**

Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.
  2. To enable students to express themselves fluently and appropriately in social and professional contexts.
- Oral practice
  - Describing objects/situations/people
  - Role play – Individual/Group activities (Using exercises from the five units of the prescribed text: **Skills Annexe -Functional English for Success**)
  - Just A Minute(JAM) Sessions.

#### **Reading Skills:**

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.
  2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
- Skimming the text
  - Understanding the gist of an argument
  - Identifying the topic sentence
  - Inferring lexical and contextual meaning
  - Understanding discourse features
  - Scanning
  - Recognizing coherence/sequencing of sentences

*NOTE : The students will be trained in reading skills using the prescribed text for detailed study.*

*They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.*

### **Writing Skills :**

#### Objectives

1. To develop an awareness in the students about writing as an exact and formal skill.
2. To equip them with the components of different forms of writing, beginning with the lower order ones.
  - Writing sentences
  - Use of appropriate vocabulary
  - Paragraph writing
  - Coherence and cohesiveness
  - Narration / description
  - Note Making
  - Formal and informal letter writing
  - Describing graphs using expressions of comparison

#### **TEXTBOOKS PRESCRIBED:**

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into Five Units, are prescribed:

**For Detailed study:** First Textbook: "Skills Annexe -Functional English for Success", Published by Orient Black Swan, Hyderabad

#### **For Non-detailed study**

1. **Second text book "Epitome of Wisdom"**, Published by Maruthi Publications, Guntur
  - The course content and study material is divided into Five Units.

#### **Unit –I:**

1. Chapter entitled '**Wit and Humour**' from "**Skills Annexe -Functional English for Success**", Published by Orient Black Swan, Hyderabad
  2. Chapter entitled '**Mokshagundam Visvesvaraya**' from "**Epitome of Wisdom**", Published by Maruthi Publications, Hyderabad.
- L- Listening For Sounds, Stress and Intonation  
 S- Greeting and Taking Leave, Introducing Oneself and Others (Formal and Informal Situations)  
 R- Reading for Subject/ Theme

- W- Writing Paragraphs
- G- Types of Nouns and Pronouns
- V- Homonyms, homophones synonyms, antonyms

**Unit –II**

1. Chapter entitled **“Cyber Age”** from **“Skills Annexe -Functional English for Success”** Published by Orient Black Swan, Hyderabad.
  2. Chapter entitled **'Three Days To See'** from **“Epitome of Wisdom”**, Published by Maruthi Publications, Hyderabad.
- L – Listening for themes and facts
  - S – Apologizing, interrupting, requesting and making polite conversation
  - R- for theme and gist
  - W- Describing people, places, objects, events
  - G- Verb forms
  - V- noun, verb, adjective and adverb

**Unit –III**

1. Chapter entitled **'Risk Management'** from **“Skills Annexe - Functional English for Success”** Published by Orient Black Swan, Hyderabad
  2. Chapter entitled **'Leela's Friend'** by R.K. Narayan from **“Epitome of Wisdom”**, Published by Maruthi Publications, Hyderabad
- L – for main points and sub-points for note taking
  - S – giving instructions and directions; Speaking of hypothetical situations
  - R – reading for details
  - W – note-making, information transfer, punctuation
  - G – present tense
  - V – synonyms and antonyms

**Unit –IV**

1. Chapter entitled **'Human Values and Professional Ethics'** from **“Skills Annexe -Functional English for Success”** Published by Orient Black Swan, Hyderabad
  2. Chapter entitled **'The Last Leaf'** from **“Epitome of Wisdom”**, Published by Maruthi Publications, Hyderabad
- L - Listening for specific details and information
  - S- narrating, expressing opinions and telephone interactions
  - R - Reading for specific details and information
  - W- Writing formal letters and CVs

- G- Past and future tenses
- V- Vocabulary - idioms and Phrasal verbs

#### Unit –V

1. Chapter entitled '**Sports and Health**' from "**Skills Annexe - Functional English for Success**" Published by Orient Black Swan, Hyderabad
  2. Chapter entitled '**The Convocation Speech**' by N.R. Narayanmurthy from "**Epitome of Wisdom**", Published by Maruthi Publications, Hyderabad
- L- Critical Listening and Listening for speaker's tone/ attitude
  - S- Group discussion and Making presentations
  - R- Critical reading, reading for reference
  - W- Project proposals; Technical reports, Project Reports and Research Papers
  - G- Adjectives, prepositions and concord
  - V- Collocations and Technical vocabulary

Using words appropriately

- \* Exercises from the texts not prescribed shall also be used for classroom tasks.

#### REFERENCES :

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson
6. Handbook of English Grammar & Usage, Mark Lester and Larry Beason, Tata Mc Graw –Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press
9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.



11. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
12. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt Ltd.,
13. ABC of Common Errors Nigel D Turton, Mac Millan Publishers.
14. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
15. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw – Hill.
16. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO
17. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education
18. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,
19. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers

**Outcomes:**

- Usage of English Language, written and spoken.
- Enrichment of comprehension and fluency
- Gaining confidence in using language in verbal situations.

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**(A10002) MATHEMATICS -I****Objectives:** To learn

- The types of Matrices and their properties
- Concept of rank of a matrix and applying the concept of rank to know the consistency of linear equations and to find all possible solutions, if exist.
- The concept of eigenvalues and eigenvectors of a matrix is to reduce a quadratic form into a canonical form through a linear transformation.
- The mean value theorems and to understand the concepts geometrically.
- The functions of several variables and optimization of these functions.
- The evaluation of improper integrals, Beta and Gamma functions.
- Multiple integration and its applications.
- Methods of solving the differential equations of 1<sup>st</sup> and higher order
- The applications of the differential equations to Newton's law of cooling, Natural growth and decay, Bending of beams etc.
- The definition of integral transforms and Laplace Transform.
- Properties of Laplace transform.
- Inverse Laplace Transform.
- Convolution theorem.
- Solution of Differential equations using Laplace transform.

**UNIT-I**

**Theory of Matrices:** Real matrices – Symmetric, skew – symmetric, orthogonal. Complex matrices: Hermitian, Skew-Hermitian and Unitary Matrices. Idempotent matrix, Elementary row and column transformations-Elementary matrix, Finding rank of a matrix by reducing to Echelon and normal forms. Finding the inverse of a non-singular square matrix using row/ column transformations (Gauss- Jordan method). Consistency of system of linear equations (homogeneous and non- homogeneous) using the rank of a matrix. Solving  $m \times n$  and  $n \times n$  linear system of equations by Gauss elimination.

Cayley-Hamilton Theorem (without proof) – Verification. Finding inverse of a matrix and powers of a matrix by Cayley-Hamilton theorem, Linear dependence and Independence of Vectors. Linear Transformation – Orthogonal Transformation. Eigen values and eigen vectors of a matrix.

Properties of eigen values and eigen vectors of real and complex matrices. Finding linearly independent eigen vectors of a matrix when the eigen values of the matrix are repeated.

Diagonalization of matrix – Quadratic forms up to three variables. Rank – Positive definite, negative definite, semi definite, index, signature of quadratic forms. Reduction of a quadratic form to canonical form.

#### **UNIT – II**

**Differential calculus methods:** Rolle's Mean value Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – (all theorems without proof but with geometrical interpretations), verification of the Theorems and testing the applicability of these theorem to the given function.

Functions of several variables: Functional dependence- Jacobian- Maxima and Minima of functions of two variables without constraints and with constraints-Method of Lagrange multipliers.

#### **UNIT – III**

**Improper integration, Multiple integration & applications:** Gamma and Beta Functions –Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions

Multiple integrals – double and triple integrals – change of order of integration-change of variables (polar, cylindrical and spherical) Finding the area of a region using double integration and volume of a region using triple integration.

#### **UNIT – IV**

**Differential equations and applications:** Overview of differential equations-exact, linear and Bernoulli (NOT TO BE EXAMINED). Applications of first order differential equations – Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories.

Linear differential equations of second and higher order with constant coefficients, Non-homogeneous term of the type  $f(x) = e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ , and  $x^n$ ,  $e^{ax} V(x)$ ,  $x^n V(x)$ , method of variation of parameters. Applications to bending of beams, Electrical circuits and simple harmonic motion.

#### **UNIT – V**

**Laplace transform and its applications to Ordinary differential equations**  
Definition of Integral transform, Domain of the function and Kernel for the Laplace transforms. Existence of Laplace transform. Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied or divided by "t". Laplace transforms of derivatives and integrals of functions. – Unit step function – second shifting theorem – Dirac's delta function, Periodic function – Inverse Laplace transform by Partial fractions( Heaviside method) Inverse Laplace transforms of functions

when they are multiplied or divided by "s", Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem -- Solving ordinary differential equations by Laplace transforms.

**TEXT BOOKS:**

1. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.

**REFERENCES:**

1. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3<sup>rd</sup> edition, Narosa Publishing House, Delhi.
2. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
3. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.
4. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
5. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3<sup>rd</sup> Edi, CRC Press Taylor & Francis Group.
6. Mathematics for Engineers and Scientists, Alan Jeffrey, 6<sup>th</sup> Edi, 2013, Chapman & Hall/ CRC
7. Advanced Engineering Mathematics, Michael Greenberg, Second Edition, Pearson Education.

**Outcome:**

- After learning the contents of this Unit the student is able to write the matrix representation of a set of linear equations and to analyze solutions of system of equations.
- The student will be able to understand the methods of differential calculus to optimize single and multivariable functions.
- The student is able to evaluate the multiple integrals and can apply the concepts to find the Areas, Volumes, Moment of Inertia etc., of regions on a plane or in space.
- The student is able to identify the type of differential equation and uses the right method to solve the differential equation. Also able to apply the theory of differential equations to the real world problems.
- The student is able to solve certain differential equations using Laplace Transform. Also able to transform functions on time domain to frequency domain using Laplace transforms.

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**(A10003) MATHEMATICAL METHODS****Objectives:**

- The objective is to find the relation between the variables x and y out of the given data (x,y).
- This unit also aims to find such relationships which exactly pass through data or approximately satisfy the data under the condition of least sum of squares of errors.
- The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data.
- This topic deals with methods to find roots of an equation and solving a differential equation.
- The numerical methods are important because finding an analytical procedure to solve an equation may not be always available.
- In the diverse fields like electrical circuits, electronic communication, mechanical vibration and structural engineering, periodic functions naturally occur and hence their properties are very much required.
- Indeed, any periodic and non-periodic function can be best analyzed in one way by Fourier series and transforms methods.
- The unit aims at forming a partial differential equation (PDE) for a function with many variables and their solution methods. Two important methods for first order PDE's are learnt. While separation of variables technique is learnt for typical second order PDE's such as Wave, Heat and Laplace equations.
- In many Engineering fields the physical quantities involved are vector-valued functions.
- Hence the unit aims at the basic properties of vector-valued functions and their applications to line integrals, surface integrals and volume integrals.

**UNIT – I:****Interpolation and Curve fitting:**

**Interpolation:** Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences –Central differences – Symbolic relations and separation of symbols- Difference Equations – Differences of a polynomial-Newton's formulae for interpolation – Central difference interpolation Formulae – Gauss Central Difference Formulae –

Interpolation with unevenly spaced points-Lagrange's Interpolation formula.  
B. Spline interpolation – Cubic spline.

**Curve fitting:** Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares.

#### **UNIT – II :**

##### **Numerical techniques:**

**Solution of Algebraic and Transcendental Equations and Linear system of equations:** Introduction – Graphical interpretation of solution of equations .The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method .

Solving system of non-homogeneous equations by L-U Decomposition method(Crout's Method)Jacobi's and Gauss-Seidel Iteration method

**Numerical Differentiation, Integration, and Numerical solutions of First order differential equations:** Numerical differentiation, Numerical integration - Trapezoidal rule, Simpson's 1/3<sup>rd</sup> and 3/8 Rule , Generalized Quadrature.

Numerical solution of Ordinary Differential equations: Solution by Taylor's series method –Picard's Method of successive Approximation- single step methods-Euler's Method-Euler's modified method, Runge-Kutta Methods ,Predictor–corrector methods(Milne's Method and Adams-Bashforth methods only).

#### **UNIT – III:**

**Fourier series and Fourier Transforms:** Definition of periodic function.

Fourier expansion of periodic functions in a given interval of length  $2\pi$   
Determination of Fourier coefficients – Fourier series of even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

Fourier integral theorem - Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

#### **UNIT-IV:**

**Partial differential equations :** Introduction and Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and non-linear equations (Charpit's method), Method of separation of variables for second order equations –Applications of Partial differential equations-Two dimensional wave equation., Heat equation.

#### **UNIT – V**

**Vector Calculus:** Vector Calculus: Scalar point function and vector point

function, Gradient- Divergence- Curl and their related properties, - Laplacian operator, Line integral – work done – Surface integrals -Volume integral. Green's Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification). Solenoidal and irrotational vectors, Finding Potential function.

**TEXT BOOKS:**

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers.

**REFERENCES:**

1. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi & Others, S. Chand.
2. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt. Ltd.
3. Mathematical Methods by G.Shankar Rao, I.K. International Publications, N.Delhi
4. Mathematical Methods by V. Ravindranath, Etl, Himalaya Publications.
5. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3<sup>rd</sup> Edi, 2013, CRC Press Taylor & Francis Group.
6. Mathematics for Engineers and Scientists, Alan Jeffrey, 6<sup>th</sup> Edi, 2013, Chapman & Hall/ CRC
7. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.

**Outcomes:**

From a given discrete data, one will be able to predict the value of the data at an intermediate point and by curve fitting, can find the most appropriate formula for a guessed relation of the data variables. This method of analysis data helps engineers to understand the system for better interpretation and decision making

- After studying this unit one will be able to find a root of a given equation and will be able to find a numerical solution for a given differential equation.
- Helps in describing the system by an ODE, if possible. Also, suggests to find the solution as a first approximation.
- One will be able to find the expansion of a given function by Fourier series and Fourier Transform of the function.
- Helps in phase transformation, Phase change and attenuation of coefficients in acoustics.

- After studying this unit, one will be able to find a corresponding Partial Differential Equation for an unknown function with many independent variables and to find their solution.
- Most of the problems in physical and engineering applications, problems are highly non-linear and hence expressing them as PDEs'. Hence understanding the nature of the equation and finding a suitable solution is very much essential.
- After studying this unit, one will be able to evaluate multiple integrals (line, surface, volume integrals) and convert line integrals to area integrals and surface integrals to volume integrals.
- It is an essential requirement for an engineer to understand the behavior of the physical system.



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**(A10004) ENGINEERING PHYSICS****Objectives:**

It gives

- to the students basic understanding of bonding in solids, crystal structures and techniques to characterize crystals.
- to understand the behavior of electron in a solid and thereby one can determine the conductivity and specific heat values of the solids.
- to study applications in Engineering like memory devices, transformer core and Electromagnetic machinery.
- to help the student to design powerful light sources for various Engineering Applications and also enable them to develop communication systems using Fiber Technology.
- to understand the working of Electronic devices, how to design acoustic proof halls and understand the behavior of the materials at Nano scale.

**UNIT-I**

**Crystallography:** Ionic Bond, Covalent Bond, Metallic Bond, Hydrogen Bond, Vander-Waal's Bond, Calculation of Cohesive Energy of diatomic molecule-Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems, Structure of Diamond and NaCl.

**X-ray Diffraction & Defects in Crystals:** Bragg's Law, X-Ray diffraction methods: Laue Method, Powder Method: Point Defects: Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects, line defects (Qualitative) & Burger's Vector.

**UNIT-II**

**Principles of Quantum Mechanics:** Waves and Particles, de Broglie Hypothesis, Matter Waves, Davisson and Germer' Experiment, Heisenberg's Uncertainty Principle, Schrödinger's Time Independent Wave Equation - Physical Significance of the Wave Function – Infinite square well potential, extension to three dimensions

**Elements of Statistical Mechanics & Electron theory of Solids:** Phase space, Ensembles, Micro Canonical, Canonical and Grand Canonical Ensembles - Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics (Qualitative Treatment), Concept of Electron Gas, Density of States, Fermi

Energy- Electron in a periodic Potential, Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), E-K curve, Origin of Energy Band Formation in Solids, Concept of Effective Mass of an Electron, Classification of Materials into Conductors, Semi Conductors & Insulators.

#### UNIT-III

**Dielectric Properties:** Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities: Ionic and Electronic - Internal Fields in Solids, Clausius - Mossotti Equation, Piezo - electricity and Ferro- electricity.

**Magnetic Properties & Superconducting Properties:** Permeability, Field Intensity, Magnetic Field Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro Magnetism on the basis of Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials and their Applications, Superconductivity, Meissner Effect, Effect of Magnetic field, Type-I & Type-II Superconductors, Applications of Superconductors.

#### UNIT-IV

**Optics:** Interference-Interference in thin films (Reflected light), Newton rings experiment- Fraunhofer diffraction due to single slit, N-slits, Diffraction grating experiment, Double refraction-construction and working of Nicol's Prism

**Lasers & Fiber Optics:** Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Einstein's Coefficients and Relation between them, Population Inversion, Lasing Action, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers- Principle of Optical Fiber, Construction of fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers: Step Index and Graded Index Fibers, Attenuation in Optical Fibers, Application of Optical Fiber in communication systems.

#### UNIT-V:

**Semiconductor Physics:** Fermi Level in Intrinsic and Extrinsic Semiconductors, Calculation of carrier concentration in Intrinsic &, Extrinsic Semiconductors, Direct and Indirect Band gap semiconductors, Hall Effect-Formation of PN Junction, Open Circuit PN Junction, Energy Diagram of PN Diode, Diode Equation, I-V Characteristics of PN Junction diode, Solar cell, LED & Photo Diodes. **Acoustics of Buildings & Acoustic Quieting:** Reverberation and Time of Reverberation, Sabine's Formula for Reverberation Time, Measurement of Absorption Coefficient of a Material, factors affecting the Architectural Acoustics and their Remedies

**Nanotechnology:** Origin of Nanotechnology, Nano Scale, Surface to Volume

Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Top-down Fabrication: Chemical Vapour Deposition, Characterization by TEM.

**TEXT BOOKS:**

1. Engineering Physics, K. Malik, A. K. Singh, Tata Mc Graw Hill Book Publishers.
2. Engineering Physics, V. Rajendran, Tata Mc Graw Hill Book Publishers.

**REFERENCES:**

1. Fundamentals of Physics, David Halliday, Robert Resnick, Jearl Walker by John Wiley & Sons.
2. Sears and Zemansky's University Physics (10th Edition) by Hugh D. Young Roger A. Freedman, T. R. Sandin, A. Lewis Ford Addison-Wesley Publishers.
3. Applied Physics for Engineers – P. Madhusudana Rao (Academic Publishing company, 2013).
4. Solid State Physics – M. Arumugam (Anuradha Publications).
5. Modern Physics – R. Murugesan & K. Siva Prasath – S. Chand & Co. (for Statistical Mechanics).
6. A Text Book of Engg Physics – M. N. Avadhanulu & P. G. Khsirsagar– S. Chand & Co. (for acoustics).
7. Modern Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co.Ltd.
8. Nanotechnology – M.Ratner & D. Ratner (Pearson Ed.).
9. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
10. Solid State Physics – A.J. Dekker (Macmillan).
11. Applied Physics – Mani Naidu Pearson Education.

**Outcomes:**

- The student would be able to learn the fundamental concepts on behavior of crystalline solids.
- The knowledge on Fundamentals of Quantum Mechanics, Statistical Mechanics enables the student to apply to various systems like Communications Solar Cells, Photo Cells and so on.
- Design, Characterization and study of properties of materials help the student to prepare new materials for various Engineering applications.
- This course also helps the student exposed to non-destructive testing methods.
- Finally, Engineering Physics Course helps the student to develop problem solving skills and analytical skills.

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**(A10005) ENGINEERING CHEMISTRY****Objective:**

An engineer is as someone who uses scientific, natural and physical principles to design something of use for people or other living creatures. Much of what any engineer does involves chemistry because everything in our environment has a molecular make up. Engineering requires the concepts of applied chemistry and the more chemistry an engineer understands, the more beneficial it is. In the future, global problems and issues will require an in-depth understanding of chemistry to have a global solution. This syllabus aims at bridging the concepts and theory of chemistry with examples from fields of practical application, thus reinforcing the connection between science and engineering. It deals with the basic principles of various branches of chemistry which are fundamental tools necessary for an accomplished engineer.

**UNIT I:**

**Electrochemistry & Corrosion:** Electro Chemistry – Conductance - Specific, Equivalent and Molar conductance and their Units; Applications of Conductance (Conductometric titrations). **EMF:** Galvanic Cells, types of Electrodes – (Calomel, Quinhydrone and glass electrodes); Nernst equation and its applications ; concept of concentration cells, electro chemical series, Potentiometric titrations, determination of  $P^H$  using glass electrode-Numerical problems.

**Batteries:** Primary cells (dry cells) and secondary cells (lead-Acid cell, Ni-Cd cell, Lithium cells). Applications of batteries. **Fuel cells** – Hydrogen – Oxygen fuel cell; methanol – oxygen fuel cell ; Advantages and Applications.

**Corrosion and its control:** Causes and effects of corrosion; Theories of corrosion – Chemical & Electrochemical corrosion; Types of corrosion (Galvanic, Water line, Pitting and Intergranular); Factors affecting rate of corrosion – Nature of metal and Nature of Environment – Corrosion control methods – Cathodic protection (sacrificial anodic and impressed current). Surface coatings: Metallic coatings & methods of application of metallic coatings - hot dipping (galvanization & tinning), Cementation, cladding, electroplating (copper plating) Electroless plating (Ni plating) - Organic coatings – Paints - constituents and their functions.

**UNIT II:**

**Engineering Materials: Polymers:** Types of Polymerization (Chain & Step growth). **Plastics:** Thermoplastic & Thermo setting resins; Compounding &

fabrication of plastics (Compression and injection moulding). Preparation, properties, engineering applications of PVC, Teflon and Bakelite. **Fibers**- Characteristics of fibers – preparation, properties and uses of Nylon – 6,6 and Dacron – Fiber Reinforced Plastics (FRP) – applications. **Rubbers** – Natural rubber and its vulcanization. Elastomers – Buna-s, Butyl rubber and Thiokol rubber.

**Conducting polymers:** Polyacetylene, Polyaniline, Mechanism of Conduction, doping; applications of Conducting polymers. **Bio-degradable Polymers**- preparation and Applications of Poly vinyl acetate and Poly lactic acid - **Cement:** composition of Portland cement, setting & hardening of cement (reactions), **Lubricants:** Classification with examples- Characteristics of a good lubricant & mechanism of lubrication (thick film, thin film and extreme pressure) – properties of lubricants: viscosity, Cloud point, flash and fire points. **Refractories:** Classification, characteristics of a good refractory and applications.

**Nanomaterials:** Introduction, preparation by sol-gel & chemical vapour deposition methods. Applications of nanomaterials.

#### **UNIT III:**

**Water and its Treatment:** Hardness of Water: Causes of hardness, expression of hardness – units – types of hardness, estimation of temporary & permanent hardness of water by EDTA method - numerical problems. Boiler troubles – Scale & sludges, Priming and foaming, caustic embrittlement and boiler corrosion; Treatment of boiler feed water – Internal treatment (Phosphate, Colloidal and calgon conditioning) – External treatment – Lime Soda process, Zeolite process and ion exchange process. Numerical Problems. **Potable Water**- Its Specifications – Steps involved in treatment of potable water – Disinfection of water by chlorination and ozonisation. Reverse osmosis & its significance.

#### **Unit – IV :**

**Fuels & Combustion: Fuels** – Classification – solid fuels : coal – analysis of coal - proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining – cracking – types – fixed bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol, Bergius and Fischer-Tropsch's process: Gaseous fuels - constituents, characteristics and applications of natural gas, LPG and CNG. Analysis of flue gas by Orsat's apparatus – Numerical Problems.

**Combustion** – Definition, Calorific value of fuel – HCV , LCV; Determination of calorific value by Junker's gas calorimeter – theoretical calculation of Calorific value by Dulong's formula – Numerical problems on combustion.

#### **UNIT V:**

**Phase Rule & Surface Chemistry : Phase Rule:** Definition of terms: Phase,

component, degree of freedom, phase rule equation. Phase diagrams – one component system- water system. Two component system Lead- Silver, cooling curves, heat treatment based on iron-carbon phase diagram - hardening, annealing and normalization.

**Surface Chemistry: Adsorption** – Types of Adsorption, Isotherms – Freundlich and Langmuir adsorption isotherm, applications of adsorption; **Colloids**: Classification of Colloids; Electrical & optical properties, micelles, applications of colloids in industry.

**TEXT BOOKS:**

1. Engineering Chemistry by R.P. Mani, K.N. Mishra, B. Rama Devi / CENGAGE learning.
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).

**REFERENCE BOOKS**

1. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited, New Delhi (2006)
2. Engineering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills Publishing Company Limited, New Delhi (2004).
3. Text Book of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co Publishers, New Delhi (2006).
4. Chemistry of Engineering Materials by CV Agarwal, C.P Murthy, A.Naidu, BS Publications.

**Outcome:**

- Students will demonstrate a depth of knowledge and apply the methods of inquiry in a discipline of their choosing, and they will demonstrate a breadth of knowledge across their choice of varied disciplines.
- Students will demonstrate the ability to access and interpret information, respond and adapt to changing situations, make complex decisions, solve problems, and evaluate actions.
- Students will demonstrate awareness and understanding of the skills necessary to live and work in a diverse engineering world.

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**(A10501) COMPUTER PROGRAMMING****Objectives:**

- To understand the various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs.
- To learn to write programs (using structured programming approach) in C to solve problems.
- To introduce the students to basic data structures such as lists, stacks and queues.
- To make the student understand simple sorting and searching methods.

**UNIT - I**

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development.

Introduction to the C Language – Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Operators (Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements- Selection Statements (making decisions) – if and switch statements, Repetition statements (loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Program examples.

**UNIT - II**

Functions-Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Limitations of recursion, example C programs, Preprocessor commands.

Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C program examples.

**UNIT - III**

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and arrays, Passing an array to a function,

memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

#### **UNIT - IV**

Enumerated, Structure, and Union Types– The Type Definition (typedef), Enumerated types, Structures –Declaration, initialization, accessing structures, operations on structures, Complex structures, structures and functions, Passing structures through pointers, self referential structures, unions, bit fields, C programming examples, command –line arguments.

Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling), Positioning functions, C program examples.

#### **UNIT – V**

Searching and Sorting – Sorting- selection sort, bubble sort, Searching-linear and binary search methods.

Lists- Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Push and Pop Operations, Queues- Enqueue and Dequeue operations.

#### **TEXT BOOKS:**

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh , Oxford University Press.

#### **REFERENCE BOOKS:**

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. C for All, S. Thamarai Selvi, R.Murugesan, Anuradha Publications.
3. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7<sup>th</sup> Edition, Pearson education.
4. Programming in C, Ajay Mittal, Pearson.
5. Programming with C, B.Gottfried, 3<sup>rd</sup> edition, Schaum's outlines, TMH.
6. Problem solving with C, M.T.Somasekhara, PHI
7. Programming with C, R.S.Bickar, Universities Press.
8. Computer Programming & Data Structures, E.Balagurusamy, 4<sup>th</sup> edition, TMH.
9. Programming in C – Stephen G. Kochan, III Edition, Pearson



Education.

10. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
11. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press.

**Outcomes:**

- Demonstrate the basic knowledge of computer hardware and software.
- Ability to apply solving and logical skills to programming in C language and also in other languages.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****I Year B.Tech. CSE**

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<b>2</b>	<b>-/13</b>	<b>6</b>

**(A10301) ENGINEERING DRAWING****UNIT – I**

**Introduction to Engineering Drawing:** Principles of Engineering Drawing/ Graphics – Various Drawing Instruments – Conventions in Drawing – **Lettering practice** – BIS Conventions.

**Curves:** Constructions of Curves used in Engineering Practice:

- Conic Sections including the Rectangular Hyperbola – General method only.
- Cycloid, Epicycloid and Hypocycloid
- Involute.

**Scales:** Construction of different types of Scales, Plain, Diagonal, Vernier scale.

**UNIT – II****Orthographic Projections in First Angle**

**Projection:** Principles of Orthographic Projections – Conventions – First and Third Angle projections.

**Projections of Points :** including Points in all four quadrants.

**Projections of Lines :** Parallel, perpendicular, inclined to one plan and inclined to both planes. True length and true angle of a line. Traces of a line.

**Projections of Planes:** Plane parallel, perpendicular and inclined to one reference plane. Plane inclined to both the reference planes.

**UNIT – III**

**Projections of Solids:** Projections of regular solids, cube, prisms, pyramids, tetrahedran, cylinder and cone, axis inclined to both planes.

**Sections and Sectional Views:** Right Regular Solids – Prism, Cylinder, Pyramid, Cone – use of Auxiliary views.

**UNIT – IV**

**Development of Surfaces:** Development of Surfaces of Right, Regular Solids – Prisms, Cylinder, Pyramids, Cone and their parts. frustum of solids.

**Intersection of Solids:-** Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

**UNIT – V**

**Isometric Projections :** Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Plane Figures, Simple and Compound

Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of parts with Spherical surface.

**Transformation of Projections** : Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects.

**Perspective Projections** : Perspective View : Points, Lines and Plane Figures, Vanishing Point Methods (General Method only).

**TEXT BOOKS**

1. Engineering Drawing – Basant, Agrawal, TMH
2. Engineering Drawing, N.D. Bhatt

**REFERENCES :**

1. Engineering Graphics. P I Varghese Tata McGraw Hill Education Pvt. Ltd.
2. Engineering drawing – P.J. Shah .S.Chand Publishers.
3. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers.
4. Engineering Drawing – M.B. Shah and B.C. Rana, Pearson.
5. Engineering Drawing by K.Venu Gopal & V.Prabu Raja New Age Publications.
6. Engineering Drawing by John. PHI Learning Publisher.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****I Year B.Tech. CSE****L T/P/D C****- -/3/- 4****(A10581) COMPUTER PROGRAMMING LAB****Objectives:**

- To write programs in C to solve the problems.
- To implement linear data structures such as lists, stacks, queues.
- To implement simple searching and sorting methods.

**Recommended Systems/Software Requirements:**

- Intel based desktop PC
- ANSI C Compiler with Supporting Editors

**Week 1**

- a) Write a C program to find the sum of individual digits of a positive integer.
- b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

**Week 2**

- a) Write a C program to calculate the following Sum:  
 $Sum = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$
- b) Write a C program to find the roots of a quadratic equation.

**Week 3**

a) The total distance travelled by vehicle in 't' seconds is given by distance  $s = ut + 1/2at^2$  where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec<sup>2</sup>). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, \*, /, % and use Switch Statement)

**Week 4**

- a) Write C programs that use both recursive and non-recursive functions
- To find the factorial of a given integer.

- ii) To find the GCD (greatest common divisor) of two given integers.

**Week 5**

- a) Write a C program to find the largest integer in a list of integers.
- b) Write a C program that uses functions to perform the following:
  - i) Addition of Two Matrices
  - ii) Multiplication of Two Matrices

**Week 6**

- a) Write a C program that uses functions to perform the following operations:
  - i) To insert a sub-string in to a given main string from a given position.
  - ii) To delete n Characters from a given position in a given string.
- b) Write a C program to determine if the given string is a palindrome or not

**Week 7**

- a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.
- b) Write a C program to count the lines, words and characters in a given text.

**Week 8**

- a) Write a C program to generate Pascal's triangle.
- b) Write a C program to construct a pyramid of numbers.

**Week 9**

Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:

$$1+x+x^2+x^3+\dots+x^n$$

For example: if n is 3 and x is 5, then the program computes 1+5+25+125.

Print x, n, the sum

Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if  $n < 0$ , then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

**Week 10**

- a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
- b) Write a C program to convert a Roman numeral to its decimal equivalent.

**Week 11**

Write a C program that uses functions to perform the following operations:

- i) Reading a complex number
- ii) Writing a complex number
- iii) Addition of two complex numbers
- iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

**Week 12**

a) Write a C program which copies one file to another.

b) Write a C program to reverse the first n characters in a file.

(Note: The file name and n are specified on the command line.)

**Week 13**

a) Write a C program to display the contents of a file.

b) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

**Week 14**

a) Write a C program that uses non recursive function to search for a Key value in a given list of integers using Linear search.

b) Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using Binary search.

**Week 15**

a) Write a C program that implements the Selection sort method to sort a given array of integers in ascending order.

b) Write a C program that implements the Bubble sort method to sort a given list of names in ascending order.

**Week 16**

Write a C program that uses functions to perform the following operations:

- i) Create a singly linked list of integer elements.
- ii) Traverse the above list and display the elements.

**Week 17**

Write a C program that implements stack (its operations) using a singly linked list to display a given list of integers in reverse order. Ex. input: 10 23 4 6 output: 6 4 23 10

**Week 18**

Write a C program that implements Queue (its operations) using a singly linked list to display a given list of integers in the same order. Ex. input: 10

23 4 6 output: 10 23 4 6

**Week 19**

Write a C program to implement the linear regression algorithm.

**Week 20**

Write a C program to implement the polynomial regression algorithm.

**Week 21**

Write a C program to implement the Lagrange interpolation.

**Week 22**

Write C program to implement the Newton- Gregory forward interpolation.

**Week 23**

Write a C program to implement Trapezoidal method.

**Week 24**

Write a C program to implement Simpson method.

**TEXT BOOKS:**

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
2. Computer Programming in C, V. Rajaraman, PHI Publishers.
3. C Programming, E.Balagurusamy, 3<sup>rd</sup> edition, TMH Publishers.
4. C Programming, M.V.S.S.N.Prasad, ACME Learning Pvt. Ltd.
5. C and Data Structures, N.B.Venkateswarlu and E.V.Prasad,S.Chand Publishers
6. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****I Year B.Tech. CSE****L T/P/D C****- -/3/- 4****(A10081) ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB****ENGINEERING PHYSICS LAB****(Any TEN experiments compulsory)****Objectives**

This course on Physics lab is designed with 13 experiments in an academic year. It is common to all branches of Engineering in B.Tech 1<sup>st</sup> year.

The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student.

The experiments are selected from various areas of Physics like Physical Optics, Lasers, Fiber Optics, Sound, Mechanics, Electricity & Magnetism and Basic Electronics.

Also the student is exposed to various tools like Screw gauge, Vernier Callipers, Physics Balance, Spectrometer and Microscope.

1. Dispersive power of the material of a prism – Spectrometer
2. Determination of wavelength of a source – Diffraction Grating.
3. Newton's Rings - Radius of curvature of plano convex lens.
4. Melde's experiment – Transverse and longitudinal modes.
5. Time constant of an R-C circuit.
6. L-C-R circuit.
7. Magnetic field along the axis of current carrying coil – Stewart and Gees method.
8. Study the characteristics of LED and LASER sources.
9. Bending losses of fibres & Evaluation of numerical aperture of a given fibre.
10. Energy gap of a material of p-n junction.
11. Torsional pendulum.
12. Wavelength of light –diffraction grating - using laser.
13. Characteristics of a solar cell

**LABORATORY MANUAL:**

1. Laboratory Manual of Engineering Physics by Dr.Y.Aparna & Dr.K.Venkateswara Rao (V.G.S Publishers)



**Outcomes**

The student is expected to learn from this laboratory course the concept of error and its analysis. It also allows the student to develop experimental skills to design new experiments in Engineering.

With the exposure to these experiments the student can compare the theory and correlate with experiment.

**ENGINEERING CHEMISTRY LAB**

List of Experiments ( Any 12 of the following)

**Titrimetry:**

1. Estimation of ferrous iron by dichrometry.
2. Estimation of hardness of water by EDTA method.

**Mineral analysis:**

3. Determination of percentage of copper in brass.
4. Estimation of manganese dioxide in pyrolusite.

**Instrumental Methods:****Colorimetry:**

5. Determination of ferrous iron in cement by colorimetric method
6. Estimation of copper by colorimetric method.

**Conductometry:**

7. Conductometric titration of strong acid vs strong base.
8. Conductometric titration of mixture of acids vs strong base.

**Potentiometry:**

9. Titration of strong acid vs strong base by potentiometry.
10. Titration of weak acid vs strong base by potentiometry.

**Physical properties:**

11. Determination of viscosity of sample oil by redwood / oswald's viscometer.
12. Determination of Surface tension of lubricants.

**Preparations:**

13. Preparation of Aspirin
14. Preparation of Thiokol rubber

**Adsorption:**

15. Adsorption of acetic acid on charcoal.

**TEXT BOOKS:**

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Inorganic quantitative analysis, Vogel.

**REFERENCE BOOKS:**

1. Text Book of engineering chemistry by R. N. Goyal and Harmendra Goel, Ane Books Private Ltd.,
2. A text book on experiments and calculation Engg. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

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**(A10083) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB**

The **Language Lab** focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

**Objectives**

- ☒ To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- ☒ To sensitise the students to the nuances of English speech sounds, word accent, intonation and rhythm
- ☒ To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
- ☒ To improve the fluency in spoken English and neutralize mother tongue influence
- ☒ To train students to use language appropriately for interviews, group discussion and public speaking

**Syllabus: English Language Communication Skills Lab shall have two parts:**

**a. Computer Assisted Language Learning (CALL) Lab**

**b. Interactive Communication Skills (ICS) Lab**

The following course content is prescribed for the **English Language Communication Skills Lab**

**Exercise – I**

**CALL Lab:** Introduction to Phonetics – Speech Sounds – Vowels and Consonants

**ICS Lab:** Ice-Breaking activity and JAM session

Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

**Exercise – II**

**CALL Lab:** Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.

**ICS Lab:** Situational Dialogues – Role-Play- Expressions in Various Situations

– Self-introduction and Introducing Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.

Concord (Subject in agreement with verb) and Words often misspelt-confused/misused

#### **Exercise - III**

**CALL Lab:** Minimal Pairs- Word accent and Stress Shifts- Listening Comprehension.

**ICS Lab:** Descriptions- Narrations- Giving Directions and guidelines.

Sequence of Tenses, Question Tags and One word substitutes.

#### **Exercise – IV**

**CALL Lab:** Intonation and Common errors in Pronunciation.

**ICS Lab:** Extempore- Public Speaking

Active and Passive Voice, –Common Errors in English, Idioms and Phrases

#### **Exercise – V**

**CALL Lab:** Neutralization of Mother Tongue Influence and Conversation Practice

**ICS Lab:** Information Transfer- Oral Presentation Skills

Reading Comprehension and Job Application with Resume preparation.

#### **Minimum Requirement of infra structural facilities for ELCS Lab:**

##### **1. Computer Assisted Language Learning (CALL) Lab:**

**The Computer aided Language Lab** for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

##### **System Requirement (Hardware component):**

*Computer network with Lan with minimum 60 multimedia systems with the following specifications:*

- i) P – IV Processor
  - a) Speed – 2.8 GHZ
  - b) RAM – 512 MB Minimum
  - c) Hard Disk – 80 GB
- ii) Headphones of High quality

##### **2. Interactive Communication Skills (ICS) Lab :**

**The Interactive Communication Skills Lab:** A Spacious room with movable chairs and audio-visual aids with a Public Address System,

a T. V., a digital stereo –audio & video system and camcorder etc.

**Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):**

1. Suresh Kumar, E. & Sreehari, P. 2009. *A Handbook for English Language Laboratories*. New Delhi: Foundation
2. *Speaking English Effectively* 2<sup>nd</sup> Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
3. Sasi Kumar, V & Dhamija, P.V. *How to Prepare for Group Discussion and Interviews*. Tata McGraw Hill
4. Hancock, M. 2009. *English Pronunciation in Use. Intermediate*. Cambridge: CUP
5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
6. Hewings, M. 2009. *English Pronunciation in Use. Advanced*. Cambridge: CUP
7. Marks, J. 2009. *English Pronunciation in Use. Elementary*. Cambridge: CUP
8. Nambiar, K.C. 2011. *Speaking Accurately. A Course in International Communication*. New Delhi : Foundation
9. Soundararaj, Francis. 2012. *Basics of Communication in English*. New Delhi: Macmillan
10. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.
11. **English Pronouncing Dictionary** Daniel Jones Current Edition with CD.
12. **A textbook of English Phonetics for Indian Students** by T. Balasubramanian (Macmillan)
13. **Prescribed Lab Manual:** A Manual entitled "*English Language Communication Skills (ELCS) Lab Manual- cum- Work Book*", published by Cengage Learning India Pvt. Ltd, New Delhi. 2013

#### **DISTRIBUTION AND WEIGHTAGE OF MARKS**

##### ***English Language Laboratory Practical Examination:***

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation

during the year for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

**Outcomes:**

- Better Understanding of nuances of language through audio- visual experience and group activities
- Neutralization of accent for intelligibility
- Speaking with clarity and confidence thereby enhancing employability skills of the students

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****I Year B.Tech. CSE****L T/P/D C****- -3/- 4****(A10082) IT WORKSHOP / ENGINEERING WORKSHOP****Objectives:**

The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel and Power Point.

**PC Hardware** introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. **The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.**

**Internet & World Wide Web** module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

**Productivity tools** module would enable the students in crafting professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools and LaTeX. **(Recommended to use Microsoft office 2007 in place of MS Office 2003)**

**PC Hardware**

**Week 1 – Task 1 :** Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

**Week 2 – Task 2 :** Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

**Week 3 – Task 3 :** Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

**Week 4 – Task 4 :** Every student should install Linux on the computer. This

computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

**Week 5 – Task 5: Hardware Troubleshooting:** Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

**Week 6 – Task 6 : Software Troubleshooting :** Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

#### **Internet & World Wide Web**

**Week 7 - Task 1 : Orientation & Connectivity Boot Camp :** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

**Week 8 - Task 2 : Web Browsers, Surfing the Web :** Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

**Week 9 - Task 3 : Search Engines & Netiquette :** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

**Week 10 - Task 4: Cyber Hygiene:** Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

**Week 11- Task 5:** Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.

#### **Productivity tools**

##### **LaTeX and Word**

**Week 12 – Word Orientation:** The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word:



Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

**Task 1 : Using LaTeX and Word** to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

**Week 13 - Task 2: Creating project abstract** Features to be covered:- Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

**Week 14 - Task 3 : Creating a Newsletter** : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

#### **Excel**

**Week 15 - Excel Orientation:** The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

**Task 1: Creating a Scheduler** - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

**Week 16 - Task 2 : Calculating GPA** - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting

#### **LaTeX and MS/equivalent (FOSS) tool Power Point**

**Week 17 - Task1:** Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

**Week 18- Task 2:** Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyperlinks, Inserting – Images, Clip Art, Audio, Video, Objects, Tables and Charts

**Week 19 - Task 3:** Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing

and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.

**REFERENCE BOOKS:**

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill Publishers.
4. Upgrading and Repairing, PC's 18<sup>th</sup> e, Scott Muller QUE, Pearson Education
5. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
7. PC Hardware and A+Handbook – Kate J. Chase PHI (Microsoft)

**Outcomes:**

- Apply knowledge for computer assembling and software installation.
- Ability how to solve the trouble shooting problems.
- Apply the tools for preparation of PPT, Documentation and budget sheet etc.

**ENGINEERING WORKSHOP**

**1. TRADES FOR EXERCISES:**

**At least two exercises from each trade:**

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Black Smithy
5. House-wiring
6. Foundry
7. Welding
8. Power tools in construction, wood working, electrical engineering and mechanical Engineering.

**2. TRADES FOR DEMONSTRATION & EXPOSURE:**

1. Plumbing
2. Machine Shop
3. Metal Cutting (Water Plasma)

**TEXT BOOK:**

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
2. Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>II Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A30008) PROBABILITY AND STATISTICS**

Objectives: To learn

- Understand a random variable that describes randomness or an uncertainty in certain realistic situation. It can be of either discrete or continuous type.
- In the discrete case, study of the binomial and the Poisson random variables and the Normal random variable for the continuous case predominantly describe important probability distributions. Important statistical properties for these random variables provide very good insight and are essential for industrial applications.
- Most of the random situations are described as functions of many single random variables. In this unit, the objective is to learn functions of many random variables through joint distributions.
- The types of sampling, Sampling distribution of means, Sampling distribution of variance, Estimations of statistical parameters, Testing of hypothesis of few unknown statistical parameters.
- The mechanism of queuing system, The characteristics of queue, The mean arrival and service rates
- The expected queue length, The waiting line
- The random processes, The classification of random processes, Markov chain, Classification of states
- Stochastic matrix ( transition probability matrix), Limiting probabilities, Applications of Markov chains

**UNIT-I**

**Single Random variables and probability distributions:** Random variables – Discrete and continuous. Probability distributions, mass function/ density function of a probability distribution. Mathematical Expectation, Moment about origin, Central moments Moment generating function of probability distribution.

Binomial, Poisson & normal distributions and their properties. Moment generating functions of the above three distributions, and hence finding the mean and variance.

**UNIT-II**

**Multiple Random variables, Correlation & Regression:** Joint probability distributions- Joint probability mass / density function, Marginal probability

mass / density functions, Covariance of two random variables, Correlation - Coefficient of correlation, The rank correlation.

Regression- Regression Coefficient, The lines of regression and multiple correlation & regression.

### UNIT-III

Sampling Distributions and Testing of Hypothesis

**Sampling:** Definitions of population, sampling, statistic, parameter. Types of sampling, Expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of variance.

**Parameter estimations** – likelihood estimate, interval estimations.

**Testing of hypothesis:** Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, Level of significance. One sided test, two sided test,

#### Large sample tests:

- (i) Test of Equality of means of two samples equality of sample mean and population mean (cases of known variance & unknown variance, equal and unequal variances)
- (ii) Tests of significance of difference between sample S.D and population S.D.
- (iii) Tests of significance difference between sample proportion and population proportion & difference between two sample proportions.

#### Small sample tests:

Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples

Snedecor's F- distribution and its properties. Test of equality of two population variances

Chi-square distribution, its properties, Chi-square test of goodness of fit

### UNIT-IV

**Queuing Theory:** Structure of a queuing system, Operating Characteristics of queuing system, Transient and steady states, Terminology of Queuing systems, Arrival and service processes- Pure Birth-Death process Deterministic queuing models- M/M/1 Model of infinite queue, M/M/1 model of finite queue .

### UNIT-V

**Stochastic processes:** Introduction to Stochastic Processes – Classification of Random processes, Methods of description of random processes,

Stationary and non-stationary random process, Average values of single random process and two or more random processes. Markov process, Markov chain, classification of states – Examples of Markov Chains, Stochastic Matrix.

**TEXT BOOKS:**

- 1) Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers
- 2) Probability and Statistics for Engineers and Scientists by Sheldon M.Ross, Academic Press
- 3) Operations Research by S.D. Sarma,

**REFERENCE BOOKS:**

1. Mathematics for Engineers by K.B.Datta and M.A S.Srinivas,Cengage Publications
2. Probability and Statistics by T.K.V.Iyengar & B.Krishna Gandhi Et
3. Fundamentals of Mathematical Statistics by S C Gupta and V.K.Kapoor
4. Probability and Statistics for Engineers and Scientists by Jay I.Devore.

**Outcomes:**

- Students would be able to identify distribution in certain realistic situation. It is mainly useful for circuit as well as non-circuit branches of engineering. Also able to differentiate among many random variable involved in the probability models. It is quite useful for all branches of engineering.
- The student would be able to calculate mean and proportions (small and large sample) and to make important decisions from few samples which are taken out of unmanageably huge populations .It is Mainly useful for non-circuit branches of engineering.
- The students would be able to find the expected queue length, the ideal time, the traffic intensity and the waiting time. These are very useful tools in many engineering and data management problems in the industry. It is useful for all branches of engineering.
- The student would able to understand about the random process, Markov process and Markov chains which are essentially models of many time dependent processes such as signals in communications, time series analysis, queuing systems. The student would be able to find the limiting probabilities and the probabilities in nth state. It is quite useful for all branches of engineering

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>II Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A30504) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE****Objectives:**

- To explain with examples the basic terminology of functions, relations, and sets.
- To perform the operations associated with sets, functions, and relations.
- To relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.
- To describe the importance and limitations of predicate logic.
- To relate the ideas of mathematical induction to recursion and recursively defined structures.
- To use Graph Theory for solving problems.

**UNIT-I**

**Mathematical Logic** : Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Quantifiers, universal quantifiers. Predicates : Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

**UNIT-II**

**Relations**: Properties of Binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram. Functions: Inverse Function Composition of functions, recursive Functions, Lattice and its Properties, Algebraic structures : Algebraic systems Examples and general properties, Semi groups and monads, groups sub groups' homomorphism, Isomorphism.

**UNIT-III**

**Elementary Combinatorics**: Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion. Pigeon hole principles and its application.

**UNIT-IV**

**Recurrence Relation** : Generating Functions, Function of Sequences Calculating Coefficient of generating function, Recurrence relations, Solving recurrence relation by substitution and Generating funds. Characteristics

roots solution of In homogeneous Recurrence Relation.

#### **UNIT-V**

**Graph Theory :** Representation of Graph, DFS, BFS, Spanning Trees, planar Graphs. Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers.

#### **TEXT BOOKS :**

1. Elements of DISCRETE MATHEMATICS- A computer Oriented Approach- C L Liu, D P Mohapatra. Third Edition, Tata McGraw Hill.
2. Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker, PHI.

#### **REFERENCE BOOKS :**

1. Discrete Mathematics and its Applications, Kenneth H. Rosen, Fifth Edition. TMH.
2. Discrete Mathematical structures Theory and application- Malik & Sen, Cengage.
3. Discrete Mathematics with Applications, Thomas Koshy, Elsevier.
4. Logic and Discrete Mathematics, Grass Man & Trembley, Pearson Education.

#### **Outcomes:**

- Ability to Illustrate by examples the basic terminology of functions, relations, and sets and demonstrate knowledge of their associated operations.
- Ability to Demonstrate in practical applications the use of basic counting principles of permutations, combinations, inclusion/exclusion principle and the pigeonhole methodology.
- Ability to represent and Apply Graph theory in solving computer science problems.



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	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A30502) DATA STRUCTURES****Objectives:**

- To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
- To understand the notations used to analyze the Performance of algorithms.
- To understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
- To choose the appropriate data structure for a specified application.
- To understand and analyze various searching and sorting algorithms.
- To write programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables, search trees.

**UNIT- I**

Basic concepts- Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations, Introduction to Linear and Non Linear data structures.

Singly Linked Lists-Operations-Insertion, Deletion, Concatenating singly linked lists, Circularly linked lists-Operations for Circularly linked lists, Doubly Linked Lists- Operations- Insertion, Deletion.

Representation of single, two dimensional arrays, sparse matrices-array and linked representations.

**UNIT- II**

Stack ADT, definition, operations, array and linked implementations in C, applications-infix to postfix conversion, Postfix expression evaluation, recursion implementation, Queue ADT, definition and operations ,array and linked Implementations in C, Circular queues-Insertion and deletion operations, Deque (Double ended queue)ADT, array and linked implementations in C.

**UNIT- III**

Trees – Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals, Threaded binary trees, Max Priority Queue ADT-implementation-Max Heap-Definition, Insertion into a Max Heap,

Deletion from a Max Heap.

Graphs – Introduction, Definition, Terminology, Graph ADT, Graph Representations- Adjacency matrix, Adjacency lists, Graph traversals- DFS and BFS.

#### **UNIT- IV**

Searching- Linear Search, Binary Search, Static Hashing-Introduction, hash tables, hash functions, Overflow Handling.

Sorting-Insertion Sort, Selection Sort, Radix Sort, Quick sort, Heap Sort, Comparison of Sorting methods.

#### **UNIT- V**

Search Trees-Binary Search Trees, Definition, Operations- Searching, Insertion and Deletion, AVL Trees-Definition and Examples, Insertion into an AVL Tree ,B-Trees, Definition, B-Tree of order m, operations-Insertion and Searching, Introduction to Red-Black and Splay Trees(Elementary treatment-only Definitions and Examples), Comparison of Search Trees.

Pattern matching algorithm- The Knuth-Morris-Pratt algorithm, Tries (examples only).

#### **TEXT BOOKS:**

1. Fundamentals of Data structures in C, 2nd Edition, E.Horowitz, S.Sahni and Susan Anderson-Freed, Universities Press.
2. Data structures A Programming Approach with C, D.S.Kushwaha and A.K.Misra, PHI.

#### **REFERENCE BOOKS:**

1. Data structures: A Pseudocode Approach with C, 2nd edition, R.F.Gilberg And B.A.Forouzan, Cengage Learning.
2. Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
3. Data Structures using C, A.M.Tanenbaum,Y. Langsam, M.J.Augenstein, Pearson.
4. Data structures and Program Design in C, 2nd edition, R.Kruse, C.L.Tondo and B.Leung,Pearson.
5. Data Structures and Algorithms made easy in JAVA, 2nd Edition, Narsimha Karumanchi, CareerMonk Publications.
6. Data Structures using C, R.Thareja, Oxford University Press.
7. Data Structures, S.Lipscutz,Schaum's Outlines, TMH.
8. Data structures using C, A.K.Sharma, 2nd edition, Pearson..
9. Data Structures using C &C++, R.Shukla, Wiley India.
10. Classic Data Structures, D.Samanta, 2nd edition, PHI.

11. Advanced Data structures, Peter Brass, Cambridge.

**Outcomes:**

- Learn how to use data structure concepts for realistic problems.
- Ability to identify appropriate data structure for solving computing problems in respective language.
- Ability to solve problems independently and think critically.

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	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A30401) DIGITAL LOGIC DESIGN****Objectives:**

- To understand basic number systems codes and logical gates.
- To understand the Boolean algebra and minimization logic.
- To understand the design of combinational sequential circuits.
- To understand the basic s of various memory.

**UNIT-I**

**Digital Systems:** Binary Numbers, Octal, Hexa Decimal and other base numbers, Number base conversions, complements, signed binary numbers, Floating point number representation, binary codes, error detecting and correcting codes, digital logic gates(AND, NAND,OR,NOR, Ex-OR, Ex-NOR), Boolean algebra , basic theorems and properties, Boolean functions, canonical and standard forms.

**UNIT-II**

Gate –Level Minimization and combination circuits, The K-Maps Methods, Three Variable, Four Variable, Five Variable , sum of products, product of sums Simplification, Don't care conditions , NAND and NOR implementation and other two level implantation.

**UNIT-III**

**Combinational Circuits (CC):** Design Procedure, Combinational circuit for different code converters and other problems, Binary Adder, subtractor, Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, Demultiplexers.

**UNIT-IV**

**Synchronous Sequential Circuits:** Latches, Flip-flops, analysis of clocked sequential circuits, design of counters, Up-down counters, Ripple counters , Registers, Shift registers, Synchronous Counters.

Asynchronous Sequential Circuits: Reduction of state and follow tables, Role free Conditions.

**UNIT-V:**

**Memory:** Random Access memory, types of ROM, Memory decoding, address and data bus, Sequential Memory, Cache Memory, Programmable Logic Arrays, memory Hierarchy in terms of capacity and access time.

**TEXT BOOK:**

- 1) Digital Design- M. Morris Mano.

**REFERENCE BOOKS:**

- 1) Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.
- 2) Switching and Logic Design, C.V.S. Rao, Pearson Education.
- 3) Digital Principles and Design – Donald D.Givone, Tata McGraw Hill, Edition.
- 4) Fundamentals of Digital Logic & Micro Computer Design , 5TH Edition, M. Rafiqzaman John Wiley.

**Outcomes:**

After this course student could able to design, understand the number systems, combinational sequential circuits. And they should be in a position to continue with computer organization.

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	<b>4</b>	<b>-/-/</b>	<b>4</b>

**(A30404) ELECTRONIC DEVICES AND CIRCUITS****Objectives:**

This is a fundamental course, basic knowledge of which is required by all the circuit branch engineers. This course focuses:

- To familiarize the student with the principle of operation, analysis and design of Junction diode, BJT and FET amplifier circuits, transistors and field effect transistors.
- To understand diode as rectifier.
- To study basic principle of filter circuits and various types.

**UNIT -I**

**P-N Junction Diode:** Qualitative Theory of P-N Junction, P-N Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis, Breakdown Mechanisms in Semiconductor Diodes, Zener Diode Characteristics.

**Special Purpose Electronic Devices:** Principle of Operation and Characteristics of Tunnel Diode (with the help of Energy Band Diagram), Varactor Diode, SCR and Semiconductor Photo Diode.

**UNIT -II**

**Rectifiers and Filters :** The P-N junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L- Section Filters,  $\pi$ - Section Filters, Comparison of Filters, Voltage Regulation using Zener Diode.

**UNIT -III**

**Bipolar Junction Transistor and UJT:** The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, BJT Operation, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, Limits of Operation , BJT Specifications, BJT Hybrid Model, Determination of h-parameters from Transistor Characteristics, Comparison of CB, CE, and CC Amplifier Configurations, UJT and Characteristics.

**UNIT -IV**

**Transistor Biasing and Stabilization:** Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector - Emitter Feedback Bias, Voltage Divider Bias,

Bias Stability, Stabilization Factors, Stabilization against variations in  $V_{BE}$  and  $\beta$ , Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability, Analysis of a Transistor Amplifier Circuit using h-Parameters.

#### **UNIT -V**

##### **Field Effect Transistor and FET Amplifiers**

**Field Effect Transistor:** The Junction Field Effect Transistor (Construction, principle of operation, symbol) – Pinch-off Voltage - Volt-Ampere characteristics, The JFET Small Signal Model, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes.

**FET Amplifiers:** FET Common Source Amplifier, Common Drain Amplifier, Generalized FET Amplifier, Biasing FET, FET as Voltage Variable Resistor, Comparison of BJT and FET.

##### **TEXT BOOKS:**

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2 Ed.,1998, TMH.
2. Electronic Devices and Circuits – Mohammad Rashid, Cengage Learning, 2013
3. Electronic Devices and Circuits – David A. Bell, 5 Ed, Oxford.

##### **REFERENCE BOOKS:**

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 Ed., 2008, TMH.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 Ed., 2006, PEI/PHI.
3. Electronic Devices and Circuits – B. P. Singh, Rekha Singh, Pearson, 2 Ed, 2013.
4. Electronic Devices and Circuits --K. Lal Kishore, 2 Ed., 2005, BSP.
5. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal, 1 Ed., 2009, Wiley India Pvt. Ltd.
6. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 Ed., 2008, TMH.

##### **Outcomes:**

- Understand and Analyse the different types of diodes, operation and its characteristics.
- Design and analyse the DC bias circuitry of BJT and FET.
- Design biasing circuits using diodes and transistors.
- To analyze and design diode application circuits, amplifier circuits and oscillators employing BJT, FET devices.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>II Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A30202) BASIC ELECTRICAL ENGINEERING****Objectives:**

This course introduces the concepts of basic electrical engineering parameters, quantities, analysis of AC and DC circuits, the construction operation and analysis of transformers, DC and AC machines. It also gives knowledge about measuring instruments operation in detail.

**UNIT – I**

**Introduction to Electrical Engineering:** Ohm's law, basic circuit components, Kirchhoff's laws. Simple problems.

**Network Analysis:** Basic definitions, types of elements, types of sources, resistive networks, inductive networks, capacitive networks, and series parallel circuits, star delta and delta star transformation. , Network theorems- Superposition, Thevenin's, Maximum power transfer theorems and simple problems.

**UNIT-II**

**Alternating Quantities:** Principle of ac voltages, waveforms and basic definitions, root mean square and average values of alternating currents and voltage, form factor and peak factor, phasor representation of alternating quantities, the J operator and phasor algebra, analysis of ac circuits with single basic network element, single phase series circuits.

**UNIT-III**

**Transformers :** Principles of operation, Constructional Details, Ideal Transformer and Practical Transformer, Losses, Transformer Test, Efficiency and Regulation Calculations (All the above topics are only elementary treatment and simple problems).

**UNIT-IV****D.C. and A.C. Machines:**

**D.C generators:** Principle of operation of dc machines, types of D.C generators, EMF equation in D.C generator. **D.C motors:** Principle of operation of dc motors, types of D.C motors, losses and torque equation, losses and efficiency calculation in D.C generator. **A.C Machines:** Three phase induction motor, principle of operation, slip and rotor frequency, torque (simple problems).

**UNIT V**

**Basic Instruments:** Introduction, classification of instruments, operating



principles, essential features of measuring instruments, Moving coil permanent magnet (PMMC) instruments, Moving Iron of Ammeters and Voltmeters (elementary Treatment only).

**TEXT BOOKS:**

1. Basic concepts of Electrical Engineering, PS Subramanyam, BS Publications.
2. Basic Electrical Engineering, S.N. Singh, PHI.

**REFERENCE BOOKS:**

1. Basic Electrical Engineering, Abhijit Chakrabarthy, Sudipta nath, Chandrakumar Chanda, Tata-McGraw-Hill.
2. Principles of Electrical Engineering, V.K Mehta, Rohit Mehta, S.Chand Publications.
3. Basic Electrical Engineering, T.K.Nagasarkar and M.S. Sukhija, Oxford University Press.
4. Fundamentals of Electrical Engineering, RajendraPrasad, PHI.
5. Basic Electrical Engineering by D.P.Kothari , I.J. Nagrath, McGraw-Hill.

**Outcomes:**

After going through this course the student gets a thorough knowledge on basic electrical circuits, parameters, and operation of the transformers in the energy conversion process, electromechanical energy conversion, construction operation characteristics of DC and AC machines and the constructional features and operation of operation measuring instruments like voltmeter, ammeter, wattmeter etc...With which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>II Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	-	-3/-	2

**(A30282) ELECTRICAL AND ELECTRONICS LAB****PART - A**

1. Verification of Superposition and Reciprocity theorems.
2. Verification of Maximum power transfer theorem.
3. Verification of Thevenin's and Norton's theorems.
4. Magnetization characteristics of D.C. Shunt generator.
5. Swinburne's Test on DC shunt machine.
6. Brake test on DC shunt motor.
7. OC and SC tests on Single-phase transformer.
8. Brake test on 3-phase Induction motor.

**PART - B**

1. PN Junction Diode Characteristics (Forward bias, Reverse bias).
2. Zener Diode Characteristics.
3. Transistor CE Characteristics (Input and Output).
4. Rectifier without Filters (Full wave & Half wave).
5. Rectifier with Filters (Full wave & Half wave).

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>II Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	-	-/3/-	2

**(A30582) DATA STRUCTURES LAB****Objectives:**

- To write and execute programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees.
- To write and execute write programs in C to implement various sorting and searching methods.

**Recommended Systems/Software Requirements:**

- Intel based desktop PC with minimum of 166 MHZ or faster processor with at least 64 MB RAM and 100 MB free disk space.
- C compiler.

**Week1:**

Write a C program that uses functions to perform the following:

- Create a singly linked list of integers.
- Delete a given integer from the above linked list.
- Display the contents of the above list after deletion.

**Week2:**

Write a C program that uses functions to perform the following:

- Create a doubly linked list of integers.
- Delete a given integer from the above doubly linked list.
- Display the contents of the above list after deletion.

**Week3:**

Write a C program that uses stack operations to convert a given infix expression into its postfix Equivalent, Implement the stack using an array.

**Week 4:**

Write C programs to implement a double ended queue ADT using i)array and ii)doubly linked list respectively.

**Week 5 :**

Write a C program that uses functions to perform the following:

- Create a binary search tree of characters.
- Traverse the above Binary search tree recursively in Postorder.

**Week 6 :**

Write a C program that uses functions to perform the following:

- a) Create a binary search tree of integers.
- b) Traverse the above Binary search tree non recursively in inorder.

**Week 7:**

Write C programs for implementing the following sorting methods to arrange a list of integers in Ascending order :

- a) Insertion sort
- b) Merge sort

**Week 8 :**

Write C programs for implementing the following sorting methods to arrange a list of integers in ascending order:

- a) Quick sort
- b) Selection sort

**Week 9:**

i) Write a C program to perform the following operation:

- a) Insertion into a B-tree.

ii) Write a C program for implementing Heap sort algorithm for sorting a given list of integers in ascending order.

**Week 10:**

Write a C program to implement all the functions of a dictionary (ADT) using hashing.

**Week 11:**

Write a C program for implementing Knuth-Morris- Pratt pattern matching algorithm.

**Week 12:**

Write C programs for implementing the following graph traversal algorithms:

- a) Depth first traversal
- b) Breadth first traversal

**TEXT BOOKS:**

1. C and Data Structures, Third Edition, P.Padmanabham, BS Publications.
2. C and Data Structures, Prof. P.S.Deshpande and Prof. O.G. Kakde, Dreamtech Press.
3. Data structures using C, A.K.Sharma, 2nd edition, Pearson.
4. Data Structures using C, R.Thareja, Oxford University Press.
5. C and Data Structures, N.B.Venkateswarlu and E.V.Prasad,S.Chand.

6. C Programming and Data Structures, P.Radha Krishna, Hi-Tech Publishers.

**Outcomes:**

- Ability to identify the appropriate data structure for given problem.
- Graduate able to design and analyze the time and space complexity of algorithm or program.
- Ability to effectively use compilers includes library functions, debuggers and trouble shooting.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>II Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A40506) COMPUTER ORGANIZATION****Objectives:**

- To understand basic components of computers.
- To explore the I/O organizations in depth.
- To explore the memory organization.
- To understand the basic chip design and organization of 8086 with assembly language programming.

**UNIT-I****Basic Computer Organization – Functions of CPU, I/O Units, Memory:**

**Instruction:** Instruction Formats- One address, two addresses, zero addresses and three addresses and comparison; addressing modes with numeric examples: Program Control- Status bit conditions, conditional branch instructions, Program Interrupts: Types of Interrupts.

**UNIT-II****Input-Output Organizations- I/O Interface, I/O Bus and Interface**

**modules:** I/O Vs memory Bus, Isolated Vs Memory-Mapped I/O, Asynchronous data Transfer- Strobe Control, Hand Shaking: Asynchronous Serial transfer- Asynchronous Communication interface, Modes of transfer- Programmed I/O, Interrupt Initiated I/O, DMA; DMA Controller, DMA Transfer, IOP-CPU-IOP Communication, Intel 8089 IOP.

**UNIT-III****Memory Organizations**

Memory hierarchy, Main Memory, RAM, ROM Chips, Memory Address Map, Memory Connection to CPU, associate memory , Cache Memory, Data Cache, Instruction cache, Miss and Hit ratio, Access time, associative, set associative, mapping , waiting into cache, Introduction to virtual memory.

**UNIT-IV**

8086 CPU Pin Diagram- Special functions of general purpose registers, Segment register, concept of pipelining, 8086 Flag register, Addressing modes of 8086.

**UNIT-V**

**8086-Instruction formats:** assembly Language Programs involving branch & Call instructions, sorting, evaluation of arithmetic expressions.

**TEXT BOOKS:**

- 1) Computer system Architecture: Morris Mano (UNIT-1,2,3).
- 2) Advanced Micro Processor and Peripherals- Hall/ A K Ray(UNIT-4,5).

**REFERENCE BOOKS:**

- 1) Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
- 2) Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson.
- 3) Fundamentals of Computer Organization and Design, - Sivarama Dandamudi Springer Int. Edition.
- 4) Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier.
- 5) Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

**Outcomes:**

After this course students understand in a better way the I/O and memory organization in depth. They should be in a position to write assembly language programs for various applications.

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	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A40507) DATABASE MANAGEMENT SYSTEMS****Objectives:**

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- To understand the relational database design principles.
- To become familiar with the basic issues of transaction processing and concurrency control.
- To become familiar with database storage structures and access techniques.

**UNIT- I**

Introduction-Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction, Instances and Schemas, Data Models, Database Languages – DDL, DML, Database Access from Application Programs, Transaction Management, Data Storage and Querying, Database Architecture, Database Users and Administrators, History of Data base Systems.

Introduction to Data base design, ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises. Relational Model: Introduction to the Relational Model – Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views – Destroying /altering Tables and Views.

**UNIT- II**

**Relational Algebra and Calculus:** Relational Algebra – Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

Form of Basic SQL Query – Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries, Set – Comparison Operators, Aggregate Operators, NULL values – Comparison using Null values – Logical connectives – AND, OR and NOT – Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active Data bases.



**UNIT- III**

Introduction to Schema Refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF –Properties of Decompositions- Loss less-join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form, Join Dependencies, FIFTH Normal form, Inclusion Dependencies.

**UNIT- IV**

Transaction Management-Transaction Concept- Transaction State-Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability.

Concurrency Control- Lock –Based Protocols – Timestamp Based Protocols-Validation- Based Protocols – Multiple Granularity.

Recovery System-Failure Classification-Storage Structure-Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- Remote Backup systems.

**UNIT- V**

**Overview of Storage and Indexing:** Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing, Comparison of File Organizations.

**Tree Structured Indexing:** Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM) B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

**Hash Based Indexing:** Static Hashing, Extendable hashing, Linear Hashing, Extendible vs. Linear Hashing.

**TEXT BOOKS:**

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3rd Edition, 2003.
2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw hill, VI edition, 2006.

**REFERENCE BOOKS:**

1. Database Systems, 6th edition, Ramez Elmasri, Shamkant B.Navathe, Pearson Education, 2013.
2. Database Principles, Programming, and Performance, P.O'Neil, E.O'Neil, 2nd ed., ELSEVIER.

3. Database Systems, A Practical approach to Design Implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.
4. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.
5. Fundamentals of Relational Database Management Systems, S.Sumathi, S.Esakkirajan, Springer.
6. Database Management System Oracle SQL and PL/SQL, P.K.Das Gupta, PHI.
7. Introduction to Database Management, M.L.Gillenson and others, Wiley Student Edition.
8. Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.
9. Introduction to Database Systems, C.J.Date, Pearson Education.
10. Database Management Systems, G.K.Gupta, TMH.

**Outcomes:**

- Demonstrate the basic elements of a relational database management system.
- Ability to identify the data models for relevant problems.
- Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data.
- Apply normalization for the development of application software's.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

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	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A40503) JAVA PROGRAMMING****Objectives:**

- To understand object oriented programming concepts, and apply them in problem solving.
- To learn the basics of java Console and GUI based programming.

**UNIT- I**

**OOP concepts** – Data abstraction, encapsulation, inheritance, benefits of inheritance, polymorphism, classes and objects, Procedural and object oriented programming paradigms

**Java programming** - History of Java, comments, data types, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow - block scope, conditional statements, loops, break and continue statements, simple java stand alone programs, arrays, console input and output, formatting output, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection, building strings, exploring string class.

**UNIT- II**

**Inheritance** - Inheritance hierarchies, super and sub classes, Member access rules, super keyword, preventing inheritance: final classes and methods, the Object class and its methods

**Polymorphism**- dynamic binding, method overriding, abstract classes and methods.

**Interfaces** – Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface.

**Inner classes** – Uses of inner classes, local inner classes, anonymous inner classes, static inner classes, examples.

**Packages**-Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

**UNIT- III**

**Exception handling** – Dealing with errors, benefits of exception handling, the classification of exceptions- exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, re-throwing exceptions, exception specification, built in exceptions, creating

own exception sub classes.

**Multithreading** - Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, producer consumer pattern.

#### **UNIT- IV**

**Collection Framework in Java** – Introduction to Java Collections, Overview of Java Collection frame work, Generics, Commonly used Collection classes– Array List, Vector, Hash table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, calendar and Properties

**Files** – streams- byte streams, character streams, text Input/output, binary input/output, random access file operations, File management using File class.

**Connecting to Database** - JDBC Type 1 to 4 drivers, connecting to a database, querying a database and processing the results, updating data with JDBC.

#### **UNIT- V**

**GUI Programming with Java** - The AWT class hierarchy, Introduction to Swing, Swing vs. AWT, Hierarchy for Swing components, Containers – JFrame, JApplet, JDialog, JPanel, Overview of some swing components- JButton, JLabel, JTextField, JTextArea, simple swing applications, Layout management - Layout manager types – border, grid and flow

**Event handling** - Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listeners, Delegation event model, Examples: handling a button click, handling mouse events, Adapter classes.

**Applets** – Inheritance hierarchy for applets, differences between applets and applications, life cycle of an applet, passing parameters to applets, applet security issues.

#### **TEXT BOOK:**

1. Java Fundamentals – A comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

#### **REFERENCE BOOKS:**

1. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education (OR) Java: How to Program P.J.Deitel and H.M.Deitel, PHI.
2. Object Oriented Programming through Java, P.Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, Pearson Education
4. Programming in Java, S.Malhotra and S.Choudhary, Oxford Univ. Press.

**Outcomes:**

- Understanding of OOP concepts and basics of java programming (Console and GUI based).
- The skills to apply OOP and Java programming in problem solving.
- Should have the ability to extend his/her knowledge of Java programming further on his/her own.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****II Year B.Tech. CSE-II Sem****L T/P/D C****4 -/- 4****(A40009) ENVIRONMENTAL STUDIES****Objectives:**

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding of environmental policies and regulations

**UNIT-I :**

**Ecosystems:** Definition, Scope and Importance of ecosystem. Classification, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

**UNIT-II:**

**Natural Resources: Classification of Resources:** Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

**UNIT-III:**

**Biodiversity and Biotic Resources:** Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

**UNIT-IV:**

**Environmental Pollution and Control Technologies: Environmental Pollution:** Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and

characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary, Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Problems And Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

#### **UNIT-V:**

**Environmental Policy, Legislation & EIA:** Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. **EIA:** EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

#### **SUGGESTED TEXT BOOKS:**

- 1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
- 2 Environmental Studies by R. Rajagopalan, Oxford University Press.

#### **REFERENCE BOOKS:**

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B.Botkin & Edward A.Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

#### **Outcomes:**

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which inturn helps in sustainable development.

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	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A40509) FORMAL LANGUAGES AND AUTOMATA THEORY****Objectives:**

The purpose of this course is to acquaint the student with an overview of the theoretical foundations of computer science from the perspective of formal languages.

- Classify machines by their power to recognize languages.
- Employ finite state machines to solve problems in computing.
- Explain deterministic and non-deterministic machines.
- Comprehend the hierarchy of problems arising in the computer sciences.

**UNIT- I**

**Fundamentals** : Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings, and languages, deterministic finite automaton and non deterministic finite automaton, transition diagrams and Language recognizers. **Finite Automata** : NFA with  $\epsilon$  transitions - Significance, acceptance of languages. Conversions and Equivalence : Equivalence between NFA with and without  $\epsilon$ -transitions, NFA to DFA conversion, minimisation of FSM, equivalence between two FSM's, Finite Automata with output- Moore and Melay machines.

**UNIT-II**

**Regular Languages** : Regular sets, regular expressions, identity rules, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions. Pumping lemma of regular sets, closure properties of regular sets (proofs not required) **Grammar Formalism** : Regular grammars-right linear and left linear grammars, equivalence between regular linear grammar and FA, inter conversion, Context free grammar, derivation trees, sentential forms. Right most and leftmost derivation of strings.

**UNIT- III**

**Context Free Grammars** : Ambiguity in context free grammars. Minimisation of Context Free Grammars. Chomsky normal form, Greiback normal form, Pumping Lemma for Context Free Languages. Enumeration of properties of CFL (proofs omitted). **Push Down Automata** : Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, interconversion. (Proofs not required). Introduction to DCFL and DPDA.



**UNIT- IV**

**Turing Machine** : Turing Machine, definition, model, design of TM, Computable functions, recursively enumerable languages. Church's hypothesis, counter machine, types of Turing machines (proofs not required). linear bounded automata and context sensitive language.

**UNIT- V**

**Computability Theory** : Chomsky hierarchy of languages, decidability of, problems, Universal Turing Machine, undecidability of posts. Correspondence problem, Turing reducibility, Definition of P and NP problems, NP complete and NP hard problems.

**TEXT BOOKS :**

1. "Introduction to Automata Theory Languages and Computation". Hopcroft H.E. and Ullman J. D. Pearson Education.
2. Introduction to Theory of Computation –Sipser 2nd edition Thomson.

**REFERENCE BOOKS :**

1. Introduction to Formal languages Automata Theory and Computation Kamala Krithivasan Rama R.
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
3. Theory Of Computation: A Problem-Solving Approach, Kavi Mahesh, Wiley India Pvt. Ltd.
4. "Elements of Theory of Computation", Lewis H.P. & Papadimition C.H. Pearson /PHI.
5. Theory of Computer Science – Automata languages and computation -Mishra and Chandrashekaran, 2nd edition, PHI.

**Outcomes:**

- Graduate should be able to understand the concept of abstract machines and their power to recognize the languages.
- Attains the knowledge of language classes & grammars relationship among them with the help of Chomsky hierarchy.
- Graduate will be able to understanding the pre-requisites to the course compiler or advanced compiler design.

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	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A40508) DESIGN AND ANALYSIS OF ALGORITHMS****Objectives:**

- To analyze performance of algorithms.
- To choose the appropriate data structure and algorithm design method for a specified application.
- To understand how the choice of data structures and algorithm design methods impacts the performance of programs.
- To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
- Prerequisites (Subjects) Data structures, Mathematical foundations of computer science.

**UNIT- I**

**Introduction:** Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized complexity.

**Divide and conquer:** General method, applications-Binary search, Quick sort, Merge sort, Strassen's Matrix Multiplication.

**UNIT- II**

**Searching and Traversal Techniques:** Efficient non-recursive binary tree traversal algorithms, Disjoint set operations, union and find algorithms, Spanning trees, Graph traversals- Breadth first search and Depth first search, AND/OR graphs, game trees, Connected Components, Bi-connected components.

**UNIT- III**

**Greedy method:** General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

**Dynamic Programming:** General method, applications-Multistage graphs, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Traveling sales person problem, Reliability design.

**UNIT- IV**

**Backtracking:** General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

**Branch and Bound:** General method, applications - Traveling sales person problem, 0/1 knapsack problem-LC Branch and Bound solution, FIFO Branch and Bound solution.

#### **UNIT- V**

**NP-Hard and NP-Complete problems:** Basic concepts, Non-deterministic algorithms, NP - Hard and NP- Complete classes, NP-Hard problems, Cook's theorem.

#### **TEXT BOOKS:**

1. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Satraj Sahni and S.Rajasekharan, Universities Press, 2008.
2. Foundations of Algorithms, 4th edition, R.Neapolitan and K.Naimipour, Jones and Bartlett Learning.
3. Design and Analysis of Algorithms, P.H.Dave, H.B.Dave, Pearson Education, 2008.

#### **REFERENCE BOOKS:**

1. Computer Algorithms, Introduction to Design and Analysis, 3rd Edition, Sara Baase, Allen, Van, Gelder, Pearson Education.
2. Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia, John Wiley and sons.
3. Fundamentals of Sequential and Parallel Algorithms, K.A.Berman and J.L.Paul, Cengage Learning.
4. Introduction to the Design and Analysis of Algorithms, A.Levitin, Pearson Education.
5. Introduction to Algorithms, 3rd Edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, PHI Pvt.Ltd.
6. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson Education, 2004.

#### **Outcomes:**

- Be able to analyze algorithms and improve the efficiency of algorithms.
- Apply different designing methods for development of algorithms to realistic problems, such as divide and conquer, greedy and etc.
- Ability to understand and estimate the performance of algorithm.

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	-	-/3/-	2

**(A40585) JAVA PROGRAMMING LAB****Objectives:**

To introduce java compiler and eclipse platform.

To impart hand on experience with java programming.

**Note:**

1. Use Linux and MySQL for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform.
2. The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.
  - 1) Use Eclipse or Netbean platform and acquaint with the various menus. Create a test project, add a test class and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.
  - 2) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, \*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.
  - 3a) Develop an applet in Java that displays a simple message.
    - b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.
  - 4) Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.
  - 5) Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.
  - 6) Write a Java program that connects to a database using JDBC and

does add, delete, modify and retrieve operations.

- 7) Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in selected color. Initially, there is no message shown.
- 8) Write a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea () that prints the area of the given shape.
- 9) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Labels in Grid Layout.
- 10) Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).
- 11) Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).
- 12) Implement the above program with database instead of a text file.
- 13) Write a Java program that takes tab separated data (one record per line) from a text file and inserts them into a database.
- 14) Write a java program that prints the meta-data of a given table

**TEXT BOOK:**

1. Java Fundamentals – A comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

**REFERENCE BOOKS:**

1. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education (OR) Java: How to Program P.J.Deitel and H.M.Deitel, PHI.
2. Object Oriented Programming through Java, P.Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, Pearson Education.
4. Programming in Java, S.Malhotra and S.Choudhary, Oxford Univ. Press.

**Outcomes:**

- Basics of java programming, multi-threaded programs and Exception handling.
- The skills to apply OOP in Java programming in problem solving.
- Ability to access data from a DB with Java programs.
- Use of GUI components (Console and GUI based).

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	-	-/3/-	2

**(A40584) DATABASE MANAGEMENT SYSTEMS LAB****Objectives:**

This lab enables the students to practice the concepts learnt in the subject DBMS by developing a database for an example company named "Roadway Travels" whose description is as follows. The student is expected to practice the designing, developing and querying a database in the context of example database "Roadway travels". Students are expected to use "Mysql" database.

**Roadway Travels**

"Roadway Travels" is in business since 1997 with several buses connecting different places in India. Its main office is located in Hyderabad.

The company wants to computerize its operations in the following areas:

- Reservations and Ticketing
- Cancellations

**Reservations & Cancellation:**

Reservations are directly handled by booking office. Reservations can be made 30 days in advance and tickets issued to passenger. One Passenger/person can book many tickets (to his/her family).

Cancellations are also directly handed at the booking office.

In the process of computerization of Roadway Travels you have to design and develop a Database which consists the data of Buses, Passengers, Tickets, and Reservation and cancellation details. You should also develop query's using SQL to retrieve the data from the database.

The above process involves many steps like 1. Analyzing the problem and identifying the Entities and Relationships, 2. E-R Model 3. Relational Model 4. Normalization 5. Creating the database 6. Querying. Students are supposed to work on these steps week wise and finally create a complete "Database System" to Roadway Travels. Examples are given at every experiment for guidance to students.

**Experiment 1: E-R Model**

Analyze the carefully and come up with the entities in it. Identify what data has to be persisted in the database. This contains the entities, attributes etc.

Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, if any.

**Example: Entities:**

1. BUS

- 2. Ticket
- 3. Passenger

**Relationships:**

- 1. Reservation
- 2. Cancellation

**PRIMARY KEY ATTRIBUTES:**

- 1. Ticket ID (Ticket Entity)
- 2. Passport ID (Passenger Entity)
- 3. Bus\_NO (Bus Entity)

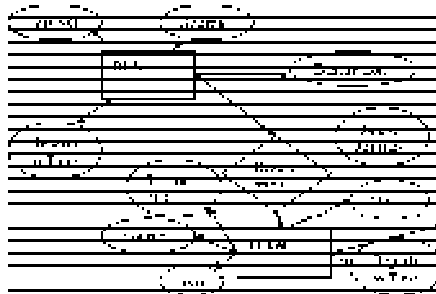
Apart from the above mentioned entities you can identify more. The above mentioned are few.

Note: The student is required to submit a document by writing the Entities and Keys to the lab teacher.

**Experiment 2: Concept design with E-R Model**

Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entities and weak entities (if any). Indicate the type of relationships (total / partial). Try to incorporate generalization, aggregation, specialization etc wherever required.

**Example: E-R diagram for bus**



Note: The student is required to submit a document by drawing the E-R Diagram to the lab teacher.

**Experiment 3: Relational Model**

Represent all the entities (Strong, Weak) in tabular fashion. Represent relationships in a tabular fashion. There are different ways of representing relationships as tables based on the cardinality. Represent attributes as columns in tables or as tables based on the requirement. Different types of attributes (Composite, Multi-valued, and Derived) have different way of representation.

Example: The passenger tables look as below. This is an example. You can



add more attributes based on your E-R model. This is not a normalized table.

Passenger

Name	Age	Sex	Address	Ticket_id	Passport ID

*Note: The student is required to submit a document by Represent relationships in a tabular fashion to the lab teacher.*

**Experiment 4: Normalization**

Database normalization is a technique for designing relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain types of logical or structural problems, namely data anomalies. For example, when multiple instances of a given piece of information occur in a table, the possibility exists that these instances will not be kept consistent when the data within the table is updated, leading to a loss of data integrity. A table that is sufficiently normalized is less vulnerable to problems of this kind, because its structure reflects the basic assumptions for when multiple instances of the same information should be represented by a single instance only.

For the above table in the First normalization we can remove the multi valued attribute Ticket\_id and place it in another table along with the primary key of passenger.

First Normal Form: The above table can be divided into two tables as shown below.

Passenger

Name	Age	Sex	Address	Passport ID

Passport ID	Ticket_id

You can do the second and third normal forms if required. Any how Normalized tables are given at the end.

**Experiment 5: Installation of Mysql and practicing DDL commands**

Installation of MySQL. In this week you will learn Creating databases, How to create tables, altering the database, dropping tables and databases if not required. You will also try truncate, rename commands etc.

Example for creation of a normalized “Passenger” table.

```
CREATE TABLE Passenger (
    Passport_id INTEGER PRIMARY KEY,
    Name VARCHAR (50) Not NULL,
    Age Integer Not NULL,
    Sex Char,
    Address VARCHAR (50) Not NULL);
```

Similarly create all other tables.

**Note: Detailed creation of tables is given at the end.**

**Experiment 6: Practicing DML commands**

DML commands are used to for managing data within schema objects. Some examples:

- SELECT - retrieve data from the a database
- INSERT - insert data into a table
- UPDATE - updates existing data within a table
- DELETE - deletes all records from a table, the space for the records remain

**Inserting values into “Bus” table:**

```
Insert into Bus values (1234,'hyderabad', 'tirupathi');
```

```
Insert into Bus values (2345,'hyderabad','Banglore');
```

```
Insert into Bus values (23,'hyderabad','Kolkata');
```

```
Insert into Bus values (45,'Tirupathi','Banglore');
```

```
Insert into Bus values (34,'hyderabad','Chennai');
```

**Inserting values into “Passenger” table:**

```
Insert into Passenger values (1, 45,'ramesh', 45,'M','abc123');
```

```
Insert into Passenger values (2, 78,'geetha', 36,'F','abc124');
```

```
Insert into Passenger values (45, 90,'ram', 30,'M','abc12');
```

```
Insert into Passenger values (67, 89,'ravi', 50,'M','abc14');
```

```
Insert into Passenger values (56, 22,'seetha', 32,'F','abc55');
```

**Few more Examples of DML commands:**

```
Select * from Bus; (selects all the attributes and display)
```

UPDATE BUS SET Bus No = 1 WHERE BUS NO=2;

### Experiment 7: Querying

In this week you are going to practice queries (along with sub queries) using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.

#### Practice the following Queries:

1. Display unique PNR\_no of all passengers.
2. Display all the names of male passengers.
3. Display the ticket numbers and names of all the passengers.
4. Find the ticket numbers of the passengers whose name start with 'r' and ends with 'h'.
5. Find the names of passengers whose age is between 30 and 45.
6. Display all the passengers names beginning with 'A'
7. Display the sorted list of passengers names

#### Experiment 8 and Experiment 9: Querying (continued...)

You are going to practice queries using Aggregate functions (COUNT, SUM, AVG, and MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

1. Write a Query to display the Information present in the Passenger and cancellation tables. Hint: Use UNION Operator.
2. Display the number of days in a week on which the 9W01 bus is available.
3. Find number of tickets booked for each PNR\_no using GROUP BY CLAUSE. Hint: Use GROUP BY on PNR\_No.
4. Find the distinct PNR numbers that are present.
5. Find the number of tickets booked by a passenger where the number of seats is greater than 1. Hint: Use GROUP BY, WHERE and HAVING CLAUSES.
6. Find the total number of cancelled seats.

#### Experiment 10: Triggers

In this week you are going to work on Triggers. Creation of insert trigger, delete trigger, update trigger. Practice triggers using the above database.

**Eg: CREATE TRIGGER updcheck BEFORE UPDATE ON passenger**

**FOR EACH ROW**

**BEGIN**

**IF NEW.TickentNO > 60 THEN**

**SET New.Tickent no = Ticket no;**

```

ELSE
    SET New.Ticketno = 0;
END IF;
END;

```

**Experiment 11: Procedures**

In this session you are going to learn Creation of stored procedure, Execution of procedure and modification of procedure. Practice procedures using the above database.

```

Eg:CREATE PROCEDURE myProc()
BEGIN
SELECT COUNT(Tickets) FROM Ticket WHERE age>=40;
End;

```

**Experiment 12: Cursors**

In this week you need to do the following: Declare a cursor that defines a result set.

Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done

```

CREATE PROCEDURE myProc(in_customer_id INT)
BEGIN
DECLARE v_id INT;
DECLARE v_name VARCHAR (30);
DECLARE c1 CURSOR FOR SELECT stdId,stdFirstname FROM
students WHERE stdId=in_customer_id;
OPEN c1;
FETCH c1 into v_id, v_name;
Close c1;
END;

```

Tables

**BUS**

Bus No: Varchar: PK (public key)

Source : Varchar

Destination : Varchar

**Passenger**

PPNO: Varchar(15)) : PK

Name: Varchar(15)

Age : int (4)

Sex:Char(10) : Male / Female

Address: VarChar(20)

#### **Passenger\_Tickets**

PPNO: Varchar(15)) : PK

Ticket\_No: Numeric (9)

#### **Reservation**

PNR\_No: Numeric(9) : FK

Journey\_date : datetime(8)

No\_of\_seats : int (8)

Address : Varchar (50)

Contact\_No: Numeric (9)--> Should not be less than 9 and Should not accept any other character other than Integer

Status: Char (2) : Yes / No

#### **Cancellation**

PNR\_No: Numeric(9) : FK

Journey\_date : datetime(8)

No\_of\_seats : int (8)

Address : Varchar (50)

Contact\_No: Numeric (9)--> Should not be less than 9 and Should not accept any other character other than Integer

Status: Char (2) : Yes / No

#### **Ticket**

Ticket\_No: Numeric (9): PK

Journey\_date : datetime(8)

Age : int (4)

Sex:Char(10) : Male / Female

Source : Varchar

Destination : Varchar

Dep\_time : Varchar

#### **REFERENCE BOOKS:**

1. Introduction to SQL, Rick F.Vander Lans, Pearson education.
2. Oracle PL/SQL, B.Rosenzweig and E.Silvestrova,Pearson education.
3. Oracle PL/SQL Programming,Steven Feuerstein,SPD.
4. SQL & PL/SQL for Oracle 10g, Black Book, Dr.P.S.Deshpande, Dream

Tech.

5. Oracle Database 11g PL/SQL Programming, M.Mc Laughlin, TMH.
6. SQL Fundamentals, J.J.Patrick, Pearson Education.

**Outcomes:**

- Ability to design and implement a database schema for given problem.
- Be capable to Design and build a GUI application.
- Apply the normalization techniques for development of application software to realistic problems.
- Ability to formulate queries using SQL DML/DDDL/DCL commands.

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**(A50511) PRINCIPLES OF PROGRAMMING LANGUAGES****Objectives:**

- To briefly describe various programming paradigms.
- To provide conceptual understanding of High level language design and implementation.
- To introduce the power of scripting languages.

**UNIT- I**

**Preliminary Concepts:** Reasons for studying, concepts of programming languages, Programming domains, Language Evaluation Criteria, influences on Language design, Language categories, Programming Paradigms – Imperative, Object Oriented, functional Programming , Logic Programming. Programming Language Implementation – Compilation and Virtual Machines, programming environments. Syntax and Semantics: general Problem of describing Syntax and Semantics, formal methods of describing syntax - BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, attribute grammars, denotational semantics and axiomatic semantics for common programming language features.

**UNIT- II**

**Data types:** Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization. Expressions and Statements: Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements, Control Structures – Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements, guarded commands.

**UNIT-III**

**Subprograms and Blocks:** Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions user defined overloaded operators, co routines.

**UNIT- IV**

**Abstract Data types:** Abstractions and encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT,

object oriented programming in small talk, C++, Java, C#, Ada 95

**Concurrency:** Subprogram level concurrency, semaphores, monitors, message passing, Java threads, C# threads.

**Exception handling :** Exceptions, exception Propagation, Exception handler in Ada, C++ and Java.

**Logic Programming Language :** Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

#### **UNIT- V**

**Functional Programming Languages:** Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages.

Scripting Language: Pragmatics, Key Concepts, Case Study : Python – Values and Types, Variables , Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library.

#### **TEXT BOOKS:**

1. Concepts of Programming Languages Robert .W. Sebesta 8/e, Pearson Education,2008.
2. Programming Language Design Concepts, D. A. Watt, Wiley dreamtech,rp-2007.

#### **REFERENCE BOOKS:**

1. Programming Languages, 2nd Edition, A.B. Tucker, R.E. Noonan, TMH.
2. Programming Languages, K. C.Louden, 2nd Edition, Thomson, 2003.
3. LISP, Patric Henry Winston and Paul Horn, Pearson Education.
4. Programming in Prolog, W.F. Clocksin,& C.S.Mellish, 5th Edition, Springer.
5. Programming Python, M.Lutz, 3rd Edition, O'reilly, SPD, rp-2007.
6. Core Python Programming, Chun, II Edition, Pearson Education, 2007.
7. Guide to Programming with Python, Michael Dawson, Thomson, 2008

#### **Outcomes:**

- Ability to express syntax and semantics in formal notation.
- Ability to apply suitable programming paradigm for the application.
- Gain Knowledge and comparison of the features programming languages.



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-I Sem****L T/P/D C****4 -/- 4****(A50018) HUMAN VALUES AND PROFESSIONAL ETHICS****(Open Elective)**

Objectives : This introductory course input is intended

- a. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- b. To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Value based living in a natural way.
- c. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

**Unit I:**

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self Exploration-what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

**Unit II:**

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' - Sukh and Savidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

**Unit III:****Understanding Harmony in the Family and Society- Harmony in Human**

- **Human Relationship** : Understanding harmony in the Family- the basic unit of human interaction. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; **Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.** Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals. Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha )- from family to world family!

**Unit IV:**

**Understanding Harmony in the Nature and Existence - Whole existence as Co-existence** : Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

**Unit V:**

**Implications of the above Holistic Understanding of Harmony on Professional Ethics** : Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

- a) Ability to utilize the professional competence for augmenting universal human order,
- b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
- c) Ability to identify and develop appropriate technologies and management patterns for above production systems.

Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order:

- a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers
- b) At the level of society: as mutually enriching institutions and organizations

**TEXT BOOKS**

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in

Human Values and Professional Ethics.

2. Prof. KV Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

#### **REFERENCE BOOKS**

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. A Nagraj, 1998, Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Susan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
5. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A.N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethichs (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.

#### **Relevant CDs, Movies, Documentaries & Other Literature:**

1. Value Education website, <http://www.uptu.ac.in>
2. Story of Stuff, <http://www.storyofstuff.com>
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charlie Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story

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**(A50017) INTELLECTUAL PROPERTY RIGHTS****(Open Elective)****UNIT – I**

**Introduction to Intellectual property:** Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

**UNIT – II**

**Trade Marks :** Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

**UNIT – III**

**Law of copy rights :** Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents : Foundation of patent law, patent searching process, ownership rights and transfer

**UNIT – IV**

**Trade Secrets :** Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

**Unfair competition :** Misappropriation right of publicity, False advertising.

**UNIT – V**

**New development of intellectual property:** new developments in trade mark law ; copy right law, patent law, intellectual property audits.

International overview on intellectual property, international – trade mark law, copy right law, international patent law, international development in trade secrets law.

**TEXT BOOKS & REFERENCES:**

1. Intellectual property right, Deborah. E. Bouchoux, cengage learning.
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tate Mc Graw Hill Publishing company ltd.,

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**(A50117) DISASTER MANAGEMENT****(Open Elective)****Unit-I**

**Environmental Hazards & Disasters:** Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

**Unit –II**

**Types of Environmental hazards & Disasters:** Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards –

**Unit –III**

Endogenous Hazards - Volcanic Eruption – Earthquakes – Landslides - Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - - Earthquake Hazards in India - - Human adjustment, perception & mitigation of earthquake.

**Unit –IV**

Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters

**Infrequent events:** Cyclones – Lightning – Hailstorms

**Cyclones:** Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes , distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves Floods:- Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & mitigation) Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Palnetary Hazards/ Disasters- Man induced Hazards / Disasters- Physical hazards/ Disasters-Soil Erosion

**Soil Erosion:**-- Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion

**Chemical hazards/ disasters:**-- Release of toxic chemicals, nuclear explosion- Sedimentation processes Sedimentation processes:- Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation

**Biological hazards/ disasters:**- Population Explosion.

#### **Unit –V**

Emerging approaches in Disaster Management- Three Stages

1. Pre- disaster stage (preparedness)
2. Emergency Stage
3. Post Disaster stage-Rehabilitation

#### **TEXT BOOKS:**

1. Disaster Mitigation: Experiences And Reflections by Pardeep Sahni
2. Natural Hazards & Disasters by Donald Hyndman & David Hyndman – Cengage Learning

#### **REFERENCES**

1. R.B.Singh (Ed) Environmental Geography, Heritage Publishers New Delhi,1990
2. Savinder Singh Environmental Geography, Prayag Pustak Bhawan, 1997
3. Kates,B.I & White, G.F The Environment as Hazards, oxford, New York, 1978
4. R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
5. H.K. Gupta (Ed) Disaster Management, Universiters Press, India, 2003
6. R.B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994
7. Dr. Satender , Disaster Management t in Hills, Concept Publishing Co., New Delhi, 2003
8. A.S. Arya Action Plan For Earthquake,Disaster, Mitigation in V.K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994
9. R.K. Bhandani An overview on Natural & Man made Disaster & their Reduction,CSIR, New Delhi
10. M.C. Gupta Manuals on Natural Disaster management in India, National Centre for Disaster Management, IIPA, New Delhi, 2001

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**(A50518) SOFTWARE ENGINEERING****Objectives:**

- To understanding of software process models such as waterfall and evolutionary models.
- To understanding of software requirements and SRS document.
- To understanding of different software architectural styles.
- To understanding of software testing approaches such as unit testing and integration testing.
- To understanding on quality control and how to ensure good quality software.

**UNIT- I**

**Introduction to Software Engineering:** The evolving role of software, Changing Nature of Software, legacy software, Software myths.

**A Generic view of process:** Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

**Process models:** The waterfall model, Incremental process models, Evolutionary process models, Specialized process models, The Unified process.

**UNIT- II**

**Software Requirements:** Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

**Requirements engineering process:** Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

**System models:** Context Models, Behavioral models, Data models, Object models, structured methods.

**UNIT- III**

**Design Engineering:** Design process and Design quality, Design concepts, the design model, pattern based software design.

**Creating an architectural design:** software architecture, Data design, Architectural styles and patterns, Architectural Design, assessing alternative architectural designs, mapping data flow into a software architecture.

**Modeling component-level design :** Designing class-based components, conducting component-level design, Object constraint language, designing conventional components.

**Performing User interface design:** Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

#### **UNIT- IV**

**Testing Strategies:** A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

**Product metrics:** Software Quality, Frame work for Product metrics, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Metrics for Process and Products: Software Measurement, Metrics for software quality.

#### **UNIT- V**

**Risk management:** Reactive vs Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

**Quality Management:** Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

#### **TEXT BOOKS:**

1. Software Engineering A practitioner's Approach, Roger S Pressman, sixth edition McGrawHill International Edition.
2. Software Engineering, Ian Sommerville, seventh edition, Pearson education.

#### **REFERENCE BOOKS:**

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, Rajib Mall,PHI, 2005
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition 2006.
7. Software Engineering Foundations, Yingxu Wang, Auerbach



Publications,2008.

8. Software Engineering Principles and Practice, Hans Van Vliet,3rd edition, John Wiley & Sons Ltd.
9. Software Engineering 3: Domains, Requirements, and Software Design, D. Bjorner, Springer International Edition.
10. Introduction to Software Engineering, R.J. Leach, CRC Press.

**Outcomes:**

- Ability to identify the minimum requirements for the development of application.
- Ability to develop, maintain, efficient, reliable and cost effective software solutions
- Ability to critically think and evaluate assumptions and arguments.

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**(A50514) COMPILER DESIGN****Objectives:**

- To describe the steps and algorithms used by language translators.
- To discuss the effectiveness of optimization.
- To explain the machine dependent aspects of Compilation

**UNIT – I**

**Overview of Compilation:** Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation – LEX lexical analyzer generator.

**Top down Parsing:** Context free grammars, Top down parsing – Backtracking, LL (1), recursive descent parsing, Predictive parsing, Preprocessing steps required for predictive parsing.

**UNIT – II**

**Bottom up parsing :** Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing , handling ambiguous grammar, YACC – automatic parser generator.

**UNIT – III**

**Semantic analysis :** Intermediate forms of source Programs – abstract syntax tree, polish notation and three address codes. Attributed grammars, Syntax directed translation, Conversion of popular Programming languages language Constructs into Intermediate code forms, Type checker.

**Symbol Tables :** Symbol table format, organization for block structures languages, hashing, tree structures representation of scope information. Block structures and non block structure storage allocation: static, Runtime stack and heap storage allocation, storage allocation for arrays, strings and records.

**UNIT – IV**

**Code optimization :** Consideration for Optimization, Scope of Optimization, local optimization, loop optimization, frequency reduction, folding, DAG representation.

**Data flow analysis :** Flow graph, data flow equation, global optimization, redundant sub expression elimination, Induction variable elements, Live variable analysis, Copy propagation.

**UNIT – V**

**Object code generation** : Object code forms, machine dependent code optimization, register allocation and assignment generic code generation algorithms, DAG for register allocation.

**TEXT BOOKS :**

1. Principles of compiler design -A.V. Aho . J.D.Ullman; Pearson Education.
2. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.

**REFERENCE BOOKS :**

1. lex &yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
2. Modern Compiler Design- Dick Grune, Henry E. Bal, Caryl T. H. Jacobs, Wiley dreamtech.
3. Engineering a Compiler-Cooper & Linda, Elsevier.
4. Compiler Construction, Loudon, Thomson.

**Outcomes:**

- Ability to understand the design of a compiler given features of the languages.
- Ability to implement practical aspects of automata theory.
- Gain Knowledge of powerful compiler generation tools.

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**(A50510) OPERATING SYSTEMS****Objectives:**

- To understand main components of OS and their working
- To study the operations performed by OS as a resource manager
- To understand the scheduling policies of OS
- To understand the different memory management techniques
- To understand process concurrency and synchronization
- To understand the concepts of input/output, storage and file management
- To study different OS and compare their features.

**UNIT- I**

**Operating System Introduction:** Operating Systems objectives and functions, Computer System Architecture, OS Structure, OS Operations, Evolution of Operating Systems - Simple Batch, Multi programmed, time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, Special -Purpose Systems, Operating System services, User OS Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, OS Structure, Virtual Machines.

**UNIT- II**

Process and CPU Scheduling - Process concepts-The Process, Process State, Process Control Block, Threads, Process Scheduling-Scheduling Queues, Schedulers, Context Switch, Preemptive Scheduling, Dispatcher, Scheduling Criteria, Scheduling algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Thread scheduling, Case studies: Linux, Windows.

Process Coordination – Process Synchronization, The Critical Section Problem, Peterson's solution, Synchronization Hardware, Semaphores, and Classic Problems of Synchronization, Monitors, Case Studies: Linux, Windows.

**UNIT- III**

Memory Management and Virtual Memory - Logical & Physical Address Space, Swapping, Contiguous Allocation, Paging, Structure of Page Table, Segmentation, Segmentation with Paging, Virtual Memory, Demand Paging, Performance of Demanding Paging, Page Replacement Page Replacement Algorithms, Allocation of Frames, Thrashing.

**UNIT- IV**

File System Interface - The Concept of a File, Access methods, Directory Structure, File System Mounting, File Sharing, Protection, File System Implementation - File System Structure, File System Implementation, Allocation methods, Free-space Management, Directory Implementation, Efficiency and Performance.

Mass Storage Structure – Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap space Management

**UNIT- V**

Deadlocks - System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

Protection – System Protection, Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, Capability-Based Systems, Language-Based Protection.

**TEXT BOOKS:**

1. Operating System Principles , Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 8th Edition, Wiley Student Edition
2. Operating Systems – Internals and Design Principles, W. Stallings, 6th Edition, Pearson.

**REFERENCE BOOKS:**

1. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, PHI
2. Operating Systems A concept-based Approach, 2nd Edition, D.M.Dhamdhere, TMH.
3. Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.
4. Operating Systems, A.S.Godbole, 2nd Edition, TMH
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6. Operating Systems, S.Haldar and A.A.Aravind, Pearson Education.
7. Operating Systems, R.Elmasri, A,G.Carrick and D.Levine, Mc Graw Hill.
8. Operating Systems in depth, T.W. Doeppner, Wiley.

**Outcomes:**

- Apply optimization techniques for the improvement of system performance.
- Ability to understand the synchronous and asynchronous

communication mechanisms in their respective OS.

- Learn about minimization of turnaround time, waiting time and response time and also maximization of throughput with keeping CPU as busy as possible.
- Ability to compare the different OS

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	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A50515) COMPUTER NETWORKS****Objectives:**

- To introduce the fundamental various types of computer networks.
- To demonstrate the TCP/IP and OSI models with merits and demerits.
- To explore the various layers of OSI Model.
- To introduce UDP and TCP Models.

**UNIT-I**

**Overview of the Internet:** Protocol, Layering Scenario, TCP/IP Protocol Suite: The OSI Model, Internet history standards and administration; Comparison of the OSI and TCP/IP reference model.

**Physical Layer:** Guided transmission media, wireless transmission media.

**Data Link Layer –** design issues, CRC Codes, Elementary Data link Layer protocols, sliding window protocol

**UNIT-II**

**Multiple Access Protocols –**ALOHA, CSMA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer, data link layer switching & use of bridges, learning bridges, spanning tree bridges, repeaters , hubs, bridges , switches, routers and gateways.

**UNIT-III**

**Network Layer:** Network Layer Design issues, store and forward packet switching connection less and connection oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Count to Infinity Problem, Hierarchical Routing, Congestion control algorithms, admission control.

**UNIT-IV**

**Internetworking:** Tunneling, Internetwork Routing, Packet fragmentation, IPv4, Ipv6 Protocol, IP addresses, CIDR, ICMP, ARP, RARP, DHCP.

**Transport Layer:** Services provided to the upper layers elements of transport protocol-addressing connection establishment, connection release, Connection Release, Crash Recovery.

**UNIT-V**

The Internet Transport Protocols UDP-RPC, Real Time Transport Protocols, The Internet Transport Protocols- Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP

Connection Release, The TCP Connection Management Modeling, The TCP Sliding Window, The TCP Congestion Control, The future of TCP.

Application Layer-Introduction ,providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS, SSH

**TEXT BOOKS:**

1. Data Communications and Networking – Behrouz A. Forouzan, Fifth Edition TMH, 2013.
2. Computer Networks -- Andrew S Tanenbaum, 4th Edition, Pearson Education.

**REFERENCE BOOKS:**

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W.A.Shay, Cengage Learning.
3. Introduction to Computer Networks and Cyber Security, Chwan-Hwa (John) Wu, J. David Irwin, CRC Press.
4. Computer Networks, L.L.Peterson and B.S.Davie, 4th edition, ELSEVIER.
5. Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose,K.W.Ross,3rd Edition, Pearson Education.

**Outcomes:**

- Students should be understand and explore the basics of Computer Networks and Various Protocols. He/She will be in a position to understand the World Wide Web concepts.
- Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile and ad hoc networks.



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-I Sem****L T/P/D C****- -/3/- 2****(A50589) OPERATING SYSTEMS LAB****Objectives:**

- To use inux perating system for study of operating system concepts.
- To write the code to mplement nd odify ariousconcepts in operating systems using Linux.

**List of Programs:**

1. Simulate the following CPU scheduling algorithms  
a) Round Robin b) SJF c) FCFS d) Priority
2. Simulate all file allocation strategies  
a) Sequential b) Indexed c) Linked
3. Simulate MVT and MFT
4. Simulat all File Organization Techniques  
a) Single level directory b) Two level c) Hierarchical d) DAG
5. Simulate Bankers Algorithm for Dead Lock Avoidance
6. Simulate Bankers Algorithm for Dead Lock Prevention
7. Simulate all page replacement algorithms  
a) FIF b) LRU c) LFU Etc.
8. Simulate Paging Technique of memory management.

**Outcomes:**

- The course objectives ensure the development of students applied skills in operating systems related areas.
- Students willgin knowledge in writing oftware routines odules or mplementing various concepts of perating systems

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

III Year B.Tech. CSE-I Sem

L T/P/D C

- /3/- 2

**(A50587) COMPILER DESIGN LAB****Objectives:**

- To provide an understanding of the language translation peculiarities by designing a complete translator for a mini language.

**Recommended Systems/Software Requirements:**

- Intel based desktop PC with minimum of 166 MHZ or faster processor with atleast 64 MB RAM and 100 MB free disk space
- C++ compiler and JDK kit

Consider the following mini Language, a simple procedural high-level language, only operating on integer

data, with a syntax looking vaguely like a simple C crossed with Pascal. The syntax of the language is

defined by the following BNF grammar:

```
<program> ::= <block>
```

```
<block> ::= { <variabledefinition> <slislist> }
```

```
| { <slislist> }
```

```
<variabledefinition> ::= int <vardeflist> ;
```

```
<vardeflist> ::= <vardec> | <vardec> , <vardeflist>
```

```
<vardec> ::= <identifier> | <identifier> [ <constant> ]
```

```
<slislist> ::= <statement> | <statement> ; <slislist>
```

```
<statement> ::= <assignment> | <ifstatement> | <whilestatement>
```

```
| <block> | <printstatement> | <empty>
```

```
<assignment> ::= <identifier> = <expression>
```

```
| <identifier> [ <expression> ] = <expression>
```

```
<ifstatement> ::= if <bexpression> then <slislist> else <slislist> endif
```

```
| if <bexpression> then <slislist> endif
```

```
<whilestatement> ::= while <bexpression> do <slislist> enddo
```

```
<printstatement> ::= print ( <expression> )
```

```
<expression> ::= <expression> <addingop> <term> | <term> | <addingop>
```

```
<term>
```

```
<bexpression> ::= <expression> <relop> <expression>
```

```
<relop> ::= < <= | == | >= | > | !=
```

```

<addingop> ::= + | -
<term> ::= <term> <multop> <factor> | <factor>
<multop> ::= * | /
<factor> ::= <constant> | <identifier> | <identifier> [ <expression>]
| ( <expression> )
<constant> ::= <digit> | <digit> <constant>
<identifier> ::= <identifier> <letterordigit> | <letter>
<letterordigit> ::= <letter> | <digit>
<letter> ::= a|b|c|d|e|f|g|h|i|j|k|l|m|n|o|p|q|r|s|t|u|v|w|x|y|z
<digit> ::= 0|1|2|3|4|5|6|7|8|9

```

<empty> has the obvious meaning

Comments (zero or more characters enclosed between the standard C/Java-style comment brackets /

\*...\*/) can be inserted. The language has rudimentary support for 1-dimensional arrays. The declaration

int a[3] declares an array of three elements, referenced as a[0], a[1] and a[2]. Note also that you should

worry about the scoping of names.

A simple program written in this language is:

```

{ int a[3],t1,t2;
t1=2;
a[0]=1; a[1]=2; a[t1]=3;
t2=-(a[2]+t1*6)/(a[2]-t1);
if t2>5 then
print(t2);
else {
int t3;
t3=99;
t2=-25;
print(-t1+t2*t3); /* this is a comment
on 2 lines */
} endif }

```

1. Design a Lexical analyzer for the above language. The lexical analyzer should ignore redundant spaces, tabs and newlines. It should also ignore comments. Although the syntax specification states that

identifiers can be arbitrarily long, you may restrict the length to some reasonable value.

2. Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generating tools.
3. Design Predictive parser for the given language
4. Design LALR bottom up parser for the above language.
5. Convert the BNF rules into Yacc form and write code to generate abstract syntax tree.
6. Write program to generate machine code from the abstract syntax tree generated by the parser. The following instruction set may be considered as target code.

The following is a simple register-based machine, supporting a total of 17 instructions. It has three distinct internal storage areas. The first is the set of 8 registers, used by the individual instructions as detailed below, the second is an area used for the storage of variables and the third is an area used for the storage of program. The instructions can be preceded by a label. This consists of an integer in the range 1 to 9999 and the label is followed by a colon to separate it from the rest of the instruction. The numerical label can be used as the argument to a jump instruction, as detailed below.

In the description of the individual instructions below, instruction argument types are specified as follows :

R

specifies a register in the form R0, R1, R2, R3, R4, R5, R6 or R7 (or r0, r1, etc.).

L

specifies a numerical label (in the range 1 to 9999).

V

specifies a "variable location" (a variable number, or a variable location pointed to by a register - see below).

A

specifies a constant value, a variable location, a register or a variable location pointed to by a register (an indirect address). Constant values are specified as an integer value, optionally preceded by a minus sign, preceded by a # symbol. An indirect address is specified by an @ followed by a register.

So, for example, an A-type argument could have the form 4 (variable number 4), #4 (the constant value 4), r4 (register 4) or @r4 (the contents of register 4 identifies the variable location to be accessed).

The instruction set is defined as follows:

LOAD A,R

loads the integer value specified by A into register R.

STORE R,V

stores the value in register R to variable V.

OUT R

outputs the value in register R.

NEG R

negates the value in register R.

ADD A,R

adds the value specified by A to register R, leaving the result in register R.

SUB A,R

subtracts the value specified by A from register R, leaving the result in register R.

MUL A,R

multiplies the value specified by A by register R, leaving the result in register R.

DIV A,R

divides register R by the value specified by A, leaving the result in register R.

JMP L

causes an unconditional jump to the instruction with the label L.

JEQ R,L

jumps to the instruction with the label L if the value in register R is zero.

JNE R,L

jumps to the instruction with the label L if the value in register R is not zero.

JGE R,L

jumps to the instruction with the label L if the value in register R is greater than or equal to zero.

JGT R,L

jumps to the instruction with the label L if the value in register R is greater than zero.

JLE R,L

jumps to the instruction with the label L if the value in register R is less than or equal to zero.

JLT R,L

jumps to the instruction with the label L if the value in register R is less than zero.

NOP

is an instruction with no effect. It can be tagged by a label.

STOP

stops execution of the machine. All programs should terminate by executing a STOP instruction.

**Outcomes:**

- By this laboratory, students will understand the practical approach of how a compiler works.
- This will enable him to work in the development phase of new computer languages in industry.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

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	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A60521) DISTRIBUTED SYSTEMS****Objectives:**

- To understand what and why a distributed system is.
- To understand theoretical concepts, namely, virtual time, agreement and consensus protocols.
- To understand IPC, Group Communication & RPC Concepts.
- To understand the DFS and DSM Concepts.
- To understand the concepts of transaction in distributed environment and associated concepts, namely, concurrency control, deadlocks and error recovery.

**UNIT-I**

**Characterization of Distributed Systems:** Introduction, Examples of Distributed Systems, Resource Sharing and the Web, Challenges.

**System Models:** Introduction, Architectural Models, Fundamental Models.

**UNIT-II**

**Time and Global States:** Introduction, Clocks Events and Process States, Synchronizing Physical Clocks, Logical Time and Logical Clocks, Global States, Distributed Debugging.

**Coordination and Agreement:** Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication, Consensus and Related Problems.

**UNIT-III**

**InterProcess Communication:** Introduction, The API for the Internet Protocols, External Data Representation and Marshalling, Client-Server Communication, Group Communication, Case Study: IPC in **UNIX**.

**Distributed Objects and Remote Invocation:** Introduction, Communication between Distributed Objects, Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI.

**UNIT-IV**

**Distributed File Systems:** Introduction, File Service Architecture, Case Study 1: Sun Network File System, Case Study 2: The Andrew File System.

**Name Services:** Introduction, Name Services and the Domain Name System, Directory Services, Case Study of the Global Name Services.

**Distributed Shared Memory:** Introduction, Design and Implementation Issues, Sequential Consistency and IVY case study, Release Consistency,

Munin Case Study, Other Consistency Models.

**UNIT- V**

**Transactions and Concurrency Control:** Introduction, Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Timestamp Ordering, Comparison of Methods for Concurrency Control.

**Distributed Transactions:** Introduction, Flat and Nested Distributed Transactions, Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Deadlocks, Transaction Recovery.

**TEXT BOOK:**

- 1) Distributed Systems, Concepts and Design, George Coulouris, J Dollimore and Tim Kindberg, Pearson Education, 4<sup>th</sup> Edition, 2009.

**REFERENCE BOOKS:**

- 1) Distributed Systems, Principles and Paradigms, Andrew S. Tanenbaum, Maarten Van Steen, 2<sup>nd</sup> Edition, PHI.
- 2) Distributed Systems, An Algorithm Approach, Sukumar Ghosh, Chapman&Hall/CRC, Taylor & Fransis Group, 2007.

**Outcomes:**

- Able to comprehend and design a new distributed system with the desired features.
- Able to start literature survey leading to further research in any subarea.
- Able to develop new distributed applications.



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-II Sem**

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**(A60522) INFORMATION SECURITY****Objectives:**

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- Understand various cryptographic algorithms.
- Understand the basic categories of threats to computers and networks
- Describe public-key cryptosystem.
- Describe the enhancements made to IPv4 by IPsec
- Understand Intrusions and intrusion detection
- Discuss the fundamental ideas of public-key cryptography.
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
- Discuss Web security and Firewalls

**UNIT – I**

**Attacks on Computers and Computer Security:** Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

**Cryptography: Concepts and Techniques:** Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

**UNIT – II**

**Symmetric key Ciphers:** Block Cipher principles & Algorithms(DES, AES, Blowfish), Differential and Linear Cryptanalysis, Block cipher modes of operation, Stream ciphers, RC4, Location and placement of encryption function, Key distribution  
**Asymmetric key Ciphers:** Principles of public key cryptosystems, Algorithms(RSA, Diffie-Hellman, ECC), Key Distribution.

**UNIT – III**

**Message Authentication Algorithms and Hash Functions:** Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm  
**Authentication Applications:** Kerberos, X.509

Authentication Service, Public – Key Infrastructure, Biometric Authentication

#### **UNIT – IV**

**E-Mail Security:** Pretty Good Privacy, S/MIME **IP Security:** IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, key management

#### **UNIT – V**

**Web Security:** Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction **Intruders, Virus and Firewalls:** Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls **Case Studies on Cryptography and security:** Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability, Virtual Elections

#### **TEXT BOOKS:**

1. Cryptography and Network Security : William Stallings, Pearson Education, 4<sup>th</sup> Edition
2. Cryptography and Network Security : Atul Kahate, Mc Graw Hill, 2<sup>nd</sup> Edition

#### **REFERENCE BOOKS:**

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1<sup>st</sup> Edition.
2. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 2<sup>nd</sup> Edition
3. Information Security, Principles and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM.Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

#### **Outcomes:**

- Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
- Ability to identify information system requirements for both of them such as client and server.
- Ability to understand the current legal issues towards information security.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-II Sem****L T/P/D C****4 -/- 4****(A60524) OBJECT ORIENTED ANALYSIS AND DESIGN****Objectives:**

- Concisely define the following key terms: class, object, state, behavior, object class, class diagram, object diagram, operation, encapsulation, constructor operation, query operation, update operation, scope operation, association, association role, multiplicity, association class, abstract class, concrete class, class-scope attribute, abstract operation, method, polymorphism, overriding, multiple classification, aggregation, and composition.
- Describe the activities in the different phases of the object-oriented development life cycle.
- State the advantages of object-oriented modeling vis-à-vis structured approaches.
- Compare and contrast the object-oriented model with the E-R and EER models.
- Model a real-world application by using a UML class diagram.
- Provide a snapshot of the detailed state of a system at a point in time using a UML (Unified Modeling Language) object diagram.
- Recognize when to use generalization, aggregation, and composition relationships.
- Specify different types of business rules in a class diagram.

**UNIT- I**

**Introduction to UML:** Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

**UNIT- II**

**Basic Structural Modeling:** Classes, Relationships, common Mechanisms, and diagrams.

Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

**UNIT- III**

Basic Behavioral Modeling-I: Interactions, Interaction diagrams.

Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity

Diagrams.

#### **UNIT- IV**

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

#### **UNIT- V**

Patterns and Frameworks, Artifact Diagrams. Case Study: The Unified Library application

#### **TEXT BOOKS:**

1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education 2nd Edition.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

#### **REFERENCE BOOKS:**

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML, TMH.
5. Applying UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
6. Object-Oriented Analysis and Design with the Unified Process By John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.
7. UML and C++, R.C.Lee, and W.M.Tepfenhart, PHI.
8. Object Oriented Analysis, Design and Implementation, B.Dathan, S.Ramnath, Universities Press.
9. OODesign with UML and Java, K.Barclay, J.Savage, Elsevier.
10. Learning UML 2.0, Russ Miles and Kim Hamilton, O'Reilly, SPD.

**Outcomes:** Graduate can able to take up the case studies and model it in different views with respect user requirement such as use case, logical, component and deployment and etc, and preparation of document of the project for the unified Library application.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-II Sem****L T/P/D C****4 -/- 4****(A60525) SOFTWARE TESTING METHODOLOGIES****Objectives:**

To understand the software testing methodologies such as flow graphs and path testing, transaction flows testing, data flow testing, domain testing and logic base testing.

**UNIT - I**

Introduction:- Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs.

Flow graphs and Path testing:- Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

**UNIT - II**

Transaction Flow Testing:-transaction flows, transaction flow testing techniques.

Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

**UNIT - III**

Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

**UNIT-IV**

Paths, Path products and Regular expressions:- path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

Logic Based Testing:- overview, decision tables, path expressions, kv charts, specifications.

**UNIT - V**

State, State Graphs and Transition testing:- state graphs, good & bad state graphs, state testing, Testability tips.

Graph Matrices and Application:-Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter or Win-runner).

**TEXT BOOKS:**

1. Software Testing techniques – Boris Beizer, Dreamtech, second

edition.

2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

**REFERENCE BOOKS:**

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing, 3<sup>rd</sup> edition, P.C. Jorgensen, Aurbach Publications (Dist. by SPD).
3. Software Testing, N.Chauhan, Oxford University Press.
4. Introduction to Software Testing, P.Ammann&J.Offutt, Cambridge Univ.Press.
5. Effective methods of Software Testing, Perry, John Wiley, 2<sup>nd</sup> Edition, 1999.
6. Software Testing Concepts and Tools, P.Nageswara Rao, dreamtech Press.
7. Software Testing, M.G.Limaye, TMH.
8. Software Testing, S.Desikan, G.Ramesh, Pearson.
9. Foundations of Software Testing, D.Graham & Others, Cengage Learning.
10. Foundations of Software Testing, A.P.Mathur, Pearson.

**Outcomes:**

- Ability to apply the process of testing and various methodologies in testing for developed software.
- Ability to write test cases for given software to test it before delivery to the customer.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>III Year B.Tech. CSE-II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A60010) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS****Objectives:**

To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations namely: demand and supply, production function, cost analysis, markets, forms of business organisations, capital budgeting and financial accounting and financial analysis.

**Unit I**

**Introduction & Demand Analysis:** Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. *Elasticity of Demand:* Definition, Types, Measurement and Significance of Elasticity of Demand. *Demand Forecasting,* Factors governing demand forecasting, methods of demand forecasting.

**Unit II**

**Production & Cost Analysis:** *Production Function* – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. *Cost Analysis:* Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

**Unit III**

**Markets & New Economic Environment:** Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. *Pricing:* Objectives and Policies of Pricing. Methods of Pricing. *Business:* Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, *New Economic Environment:* Changing Business Environment in Post-liberalization scenario.

**Unit IV**

**Capital Budgeting:** Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital - Trading Forecast, Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

**Unit V**

**Introduction to Financial Accounting & Financial Analysis:** Accounting concepts and Conventions - Introduction IFRS - Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). *Financial Analysis:* Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios. Du Pont Chart.

**TEXT BOOKS:**

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2013.
3. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, 2012.

**REFERENCES:**

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2012.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey & Chrystel, Economics, Oxford University Press, 2012
5. Domnick Salvatore: Managerial Economics in a Global Economy, Thomson, 2012.
6. Narayanaswamy: Financial Accounting—A Managerial Perspective, Pearson, 2012.
7. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2012.
8. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2012.
9. Dwivedi: Managerial Economics, Vikas, 2012.
10. Shailaja & Usha : MEFA, University Press, 2012.
11. Aryasri: Managerial Economics and Financial Analysis, TMH, 2012.
12. Vijay Kumar & Appa Rao, Managerial Economics & Financial Analysis, Cengage 2011.
13. J. V. Prabhakar Rao & P.V. Rao, Managerial Economics & Financial Analysis, Maruthi Publishers, 2011.

**Outcomes:**

At the end of the course, the student will

- Understand the market dynamics namely, demand and supply, demand forecasting , elasticity of demand and supply, pricing methods and pricing in different market structures.



- Gain an insight into how production function is carried out to achieve least cost combination of inputs and cost analysis
- Develop an understanding of
- Analyse how capital budgeting decisions are carried out
- Understand the framework for both manual and computerised accounting process
- Know how to analyse and interpret the financial statements through ratio analysis.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-II Sem****L T/P/D C****4 -/- 4****(A60512) WEB TECHNOLOGIES****Objectives:**

- To introduce PHP language for server side scripting
- To introduce XML and processing of XML Data with Java
- To introduce Server side programming with Java Servlets and JSP
- To introduce Client side scripting with Javascript and AJAX.

**UNIT- I**

**Introduction to PHP:** Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads, Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies

**File Handling in PHP:** File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories

**UNIT- II**

**XML:** Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemas, Document Object Model, XHTML

**Parsing XML Data** - DOM and SAX Parsers in java.

**UNIT- III**

**Introduction to Servlets:** Common Gateway Interface (CGI), Lifecycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions, connecting to a database using JDBC.

**UNIT- IV**

**Introduction to JSP:** The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session for session tracking, connecting to database in JSP.

**UNIT- V**

**Client side Scripting:** Introduction to Javascript: Javascript language - declaring variables, scope of variables, functions, event handlers (onclick, onsubmit etc.), Document Object Model, Form validation.

Simple AJAX application.

**TEXT BOOKS:**

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill

**REFERENCE BOOKS:**

1. Web Programming, building internet applications, Chris Bates 2<sup>nd</sup> edition, Wiley Dreamtech
2. Java Server Pages –Hans Bergsten, SPD O'Reilly
3. Java Script, D.Flanagan, O'Reilly,SPD.
4. Beginning Web Programming–Jon Duckett WROX.
5. Programming world wide web, R.W.Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

**Outcomes:**

- gain knowledge of client side scripting, validation of forms and AJAX programming
- have understanding of server side scripting with PHP language
- have understanding of what is XML and how to parse and use XML Data with Java
- To introduce Server side programming with Java Servlets and JSP

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-II Sem****L T/P/D C****- -/3/- 2****(A60591) CASE TOOLS and WEB TECHNOLOGIES LAB****CASE TOOLS LAB****Objectives:**

- Understand how UML supports the entire OOAD process.
  - Become familiar with all phases of OOAD.
  - Understand different software testing tools and their features
- I. Students are divided into batches of 5 each and each batch has to draw the following diagrams using UML for an ATM system whose description is given below.

UML diagrams to be developed are:

1. Use Case Diagram.
2. Class Diagram.
3. Sequence Diagram.
4. Collaboration Diagram.
5. State Diagram
6. Activity Diagram.
7. Component Diagram
8. Deployment Diagram.
9. Test Design.

**Description for an ATM System**

The software to be designed will control a simulated automated teller machine (ATM) having a magnetic stripe reader for reading an ATM card, a customer console (keyboard and display) for interaction with the customer, a slot for depositing envelopes, a dispenser for cash (in multiples of Rs. 100, Rs. 500 and Rs. 1000), a printer for printing customer receipts, and a key-operated switch to allow an operator to start or stop the machine. The ATM will communicate with the bank's computer over an appropriate communication link. (The software on the latter is not part of the requirements for this problem.)

The ATM will service one customer at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN) - both of which will be sent to the bank for validation as part of each transaction. The customer will then be able to perform one or more transactions. The card will be retained in the machine until the customer indicates that he/she

desires no further transactions, at which point it will be returned - except as noted below.

The ATM must be able to provide the following services to the customer:

1. A customer must be able to make a cash withdrawal from any suitable account linked to the card, in multiples of Rs. 100 or Rs. 500 or Rs. 1000. Approval must be obtained from the bank before cash is dispensed.
2. A customer must be able to make a deposit to any account linked to the card, consisting of cash and/or checks in an envelope. The customer will enter the amount of the deposit into the ATM, subject to manual verification when the envelope is removed from the machine by an operator. Approval must be obtained from the bank before physically accepting the envelope.
3. A customer must be able to make a transfer of money between any two accounts linked to the card.
4. A customer must be able to make a balance inquiry of any account linked to the card.
5. A customer must be able to abort a transaction in progress by pressing the Cancel key instead of responding to a request from the machine.

The ATM will communicate each transaction to the bank and obtain verification that it was allowed by the bank. Ordinarily, a transaction will be considered complete by the bank once it has been approved. In the case of a deposit, a second message will be sent to the bank indicating that the customer has deposited the envelope. (If the customer fails to deposit the envelope within the timeout period, or presses cancel instead, no second message will be sent to the bank and the deposit will not be credited to the customer.)

If the bank determines that the customer's PIN is invalid, the customer will be required to re-enter the PIN before a transaction can proceed. If the customer is unable to successfully enter the PIN after three tries, the card will be permanently retained by the machine, and the customer will have to contact the bank to get it back.

If a transaction fails for any reason other than an invalid PIN, the ATM will display an explanation of the problem, and will then ask the customer whether he/she wants to do another transaction.

The ATM will provide the customer with a printed receipt for each successful transaction

The ATM will have a key-operated switch that will allow an operator to start and stop the servicing of customers. After turning the switch to the "on" position, the operator will be required to verify and enter the total cash on hand. The machine can only be turned off when it is not servicing a customer.

When the switch is moved to the “off” position, the machine will shut down, so that the operator may remove deposit envelopes and reload the machine with cash, blank receipts, etc.

- II. Study of any testing tool (e.g. Win runner)
- III. Study of any web testing tool (e.g. Selenium)
- IV. Study of any bug tracking tool (e.g. Bugzilla, bugbit)
- V. Study of any test management tool (e.g. Test Director)
- VI. Study of any open source-testing tool (e.g. Test Link)

**Outcomes:**

Ability to understand the history, cost of using and building CASE tools.

Ability to construct and evaluate hybrid CASE tools by integrating existing tools.

**WEB TECHNOLOGIES LAB**

**Objectives:**

- To enable the student to program web applications using the following technologies HTML ,Javascript ,AJAX ,PHP ,Tomcat Server, Servlets ,JSP

**Note:**

1. **Use LAMP Stack (Linux, Apache, MySQL and PHP) for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform wherever applicable**
2. **The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed**
  1. Install the following on the local machine
    - Apache Web Server (if not installed)
    - Tomcat Application Server locally
    - Install MySQL (if not installed)
    - Install PHP and configure it to work with Apache web server and MySQL (if not already configured)
  2. Write an HTML page including any required Javascript that takes a number from one text field in the range of 0 to 999 and shows it in another text field in words. If the number is out of range, it should show “out of range” and if it is not a number, it should show “not a number” message in the result box.
  3. Write an HTML page that has one input, which can take multi-line

text and a submit button. Once the user clicks the submit button, it should show the number of characters, words and lines in the text entered using an alert message. Words are separated with white space and lines are separated with new line character.

4. Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).
5. Create an XML document that contains 10 users information. Write a Java program, which takes User Id as input and returns the user details by taking the user information from the XML document using (a) DOM Parser and (b) SAX parser
6. Implement the following web applications using (a) PHP, (b) Servlets and (c) JSP:
  - i. A user validation web application, where the user submits the login name and password to the server. The name and password are checked against the data already available in Database and if the data matches, a successful login page is returned. Otherwise a failure message is shown to the user.
  - ii. Modify the above program to use an xml file instead of database.
  - iii. Modify the above program to use AJAX to show the result on the same page below the submit button.
  - iv. A simple calculator web application that takes two numbers and an operator (+, -, /, \* and %) from an HTML page and returns the result page with the operation performed on the operands.
  - v. Modify the above program such that it stores each query in a database and checks the database first for the result. If the query is already available in the DB, it returns the value that was previously computed (from DB) or it computes the result and returns it after storing the new query and result in DB.
  - vi. A web application takes a name as input and on submit it shows a hello <name> page where <name> is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, it should show a logout page with Thank You <name> message with the duration of usage (hint: Use session to store name and time).
  - vii. A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with "Hello <name>, you are not authorized to visit this site" message, where <name> should be replaced with the entered name. Otherwise it should send "Welcome <name> to this site" message.

viii. A web application for implementation:

The user is first served a login page which takes user's name and password. After submitting the details the server checks these values against the data from a database and takes the following decisions.

If name and password matches, serves a welcome page with user's full name.

If name matches and password doesn't match, then serves "password mismatch" page

If name is not found in the database, serves a registration page, where user's full name is asked and on submitting the full name, it stores, the login name, password and full name in the database (hint: use session for storing the submitted login name and password)

ix. A web application that lists all cookies stored in the browser on clicking "List Cookies" button. Add cookies if necessary.

**TEXT BOOKS:**

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill

**REFERENCE BOOKS:**

1. Web Programming, building internet applications, Chris Bates 2<sup>nd</sup> edition, Wiley Dreamtech
2. Java Server Pages –Hans Bergsten, SPD O'Reilly
3. Java Script, D.Flanagan, O'Reilly, SPD.
4. Beginning Web Programming-Jon Duckett WROX.
5. Programming world wide web, R.W.Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

**Outcomes:**

- Use LAMP Stack for web applications
- Use Tomcat Server for Servlets and JSPs
- Write simple applications with Technologies like HTML, Javascript, AJAX, PHP, Servlets and JSPs
- Connect to Database and get results
- Parse XML files using Java (DOM and SAX parsers)



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****III Year B.Tech. CSE-II Sem****L T/P/D C****- -/3/- 2****(A60086) ADVANCED COMMUNICATION SKILLS (ACS) LAB****Introduction**

The introduction of the Advanced Communication Skills Lab is considered essential at 3<sup>rd</sup> year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organise ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

**Objectives:**

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

**Syllabus:**

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

1. **Activities on Fundamentals of Inter-personal Communication and Building Vocabulary** - Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.
2. **Activities on Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
3. **Activities on Writing Skills** – Structure and presentation of different types of writing – *letter writing/Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing* – planning for writing – improving one's writing.
4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/**PPTs** and written presentations through posters/projects/reports/ e-mails/assignments etc.
5. **Activities on Group Discussion and Interview Skills** – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

**Minimum Requirement:**

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- **Spacious room with appropriate acoustics.**
- **Round Tables with movable chairs**
- **Audio-visual aids**
- **LCD Projector**
- **Public Address system**
- **P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ**
- **T. V, a digital stereo & Camcorder**
- **Headphones of High quality**

**Prescribed Lab Manual:** A book titled *A Course Book of Advanced*

**Communication Skills (ACS) Lab** published by Universities Press, Hyderabad.

**Suggested Software:**

The software consisting of the prescribed topics elaborated above should be procured and used.

- **Oxford Advanced Learner's Compass**, 7<sup>th</sup> Edition
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE**( KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- **The following software from 'train2success.com'**
  - **Preparing for being Interviewed**
  - **Positive Thinking**
  - **Interviewing Skills**
  - **Telephone Skills**
  - **Time Management**

**Books Recommended:**

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
3. Technical Communication by Paul V. Anderson. 2007. Cengage Learning Pvt. Ltd. New Delhi.
4. Business and Professional Communication: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.
5. The Basics of Communication: A Relational Perspective. Steve Duck & David T. McMahan. Sage South Asia Edition. Sage Publications. 2012.
6. English Vocabulary in Use series, Cambridge University Press 2008.
7. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
8. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
9. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.

10. Handbook for Technical Writing by David A McMurrey & Joanne Buckley CENGAGE Learning 2008.
11. Job Hunting by Colm Downes, Cambridge University Press 2008.
12. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
13. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.
14. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/ Cambridge University Press.
15. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

#### **DISTRIBUTION AND WEIGHTAGE OF MARKS:**

##### ***Advanced Communication Skills Lab Practicals:***

1. The practical examinations for the ACS Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

##### **Mini Project: As a part of Internal Evaluation**

1. **Seminar/ Professional Presentation**
  2. **A Report on the same has to be prepared and presented.**
- \* ***Teachers may use their discretion to choose topics relevant and suitable to the needs of students.***
  - \* ***Not more than two students to work on each mini project.***
  - \* ***Students may be assessed by their performance both in oral presentation and written report.***

##### **Outcomes**

- ☞ Accomplishment of sound vocabulary and its proper use contextually.
- ☞ Flair in Writing and felicity in written expression.
- ☞ Enhanced job prospects.
- ☞ Effective Speaking Abilities

## IV YEAR I SEMESTER

## COURSE STRUCTURE

Code	Subject	L	T/P/D	C
57046	Linux Programming	4	1	4
57047	Software Testing Methodologies	4	1	4
57048	Data Warehousing and Data Mining	4	-	4
57049	Computer Graphics	3	1	3
	<b>ELECTIVE-I</b>	3	1	3
57050	Advanced Computer Architecture			
57051	Cloud Computing			
57052	Distributed Computing			
57053	Mobile Computing			
	<b>ELECTIVE-II</b>	3	1	3
57054	Design Patterns			
57055	Machine Learning			
57056	Soft Computing			
57057	Information Retrieval Systems			
57609	Linux Programming and Data Mining Lab	-	3	2
57610	Case Tools & Software Testing Lab	-	3	2
	<b>Total</b>	<b>21</b>	<b>11</b>	<b>25</b>

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD**

<b>IV Year B.Tech, CSE - I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	4	1/-/-	4

**(57046) LINUX PROGRAMMING**

**UNIT - I**

Linux Utilities-File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities, sed – scripts, operation; addresses, commands, applications, awk – execution, fields and records, scripts, operation, patterns, actions, functions, using system commands in awk.

**UNIT-II**

Working with the Bourne again shell(bash): Introduction, shell responsibilities, pipes and input Redirection, output redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts.

**UNIT - III**

Files: File Concept, File System Structure, Inodes, File Attributes, File types, Library functions, the standard I/O and formatted I/O in C, stream errors, kernel support for files, System calls, file descriptors, low level file access – File structure related system calls(File APIs), file and record locking, file and directory management – Directory file APIs, Symbolic links & hard links.

**UNIT - IV**

Process – Process concept, Kernel support for process, process attributes, process control - process creation, waiting for a process, process termination, zombie process, orphan process, Process APIs.

Signals– Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions.

**UNIT - V**

Interprocess Communication : Introduction to IPC, Pipes, FIFOs, Introduction to three types of IPC-message queues, semaphores and shared memory.

Message Queues- Kernel support for messages, Unix system V APIs for messages, client/server example.

#### UNIT-VI

Semaphores- Kernel support for semaphores, Unix system V APIs for semaphores.

Shared Memory- Kernel support for shared memory, Unix system V APIs for shared memory, semaphore and shared memory example.

#### UNIT-VII

Multithreaded Programming: Differences between threads and processes, Thread structure and uses, Threads and Lightweight Processes, POSIX Thread APIs, Creating Threads, Thread Attributes, Thread Synchronization with semaphores and with Mutexes, Example programs.

#### UNIT-VIII

Sockets: Introduction to Sockets, Socket Addresses, Socket system calls for connection oriented protocol and connectionless protocol, example client/server programs.

#### TEXT BOOKS:

1. Unix System Programming using C++, T.Chan, PHL(UNIT III to UNIT VIII)
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH.
3. Beginning Linux Programming, 4<sup>th</sup> Edition, N.Matthew, R.Stones,Wrox, Wiley India Edition.

#### REFERENCE BOOKS:

1. Linux System Programming, Robert Love, O'Reilly, SPD.
2. Advanced Programming in the Unix environment, 2<sup>nd</sup> Edition, W.R.Stevens, Pearson Education.
3. Unix Network Programming, W.R.Stevens,PHL.
4. Unix for programmers and users, 3<sup>rd</sup> Edition, Graham Glass, King Ables, Pearson Education.
5. Unix and Shell programming, B.A.Forouzan and R.F.Gilberg, Cengage Learning.
6. Unix The Text book, 2<sup>nd</sup> edition, S.M.Sarwar, R.Koretsky, S.A.Sarwar, Pearson Education.
7. Unix Internals, U.Vihalia, Pearson Education.
8. Unix shell Programming, S.G.Kochan and P.Wood, 3<sup>rd</sup> edition, Pearson Education.

### JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CSE - I Sem	L	T/P/D	C
	4	1/-	4

#### (57047) SOFTWARE TESTING METHODOLOGIES

##### UNIT-I

Introduction:- Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs.

##### UNIT-II

Flow graphs and Path testing:- Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

##### UNIT-III

Transaction Flow Testing:- transaction flows, transaction flow testing techniques. Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

##### UNIT-IV

Domain Testing:- domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

##### UNIT-V

Paths, Path products and Regular expressions:- path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

##### UNIT-VI

Logic Based Testing:- overview, decision tables, path expressions, kv charts, specifications.

##### UNIT-VII

State, State Graphs and Transition testing:- state graphs, good & bad state graphs, state testing. Testability tips.



**UNIT - VIII**

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter or Win-runner).

**TEXT BOOKS:**

1. Software Testing techniques – Boris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

**REFERENCE BOOKS:**

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing, 3<sup>rd</sup> edition, P.C.Jorgensen, Aurbach Publications (Dist.by SPD).
3. Software Testing, N.Chauhan, Oxford University Press.
4. Introduction to Software Testing, P.Ammann & J.Offutt, Cambridge Univ.Press.
5. Effective methods of Software Testing, Perry, John Wiley, 2<sup>nd</sup> Edition, 1999.
6. Software Testing Concepts and Tools, P.Nageswara Rao, dreamtech Press.
7. Software Testing, M.G.Limaye, TMH.
8. Software Testing, S.Desikan, G.Ramesh, Pearson.
9. Foundations of Software Testing, D.Graham & Others, Cengage Learning.
10. Foundations of Software Testing, A.P.Mathur, Pearson.

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HYDERABAD**

IV Year B.Tech: CSE - I Sem

<b>L</b>	<b>T/P/D</b>	<b>C</b>
4	-/-	4

**(57048) DATA WAREHOUSING AND DATA MINING****UNIT I**

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Major issues in Data Mining.  
Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

**UNIT II**

Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining  
Data Cube Computation and Data Generalization: Efficient Methods for Data Cube Computation, Further Development of Data Cube and OLAP Technology, Attribute-Oriented Induction.

**UNIT III**

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent Itemset Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining

**UNIT IV**

Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Backpropagation, Support Vector Machines, Associative Classification, Lazy Learners, Other Classification Methods, Prediction, Accuracy and Error measures, Evaluating the accuracy of a Classifier or a Predictor, Ensemble Methods

**Unit V**

Cluster Analysis Introduction :Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Clustering High-Dimensional Data, Constraint-Based Cluster Analysis, Outlier Analysis.



**UNIT VI**

Mining Streams, Time Series and Sequence Data: Mining Data Streams, Mining Time-Series Data, Mining Sequence Patterns in Transactional Databases, Mining Sequence Patterns in Biological Data, Graph Mining, Social Network Analysis and Multirelational Data Mining.

**UNIT VII**

Mining Object, Spatial, Multimedia, Text and Web Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web.

**UNIT VIII**

Applications and Trends in Data Mining: Data Mining Applications, Data Mining System Products and Research Prototypes, Additional Themes on Data Mining and Social Impacts of Data Mining.

**TEXT BOOKS:**

1. Data Mining – Concepts and Techniques – Jiawei Han & Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2<sup>nd</sup> Edition, 2006.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.

**REFERENCE BOOKS:**

1. Data Mining Techniques – Arun K.Pujari, 2<sup>nd</sup> edition, Universities Press.
2. Data Warehousing in the Real World – Sam Aathory & Dennis Murray Pearson Edn Asia.
3. Insight into Data Mining, K.P.Soman, S.Diwakar, V.Ajay, PHI, 2008.
4. Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley student Edition
5. The Data Warehouse Life cycle Tool kit – Ralph Kimball Wiley student edition
6. Building the Data Warehouse By William H Inmon, John Wiley & Sons Inc, 2005.
7. Data Mining Introductory and advanced topics – Margaret H Durham, Pearson education
8. Data Mining, V.Pudi and P.Radha Krishna, Oxford University Press.
9. Data Mining: Methods and Techniques, A.B.M Shawkat Ali and S.A.Wasimi, Cengage Learning
10. Data Warehouse 2.0, The Architecture for the next generation of Data Warehousing, W.H.Inmon, D.Strauss, G.Neushloss, Elsevier, Distributed by SPD.

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HYDERABAD**

<b>IV Year B.Tech. CSE - I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>3</b>	<b>1/-/-</b>	<b>3</b>

**(57049) COMPUTER GRAPHICS**

**UNIT I**

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices.

**UNIT II**

Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

**UNIT III**

2-D Geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

**UNIT IV**

2-D Viewing : The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland-Hodgeman polygon clipping algorithm.

**UNIT V**

3-D Object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces, Basic illumination models, polygon rendering methods.

**UNIT VI**

3-D Geometric transformations: Translation, rotation, scaling, reflection and

shear transformations, composite transformations, 3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

#### UNIT VII

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods.

#### UNIT VIII

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

#### TEXT BOOKS:

1. "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson education.
2. "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.

#### REFERENCE BOOKS:

1. "Computer Graphics Second edition", Zhiqiang Xiang, Roy Plustock, Schaum's outlines, Tata Mc Graw hill edition.
2. "Procedural elements for Computer Graphics", David F Rogers, Tata Mc Graw hill, 2nd edition.
3. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
4. "Principles of Computer Graphics", Shalini, Govil-Pai, Springer.
5. "Computer Graphics", Steven Harrington, TMH.
6. Computer Graphics, F.S.Hill, S.M.Keiley PHL.
7. Computer Graphics, P.Shirley, Steve Marschner & Others, Cengage Learning.
8. Computer Graphics & Animation, M.C.Trivedi, Jaico Publishing House.
9. An Integrated Introduction to Computer Graphics and Geometric Modelling, R.Goldman, CRC Press, Taylor & Francis Group.
10. Computer Graphics, Rajesh K.Maurya, Wiley India.

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#### (57050) ADVANCED COMPUTER ARCHITECTURE (ELECTIVE-I)

##### Unit-I

Theory of Parallelism, Parallel computer models, The State of Computing, Multiprocessors and Multicomputers, Multivector and SIMD Computers, PRAM and VLSI models, Architectural development tracks, Program and network properties, Conditions of parallelism, Program partitioning and Scheduling, Program flow Mechanisms, System interconnect Architectures.

##### Unit-II

Principals of Scalable performance, Performance metrics and measures, Parallel Processing applications, Speed up performance laws, Scalability Analysis and Approaches, Hardware Technologies, Processes and Memory Hierarchy, Advanced Processor Technology, Superscalar and Vector Processors, Memory Hierarchy Technology, Virtual Memory Technology.

##### Unit-III

Bus-Cache and Shared-memory, Backplane bus systems, Cache Memory organizations, Shared-Memory Organizations, Sequential and weak consistency models, Pipelining and superscalar techniques, Linear Pipeline Processors, Non-Linear Pipeline Processors, Instruction Pipeline design, Arithmetic pipeline design, superscalar pipeline design.

##### Unit-IV

Parallel and Scalable Architectures, Multiprocessors and Multicomputers, Multiprocessor system interconnects, cache coherence and synchronization mechanism, Three Generations of Multicomputers, Message-passing Mechanisms, Multivector and SIMD computers, Vector Processing Principals, Multivector Multiprocessors, Compound Vector processing, SIMD computer Organizations, The connection machine CM-5.

##### Unit-V

Scalable, Multithreaded and Dataflow Architectures, Latency-hiding techniques, Principals of Multithreading, Fine-Grain Multicomputers, Scalable and multithreaded Architectures, Dataflow and hybrid



Architectures.

#### Unit – VI

Software for parallel programming, Parallel models, Languages and Compilers, Parallel Programming models, Parallel languages and compilers, Dependence analysis and data arrays, code optimization and scheduling, Loop Parallelization and pipelining.

#### Unit – VII

Parallel Program development and Environments, Parallel Programming Environments, Synchronization and Multiprocessing modes, Shared-Variable program structures, Message-passing program development, Mapping program onto multicomputers.

#### Unit – VIII

Instruction level parallelism, Introduction, Basic Design issues, Problem Definition, Model of typical processor, Compiler-Detector Instruction level parallelism, Operand forwarding, Recorder Buffer, Register Re-naming, Tomasulo's Algorithm, Branch Prediction, Limitations in exploiting instruction level parallelism, Thread level parallelism, Recent Advances in computer Architecture, Brief overview of Technology, Forms of Parallelism.

#### TEXT BOOK:

1. Advanced Computer Architecture Second Edition, Kai Hwang, Tata McGraw Hill Publishers.

#### REFERENCE BOOKS:

1. Computer Architecture, Fourth edition, J.L.Hennessy and D.A, Patterson, ELSEVIER.
2. Advanced Computer Architectures, S.G.Shiva, Special Indian edition, CRC, Taylor & Francis.
3. Introduction to High Performance Computing for Scientists and Engineers, G.Hager and G.Wellein, CRC Press, Taylor & Francis Group.
4. Advanced Computer Architecture, D.Sima, T .Fountain, P.Kacsuk, Pearson education.
5. Computer Architecture, B.Parhami, Oxford Univ. Press.

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#### (57051) CLOUD COMPUTING (ELECTIVE-I)

#### UNIT-I

Introductory concepts and overview: Distributed systems – Parallel computing architectures: Vector processing, Symmetric multi processing and Massively parallel processing systems – High performance Cluster computing – Grid computing – Service Oriented Architecture overview – Virtualization.

#### UNIT-II

Overview of Cloud Computing: Meaning of the terms cloud and cloud computing – cloud based service offerings – Grid computing Vs Cloud computing – Benefits of cloud model – limitations – legal issues – Key characteristics of cloud computing – Challenges for the cloud – The evolution of cloud computing.

#### UNIT-III

Web services delivered from the cloud: Infrastructure as a service – Platform-as-a-service – Software-as-a-service. Building Cloud networks: Evolution from the MSP model to cloud computing and software-as-a-service – The cloud data center – SOA as step toward cloud computing – Basic approach to a data center based SOA.

#### UNIT-IV

Federation Presence, Identity and Privacy in the cloud: Federation in the cloud – Presence in the cloud – Privacy and its relation to cloud based information system. Security in the Cloud: Cloud security challenges – Software-as-a-service security

#### UNIT-V

Common Standards in Cloud computing: The open cloud consortium – The

distributed management task force – standards for application developers  
– standards for messaging – standards for security

**UNIT – VI**

End user access to cloud computing: youtube – zimbra – Facebook – Zoho  
– DimDim Collaboration

Mobile internet devices and the cloud: Smartphone – mobile operating  
systems for smart phones – Mobile Platform virtualization – Collaboration  
applications for mobile platforms – Future trends

**UNIT – VII**

Virtualization: Adding guest Operating system. Cloud computing case  
studies 1: Amazon EC2 – Amazon simple DB – Amazon S3 – Amazon Cloud  
Front – Amazon SQS

**UNIT – VIII**

Cloud computing case studies 2: Google App Engine- Google web tool kit –  
Microsoft Azure Services platform – Windows live – Exchange on line –  
Sharepoint services – Microsoft dynamic CRM – salesforce.com CRM –  
App Exchange

**TEXT BOOKS:**

1. Cloud Computing implementation, management and security by John  
W. Rittinghouse, James F. Ransome, CRC Press, Taylor & Francis  
group, 2010
2. Cloud Computing a practical approach by Anthony T. velte, Toby  
J. velte Robert Elsenpeter, Tata Mc Graw Hill edition, 2010

**REFERENCES:**

1. Cloud Application Architectures by George Reese, O'Reilly publishers
2. Cloud computing and SOA convergence in your enterprise, by David  
S. Lindicum, Addison- Wesley

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**(57052) DISTRIBUTED COMPUTING****(ELECTIVE -I)****UNIT I****Introduction**

Definitions, The different forms of computing – Monolithic, Distributed,  
Parallel and cooperative computing, the meaning of Distributed computing,  
Examples of Distributed systems, the strengths and weaknesses of  
Distributed computing, operating system concepts relevant to distributed  
computing, Network basics, the architecture of distributed applications,  
Interprocess Communications – An Archetypal IPC Program Interface, Event  
Synchronization, Timeouts and Threading, Deadlocks and Timeouts, Data  
representation,

Data Encoding, Text-Based Protocols, Request-Response Protocols, Event  
Diagram and Sequence Diagram, Connection-Oriented versus  
Connectionless IPC, The Evolution of Paradigms for IPCs.

**UNIT II****Distributed Computing Paradigms**

Paradigms and Abstraction, Paradigms for Distributed Applications –  
Message Passing Paradigm, The Client-Server Paradigm, The peer-to-peer  
Paradigm, Message system (or MOM) Paradigm – the point-to-point message  
model and the publish/subscribe message model, RPC model, The Distributed  
Objects Paradigms – RMI, ORB, the object space Paradigm, The Mobile  
Agent Paradigm, the Network Services Paradigm, The collaborative  
application ( Groupware Paradigm) ,choosing a Paradigm for an  
application.

**UNIT III**

The Socket API-The Datagram Socket API, The Stream-Mode Socket



API, Client-Server Paradigm Issues, Connection-Oriented and Connectionless Servers, Iterative and Concurrent Servers.

Group Communication-Unicasting versus Multicasting, Multicast API, Connectionless versus Connection-Oriented Multicast, Reliable Multicasting versus Unreliable Multicasting, The Java Basic Multicast API.

#### UNIT IV

Distributed Objects Paradigm (RMI)

Message passing versus Distributed Objects, An Archetypal Distributed Object Architecture, Distributed Object Systems, RPC, RMI, The Java RMI Architecture, Java RMI API, A sample RMI Application, steps for building an RMI application, testing and debugging, comparison of RMI and socket API

#### UNIT V

Distributed Object Paradigm (CORBA)

The basic Architecture, The CORBA object interface, Inter-ORB protocols, object servers and object clients, CORBA object references, CORBA Naming Service and the Interoperable Naming Service, CORBA object services, object Adapters, Java IDL, An example CORBA application.

#### UNIT VI

Grid Computing

Introduction, Grid Computing Anatomy – The Grid Problem, The Concept of Virtual Organizations, Grid Architecture, Grid Architecture and relationship to other Distributed Technologies, Grid computing road map. Merging the Grid services Architecture with the Web Services Architecture.

#### UNIT VII

Open Grid Service Architecture – Introduction, Architecture and Goal, Sample Use cases: Commercial Data Center, National Fusion Collaboratory, Online Media and Entertainment. OGSA platform Components, Open Grid Services Infrastructure.

#### UNIT VIII

Globus GT 3 Toolkit – Architecture, Programming Model. A sample

implementation.

#### TEXT BOOKS:

1. Distributed Computing, Principles and Applications, M.L.Liu, Pearson Education.
2. Grid Computing, Joshy Joseph & Craig Fellenstein, Pearson education, 2004

#### REFERENCE BOOKS:

1. A Networking Approach to Grid Computing, D.Minoli, Wiley & sons.
2. Grid Computing: A Practical Guide to Technology and Applications, A.Abbas, Firewall Media.
3. Java Network Programming, E.R.Harold, 2nd edition, O'Reilly, SPD.
4. Distributed Systems, Concepts and Design, 3rd edition, G.Coulouris, J.Dollimore and Tim Kindbirg, Pearson Education.
5. Java Programming with CORBA, 3rd edition, Brose, Vogel, Duddy, Wiley Dreamtech.
6. Client/Server Programming with Java and CORBA, second edition, R.Orfali & Dan Harkey, John Wiley & sons.
7. Grid Computing – Making the global infrastructure a reality, Fran Berman, Geoffrey C Fox, Anthony JG Hey, Wiley India, 2010

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**(57053) MOBILE COMPUTING  
(ELECTIVE - I)**

**UNIT I**

## Introduction:

Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.

GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS, CSHSD, DECT.

**UNIT-II**

(Wireless) Medium Access Control (MAC)

Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA. MAC protocols for GSM, Wireless LAN (IEEE802.11), Collision Avoidance (MACA, MACAW) Protocols.

**UNIT-III**

Mobile IP Network Layer

IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunnelling and Encapsulation, Route Optimization, DHCP.

**UNIT-IV**

Mobile Transport Layer

Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

**UNIT V**

Database Issues

Database Hoarding & Caching Techniques, C – S Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

**UNIT VI**

Data Dissemination and Synchronization, Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination Broadcast Models, Selective Tuning and Indexing Methods, Digital Audio and Video Broadcasting (DAB & DVB), Data Synchronization – Introduction, Software, and Protocols

**UNIT VII**

Mobile Ad hoc Networks (MANETs)

Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc., Mobile Agents, Service Discovery.

**UNIT-VIII**

Protocols and Platforms for Mobile Computing WAP, Bluetooth, XML, J2ME, JavaCard, PalmOS, Windows CE, SymbianOS, Linux for Mobile Devices.

**TEXT BOOKS**

1. Raj Kamal, "Mobile Computing", Oxford University Press, 2007, ISBN: 0195686772

**REFERENCE BOOKS**

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2004.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002, ISBN 0471419028.
3. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, Oct 2004.

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**(57054) DESIGN PATTERNS  
(ELECTIVE - II)**

**UNIT-I**

Introduction : What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

**UNIT-II**

A Case Study : Designing a Document Editor : Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary .

**UNIT-III**

Creational Patterns : Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

**UNIT-IV**

Structural Pattern Part-I : Adapter, Bridge, Composite.

**UNIT-V**

Structural Pattern Part-II : Decorator, façade, Flyweight, Proxy.

**UNIT-VI**

Behavioral Patterns Part-I : Chain of Responsibility, Command, Interpreter, Iterator.

**UNIT-VII**

Behavioral Patterns Part-II : Mediator, Memento, Observer, State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns.

**UNIT-VIII**

What to Expect from Design Patterns, A Brief History, The Pattern Community An Invitation, A Parting Thought.

**TEXT BOOK :**

1. Design Patterns By Erich Gamma, Pearson Education
2. Head First Design Patterns By Eric Freeman-Oreilly-SPD.

**REFERENCES:-**

1. Pattern's in JAVA Vol-I By Mark Grand ,Wiley DreamTech.
2. Pattern's in JAVA Vol-II By Mark Grand ,Wiley DreamTech.
3. JAVA Enterprise Design Patterns Vol-III By Mark Grand ,Wiley DreamTech.
4. Design Patterns Explained By Alan Shalloway,Pearson Education.
5. Pattern Oriented Software Architecture,F.Buschmann&others,John Wiley & Sons.



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**(57055) MACHINE LEARNING  
(ELECTIVE - II)**

**UNIT-I**

Introduction: An illustrative learning task, and a few approaches to it. What is known from algorithms? Theory, Experiment, Biology, Psychology.

**UNIT-II**

Concept Learning: Version spaces, Inductive Bias, Active queries, Mistake bound/ PAC model, basic results, Overview of issues regarding data sources, success criteria.

**UNIT-III**

Decision Tree Learning: - Minimum Description Length Principle, Occam's razor, Learning with active queries

**UNIT-IV**

Neural Network Learning: Perceptions and gradient descent back propagation.

**UNIT-V**

Sample Complexity and Over fitting, Errors in estimating means, Cross Validation and jackknifing VC dimension, Irrelevant features: Multiplicative rules for weight tuning.

**UNIT-VI**

Bayesian Approaches: The basics Expectation Maximization, Hidden Markov Models

**UNIT-VII**

Instance-based Techniques: Lazy vs. eager generalization, K nearest neighbor, case- based reasoning

**UNIT-VIII**

Genetic Algorithms: Different search methods for induction - Explanation-based Learning: using prior knowledge to reduce sample complexity.

**TEXT BOOKS:**

1. Tom Michel, Machine Learning, McGraw Hill, 1997
2. Trevor Hastie, Robert Tibshirani & Jerome Friedman, The Elements of Statistically Learning, Springer Verlag, 2001

**REFERENCE BOOKS:**

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.
2. Richard o. Duda, Peter E. Hart and David G Stork, pattern classification, John Wiley & Sons Inc., 2001
3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995.





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**(57057) INFORMATION RETRIEVAL SYSTEMS**

**(ELECTIVE – II)**

**UNIT I**

Introduction, Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses, Information Retrieval System Capabilities - Search, Browse, Miscellaneous.

**UNIT II**

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction, Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure.

**UNIT III**

Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages

**UNIT IV**

Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

**UNIT V**

User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, Weighted searches of Boolean systems, Searching the Internet and hypertext.

Information Visualization: Introduction, Cognition and perception, Information visualization technologies.

**UNIT VI**

Text Search Algorithms: Introduction, Software text search algorithms.

Hardware text search systems.

Information System Evaluation: Introduction, Measures used in system evaluation, Measurement example – TREC results.

**UNIT VII**

Multimedia Information Retrieval – Models and Languages – Data Modeling, Query Languages, Indexing and Searching.

**UNIT VIII**

Libraries and Bibliographical Systems – Online IR Systems, OPACs, Digital Libraries.

**TEXTBOOKS**

1. Information Storage and Retrieval Systems: Theory and Implementation By Kowalski, Gerald, Mark T Maybury, Springer.
2. Modern Information Retrieval By Ricardo Baeza-Yates, Pearson Education, 2007.
3. Information Retrieval: Algorithms and Heuristics By David A Grassman and Ophir Frieder, 2<sup>nd</sup> Edition, Springer.

**REFERENCE BOOKS**

1. Information Retrieval Data Structures and Algorithms By William B Frakes, Ricardo Baeza-Yates, Pearson Education, 1992.
2. Information Storage & Retrieval By Robert Korfhage – John Wiley & Sons.
3. Introduction to Information Retrieval By Christopher D. Manning and Prabhakar Raghavan, Cambridge University Press, 2008.
4. Natural Language Processing and Information Retrieval. T.Siddiqui and U.S.Tiwary, Oxford Univ. Press.



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**(57609) LINUX PROGRAMMING AND DATA MINING LAB**

- LINUX PROGRAMMING:
  - Note: Use Bash for Shell scripts.
1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
  2. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
  3. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
  4. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
  5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
  6. Write a shell script to list all of the directory files in a directory.
  7. Write a shell script to find factorial of a given integer.
  8. Write an awk script to count the number of lines in a file that do not contain vowels.
  9. Write an awk script to find the number of characters, words and lines in a file.
  10. Write a c program that makes a copy of a file using standard I/O and system calls.
  11. Implement in C the following Unix commands using System calls  
A. cat      B. ls      C. mv
  12. Write a program that takes one or more file/directory names as command line input and reports the following information on the file.

- A. File type.
  - B. Number of links.
  - C. Time of last access.
  - D. Read, Write and Execute permissions.
13. Write a C program to emulate the Unix ls -l command.
  14. Write a C program to list for every file in a directory, its inode number and file name.
  15. Write a C program that demonstrates redirection of standard output to a file. Ex: ls > fl.
  16. Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen.
  17. Write a C program to create a Zombie process.
  18. Write a C program that illustrates how an orphan is created.
  19. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex: ls -l | sort
  20. Write C programs that illustrate communication between two unrelated processes using named pipe.
  21. Write a C program to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.
  22. Write a C program that receives the messages (from the above message queue as specified in (21)) and displays them.
  23. Write a C program to allow cooperating processes to lock a resource for exclusive use, using a) Semaphores, b) flock or lockf system calls.
  24. Write a C program that illustrates suspending and resuming processes using signals.
  25. Write a C program that implements a producer-consumer system with two processes. (using Semaphores).
  26. Write client and server programs (using c) for interaction between server and client processes using Unix Domain sockets.
  27. Write client and server programs (using c) for interaction between server and client processes using Internet Domain sockets.
  28. Write a C program that illustrates two processes communicating using shared memory.

**TEXT BOOKS:**

1. Advanced Unix Programming, N.B.Venkateswarala, BS Publications.

2. Unix and Shell programming, B. A. Forouzan and R. F. Gilberg, Cengage Learning.
3. Unix and Shell Programming, M.G. Venkatesh Murthy, Pearson Education, 2005.
4. Unix Shells by Example, 4th Edition, Ellie Quigley, Pearson Education.
5. Sed and Awk, O. Dougherty & A. Robbins, 2<sup>nd</sup> edition, SPD.

### Data Mining Lab:

#### Credit Risk Assessment:

Description: The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the bank's profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.

To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.
2. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

### The German Credit Data:

Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany, credit dataset (original) Excel spreadsheet version of the German credit data. (Download from web)

In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer !)

A few notes on the German dataset

- DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
- owns\_telephone. German phone rates are much higher than in Canada so fewer people own telephones.
- foreign\_worker. There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.
- There are 20 attributes used in judging a loan applicant. The goal is to classify the applicant into one of two categories, good or bad.

Subtasks : (Turn in your answers to the following tasks)

1. List all the categorical (or nominal) attributes and the real-valued attributes separately.
2. What attributes do you think might be crucial in making the credit assessment? Come up with some simple rules in plain English using your selected attributes.
3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training.
4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy?
5. Is testing on the training set as you did above a good idea? Why or Why not?



6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what is cross-validation briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why? (10 marks)
7. Check to see if the data shows a bias against "foreign workers" (attribute 20), or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss.
8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)
9. Sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifications equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)?
10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model?
11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees

using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase?

12. (Extra Credit): How can you convert a Decision Trees into "if-then-else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules.PART. train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one! Can you predict what attribute that might be in this dataset? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR.

#### Task Resources:

Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)

- Decision Trees (Source: Tan, MSU)
- Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)
- Weka resources:
  - o Introduction to Weka (html version) (download ppt version)
  - o Download Weka
  - o Weka Tutorial
  - o ARFF format
  - o Using Weka from command line

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD

IV Year B.Tech. CSE - I Sem

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**(57610) CASE TOOLS AND SOFTWARE TESTING LAB**

**Case Tools Lab**

Students are divided into batches of 5 each and each batch has to draw the following diagrams using UML for an ATM system whose description is given below.

UML diagrams to be developed are:

- |                       |                           |
|-----------------------|---------------------------|
| 1. Use Case Diagram.  | 2. Class Diagram.         |
| 3. Sequence Diagram.  | 4. Collaboration Diagram. |
| 5. State Diagram.     | 6. Activity Diagram.      |
| 7. Component Diagram. | 8. Deployment Diagram.    |
| 9. Test Design.       |                           |

**Description for an ATM System**

The software to be designed will control a simulated automated teller machine (ATM) having a magnetic stripe reader for reading an ATM card, a customer console (keyboard and display) for interaction with the customer, a slot for depositing envelopes, a dispenser for cash (in multiples of Rs. 100, Rs. 500 and Rs. 1000), a printer for printing customer receipts, and a key-operated switch to allow an operator to start or stop the machine. The ATM will communicate with the bank's computer over an appropriate communication link. (The software on the latter is not part of the requirements for this problem.)

The ATM will service one customer at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN) - both of which will be sent to the bank for validation as part of each transaction. The customer will then be able to perform one or more transactions. The card will be retained in the machine until the customer indicates that he/she desires no further transactions, at which point it will be returned - except as noted below.

The ATM must be able to provide the following services to the customer:

1. A customer must be able to make a cash withdrawal from any suitable account linked to the card, in multiples of Rs. 100 or Rs. 500 or Rs. 1000. Approval must be obtained from the bank before cash is dispensed.
2. A customer must be able to make a deposit to any account linked to the card, consisting of cash and/or checks in an envelope. The customer will enter the amount of the deposit into the ATM, subject to manual verification when the envelope is removed from the machine by an operator. Approval must be obtained from the bank before physically accepting the envelope.
3. A customer must be able to make a transfer of money between any two accounts linked to the card.
4. A customer must be able to make a balance inquiry of any account linked to the card.
5. A customer must be able to abort a transaction in progress by pressing the Cancel key instead of responding to a request from the machine.

The ATM will communicate each transaction to the bank and obtain verification that it was allowed by the bank. Ordinarily, a transaction will be considered complete by the bank once it has been approved. In the case of a deposit, a second message will be sent to the bank indicating that the customer has deposited the envelope. (If the customer fails to deposit the envelope within the timeout period, or presses cancel instead, no second message will be sent to the bank and the deposit will not be credited to the customer.)

If the bank determines that the customer's PIN is invalid, the customer will be required to re-enter the PIN before a transaction can proceed. If the customer is unable to successfully enter the PIN after three tries, the card will be permanently retained by the machine, and the customer will have to contact the bank to get it back.

If a transaction fails for any reason other than an invalid PIN, the ATM will display an explanation of the problem, and will then ask the customer whether he/she wants to do another transaction.

The ATM will provide the customer with a printed receipt for each successful



transaction.

The ATM will have a key-operated switch that will allow an operator to start and stop the servicing of customers. After turning the switch to the "on" position, the operator will be required to verify and enter the total cash on hand. The machine can only be turned off when it is not servicing a customer. When the switch is moved to the "off" position, the machine will shut down, so that the operator may remove deposit envelopes and reload the machine with cash, blank receipts, etc.

### Software Testing Lab

#### List of Experiments

1. Write programs in 'C' Language to demonstrate the working of the following constructs:  
i) do...while ii) while...do iii) if...else iv) switch v) for
2. "A program written in 'C' language for Matrix Multiplication fails"  
Introspect the causes for its failure and write down the possible reasons for its failure.
3. Take any system (e.g. ATM system) and study its system specifications and report the various bugs.
4. Write the test cases for any known application (e.g. Banking application)
5. Create a test plan document for any application (e.g. Library Management System)
6. Study of any testing tool (e.g. Win runner)
7. Study of any web testing tool (e.g. Selenium)
8. Study of any bug tracking tool (e.g. Bugzilla, bugbit)
9. Study of any test management tool (e.g. Test Director)
10. Study of any open source-testing tool (e.g. Test Link)
11. Take a mini project (e.g. University admission, Placement Portal) and execute it. During the Life cycle of the mini project create the various testing documents\* and final test report document.

\*Note: To create the various testing related documents refer to the text "Effective Software Testing Methodologies by William E. Perry"

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**(58007) MANAGEMENT SCIENCE**

**Unit I**

[www.jntuworld.com](http://www.jntuworld.com)

Introduction to Management: Entrepreneurship and organization - Nature and Importance of Management, Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Social responsibilities of Management.

**Unit II**

Designing Organisational Structures: Departmentation and Decentralisation, Types of Organisation structures - Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organisation, Cellular Organisation, team structure, boundaryless organization, inverted pyramid structure, lean and flat organization structure and their merits, demerits and suitability.

**Unit III**

Operations Management: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement-Statistical Quality Control:  $\bar{X}$  chart, R chart, c chart, p chart, (simple Problems), Acceptance Sampling, Deming's contribution to quality.

**Unit IV**

- A) Materials Management: Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records - Supply Chain Management
- B) Marketing: Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle., Channels of distribution.



**Unit V**

Human Resources Management (HRM): Evolution of HRM, Concepts of HRM, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

[www.jntuworld.com](http://www.jntuworld.com)

**Unit VI**

Project Management (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing, (simple problems)

**Unit VII**

Strategic Management: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

**Unit VIII**

Contemporary Management Practices: Basic concepts of Just-In-Time (JIT) System, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levels, Value Chain Analysis, Enterprise Resource Planning (ERP), Performance Management, Business Process outsourcing (BPO), Business Process Re-engineering 5S Model, Deming's PDCA, Kaizen, Poka-Yoke, Muda, Benchmarking, Balanced Score Card.

**TEXT BOOK:**

1. Aryasri: Management Science, TMH, New Delhi, 2009

**REFERENCE BOOKS:**

1. Stoner, Management, Pearson, 2009
2. Kotler Philip & Keller Kevin Lane: Marketing Management PHI, 2009.
3. Koontz, Weihrich, & Aryasri: Principles of Management, TMH, 2009.

4. Thomas N. Duening & John M. Ivancevich Management—Principles and Guidelines, Cengage, 2009.
5. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2009.
6. Memoria & S.V.Ganker, Personnel Management, Himalaya, 2009.
7. Schermerhorn: Management, Wiley, 2009.
8. Parnell: Strategic Management, Biztantra, 2009.
9. L.S.Srinath: PERT/CPM, Affiliated East-West Press, 2009.
10. William J. Stevenson & Ceyhan Ozgur: Introduction to Management Science, TMH, 2007.

[www.jntuworld.com](http://www.jntuworld.com)

**Pre-requisites: Managerial Economics**

Objective: To familiarize with the process of management and to provide basic insights into select contemporary management practices.

Codes/Tables: Normal Distribution Function Table need to be permitted into the examination Hall.

Question Paper Pattern: 5 Questions to be answered out of 8 questions. The question paper should contain atleast 2 practical problems, one each from units – III & VI

Each question should not have more than 3 bits.

Unit VIII will have only short questions, not essay questions.

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**(58035) WEB SERVICES  
(ELECTIVE – III)**

[www.jntuworld.com](http://www.jntuworld.com)

**UNIT-I**

Evolution and Emergence of Web Services - Evolution of distributed computing, Core distributed computing technologies – client/server, CORBA, JAVARMI, Micro Soft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA).

**UNIT-II**

Introduction to Web Services – The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

**UNIT-III**

Web Services Architecture – Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication, basic steps of implementing web services, developing web services enabled applications.

**UNIT-IV**

Core fundamentals of SOAP – SOAP Message Structure, SOAP encoding, SOAP message exchange models, SOAP communication and messaging, SOAP security.

**UNIT-V**

Developing Web Services using SOAP – Building SOAP Web Services, developing SOAP Web Services using Java, limitations of SOAP

**UNIT-VI**

Describing Web Services – WSDL – WSDL in the world of Web Services, Web Services life cycle, anatomy of WSDL definition document, WSDL bindings, WSDL Tools, limitations of WSDL.

**UNIT-VII**

Discovering Web Services – Service discovery, role of service discovery in a SOA, service discovery mechanisms, UDDI – UDDI Registries, uses of UDDI Registry, Programming with UDDI, UDDI data structures, support for categorization in UDDI Registries, Publishing API, Publishing information to a UDDI Registry, searching information in a UDDI Registry, deleting information in a UDDI Registry, limitations of UDDI.

**UNIT-VIII**

[www.jntuworld.com](http://www.jntuworld.com)

Web Services Interoperability – Means of ensuring Interoperability, Overview of .NET and J2EE, Web Services Security – XML security framework, XML encryption, XML digital signature, XKMS structure, guidelines for signing XML documents.

**TEXT BOOKS:**

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Srganesh, Wiley India, rp – 2008.
2. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education, 2008.
3. XML, Web Services, and the Data Revolution, F.P.Coyle, Pearson Education.

**REFERENCES:**

1. Building Web Services with Java, 2<sup>nd</sup> Edition, S. Graftam and others, Pearson Edn., 2008.
2. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly, SPD.
3. McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers, 2005.
4. J2EE Web Services, Richard Monson-Haefel, Pearson Education.
5. Web Services, G. Alonso, F. Casati and others, Springer, 2005.



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**(58036) SEMANTIC WEB AND SOCIAL NETWORKS  
(ELECTIVE - III)**

**Unit I:**

Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of Today's Web, The Next Generation Web

**Unit II:**

Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

[www.jntuworld.com](http://www.jntuworld.com)

**Unit III:**

Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web - Resource Description Framework (RDF) / RDF Schema, Ontology Web Language (OWL), UML, XML/XML Schema.

**Unit IV:**

Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping.

**Unit V**

Logic, Rule and Inference Engines, Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base

**Unit VI:**

XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods.

**Unit VII:**

What is social Networks analysis, development of the social networks

analysis, Electronic Sources for Network Analysis - Electronic Discussion networks.

**Unit VIII**

Blogs and Online Communities, Web Based Networks, Building Semantic Web Applications with social network features.

**TEXT BOOKS:** [www.jntuworld.com](http://www.jntuworld.com)

1. Thinking on the Web - Berners Lee, Godel and Turing, Wiley interscience, 2008.
2. Social Networks and the Semantic Web, Peter Mika, Springer, 2007.

**REFERENCE BOOKS:**

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J. Davies, Rudi Studer, Paul Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services - Liyang Lu Chapman and Hall/CRC Publishers, (Taylor & Francis Group)
3. Information Sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
4. Programming the Semantic Web, T. Segaran, C. Evans, J. Taylor, O'Reilly, SPD.

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**(58037) SCRIPTING LANGUAGES (ELECTIVE - III)**

**UNIT - I :** Introduction to PERL and Scripting Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures: arrays, list, hashes, strings, pattern and regular expressions, subroutines.

**UNIT - II :** Advanced perl  
Finer points of looping, pack and unpack; filesystem, eval, datastructures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

**UNIT - III :** PHP Basics  
PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Datatypes, Variables, Constants, expressions, string interpolation, control structures - Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

[www.jntuworld.com](http://www.jntuworld.com)

**UNIT - IV :** Advanced PHP Programming  
PHP and Web Forms, Files, PHP Authentication and Methodologies - Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World.

**UNIT - V :** TCL  
TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.

**UNIT VI - Tk**

Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding, Peri-Tk.

**UNIT - VII :** Python

Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling.

**UNIT - VIII**

Integrated Web Applications in Python - Building Small, Efficient Python Web Systems, Web Application Framework.

**TEXT BOOKS:**

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL, 3<sup>rd</sup> Edition, Jason Gilmore, Apress Publications (Dream tech.).

**REFERENCE BOOKS:** [www.jntuworld.com](http://www.jntuworld.com)

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J. Lee and B. Ware (Addison Wesley) Pearson Education.
2. Programming Python, M. Lutz, SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1, L. Bayross and S. Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.
6. Guide to Programming with Python, M. Dawson, Cengage Learning.
7. Perl by Example, E. Quigley, Pearson Education.
8. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD.
9. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
10. PHP and MySQL by Example, E. Quigley, Prentice Hall (Pearson).
11. Perl Power, J. P. Flynn, Cengage Learning.
12. PHP Programming solutions, V. Vaswani, TMH.



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**(58038) MULTIMEDIA & RICH INTERNET APPLICATIONS  
(ELECTIVE - III)**

**UNIT-I**

Fundamental concepts in Text and Image: Multimedia and hypermedia, World Wide Web, overview of multimedia software tools, Graphics and image data representation graphics/image data types, file formats, Color in image and video; color science, color models in images, color models in video.

**UNIT-II**

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

[www.jntuworld.com](http://www.jntuworld.com)

**UNIT III**

Multimedia Data Compression: Lossless compression algorithms, Lossy compression algorithms, Image compression standards.

**UNIT IV**

Basic Video compression techniques, Case study: MPEG Video Coding I, Basic Audio compression techniques, Case study: MPEG Audio compression.

**UNIT - V****Web 2.0**

What is web 2.0, Search, Content Networks, User Generated Content, Blogging, Social Networking, Social Media, Tagging, Social Marking, Rich Internet Applications, Web Services, Mashups, Location Based Services, XML, RSS, Atom, JSON, and VoIP, Web 2.0 Monetization and Business Models, Future of the Web.

**UNIT - VI**

Rich Internet Applications (RIAs) with Adobe Flash : Adobe Flash- Introduction, Flash Movie Development, Learning Flash with Hands-on Examples, Publish your flash movie, Creating special effects with Flash, Creating a website splash screen, action script, web sources.

**UNIT - VII**

Rich Internet Applications (RIAs) with Flex 3 - Introduction, Developing with Flex 3, Working with Components, Advanced Component Development.

Visual Effects and Multimedia.

**UNIT-VIII**

Ajax- Enabled Rich Internet Application : Introduction, Traditional Web Applications vs Ajax Applications, Rich Internet Application with Ajax, History of Ajax, Raw Ajax example using XMLHttpRequest object, Using XML, Creating a full scale Ajax Enabled application, Dojo Toolkit.

**TEXT BOOKS:**

1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHI Learning, 2004
2. Professional Adobe Flex 3, Joseph Balderson, Peter Ent, et al, Wrox Publications, Wiley India, 2009.
3. AJAX, Rich Internet Applications, and Web Development for Programmers, Paul J Deitel and Harvey M Deitel, Deitel Developer Series, Pearson Education

[www.jntuworld.com](http://www.jntuworld.com)

**REFERENCES:**

1. Multimedia Communications: Applications, Networks, Protocols and Standards, Fred Halsall, Pearson Education, 2001, rp 2005.
2. Multimedia Making it work, Tay Vaughan, 7<sup>th</sup> edition, TMH, 2008.
3. Introduction to multimedia communications and Applications, Middleware, Networks, K.R.Rao, Zoran, Dragored, Wiley India, 2006, rp, 2009.
4. Multimedia Computing, Communications & Applications, Ralf Steinmetz and Klara Nahrstedt, Pearson Education, 2004
5. Principles of Multimedia, Ranjan Parekh, TMH, 2006.
6. Multimedia in Action, James E. Shuman, Cengage Learning, 198, rp 2008.
7. Multimedia Systems design, Prabhat K. Andleigh, Kiran Thakrar, PHI, 1986.
8. Multimedia and Communications Technology, Steve Heath, Elsevier, 1999, rp 2003.
9. Adobe Flash CS3 Professional, Adobe press, Pearson Education, 2007.
10. Flash CS3 Professional Advanced, Russel Chun, Pearson Education, 2007.
11. Flash CS5, Chris Grover, O'Reilly, SPD, 2010.
12. SAMS Teach yourself Adobe flash CS3, Pearson Education, 2007.
13. Flex 4 Cookbook, Joshua Noble, et al, O'Reilly, SPD 2010.
14. Flex3 - A beginner's guide, Michele E. Davis, Jon A. Phillips, TMH, 2008.
15. Mastering Dojo, R.Gill, C. Riecke and A. Russell, SPD.

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**(58039) ADHOC AND SENSOR NETWORKS  
(ELECTIVE-IV)**

**UNIT I**

Introduction to Ad Hoc Wireless Networks  
Characteristics of MANETs, Applications of MANETs, Challenges.

**UNIT II**

Routing in MANETs

[www.jntuworld.com](http://www.jntuworld.com)

Topology-based versus Position-based approaches, Topology based routing protocols, Position based routing, Other Routing Protocols.

**UNIT III**

Data Transmission in MANETs

The Broadcast Storm, Multicasting, Geocasting

TCP over Ad Hoc Networks

TCP Protocol overview, TCP and MANETs, Solutions for TCP over Ad Hoc

**UNIT IV**

Basics of Wireless Sensors and Applications

The Mica Mote, Sensing and Communication Range, Design Issues, Energy consumption, Clustering of Sensors, Applications

**UNIT V**

Data Retrieval in Sensor Networks

Classification of WSNs, MAC layer, Routing layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

**UNIT VI**

Security

Security in Ad hoc Wireless Networks, Key Management, Secure Routing, Cooperation in MANETs, Intrusion Detection Systems.

**UNIT VII**

Sensor Network Platforms and Tools

Sensor Network Hardware, Sensor Network Programming Challenges, Node-Level Software Platforms

[www.jntuworld.com](http://www.jntuworld.com)**UNIT VIII**

Operating System – TinyOS

Imperative Language: nesC, Dataflow style language: TinyGALS, Node-Level Simulators, ns-2 and its sensor network extension, TOSSIM

**TEXT BOOKS:**

1. Ad Hoc and Sensor Networks – Theory and Applications, Carlos Cordeiro Dharma P. Aggarwal, World Scientific Publications / Cambridge University Press, March 2006
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science imprint, Morgan Kaufmann Publishers, 2005, rp2009

**REFERENCE BOOKS:**

1. Adhoc Wireless Networks – Architectures and Protocols, C.Siva Ram Murthy, B.S.Murthy, Pearson Education, 2004
2. Wireless Sensor Networks – Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010
3. Wireless Ad hoc Mobile Wireless Networks – Principles, Protocols and Applications, Subir Kumar Sarkar, et al., Auerbach Publications, Taylor & Francis Group, 2008.
4. Ad hoc Networking, Charles E. Perkins, Pearson Education, 2001.
5. Wireless Ad hoc Networking, Shih-Lin Wu, Yu-Chee Tseng, Auerbach Publications, Taylor & Francis Group, 2007
6. Wireless Ad hoc and Sensor Networks – Protocols, Performance and Control, Jagannathan Sarangapani, CRC Press, Taylor & Francis Group, 2007, rp 2010.
7. Security in Ad hoc and Sensor Networks, Raheem Beyali, et al., World Scientific Publications / Cambridge University Press, 2010
8. Ad hoc Wireless Networks – A communication-theoretic perspective, Ozan K. Tonguz, Gialuigi Ferrari, Wiley India, 2006, rp2009.
9. Wireless Sensor Networks – Signal processing and communications perspectives, Ananthram Swami, et al., Wiley India, 2007, rp2009.



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(58040) STORAGE AREA NETWORKS  
(ELECTIVE - IV)

**Unit I:**

Review data creation and the amount of data being created and understand the value of data to a business, challenges in data storage and data management, Solutions available for data storage, Core elements of a data center infrastructure, role of each element in supporting business activities

**Unit II:** [www.jntuworld.com](http://www.jntuworld.com)

Hardware and software components of the host environment, Key protocols and concepts used by each component, Physical and logical components of a connectivity environment, Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications.

**Unit III:**

Concept of RAID and its components, Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Compare and contrast integrated and modular storage systems, High-level architecture and working of an intelligent storage system

**Unit IV:**

Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN, Benefits of the different networked storage options, Understand the need for long-term archiving solutions and describe how CAS fulfills the need, Understand the appropriateness of the different networked storage options for different application environments

**Unit V:**

List reasons for planned/unplanned outages and the impact of downtime,

Impact of downtime, Differentiate between business continuity (BC) and disaster recovery (DR), RTO and RPO, Identify single points of failure in a storage infrastructure and list solutions to mitigate these failures.

**Unit VI:**

Architecture of backup/recovery and the different backup/recovery topologies, replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities

**Unit VII**

Identify key areas to monitor in a data center, Industry standards for data center monitoring and management, Key metrics to monitor for different components in a storage infrastructure, Key management tasks in a data center, Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain

**Unit VIII:**

Virtualization technologies, block-level and file-level virtualization technologies and processes.

**Case Studies** [www.jntuworld.com](http://www.jntuworld.com)

The technologies described in the course are reinforced with EMC examples of actual solutions.

Realistic case studies enable the participant to design the most appropriate solution for given sets of criteria.

**TEXT BOOKS:**

1. EMC Corporation, Information Storage and Management, Wiley.

**REFERENCE BOOKS:**

1. Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, Osborne, 2003.
2. Marc Farley, "Building Storage Networks", Tata McGraw Hill, Osborne, 2001.
3. Meeta Gupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002.

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**(58041) DATA BASE SECURITY  
(ELECTIVE - IV)**

**UNIT I**

Introduction  
Introduction to Databases Security Problems in Databases Security Controls  
Conclusions

**UNIT II**

[www.jntuworld.com](http://www.jntuworld.com)

Security Models -1  
Introduction Access Matrix Model Take-Grant Model Acten Model PN Model Hartson and Hsiao's Model Fernandez's Model Bussolati and Martella's Model for Distributed databases

**UNIT III**

Security Models -2  
Bell and LaPadula's Model Biba's Model Dion's Model Sea View Model Jajodia and Sandhu's Model The Lattice Model for the Flow Control conclusion

**UNIT IV**

Security Mechanisms  
Introduction User Identification/Authentication Memory Protection Resource Protection Control Flow Mechanisms Isolation Security Functionalities in Some Operating Systems Trusted Computer System Evaluation Criteria

**UNIT V**

Security Software Design  
Introduction A Methodological Approach to Security Software Design Secure Operating System Design Secure DBMS Design Security Packages

## Database Security Design

**UNIT VI**

Statistical Database Protection & Intrusion Detection Systems  
Introduction Statistics Concepts and Definitions Types of Attacks Inference Controls evaluation Criteria for Control Comparison Introduction IDES System RETISS System ASES System Discovery

**UNIT VII**

[www.jntuworld.com](http://www.jntuworld.com)

Models For The Protection Of New Generation Database Systems -1  
Introduction A Model for the Protection of Frame Based Systems A Model for the Protection of Object-Oriented Systems SORION Model for the Protection of Object-Oriented Databases

**UNIT VIII**

Models For The Protection Of New Generation Database Systems -2  
A Model for the Protection of New Generation Database Systems: the Orion Model Jajodia and Kogan's Model A Model for the Protection of Active Databases Conclusions

**TEXT BOOKS:**

1. Database Security by Castano Pearson Edition (1/e)
2. Database Security and Auditing: Protecting Data Integrity and Accessibility, 1st Edition, Hassan Afyouni, THOMSON Edition



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD**

<b>IV Year B.Tech. CSE - II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	3	1/-/	3

**(58042) EMBEDDED SYSTEMS  
(ELECTIVE-IV)**

**Unit - I**

Embedded Computing : Introduction, Complex Systems and Microprocessor, The Embedded System Design Process, Formalisms for System Design, Design Examples. (Chapter 1 from Text Book 1, Wolf).

**Unit - II**

[www.jntuworld.com](http://www.jntuworld.com)

The 8051 Architecture : Introduction, 8051 Micro controller Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts. (Chapter 3 from Text Book 2, Ayala).

**Unit - III**

Basic Assembly Language Programming Concepts : The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051, Data Transfer and Logical Instructions. (Chapters 4,5 and 6 from Text Book 2, Ayala).

**Unit - IV**

Arithmetic Operations, Decimal Arithmetic, Jump and Call Instructions, Further Details on Interrupts. (Chapter 7 and 8 from Text Book 2, Ayala)

**Unit - V**

Applications : Interfacing with Keyboards, Displays, D/A and A/D Conversions, Multiple Interrupts, Serial Data Communication. (Chapter 10 and 11 from Text Book 2, Ayala).

**Unit - VI**

Introduction to Real - Time Operating Systems : Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes

and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment.

(Chapter 6 and 7 from Text Book 3, Simon).

**Unit - VII**

Basic Design Using a Real-Time Operating System : Principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations, Saving Memory and Power, An example RTOS like uC-OS (Open Source); Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded

Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System. (Chapter 8,9,10 & 11 from Text Book 3, Simon).

**Unit - VIII**

Introduction to advanced architectures : ARM and SHARC, Processor and memory organization and Instruction level parallelism; Networked embedded systems; Bus protocols, I2C bus and CAN bus; Internet-Enabled Systems; Design Example-Elevator Controller. (Chapter 8 from Text Book 1, Wolf).

**TEXT BOOKS:**

[www.jntuworld.com](http://www.jntuworld.com)

1. Computers and Components, Wayne Wolf, Elsevier.
2. The 8051 Microcontroller, Kenneth J. Ayala, Thomson.

**REFERENCES:**

1. Embedding system building blocks, Labrosse, via CMP publishers.
2. Embedded Systems, Raj Kamal, TMH.
3. Micro Controllers, Ajay V Deshmukhi, TMH.
4. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley.
5. Microcontrollers, Raj kamal, Pearson Education.
6. An Embedded Software Primer, David E. Simon, Pearson Education.

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IV Year B.Tech. CSE - II Sem	L	T/P/D	C
	0	-/-	2

(58617) INDUSTRY ORIENTED MINI PROJECT

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD

IV Year B.Tech. CSE - II Sem	L	T/P/D	C
	0	-/6-/-	2

(58618) SEMINAR

[www.jntuworld.com](http://www.jntuworld.com)

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IV Year B.Tech. CSE - II Sem	L	T/P/D	C
	0	-/15-/-	10

(58619) PROJECT WORK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD

IV Year B.Tech. CSE - II Sem	L	T/P/D	C
	0	-/-	2

(58620) COMPREHENSIVE VIVA

## BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY

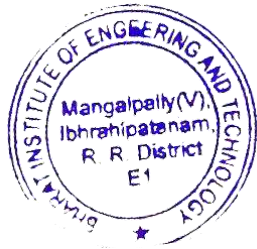
Mangalpally (Village), Ibrahimpatnam (Mandal), Ranga Reddy (District), Telangana-501510

1.3.2. Average percentage of courses that include experiential learning through project work/field work/internship during last five years

### B.Tech-COMPUTER SCIENCE ENGINEERING

2014-15

S. No.	Regulations	No. of Course	Year of Study
1.	R13	12	I Year & II Year I & II Semesters
2.	R09	22	III & IV year I & II Semesters



*Vatthara Subu*  
**PRINCIPAL**  
Principal  
Bharat Institute of Engg. and Tech  
Mangalpally (V), Ibrahimpatnam (M)  
Ranga Reddy (Dist)-Telangana-501510

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD.****B. TECH. COMPUTER SCIENCE AND ENGINEERING****I YEAR**

Code	Subject	L	T/P/D	C
A10001	English	2	-	4
A10002	Mathematics – I	3	1	6
A10003	Mathematical Methods	3	-	6
A10004	Engineering Physics	3	-	6
A10005	Engineering Chemistry	3	-	6
A10501	Computer Programming	3	-	6
A10301	Engineering Drawing	2	3	6
A10581	Computer Programming Lab.	-	3	4
A10081	Engineering Physics / Engineering Chemistry Lab.	-	3	4
A10083	English Language Communication Skills Lab.	-	3	4
A10082	IT Workshop / Engineering Workshop	-	3	4
	<b>Total</b>	<b>19</b>	<b>16</b>	<b>56</b>

**II YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A30008	Probability and Statistics	4	-	4
A30504	Mathematical Foundations of Computer Science	4	-	4
A30502	Data Structures	4	-	4
A30401	Digital Logic Design	4	-	4
A30404	Electronic Devices and Circuits	4	-	4
A30202	Basic Electrical Engineering	4	-	4
A30282	Electrical and Electronics Lab	-	3	2
A30582	Data Structures Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**II YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A40506	Computer Organization	4	-	4
A40507	Database Management Systems	4	-	4
A40503	Java Programming	4	-	4
A40009	Environmental studies	4	-	4
A40509	Formal Languages and Automata Theory	4	-	4
A40508	Design and Analysis of Algorithms	4	-	4
A40585	Java Programming Lab	-	3	2
A40584	Database Management Systems Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
A50511	Principles of Programming Languages	4	-	4
	<b>OPEN ELECTIVE</b>	4	-	4
A50018	Human Values and Professional Ethics			
A50017	Intellectual Property Rights			
A50117	Disaster Management			
A50518	Software Engineering	4	-	4
A50514	Compiler Design	4	-	4
A50510	Operating Systems	4	-	4
A50515	Computer Networks	4	-	4
A50589	Operating Systems Lab	-	3	2
A50587	Compiler Design Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
A60521	Distributed Systems	4	-	4
A60522	Information Security	4	-	4
A60524	Object Oriented Analysis and Design	4	-	4
A60525	Software Testing Methodologies	4	-	4
A60010	Managerial Economics and Financial Analysis	4	-	4
A60512	Web Technologies	4	-	4
A60591	Case Tools and Web Technologies Lab	-	3	2
A60086	Advanced Communication Skills Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>I Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>2</b>	<b>-/-</b>	<b>4</b>

**(A10001) ENGLISH****Introduction:**

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

**Objectives:**

- To improve the language proficiency of the students in English with emphasis on LSRW skills.
- To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
- To develop the study skills and communication skills in formal and informal situations.

**SYLLABUS:****Listening Skills:****Objectives**

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation.
2. To equip students with necessary training in listening so that they

can comprehend the speech of people of different backgrounds and regions.

*Students should be given practice in listening to the sounds of the language to be able to recognise them, to distinguish between them to mark stress and recognise and use the right intonation in sentences.*

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

#### **Speaking Skills:**

Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.
  2. To enable students to express themselves fluently and appropriately in social and professional contexts.
- Oral practice
  - Describing objects/situations/people
  - Role play – Individual/Group activities (Using exercises from the five units of the prescribed text: **Skills Annexe -Functional English for Success**)
  - Just A Minute(JAM) Sessions.

#### **Reading Skills:**

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.
  2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
- Skimming the text
  - Understanding the gist of an argument
  - Identifying the topic sentence
  - Inferring lexical and contextual meaning
  - Understanding discourse features
  - Scanning
  - Recognizing coherence/sequencing of sentences

*NOTE : The students will be trained in reading skills using the prescribed text for detailed study.*

*They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.*

### **Writing Skills :**

#### Objectives

1. To develop an awareness in the students about writing as an exact and formal skill.
2. To equip them with the components of different forms of writing, beginning with the lower order ones.
  - Writing sentences
  - Use of appropriate vocabulary
  - Paragraph writing
  - Coherence and cohesiveness
  - Narration / description
  - Note Making
  - Formal and informal letter writing
  - Describing graphs using expressions of comparison

#### **TEXTBOOKS PRESCRIBED:**

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into Five Units, are prescribed:

**For Detailed study:** First Textbook: "Skills Annexe -Functional English for Success", Published by Orient Black Swan, Hyderabad

#### **For Non-detailed study**

1. **Second text book "Epitome of Wisdom"**, Published by Maruthi Publications, Guntur
  - The course content and study material is divided into Five Units.

#### **Unit –I:**

1. Chapter entitled '**Wit and Humour**' from "**Skills Annexe -Functional English for Success**", Published by Orient Black Swan, Hyderabad
  2. Chapter entitled '**Mokshagundam Visvesvaraya**' from "**Epitome of Wisdom**", Published by Maruthi Publications, Hyderabad.
- L- Listening For Sounds, Stress and Intonation  
 S- Greeting and Taking Leave, Introducing Oneself and Others (Formal and Informal Situations)  
 R- Reading for Subject/ Theme



- W- Writing Paragraphs
- G- Types of Nouns and Pronouns
- V- Homonyms, homophones synonyms, antonyms

**Unit –II**

1. Chapter entitled **“Cyber Age”** from **“Skills Annexe -Functional English for Success”** Published by Orient Black Swan, Hyderabad.
  2. Chapter entitled **'Three Days To See'** from **“Epitome of Wisdom”**, Published by Maruthi Publications, Hyderabad.
- L – Listening for themes and facts
  - S – Apologizing, interrupting, requesting and making polite conversation
  - R- for theme and gist
  - W- Describing people, places, objects, events
  - G- Verb forms
  - V- noun, verb, adjective and adverb

**Unit –III**

1. Chapter entitled **'Risk Management'** from **“Skills Annexe - Functional English for Success”** Published by Orient Black Swan, Hyderabad
  2. Chapter entitled **'Leela's Friend'** by R.K. Narayan from **“Epitome of Wisdom”**, Published by Maruthi Publications, Hyderabad
- L – for main points and sub-points for note taking
  - S – giving instructions and directions; Speaking of hypothetical situations
  - R – reading for details
  - W – note-making, information transfer, punctuation
  - G – present tense
  - V – synonyms and antonyms

**Unit –IV**

1. Chapter entitled **'Human Values and Professional Ethics'** from **“Skills Annexe -Functional English for Success”** Published by Orient Black Swan, Hyderabad
  2. Chapter entitled **'The Last Leaf'** from **“Epitome of Wisdom”**, Published by Maruthi Publications, Hyderabad
- L - Listening for specific details and information
  - S- narrating, expressing opinions and telephone interactions
  - R - Reading for specific details and information
  - W- Writing formal letters and CVs

- G- Past and future tenses
- V- Vocabulary - idioms and Phrasal verbs

**Unit –V**

1. Chapter entitled '**Sports and Health**' from “**Skills Annexe - Functional English for Success**” Published by Orient Black Swan, Hyderabad
  2. Chapter entitled '**The Convocation Speech**' by N.R. Narayanmurthy from “**Epitome of Wisdom**”, Published by Maruthi Publications, Hyderabad
- L- Critical Listening and Listening for speaker's tone/ attitude
  - S- Group discussion and Making presentations
  - R- Critical reading, reading for reference
  - W- Project proposals; Technical reports, Project Reports and Research Papers
  - G- Adjectives, prepositions and concord
  - V- Collocations and Technical vocabulary

Using words appropriately

- \* Exercises from the texts not prescribed shall also be used for classroom tasks.

**REFERENCES :**

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson
6. Handbook of English Grammar & Usage, Mark Lester and Larry Beason, Tata Mc Graw –Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press
9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.

11. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
12. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt Ltd.,
13. ABC of Common Errors Nigel D Turton, Mac Millan Publishers.
14. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
15. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw – Hill.
16. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO
17. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education
18. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,
19. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers

**Outcomes:**

- Usage of English Language, written and spoken.
- Enrichment of comprehension and fluency
- Gaining confidence in using language in verbal situations.

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<b>I Year B.Tech. CSE</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>3</b>	<b>1/-/-</b>	<b>6</b>

**(A10002) MATHEMATICS -I****Objectives:** To learn

- The types of Matrices and their properties
- Concept of rank of a matrix and applying the concept of rank to know the consistency of linear equations and to find all possible solutions, if exist.
- The concept of eigenvalues and eigenvectors of a matrix is to reduce a quadratic form into a canonical form through a linear transformation.
- The mean value theorems and to understand the concepts geometrically.
- The functions of several variables and optimization of these functions.
- The evaluation of improper integrals, Beta and Gamma functions.
- Multiple integration and its applications.
- Methods of solving the differential equations of 1<sup>st</sup> and higher order
- The applications of the differential equations to Newton's law of cooling, Natural growth and decay, Bending of beams etc.
- The definition of integral transforms and Laplace Transform.
- Properties of Laplace transform.
- Inverse Laplace Transform.
- Convolution theorem.
- Solution of Differential equations using Laplace transform.

**UNIT-I**

**Theory of Matrices:** Real matrices – Symmetric, skew – symmetric, orthogonal. Complex matrices: Hermitian, Skew-Hermitian and Unitary Matrices. Idempotent matrix, Elementary row and column transformations-Elementary matrix, Finding rank of a matrix by reducing to Echelon and normal forms. Finding the inverse of a non-singular square matrix using row/ column transformations (Gauss- Jordan method). Consistency of system of linear equations (homogeneous and non- homogeneous) using the rank of a matrix. Solving  $m \times n$  and  $n \times n$  linear system of equations by Gauss elimination.

Cayley-Hamilton Theorem (without proof) – Verification. Finding inverse of a matrix and powers of a matrix by Cayley-Hamilton theorem, Linear dependence and Independence of Vectors. Linear Transformation – Orthogonal Transformation. Eigen values and eigen vectors of a matrix.

Properties of eigen values and eigen vectors of real and complex matrices. Finding linearly independent eigen vectors of a matrix when the eigen values of the matrix are repeated.

Diagonalization of matrix – Quadratic forms up to three variables. Rank – Positive definite, negative definite, semi definite, index, signature of quadratic forms. Reduction of a quadratic form to canonical form.

#### **UNIT – II**

**Differential calculus methods:** Rolle's Mean value Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – (all theorems without proof but with geometrical interpretations), verification of the Theorems and testing the applicability of these theorem to the given function.

Functions of several variables: Functional dependence- Jacobian- Maxima and Minima of functions of two variables without constraints and with constraints-Method of Lagrange multipliers.

#### **UNIT – III**

**Improper integration, Multiple integration & applications:** Gamma and Beta Functions –Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions

Multiple integrals – double and triple integrals – change of order of integration-change of variables (polar, cylindrical and spherical) Finding the area of a region using double integration and volume of a region using triple integration.

#### **UNIT – IV**

**Differential equations and applications:** Overview of differential equations-exact, linear and Bernoulli (NOT TO BE EXAMINED). Applications of first order differential equations – Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories.

Linear differential equations of second and higher order with constant coefficients, Non-homogeneous term of the type  $f(x) = e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ , and  $x^n$ ,  $e^{ax} V(x)$ ,  $x^n V(x)$ , method of variation of parameters. Applications to bending of beams, Electrical circuits and simple harmonic motion.

#### **UNIT – V**

**Laplace transform and its applications to Ordinary differential equations**  
Definition of Integral transform, Domain of the function and Kernel for the Laplace transforms. Existence of Laplace transform. Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied or divided by "t". Laplace transforms of derivatives and integrals of functions. – Unit step function – second shifting theorem – Dirac's delta function, Periodic function – Inverse Laplace transform by Partial fractions( Heaviside method) Inverse Laplace transforms of functions

when they are multiplied or divided by "s", Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem -- Solving ordinary differential equations by Laplace transforms.

**TEXT BOOKS:**

1. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.

**REFERENCES:**

1. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3<sup>rd</sup> edition, Narosa Publishing House, Delhi.
2. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
3. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.
4. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
5. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3<sup>rd</sup> Edi, CRC Press Taylor & Francis Group.
6. Mathematics for Engineers and Scientists, Alan Jeffrey, 6<sup>th</sup> Edi, 2013, Chapman & Hall/ CRC
7. Advanced Engineering Mathematics, Michael Greenberg, Second Edition, Pearson Education.

**Outcome:**

- After learning the contents of this Unit the student is able to write the matrix representation of a set of linear equations and to analyze solutions of system of equations.
- The student will be able to understand the methods of differential calculus to optimize single and multivariable functions.
- The student is able to evaluate the multiple integrals and can apply the concepts to find the Areas, Volumes, Moment of Inertia etc., of regions on a plane or in space.
- The student is able to identify the type of differential equation and uses the right method to solve the differential equation. Also able to apply the theory of differential equations to the real world problems.
- The student is able to solve certain differential equations using Laplace Transform. Also able to transform functions on time domain to frequency domain using Laplace transforms.

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I Year B.Tech. CSE

L	T/P/D	C
3	-/-	6

**(A10003) MATHEMATICAL METHODS****Objectives:**

- The objective is to find the relation between the variables x and y out of the given data (x,y).
- This unit also aims to find such relationships which exactly pass through data or approximately satisfy the data under the condition of least sum of squares of errors.
- The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data.
- This topic deals with methods to find roots of an equation and solving a differential equation.
- The numerical methods are important because finding an analytical procedure to solve an equation may not be always available.
- In the diverse fields like electrical circuits, electronic communication, mechanical vibration and structural engineering, periodic functions naturally occur and hence their properties are very much required.
- Indeed, any periodic and non-periodic function can be best analyzed in one way by Fourier series and transforms methods.
- The unit aims at forming a partial differential equation (PDE) for a function with many variables and their solution methods. Two important methods for first order PDE's are learnt. While separation of variables technique is learnt for typical second order PDE's such as Wave, Heat and Laplace equations.
- In many Engineering fields the physical quantities involved are vector-valued functions.
- Hence the unit aims at the basic properties of vector-valued functions and their applications to line integrals, surface integrals and volume integrals.

**UNIT – I:****Interpolation and Curve fitting:**

**Interpolation:** Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences –Central differences – Symbolic relations and separation of symbols- Difference Equations – Differences of a polynomial-Newton's formulae for interpolation – Central difference interpolation Formulae – Gauss Central Difference Formulae –

Interpolation with unevenly spaced points-Lagrange's Interpolation formula.  
B. Spline interpolation – Cubic spline.

**Curve fitting:** Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares.

#### **UNIT – II :**

##### **Numerical techniques:**

**Solution of Algebraic and Transcendental Equations and Linear system of equations:** Introduction – Graphical interpretation of solution of equations .The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method .

Solving system of non-homogeneous equations by L-U Decomposition method(Crout's Method)Jacobi's and Gauss-Seidel Iteration method

**Numerical Differentiation, Integration, and Numerical solutions of First order differential equations:** Numerical differentiation, Numerical integration - Trapezoidal rule, Simpson's 1/3<sup>rd</sup> and 3/8 Rule , Generalized Quadrature.

Numerical solution of Ordinary Differential equations: Solution by Taylor's series method –Picard's Method of successive Approximation- single step methods-Euler's Method-Euler's modified method, Runge-Kutta Methods ,Predictor–corrector methods(Milne's Method and Adams-Bashforth methods only).

#### **UNIT – III:**

**Fourier series and Fourier Transforms:** Definition of periodic function.

Fourier expansion of periodic functions in a given interval of length  $2\pi$   
Determination of Fourier coefficients – Fourier series of even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

Fourier integral theorem - Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

#### **UNIT-IV:**

**Partial differential equations :** Introduction and Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and non-linear equations (Charpit's method), Method of separation of variables for second order equations –Applications of Partial differential equations-Two dimensional wave equation., Heat equation.

#### **UNIT – V**

**Vector Calculus:** Vector Calculus: Scalar point function and vector point



function, Gradient- Divergence- Curl and their related properties, - Laplacian operator, Line integral – work done – Surface integrals -Volume integral. Green's Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification). Solenoidal and irrotational vectors, Finding Potential function.

**TEXT BOOKS:**

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers.

**REFERENCES:**

1. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi & Others, S. Chand.
2. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt. Ltd.
3. Mathematical Methods by G.Shankar Rao, I.K. International Publications, N.Delhi
4. Mathematical Methods by V. Ravindranath, Etl, Himalaya Publications.
5. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3<sup>rd</sup> Edi, 2013, CRC Press Taylor & Francis Group.
6. Mathematics for Engineers and Scientists, Alan Jeffrey, 6<sup>th</sup> Edi, 2013, Chapman & Hall/ CRC
7. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.

**Outcomes:**

From a given discrete data, one will be able to predict the value of the data at an intermediate point and by curve fitting, can find the most appropriate formula for a guessed relation of the data variables. This method of analysis data helps engineers to understand the system for better interpretation and decision making

- After studying this unit one will be able to find a root of a given equation and will be able to find a numerical solution for a given differential equation.
- Helps in describing the system by an ODE, if possible. Also, suggests to find the solution as a first approximation.
- One will be able to find the expansion of a given function by Fourier series and Fourier Transform of the function.
- Helps in phase transformation, Phase change and attenuation of coefficients in acoustics.

- After studying this unit, one will be able to find a corresponding Partial Differential Equation for an unknown function with many independent variables and to find their solution.
- Most of the problems in physical and engineering applications, problems are highly non-linear and hence expressing them as PDEs'. Hence understanding the nature of the equation and finding a suitable solution is very much essential.
- After studying this unit, one will be able to evaluate multiple integrals (line, surface, volume integrals) and convert line integrals to area integrals and surface integrals to volume integrals.
- It is an essential requirement for an engineer to understand the behavior of the physical system.

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**(A10004) ENGINEERING PHYSICS****Objectives:**

It gives

- to the students basic understanding of bonding in solids, crystal structures and techniques to characterize crystals.
- to understand the behavior of electron in a solid and thereby one can determine the conductivity and specific heat values of the solids.
- to study applications in Engineering like memory devices, transformer core and Electromagnetic machinery.
- to help the student to design powerful light sources for various Engineering Applications and also enable them to develop communication systems using Fiber Technology.
- to understand the working of Electronic devices, how to design acoustic proof halls and understand the behavior of the materials at Nano scale.

**UNIT-I**

**Crystallography:** Ionic Bond, Covalent Bond, Metallic Bond, Hydrogen Bond, Vander-Waal's Bond, Calculation of Cohesive Energy of diatomic molecule-Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems, Structure of Diamond and NaCl.

**X-ray Diffraction & Defects in Crystals:** Bragg's Law, X-Ray diffraction methods: Laue Method, Powder Method: Point Defects: Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects, line defects (Qualitative) & Burger's Vector.

**UNIT-II**

**Principles of Quantum Mechanics:** Waves and Particles, de Broglie Hypothesis, Matter Waves, Davisson and Germer' Experiment, Heisenberg's Uncertainty Principle, Schrödinger's Time Independent Wave Equation - Physical Significance of the Wave Function – Infinite square well potential, extension to three dimensions

**Elements of Statistical Mechanics & Electron theory of Solids:** Phase space, Ensembles, Micro Canonical, Canonical and Grand Canonical Ensembles - Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics (Qualitative Treatment), Concept of Electron Gas, Density of States, Fermi

Energy- Electron in a periodic Potential, Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), E-K curve, Origin of Energy Band Formation in Solids, Concept of Effective Mass of an Electron, Classification of Materials into Conductors, Semi Conductors & Insulators.

#### UNIT-III

**Dielectric Properties:** Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities: Ionic and Electronic - Internal Fields in Solids, Clausius - Mossotti Equation, Piezo - electricity and Ferro- electricity.

**Magnetic Properties & Superconducting Properties:** Permeability, Field Intensity, Magnetic Field Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro Magnetism on the basis of Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials and their Applications, Superconductivity, Meissner Effect, Effect of Magnetic field, Type-I & Type-II Superconductors, Applications of Superconductors.

#### UNIT-IV

**Optics:** Interference-Interference in thin films (Reflected light), Newton rings experiment- Fraunhofer diffraction due to single slit, N-slits, Diffraction grating experiment, Double refraction-construction and working of Nicol's Prism

**Lasers & Fiber Optics:** Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Einstein's Coefficients and Relation between them, Population Inversion, Lasing Action, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers- Principle of Optical Fiber, Construction of fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers: Step Index and Graded Index Fibers, Attenuation in Optical Fibers, Application of Optical Fiber in communication systems.

#### UNIT-V:

**Semiconductor Physics:** Fermi Level in Intrinsic and Extrinsic Semiconductors, Calculation of carrier concentration in Intrinsic &, Extrinsic Semiconductors, Direct and Indirect Band gap semiconductors, Hall Effect-Formation of PN Junction, Open Circuit PN Junction, Energy Diagram of PN Diode, Diode Equation, I-V Characteristics of PN Junction diode, Solar cell, LED & Photo Diodes. **Acoustics of Buildings & Acoustic Quieting:** Reverberation and Time of Reverberation, Sabine's Formula for Reverberation Time, Measurement of Absorption Coefficient of a Material, factors affecting the Architectural Acoustics and their Remedies

**Nanotechnology:** Origin of Nanotechnology, Nano Scale, Surface to Volume

Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Top-down Fabrication: Chemical Vapour Deposition, Characterization by TEM.

**TEXT BOOKS:**

1. Engineering Physics, K. Malik, A. K. Singh, Tata Mc Graw Hill Book Publishers.
2. Engineering Physics, V. Rajendran, Tata Mc Graw Hill Book Publishers.

**REFERENCES:**

1. Fundamentals of Physics, David Halliday, Robert Resnick, Jearl Walker by John Wiley & Sons.
2. Sears and Zemansky's University Physics (10th Edition) by Hugh D. Young Roger A. Freedman, T. R. Sandin, A. Lewis Ford Addison-Wesley Publishers.
3. Applied Physics for Engineers – P. Madhusudana Rao (Academic Publishing company, 2013).
4. Solid State Physics – M. Arumugam (Anuradha Publications).
5. Modern Physics – R. Murugesan & K. Siva Prasath – S. Chand & Co. (for Statistical Mechanics).
6. A Text Book of Engg Physics – M. N. Avadhanulu & P. G. Khsirsagar– S. Chand & Co. (for acoustics).
7. Modern Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co.Ltd.
8. Nanotechnology – M.Ratner & D. Ratner (Pearson Ed.).
9. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
10. Solid State Physics – A.J. Dekker (Macmillan).
11. Applied Physics – Mani Naidu Pearson Education.

**Outcomes:**

- The student would be able to learn the fundamental concepts on behavior of crystalline solids.
- The knowledge on Fundamentals of Quantum Mechanics, Statistical Mechanics enables the student to apply to various systems like Communications Solar Cells, Photo Cells and so on.
- Design, Characterization and study of properties of materials help the student to prepare new materials for various Engineering applications.
- This course also helps the student exposed to non-destructive testing methods.
- Finally, Engineering Physics Course helps the student to develop problem solving skills and analytical skills.

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**(A10005) ENGINEERING CHEMISTRY****Objective:**

An engineer is as someone who uses scientific, natural and physical principles to design something of use for people or other living creatures. Much of what any engineer does involves chemistry because everything in our environment has a molecular make up. Engineering requires the concepts of applied chemistry and the more chemistry an engineer understands, the more beneficial it is. In the future, global problems and issues will require an in-depth understanding of chemistry to have a global solution. This syllabus aims at bridging the concepts and theory of chemistry with examples from fields of practical application, thus reinforcing the connection between science and engineering. It deals with the basic principles of various branches of chemistry which are fundamental tools necessary for an accomplished engineer.

**UNIT I:**

**Electrochemistry & Corrosion:** Electro Chemistry – Conductance - Specific, Equivalent and Molar conductance and their Units; Applications of Conductance (Conductometric titrations). **EMF:** Galvanic Cells, types of Electrodes – (Calomel, Quinhydrone and glass electrodes); Nernst equation and its applications ; concept of concentration cells, electro chemical series, Potentiometric titrations, determination of  $P^H$  using glass electrode-Numerical problems.

**Batteries:** Primary cells (dry cells) and secondary cells (lead-Acid cell, Ni-Cd cell, Lithium cells). Applications of batteries. **Fuel cells** – Hydrogen – Oxygen fuel cell; methanol – oxygen fuel cell ; Advantages and Applications.

**Corrosion and its control:** Causes and effects of corrosion; Theories of corrosion – Chemical & Electrochemical corrosion; Types of corrosion (Galvanic, Water line, Pitting and Intergranular); Factors affecting rate of corrosion – Nature of metal and Nature of Environment – Corrosion control methods – Cathodic protection (sacrificial anodic and impressed current). Surface coatings: Metallic coatings & methods of application of metallic coatings - hot dipping (galvanization & tinning), Cementation, cladding, electroplating (copper plating) Electroless plating (Ni plating) - Organic coatings – Paints - constituents and their functions.

**UNIT II:**

**Engineering Materials: Polymers:** Types of Polymerization (Chain & Step growth). **Plastics:** Thermoplastic & Thermo setting resins; Compounding &

fabrication of plastics (Compression and injection moulding). Preparation, properties, engineering applications of PVC, Teflon and Bakelite. **Fibers**- Characteristics of fibers – preparation, properties and uses of Nylon – 6,6 and Dacron – Fiber Reinforced Plastics (FRP) – applications. **Rubbers** – Natural rubber and its vulcanization. Elastomers – Buna-s, Butyl rubber and Thiokol rubber.

**Conducting polymers:** Polyacetylene, Polyaniline, Mechanism of Conduction, doping; applications of Conducting polymers. **Bio-degradable Polymers**- preparation and Applications of Poly vinyl acetate and Poly lactic acid - **Cement:** composition of Portland cement, setting & hardening of cement (reactions), **Lubricants:** Classification with examples- Characteristics of a good lubricant & mechanism of lubrication (thick film, thin film and extreme pressure) – properties of lubricants: viscosity, Cloud point, flash and fire points. **Refractories:** Classification, characteristics of a good refractory and applications.

**Nanomaterials:** Introduction, preparation by sol-gel & chemical vapour deposition methods. Applications of nanomaterials.

#### **UNIT III:**

**Water and its Treatment:** Hardness of Water: Causes of hardness, expression of hardness – units – types of hardness, estimation of temporary & permanent hardness of water by EDTA method - numerical problems. Boiler troubles – Scale & sludges, Priming and foaming, caustic embrittlement and boiler corrosion; Treatment of boiler feed water – Internal treatment (Phosphate, Colloidal and calgon conditioning) – External treatment – Lime Soda process, Zeolite process and ion exchange process. Numerical Problems. **Potable Water**- Its Specifications – Steps involved in treatment of potable water – Disinfection of water by chlorination and ozonisation. Reverse osmosis & its significance.

#### **Unit – IV :**

**Fuels & Combustion: Fuels** – Classification – solid fuels : coal – analysis of coal - proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining – cracking – types – fixed bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol, Bergius and Fischer-Tropsch's process: Gaseous fuels - constituents, characteristics and applications of natural gas, LPG and CNG. Analysis of flue gas by Orsat's apparatus – Numerical Problems.

**Combustion** – Definition, Calorific value of fuel – HCV , LCV; Determination of calorific value by Junker's gas calorimeter – theoretical calculation of Calorific value by Dulong's formula – Numerical problems on combustion.

#### **UNIT V:**

**Phase Rule & Surface Chemistry : Phase Rule:** Definition of terms: Phase,

component, degree of freedom, phase rule equation. Phase diagrams – one component system- water system. Two component system Lead- Silver, cooling curves, heat treatment based on iron-carbon phase diagram - hardening, annealing and normalization.

**Surface Chemistry: Adsorption** – Types of Adsorption, Isotherms – Freundlich and Langmuir adsorption isotherm, applications of adsorption; **Colloids**: Classification of Colloids; Electrical & optical properties, micelles, applications of colloids in industry.

**TEXT BOOKS:**

1. Engineering Chemistry by R.P. Mani, K.N. Mishra, B. Rama Devi / CENGAGE learning.
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).

**REFERENCE BOOKS**

1. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited, New Delhi (2006)
2. Engineering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills Publishing Company Limited, New Delhi (2004).
3. Text Book of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co Publishers, New Delhi (2006).
4. Chemistry of Engineering Materials by CV Agarwal, C.P Murthy, A.Naidu, BS Publications.

**Outcome:**

- Students will demonstrate a depth of knowledge and apply the methods of inquiry in a discipline of their choosing, and they will demonstrate a breadth of knowledge across their choice of varied disciplines.
- Students will demonstrate the ability to access and interpret information, respond and adapt to changing situations, make complex decisions, solve problems, and evaluate actions.
- Students will demonstrate awareness and understanding of the skills necessary to live and work in a diverse engineering world.



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**(A10501) COMPUTER PROGRAMMING****Objectives:**

- To understand the various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs.
- To learn to write programs (using structured programming approach) in C to solve problems.
- To introduce the students to basic data structures such as lists, stacks and queues.
- To make the student understand simple sorting and searching methods.

**UNIT - I**

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development.

Introduction to the C Language – Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Operators (Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements- Selection Statements (making decisions) – if and switch statements, Repetition statements (loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Program examples.

**UNIT - II**

Functions-Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Limitations of recursion, example C programs, Preprocessor commands.

Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C program examples.

**UNIT - III**

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and arrays, Passing an array to a function,

memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

#### **UNIT - IV**

Enumerated, Structure, and Union Types– The Type Definition (typedef), Enumerated types, Structures –Declaration, initialization, accessing structures, operations on structures, Complex structures, structures and functions, Passing structures through pointers, self referential structures, unions, bit fields, C programming examples, command –line arguments.

Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling), Positioning functions, C program examples.

#### **UNIT – V**

Searching and Sorting – Sorting- selection sort, bubble sort, Searching-linear and binary search methods.

Lists- Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Push and Pop Operations, Queues- Enqueue and Dequeue operations.

#### **TEXT BOOKS:**

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh , Oxford University Press.

#### **REFERENCE BOOKS:**

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. C for All, S. Thamarai Selvi, R.Murugesan, Anuradha Publications.
3. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7<sup>th</sup> Edition, Pearson education.
4. Programming in C, Ajay Mittal, Pearson.
5. Programming with C, B.Gottfried, 3<sup>rd</sup> edition, Schaum's outlines, TMH.
6. Problem solving with C, M.T.Somasekhara, PHI
7. Programming with C, R.S.Bickar, Universities Press.
8. Computer Programming & Data Structures, E.Balagurusamy, 4<sup>th</sup> edition, TMH.
9. Programming in C – Stephen G. Kochan, III Edition, Pearson

Education.

10. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
11. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press.

**Outcomes:**

- Demonstrate the basic knowledge of computer hardware and software.
- Ability to apply solving and logical skills to programming in C language and also in other languages.

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**(A10301) ENGINEERING DRAWING****UNIT – I**

**Introduction to Engineering Drawing:** Principles of Engineering Drawing/ Graphics – Various Drawing Instruments – Conventions in Drawing – **Lettering practice** – BIS Conventions.

**Curves:** Constructions of Curves used in Engineering Practice:

- Conic Sections including the Rectangular Hyperbola – General method only.
- Cycloid, Epicycloid and Hypocycloid
- Involute.

**Scales:** Construction of different types of Scales, Plain, Diagonal, Vernier scale.

**UNIT – II****Orthographic Projections in First Angle**

**Projection:** Principles of Orthographic Projections – Conventions – First and Third Angle projections.

**Projections of Points :** including Points in all four quadrants.

**Projections of Lines :** Parallel, perpendicular, inclined to one plan and inclined to both planes. True length and true angle of a line. Traces of a line.

**Projections of Planes:** Plane parallel, perpendicular and inclined to one reference plane. Plane inclined to both the reference planes.

**UNIT – III**

**Projections of Solids:** Projections of regular solids, cube, prisms, pyramids, tetrahedran, cylinder and cone, axis inclined to both planes.

**Sections and Sectional Views:** Right Regular Solids – Prism, Cylinder, Pyramid, Cone – use of Auxiliary views.

**UNIT – IV**

**Development of Surfaces:** Development of Surfaces of Right, Regular Solids – Prisms, Cylinder, Pyramids, Cone and their parts. frustum of solids.

**Intersection of Solids:-** Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

**UNIT – V**

**Isometric Projections :** Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Plane Figures, Simple and Compound

Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of parts with Spherical surface.

**Transformation of Projections** : Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects.

**Perspective Projections** : Perspective View : Points, Lines and Plane Figures, Vanishing Point Methods (General Method only).

**TEXT BOOKS**

1. Engineering Drawing – Basant, Agrawal, TMH
2. Engineering Drawing, N.D. Bhatt

**REFERENCES :**

1. Engineering Graphics. P I Varghese Tata McGraw Hill Education Pvt. Ltd.
2. Engineering drawing – P.J. Shah .S.Chand Publishers.
3. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers.
4. Engineering Drawing – M.B. Shah and B.C. Rana, Pearson.
5. Engineering Drawing by K.Venu Gopal & V.Prabu Raja New Age Publications.
6. Engineering Drawing by John. PHI Learning Publisher.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****I Year B.Tech. CSE****L T/P/D C****- -/3/- 4****(A10581) COMPUTER PROGRAMMING LAB****Objectives:**

- To write programs in C to solve the problems.
- To implement linear data structures such as lists, stacks, queues.
- To implement simple searching and sorting methods.

**Recommended Systems/Software Requirements:**

- Intel based desktop PC
- ANSI C Compiler with Supporting Editors

**Week 1**

- a) Write a C program to find the sum of individual digits of a positive integer.
- b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

**Week 2**

- a) Write a C program to calculate the following Sum:  
Sum= $1-x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$
- b) Write a C program to find the roots of a quadratic equation.

**Week 3**

a) The total distance travelled by vehicle in 't' seconds is given by distance  $s = ut + 1/2at^2$  where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec<sup>2</sup>). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, \*, /, % and use Switch Statement)

**Week 4**

- a) Write C programs that use both recursive and non-recursive functions
- i) To find the factorial of a given integer.

- ii) To find the GCD (greatest common divisor) of two given integers.

**Week 5**

- a) Write a C program to find the largest integer in a list of integers.
- b) Write a C program that uses functions to perform the following:
  - i) Addition of Two Matrices
  - ii) Multiplication of Two Matrices

**Week 6**

- a) Write a C program that uses functions to perform the following operations:
  - i) To insert a sub-string in to a given main string from a given position.
  - ii) To delete n Characters from a given position in a given string.
- b) Write a C program to determine if the given string is a palindrome or not

**Week 7**

- a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.
- b) Write a C program to count the lines, words and characters in a given text.

**Week 8**

- a) Write a C program to generate Pascal's triangle.
- b) Write a C program to construct a pyramid of numbers.

**Week 9**

Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:

$$1+x+x^2+x^3+\dots+x^n$$

For example: if n is 3 and x is 5, then the program computes 1+5+25+125.

Print x, n, the sum

Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if  $n < 0$ , then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

**Week 10**

- a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
- b) Write a C program to convert a Roman numeral to its decimal equivalent.

**Week 11**

Write a C program that uses functions to perform the following operations:

- i) Reading a complex number
- ii) Writing a complex number
- iii) Addition of two complex numbers
- iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

**Week 12**

a) Write a C program which copies one file to another.

b) Write a C program to reverse the first n characters in a file.

(Note: The file name and n are specified on the command line.)

**Week 13**

a) Write a C program to display the contents of a file.

b) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

**Week 14**

a) Write a C program that uses non recursive function to search for a Key value in a given list of integers using Linear search.

b) Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using Binary search.

**Week 15**

a) Write a C program that implements the Selection sort method to sort a given array of integers in ascending order.

b) Write a C program that implements the Bubble sort method to sort a given list of names in ascending order.

**Week 16**

Write a C program that uses functions to perform the following operations:

- i) Create a singly linked list of integer elements.
- ii) Traverse the above list and display the elements.

**Week 17**

Write a C program that implements stack (its operations) using a singly linked list to display a given list of integers in reverse order. Ex. input: 10 23 4 6 output: 6 4 23 10

**Week 18**

Write a C program that implements Queue (its operations) using a singly linked list to display a given list of integers in the same order. Ex. input: 10



23 4 6 output: 10 23 4 6

**Week 19**

Write a C program to implement the linear regression algorithm.

**Week 20**

Write a C program to implement the polynomial regression algorithm.

**Week 21**

Write a C program to implement the Lagrange interpolation.

**Week 22**

Write C program to implement the Newton- Gregory forward interpolation.

**Week 23**

Write a C program to implement Trapezoidal method.

**Week 24**

Write a C program to implement Simpson method.

**TEXT BOOKS:**

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
2. Computer Programming in C, V. Rajaraman, PHI Publishers.
3. C Programming, E.Balagurusamy, 3<sup>rd</sup> edition, TMH Publishers.
4. C Programming, M.V.S.S.N.Prasad, ACME Learning Pvt. Ltd.
5. C and Data Structures, N.B.Venkateswarlu and E.V.Prasad,S.Chand Publishers
6. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****I Year B.Tech. CSE****L T/P/D C****- -/3/- 4****(A10081) ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB****ENGINEERING PHYSICS LAB****(Any TEN experiments compulsory)****Objectives**

This course on Physics lab is designed with 13 experiments in an academic year. It is common to all branches of Engineering in B.Tech 1<sup>st</sup> year.

The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student.

The experiments are selected from various areas of Physics like Physical Optics, Lasers, Fiber Optics, Sound, Mechanics, Electricity & Magnetism and Basic Electronics.

Also the student is exposed to various tools like Screw gauge, Vernier Callipers, Physics Balance, Spectrometer and Microscope.

1. Dispersive power of the material of a prism – Spectrometer
2. Determination of wavelength of a source – Diffraction Grating.
3. Newton's Rings - Radius of curvature of plano convex lens.
4. Melde's experiment – Transverse and longitudinal modes.
5. Time constant of an R-C circuit.
6. L-C-R circuit.
7. Magnetic field along the axis of current carrying coil – Stewart and Gees method.
8. Study the characteristics of LED and LASER sources.
9. Bending losses of fibres & Evaluation of numerical aperture of a given fibre.
10. Energy gap of a material of p-n junction.
11. Torsional pendulum.
12. Wavelength of light –diffraction grating - using laser.
13. Characteristics of a solar cell

**LABORATORY MANUAL:**

1. Laboratory Manual of Engineering Physics by Dr.Y.Aparna & Dr.K.Venkateswara Rao (V.G.S Publishers)

**Outcomes**

The student is expected to learn from this laboratory course the concept of error and its analysis. It also allows the student to develop experimental skills to design new experiments in Engineering.

With the exposure to these experiments the student can compare the theory and correlate with experiment.

**ENGINEERING CHEMISTRY LAB**

List of Experiments ( Any 12 of the following)

**Titrimetry:**

1. Estimation of ferrous iron by dichrometry.
2. Estimation of hardness of water by EDTA method.

**Mineral analysis:**

3. Determination of percentage of copper in brass.
4. Estimation of manganese dioxide in pyrolusite.

**Instrumental Methods:****Colorimetry:**

5. Determination of ferrous iron in cement by colorimetric method
6. Estimation of copper by colorimetric method.

**Conductometry:**

7. Conductometric titration of strong acid vs strong base.
8. Conductometric titration of mixture of acids vs strong base.

**Potentiometry:**

9. Titration of strong acid vs strong base by potentiometry.
10. Titration of weak acid vs strong base by potentiometry.

**Physical properties:**

11. Determination of viscosity of sample oil by redwood / oswald's viscometer.
12. Determination of Surface tension of lubricants.

**Preparations:**

13. Preparation of Aspirin
14. Preparation of Thiokol rubber

**Adsorption:**

15. Adsorption of acetic acid on charcoal.

**TEXT BOOKS:**

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Inorganic quantitative analysis, Vogel.

**REFERENCE BOOKS:**

1. Text Book of engineering chemistry by R. N. Goyal and Harmendra Goel, Ane Books Private Ltd.,
2. A text book on experiments and calculation Engg. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****I Year B.Tech. CSE****L T/P/D C****- /3/- 4****(A10083) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB**

The **Language Lab** focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

**Objectives**

- ☒ To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- ☒ To sensitise the students to the nuances of English speech sounds, word accent, intonation and rhythm
- ☒ To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
- ☒ To improve the fluency in spoken English and neutralize mother tongue influence
- ☒ To train students to use language appropriately for interviews, group discussion and public speaking

**Syllabus: English Language Communication Skills Lab shall have two parts:**

**a. Computer Assisted Language Learning (CALL) Lab**

**b. Interactive Communication Skills (ICS) Lab**

The following course content is prescribed for the **English Language Communication Skills Lab**

**Exercise – I**

**CALL Lab:** Introduction to Phonetics – Speech Sounds – Vowels and Consonants

**ICS Lab:** Ice-Breaking activity and JAM session

Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

**Exercise – II**

**CALL Lab:** Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.

**ICS Lab:** Situational Dialogues – Role-Play- Expressions in Various Situations

– Self-introduction and Introducing Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.

Concord (Subject in agreement with verb) and Words often misspelt-confused/misused

#### **Exercise - III**

**CALL Lab:** Minimal Pairs- Word accent and Stress Shifts- Listening Comprehension.

**ICS Lab:** Descriptions- Narrations- Giving Directions and guidelines.

Sequence of Tenses, Question Tags and One word substitutes.

#### **Exercise – IV**

**CALL Lab:** Intonation and Common errors in Pronunciation.

**ICS Lab:** Extempore- Public Speaking

Active and Passive Voice, –Common Errors in English, Idioms and Phrases

#### **Exercise – V**

**CALL Lab:** Neutralization of Mother Tongue Influence and Conversation Practice

**ICS Lab:** Information Transfer- Oral Presentation Skills

Reading Comprehension and Job Application with Resume preparation.

#### **Minimum Requirement of infra structural facilities for ELCS Lab:**

##### **1. Computer Assisted Language Learning (CALL) Lab:**

**The Computer aided Language Lab** for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

##### **System Requirement (Hardware component):**

*Computer network with Lan with minimum 60 multimedia systems with the following specifications:*

- i) P – IV Processor
  - a) Speed – 2.8 GHZ
  - b) RAM – 512 MB Minimum
  - c) Hard Disk – 80 GB
- ii) Headphones of High quality

##### **2. Interactive Communication Skills (ICS) Lab :**

**The Interactive Communication Skills Lab:** A Spacious room with movable chairs and audio-visual aids with a Public Address System,

a T. V., a digital stereo –audio & video system and camcorder etc.

**Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):**

1. Suresh Kumar, E. & Sreehari, P. 2009. *A Handbook for English Language Laboratories*. New Delhi: Foundation
2. *Speaking English Effectively* 2<sup>nd</sup> Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
3. Sasi Kumar, V & Dhamija, P.V. *How to Prepare for Group Discussion and Interviews*. Tata McGraw Hill
4. Hancock, M. 2009. *English Pronunciation in Use. Intermediate*. Cambridge: CUP
5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
6. Hewings, M. 2009. *English Pronunciation in Use. Advanced*. Cambridge: CUP
7. Marks, J. 2009. *English Pronunciation in Use. Elementary*. Cambridge: CUP
8. Nambiar, K.C. 2011. *Speaking Accurately. A Course in International Communication*. New Delhi : Foundation
9. Soundararaj, Francis. 2012. *Basics of Communication in English*. New Delhi: Macmillan
10. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.
11. **English Pronouncing Dictionary** Daniel Jones Current Edition with CD.
12. **A textbook of English Phonetics for Indian Students** by T. Balasubramanian (Macmillan)
13. **Prescribed Lab Manual: A Manual entitled “English Language Communication Skills (ELCS) Lab Manual- cum- Work Book”**, published by Cengage Learning India Pvt. Ltd, New Delhi. 2013

#### **DISTRIBUTION AND WEIGHTAGE OF MARKS**

##### **English Language Laboratory Practical Examination:**

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation

during the year for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

**Outcomes:**

- Better Understanding of nuances of language through audio- visual experience and group activities
- Neutralization of accent for intelligibility
- Speaking with clarity and confidence thereby enhancing employability skills of the students



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****I Year B.Tech. CSE****L T/P/D C****- -3/- 4****(A10082) IT WORKSHOP / ENGINEERING WORKSHOP****Objectives:**

The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel and Power Point.

**PC Hardware** introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. **The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.**

**Internet & World Wide Web** module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

**Productivity tools** module would enable the students in crafting professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools and LaTeX. **(Recommended to use Microsoft office 2007 in place of MS Office 2003)**

**PC Hardware**

**Week 1 – Task 1 :** Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

**Week 2 – Task 2 :** Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

**Week 3 – Task 3 :** Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

**Week 4 – Task 4 :** Every student should install Linux on the computer. This

computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

**Week 5 – Task 5: Hardware Troubleshooting:** Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

**Week 6 – Task 6 : Software Troubleshooting :** Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

#### **Internet & World Wide Web**

**Week 7 - Task 1 : Orientation & Connectivity Boot Camp :** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

**Week 8 - Task 2 : Web Browsers, Surfing the Web :** Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

**Week 9 - Task 3 : Search Engines & Netiquette :** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

**Week 10 - Task 4: Cyber Hygiene:** Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

**Week 11- Task 5:** Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.

#### **Productivity tools**

##### **LaTeX and Word**

**Week 12 – Word Orientation:** The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word:

Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

**Task 1 : Using LaTeX and Word** to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

**Week 13 - Task 2: Creating project abstract** Features to be covered:- Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

**Week 14 - Task 3 : Creating a Newsletter** : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

#### **Excel**

**Week 15 - Excel Orientation:** The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

**Task 1: Creating a Scheduler** - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

**Week 16 - Task 2 : Calculating GPA** - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting

#### **LaTeX and MS/equivalent (FOSS) tool Power Point**

**Week 17 - Task1:** Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

**Week 18- Task 2:** Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyperlinks, Inserting – Images, Clip Art, Audio, Video, Objects, Tables and Charts

**Week 19 - Task 3:** Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing

and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.

**REFERENCE BOOKS:**

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill Publishers.
4. Upgrading and Repairing, PC's 18<sup>th</sup> e, Scott Muller QUE, Pearson Education
5. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
7. PC Hardware and A+Handbook – Kate J. Chase PHI (Microsoft)

**Outcomes:**

- Apply knowledge for computer assembling and software installation.
- Ability how to solve the trouble shooting problems.
- Apply the tools for preparation of PPT, Documentation and budget sheet etc.

**ENGINEERING WORKSHOP**

**1. TRADES FOR EXERCISES:**

**At least two exercises from each trade:**

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Black Smithy
5. House-wiring
6. Foundry
7. Welding
8. Power tools in construction, wood working, electrical engineering and mechanical Engineering.

**2. TRADES FOR DEMONSTRATION & EXPOSURE:**

1. Plumbing
2. Machine Shop
3. Metal Cutting (Water Plasma)

**TEXT BOOK:**

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
2. Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>II Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A30008) PROBABILITY AND STATISTICS**

Objectives: To learn

- Understand a random variable that describes randomness or an uncertainty in certain realistic situation. It can be of either discrete or continuous type.
- In the discrete case, study of the binomial and the Poisson random variables and the Normal random variable for the continuous case predominantly describe important probability distributions. Important statistical properties for these random variables provide very good insight and are essential for industrial applications.
- Most of the random situations are described as functions of many single random variables. In this unit, the objective is to learn functions of many random variables through joint distributions.
- The types of sampling, Sampling distribution of means, Sampling distribution of variance, Estimations of statistical parameters, Testing of hypothesis of few unknown statistical parameters.
- The mechanism of queuing system, The characteristics of queue, The mean arrival and service rates
- The expected queue length, The waiting line
- The random processes, The classification of random processes, Markov chain, Classification of states
- Stochastic matrix ( transition probability matrix), Limiting probabilities, Applications of Markov chains

**UNIT-I**

**Single Random variables and probability distributions:** Random variables – Discrete and continuous. Probability distributions, mass function/ density function of a probability distribution. Mathematical Expectation, Moment about origin, Central moments Moment generating function of probability distribution.

Binomial, Poisson & normal distributions and their properties. Moment generating functions of the above three distributions, and hence finding the mean and variance.

**UNIT-II**

**Multiple Random variables, Correlation & Regression:** Joint probability distributions- Joint probability mass / density function, Marginal probability

mass / density functions, Covariance of two random variables, Correlation - Coefficient of correlation, The rank correlation.

Regression- Regression Coefficient, The lines of regression and multiple correlation & regression.

### UNIT-III

Sampling Distributions and Testing of Hypothesis

**Sampling:** Definitions of population, sampling, statistic, parameter. Types of sampling, Expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of variance.

**Parameter estimations** – likelihood estimate, interval estimations.

**Testing of hypothesis:** Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, Level of significance. One sided test, two sided test,

#### Large sample tests:

- (i) Test of Equality of means of two samples equality of sample mean and population mean (cases of known variance & unknown variance, equal and unequal variances)
- (ii) Tests of significance of difference between sample S.D and population S.D.
- (iii) Tests of significance difference between sample proportion and population proportion & difference between two sample proportions.

#### Small sample tests:

Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples

Snedecor's F- distribution and its properties. Test of equality of two population variances

Chi-square distribution, its properties, Chi-square test of goodness of fit

### UNIT-IV

**Queuing Theory:** Structure of a queuing system, Operating Characteristics of queuing system, Transient and steady states, Terminology of Queuing systems, Arrival and service processes- Pure Birth-Death process Deterministic queuing models- M/M/1 Model of infinite queue, M/M/1 model of finite queue .

### UNIT-V

**Stochastic processes:** Introduction to Stochastic Processes –Classification of Random processes, Methods of description of random processes,

Stationary and non-stationary random process, Average values of single random process and two or more random processes. Markov process, Markov chain, classification of states – Examples of Markov Chains, Stochastic Matrix.

**TEXT BOOKS:**

- 1) Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers
- 2) Probability and Statistics for Engineers and Scientists by Sheldon M.Ross, Academic Press
- 3) Operations Research by S.D. Sarma,

**REFERENCE BOOKS:**

1. Mathematics for Engineers by K.B.Datta and M.A S.Srinivas,Cengage Publications
2. Probability and Statistics by T.K.V.Iyengar & B.Krishna Gandhi Et
3. Fundamentals of Mathematical Statistics by S C Gupta and V.K.Kapoor
4. Probability and Statistics for Engineers and Scientists by Jay I.Devore.

**Outcomes:**

- Students would be able to identify distribution in certain realistic situation. It is mainly useful for circuit as well as non-circuit branches of engineering. Also able to differentiate among many random variable involved in the probability models. It is quite useful for all branches of engineering.
- The student would be able to calculate mean and proportions (small and large sample) and to make important decisions from few samples which are taken out of unmanageably huge populations .It is Mainly useful for non-circuit branches of engineering.
- The students would be able to find the expected queue length, the ideal time, the traffic intensity and the waiting time. These are very useful tools in many engineering and data management problems in the industry. It is useful for all branches of engineering.
- The student would able to understand about the random process, Markov process and Markov chains which are essentially models of many time dependent processes such as signals in communications, time series analysis, queuing systems. The student would be able to find the limiting probabilities and the probabilities in nth state. It is quite useful for all branches of engineering



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

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	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A30504) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE****Objectives:**

- To explain with examples the basic terminology of functions, relations, and sets.
- To perform the operations associated with sets, functions, and relations.
- To relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.
- To describe the importance and limitations of predicate logic.
- To relate the ideas of mathematical induction to recursion and recursively defined structures.
- To use Graph Theory for solving problems.

**UNIT-I**

**Mathematical Logic** : Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Quantifiers, universal quantifiers. Predicates : Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

**UNIT-II**

**Relations**: Properties of Binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram. Functions: Inverse Function Composition of functions, recursive Functions, Lattice and its Properties, Algebraic structures : Algebraic systems Examples and general properties, Semi groups and monads, groups sub groups' homomorphism, Isomorphism.

**UNIT-III**

**Elementary Combinatorics**: Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion. Pigeon hole principles and its application.

**UNIT-IV**

**Recurrence Relation** : Generating Functions, Function of Sequences Calculating Coefficient of generating function, Recurrence relations, Solving recurrence relation by substitution and Generating funds. Characteristics

roots solution of In homogeneous Recurrence Relation.

#### **UNIT-V**

**Graph Theory :** Representation of Graph, DFS, BFS, Spanning Trees, planar Graphs. Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers.

#### **TEXT BOOKS :**

1. Elements of DISCRETE MATHEMATICS- A computer Oriented Approach- C L Liu, D P Mohapatra. Third Edition, Tata McGraw Hill.
2. Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker, PHI.

#### **REFERENCE BOOKS :**

1. Discrete Mathematics and its Applications, Kenneth H. Rosen, Fifth Edition.TMH.
2. Discrete Mathematical structures Theory and application-Malik & Sen, Cengage.
3. Discrete Mathematics with Applications, Thomas Koshy, Elsevier.
4. Logic and Discrete Mathematics, Grass Man & Trembley, Pearson Education.

#### **Outcomes:**

- Ability to Illustrate by examples the basic terminology of functions, relations, and sets and demonstrate knowledge of their associated operations.
- Ability to Demonstrate in practical applications the use of basic counting principles of permutations, combinations, inclusion/exclusion principle and the pigeonhole methodology.
- Ability to represent and Apply Graph theory in solving computer science problems.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>II Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A30502) DATA STRUCTURES****Objectives:**

- To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
- To understand the notations used to analyze the Performance of algorithms.
- To understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
- To choose the appropriate data structure for a specified application.
- To understand and analyze various searching and sorting algorithms.
- To write programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables, search trees.

**UNIT- I**

Basic concepts- Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations, Introduction to Linear and Non Linear data structures.

Singly Linked Lists-Operations-Insertion, Deletion, Concatenating singly linked lists, Circularly linked lists-Operations for Circularly linked lists, Doubly Linked Lists- Operations- Insertion, Deletion.

Representation of single, two dimensional arrays, sparse matrices-array and linked representations.

**UNIT- II**

Stack ADT, definition, operations, array and linked implementations in C, applications-infix to postfix conversion, Postfix expression evaluation, recursion implementation, Queue ADT, definition and operations ,array and linked Implementations in C, Circular queues-Insertion and deletion operations, Deque (Double ended queue)ADT, array and linked implementations in C.

**UNIT- III**

Trees – Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals, Threaded binary trees, Max Priority Queue ADT-implementation-Max Heap-Definition, Insertion into a Max Heap,

Deletion from a Max Heap.

Graphs – Introduction, Definition, Terminology, Graph ADT, Graph Representations- Adjacency matrix, Adjacency lists, Graph traversals- DFS and BFS.

#### **UNIT- IV**

Searching- Linear Search, Binary Search, Static Hashing-Introduction, hash tables, hash functions, Overflow Handling.

Sorting-Insertion Sort, Selection Sort, Radix Sort, Quick sort, Heap Sort, Comparison of Sorting methods.

#### **UNIT- V**

Search Trees-Binary Search Trees, Definition, Operations- Searching, Insertion and Deletion, AVL Trees-Definition and Examples, Insertion into an AVL Tree ,B-Trees, Definition, B-Tree of order m, operations-Insertion and Searching, Introduction to Red-Black and Splay Trees(Elementary treatment-only Definitions and Examples), Comparison of Search Trees.

Pattern matching algorithm- The Knuth-Morris-Pratt algorithm, Tries (examples only).

#### **TEXT BOOKS:**

1. Fundamentals of Data structures in C, 2nd Edition, E.Horowitz, S.Sahni and Susan Anderson-Freed, Universities Press.
2. Data structures A Programming Approach with C, D.S.Kushwaha and A.K.Misra, PHI.

#### **REFERENCE BOOKS:**

1. Data structures: A Pseudocode Approach with C, 2nd edition, R.F.Gilberg And B.A.Forouzan, Cengage Learning.
2. Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
3. Data Structures using C, A.M.Tanenbaum,Y. Langsam, M.J.Augenstein, Pearson.
4. Data structures and Program Design in C, 2nd edition, R.Kruse, C.L.Tondo and B.Leung,Pearson.
5. Data Structures and Algorithms made easy in JAVA, 2nd Edition, Narsimha Karumanchi, CareerMonk Publications.
6. Data Structures using C, R.Thareja, Oxford University Press.
7. Data Structures, S.Lipscutz,Schaum's Outlines, TMH.
8. Data structures using C, A.K.Sharma, 2nd edition, Pearson..
9. Data Structures using C &C++, R.Shukla, Wiley India.
10. Classic Data Structures, D.Samanta, 2nd edition, PHI.

11. Advanced Data structures, Peter Brass, Cambridge.

**Outcomes:**

- Learn how to use data structure concepts for realistic problems.
- Ability to identify appropriate data structure for solving computing problems in respective language.
- Ability to solve problems independently and think critically.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

<b>II Year B.Tech. CSE-I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A30401) DIGITAL LOGIC DESIGN****Objectives:**

- To understand basic number systems codes and logical gates.
- To understand the Boolean algebra and minimization logic.
- To understand the design of combinational sequential circuits.
- To understand the basic s of various memory.

**UNIT-I**

**Digital Systems:** Binary Numbers, Octal, Hexa Decimal and other base numbers, Number base conversions, complements, signed binary numbers, Floating point number representation, binary codes, error detecting and correcting codes, digital logic gates(AND, NAND,OR,NOR, Ex-OR, Ex-NOR), Boolean algebra , basic theorems and properties, Boolean functions, canonical and standard forms.

**UNIT-II**

Gate –Level Minimization and combination circuits, The K-Maps Methods, Three Variable, Four Variable, Five Variable , sum of products, product of sums Simplification, Don't care conditions , NAND and NOR implementation and other two level implantation.

**UNIT-III**

**Combinational Circuits (CC):** Design Procedure, Combinational circuit for different code converters and other problems, Binary Adder, subtractor, Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, Demultiplexers.

**UNIT-IV**

**Synchronous Sequential Circuits:** Latches, Flip-flops, analysis of clocked sequential circuits, design of counters, Up-down counters, Ripple counters , Registers, Shift registers, Synchronous Counters.

Asynchronous Sequential Circuits: Reduction of state and follow tables, Role free Conditions.

**UNIT-V:**

**Memory:** Random Access memory, types of ROM, Memory decoding, address and data bus, Sequential Memory, Cache Memory, Programmable Logic Arrays, memory Hierarchy in terms of capacity and access time.

**TEXT BOOK:**

- 1) Digital Design- M. Morris Mano.

**REFERENCE BOOKS:**

- 1) Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.
- 2) Switching and Logic Design, C.V.S. Rao, Pearson Education.
- 3) Digital Principles and Design – Donald D.Givone, Tata McGraw Hill, Edition.
- 4) Fundamentals of Digital Logic & Micro Computer Design , 5TH Edition, M. Rafiqzaman John Wiley.

**Outcomes:**

After this course student could able to design, understand the number systems, combinational sequential circuits. And they should be in a position to continue with computer organization.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

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	<b>4</b>	<b>-/-/</b>	<b>4</b>

**(A30404) ELECTRONIC DEVICES AND CIRCUITS****Objectives:**

This is a fundamental course, basic knowledge of which is required by all the circuit branch engineers. This course focuses:

- To familiarize the student with the principle of operation, analysis and design of Junction diode, BJT and FET amplifier circuits, transistors and field effect transistors.
- To understand diode as rectifier.
- To study basic principle of filter circuits and various types.

**UNIT -I**

**P-N Junction Diode:** Qualitative Theory of P-N Junction, P-N Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis, Breakdown Mechanisms in Semiconductor Diodes, Zener Diode Characteristics.

**Special Purpose Electronic Devices:** Principle of Operation and Characteristics of Tunnel Diode (with the help of Energy Band Diagram), Varactor Diode, SCR and Semiconductor Photo Diode.

**UNIT -II**

**Rectifiers and Filters :** The P-N junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L- Section Filters,  $\pi$ - Section Filters, Comparison of Filters, Voltage Regulation using Zener Diode.

**UNIT -III**

**Bipolar Junction Transistor and UJT:** The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, BJT Operation, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, Limits of Operation , BJT Specifications, BJT Hybrid Model, Determination of h-parameters from Transistor Characteristics, Comparison of CB, CE, and CC Amplifier Configurations, UJT and Characteristics.

**UNIT -IV**

**Transistor Biasing and Stabilization:** Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector - Emitter Feedback Bias, Voltage Divider Bias,



Bias Stability, Stabilization Factors, Stabilization against variations in VBE and  $\beta$ , Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability, Analysis of a Transistor Amplifier Circuit using h-Parameters.

#### **UNIT -V**

##### **Field Effect Transistor and FET Amplifiers**

**Field Effect Transistor:** The Junction Field Effect Transistor (Construction, principle of operation, symbol) – Pinch-off Voltage - Volt-Ampere characteristics, The JFET Small Signal Model, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes.

**FET Amplifiers:** FET Common Source Amplifier, Common Drain Amplifier, Generalized FET Amplifier, Biasing FET, FET as Voltage Variable Resistor, Comparison of BJT and FET.

##### **TEXT BOOKS:**

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2 Ed.,1998, TMH.
2. Electronic Devices and Circuits – Mohammad Rashid, Cengage Learning, 2013
3. Electronic Devices and Circuits – David A. Bell, 5 Ed, Oxford.

##### **REFERENCE BOOKS:**

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 Ed., 2008, TMH.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 Ed., 2006, PEI/PHI.
3. Electronic Devices and Circuits – B. P. Singh, Rekha Singh, Pearson, 2 Ed, 2013.
4. Electronic Devices and Circuits --K. Lal Kishore, 2 Ed., 2005, BSP.
5. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal, 1 Ed., 2009, Wiley India Pvt. Ltd.
6. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 Ed., 2008, TMH.

##### **Outcomes:**

- Understand and Analyse the different types of diodes, operation and its characteristics.
- Design and analyse the DC bias circuitry of BJT and FET.
- Design biasing circuits using diodes and transistors.
- To analyze and design diode application circuits, amplifier circuits and oscillators employing BJT, FET devices.

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**(A30202) BASIC ELECTRICAL ENGINEERING****Objectives:**

This course introduces the concepts of basic electrical engineering parameters, quantities, analysis of AC and DC circuits, the construction operation and analysis of transformers, DC and AC machines. It also gives knowledge about measuring instruments operation in detail.

**UNIT – I**

**Introduction to Electrical Engineering:** Ohm's law, basic circuit components, Kirchhoff's laws. Simple problems.

**Network Analysis:** Basic definitions, types of elements, types of sources, resistive networks, inductive networks, capacitive networks, and series parallel circuits, star delta and delta star transformation. , Network theorems- Superposition, Thevenin's, Maximum power transfer theorems and simple problems.

**UNIT-II**

**Alternating Quantities:** Principle of ac voltages, waveforms and basic definitions, root mean square and average values of alternating currents and voltage, form factor and peak factor, phasor representation of alternating quantities, the J operator and phasor algebra, analysis of ac circuits with single basic network element, single phase series circuits.

**UNIT-III**

**Transformers :** Principles of operation, Constructional Details, Ideal Transformer and Practical Transformer, Losses, Transformer Test, Efficiency and Regulation Calculations (All the above topics are only elementary treatment and simple problems).

**UNIT-IV****D.C. and A.C. Machines:**

**D.C generators:** Principle of operation of dc machines, types of D.C generators, EMF equation in D.C generator. **D.C motors:** Principle of operation of dc motors, types of D.C motors, losses and torque equation, losses and efficiency calculation in D.C generator. **A.C Machines:** Three phase induction motor, principle of operation, slip and rotor frequency, torque (simple problems).

**UNIT V**

**Basic Instruments:** Introduction, classification of instruments, operating

principles, essential features of measuring instruments, Moving coil permanent magnet (PMMC) instruments, Moving Iron of Ammeters and Voltmeters (elementary Treatment only).

**TEXT BOOKS:**

1. Basic concepts of Electrical Engineering, PS Subramanyam, BS Publications.
2. Basic Electrical Engineering, S.N. Singh, PHI.

**REFERENCE BOOKS:**

1. Basic Electrical Engineering, Abhijit Chakrabarthy, Sudipta nath, Chandrakumar Chanda, Tata-McGraw-Hill.
2. Principles of Electrical Engineering, V.K Mehta, Rohit Mehta, S.Chand Publications.
3. Basic Electrical Engineering, T.K.Nagasarkar and M.S. Sukhija, Oxford University Press.
4. Fundamentals of Electrical Engineering, RajendraPrasad, PHI.
5. Basic Electrical Engineering by D.P.Kothari , I.J. Nagrath, McGraw-Hill.

**Outcomes:**

After going through this course the student gets a thorough knowledge on basic electrical circuits, parameters, and operation of the transformers in the energy conversion process, electromechanical energy conversion, construction operation characteristics of DC and AC machines and the constructional features and operation of operation measuring instruments like voltmeter, ammeter, wattmeter etc...With which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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	-	-3/-	2

**(A30282) ELECTRICAL AND ELECTRONICS LAB****PART - A**

1. Verification of Superposition and Reciprocity theorems.
2. Verification of Maximum power transfer theorem.
3. Verification of Thevenin's and Norton's theorems.
4. Magnetization characteristics of D.C. Shunt generator.
5. Swinburne's Test on DC shunt machine.
6. Brake test on DC shunt motor.
7. OC and SC tests on Single-phase transformer.
8. Brake test on 3-phase Induction motor.

**PART - B**

1. PN Junction Diode Characteristics (Forward bias, Reverse bias).
2. Zener Diode Characteristics.
3. Transistor CE Characteristics (Input and Output).
4. Rectifier without Filters (Full wave & Half wave).
5. Rectifier with Filters (Full wave & Half wave).

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	-	-/3/-	2

**(A30582) DATA STRUCTURES LAB****Objectives:**

- To write and execute programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees.
- To write and execute write programs in C to implement various sorting and searching methods.

**Recommended Systems/Software Requirements:**

- Intel based desktop PC with minimum of 166 MHZ or faster processor with at least 64 MB RAM and 100 MB free disk space.
- C compiler.

**Week1:**

Write a C program that uses functions to perform the following:

- Create a singly linked list of integers.
- Delete a given integer from the above linked list.
- Display the contents of the above list after deletion.

**Week2:**

Write a C program that uses functions to perform the following:

- Create a doubly linked list of integers.
- Delete a given integer from the above doubly linked list.
- Display the contents of the above list after deletion.

**Week3:**

Write a C program that uses stack operations to convert a given infix expression into its postfix Equivalent, Implement the stack using an array.

**Week 4:**

Write C programs to implement a double ended queue ADT using i)array and ii)doubly linked list respectively.

**Week 5 :**

Write a C program that uses functions to perform the following:

- Create a binary search tree of characters.
- Traverse the above Binary search tree recursively in Postorder.

**Week 6 :**

Write a C program that uses functions to perform the following:

- a) Create a binary search tree of integers.
- b) Traverse the above Binary search tree non recursively in inorder.

**Week 7:**

Write C programs for implementing the following sorting methods to arrange a list of integers in Ascending order :

- a) Insertion sort
- b) Merge sort

**Week 8 :**

Write C programs for implementing the following sorting methods to arrange a list of integers in ascending order:

- a) Quick sort
- b) Selection sort

**Week 9:**

i) Write a C program to perform the following operation:

- a) Insertion into a B-tree.

ii) Write a C program for implementing Heap sort algorithm for sorting a given list of integers in ascending order.

**Week 10:**

Write a C program to implement all the functions of a dictionary (ADT) using hashing.

**Week 11:**

Write a C program for implementing Knuth-Morris- Pratt pattern matching algorithm.

**Week 12:**

Write C programs for implementing the following graph traversal algorithms:

- a) Depth first traversal
- b) Breadth first traversal

**TEXT BOOKS:**

1. C and Data Structures, Third Edition, P.Padmanabham, BS Publications.
2. C and Data Structures, Prof. P.S.Deshpande and Prof. O.G. Kakde, Dreamtech Press.
3. Data structures using C, A.K.Sharma, 2nd edition, Pearson.
4. Data Structures using C, R.Thareja, Oxford University Press.
5. C and Data Structures, N.B.Venkateswarlu and E.V.Prasad,S.Chand.

6. C Programming and Data Structures, P.Radha Krishna, Hi-Tech Publishers.

**Outcomes:**

- Ability to identify the appropriate data structure for given problem.
- Graduate able to design and analyze the time and space complexity of algorithm or program.
- Ability to effectively use compilers includes library functions, debuggers and trouble shooting.

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	<b>4</b>	<b>-/-</b>	<b>4</b>

**(A40506) COMPUTER ORGANIZATION****Objectives:**

- To understand basic components of computers.
- To explore the I/O organizations in depth.
- To explore the memory organization.
- To understand the basic chip design and organization of 8086 with assembly language programming.

**UNIT-I****Basic Computer Organization – Functions of CPU, I/O Units, Memory:**

**Instruction:** Instruction Formats- One address, two addresses, zero addresses and three addresses and comparison; addressing modes with numeric examples: Program Control- Status bit conditions, conditional branch instructions, Program Interrupts: Types of Interrupts.

**UNIT-II****Input-Output Organizations- I/O Interface, I/O Bus and Interface**

**modules:** I/O Vs memory Bus, Isolated Vs Memory-Mapped I/O, Asynchronous data Transfer- Strobe Control, Hand Shaking: Asynchronous Serial transfer- Asynchronous Communication interface, Modes of transfer- Programmed I/O, Interrupt Initiated I/O, DMA; DMA Controller, DMA Transfer, IOP-CPU-IOP Communication, Intel 8089 IOP.

**UNIT-III****Memory Organizations**

Memory hierarchy, Main Memory, RAM, ROM Chips, Memory Address Map, Memory Connection to CPU, associate memory, Cache Memory, Data Cache, Instruction cache, Miss and Hit ratio, Access time, associative, set associative, mapping, waiting into cache, Introduction to virtual memory.

**UNIT-IV**

8086 CPU Pin Diagram- Special functions of general purpose registers, Segment register, concept of pipelining, 8086 Flag register, Addressing modes of 8086.

**UNIT-V**

**8086-Instruction formats:** assembly Language Programs involving branch & Call instructions, sorting, evaluation of arithmetic expressions.



**TEXT BOOKS:**

- 1) Computer system Architecture: Morris Mano (UNIT-1,2,3).
- 2) Advanced Micro Processor and Peripherals- Hall/ A K Ray(UNIT-4,5).

**REFERENCE BOOKS:**

- 1) Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
- 2) Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson.
- 3) Fundamentals of Computer Organization and Design, - Sivarama Dandamudi Springer Int. Edition.
- 4) Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier.
- 5) Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

**Outcomes:**

After this course students understand in a better way the I/O and memory organization in depth. They should be in a position to write assembly language programs for various applications.

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**(A40507) DATABASE MANAGEMENT SYSTEMS****Objectives:**

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- To understand the relational database design principles.
- To become familiar with the basic issues of transaction processing and concurrency control.
- To become familiar with database storage structures and access techniques.

**UNIT- I**

Introduction-Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction, Instances and Schemas, Data Models, Database Languages – DDL, DML, Database Access from Application Programs, Transaction Management, Data Storage and Querying, Database Architecture, Database Users and Administrators, History of Data base Systems.

Introduction to Data base design, ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises. Relational Model: Introduction to the Relational Model – Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views – Destroying /altering Tables and Views.

**UNIT- II**

**Relational Algebra and Calculus:** Relational Algebra – Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

Form of Basic SQL Query – Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries, Set – Comparison Operators, Aggregate Operators, NULL values – Comparison using Null values – Logical connectives – AND, OR and NOT – Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active Data bases.

**UNIT- III**

Introduction to Schema Refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF –Properties of Decompositions- Loss less-join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form, Join Dependencies, FIFTH Normal form, Inclusion Dependencies.

**UNIT- IV**

Transaction Management-Transaction Concept- Transaction State-Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability.

Concurrency Control- Lock –Based Protocols – Timestamp Based Protocols-Validation- Based Protocols – Multiple Granularity.

Recovery System-Failure Classification-Storage Structure-Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- Remote Backup systems.

**UNIT- V**

**Overview of Storage and Indexing:** Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing, Comparison of File Organizations.

**Tree Structured Indexing:** Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM) B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

**Hash Based Indexing:** Static Hashing, Extendable hashing, Linear Hashing, Extendible vs. Linear Hashing.

**TEXT BOOKS:**

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3rd Edition, 2003.
2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw hill, VI edition, 2006.

**REFERENCE BOOKS:**

1. Database Systems, 6th edition, Ramez Elmasri, Shamkant B.Navathe, Pearson Education, 2013.
2. Database Principles, Programming, and Performance, P.O'Neil, E.O'Neil, 2nd ed., ELSEVIER.

3. Database Systems, A Practical approach to Design Implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.
4. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.
5. Fundamentals of Relational Database Management Systems, S.Sumathi, S.Esakkirajan, Springer.
6. Database Management System Oracle SQL and PL/SQL, P.K.Das Gupta, PHI.
7. Introduction to Database Management, M.L.Gillenson and others, Wiley Student Edition.
8. Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.
9. Introduction to Database Systems, C.J.Date, Pearson Education.
10. Database Management Systems, G.K.Gupta, TMH.

**Outcomes:**

- Demonstrate the basic elements of a relational database management system.
- Ability to identify the data models for relevant problems.
- Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data.
- Apply normalization for the development of application software's.

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**(A40503) JAVA PROGRAMMING****Objectives:**

- To understand object oriented programming concepts, and apply them in problem solving.
- To learn the basics of java Console and GUI based programming.

**UNIT- I**

**OOP concepts** – Data abstraction, encapsulation, inheritance, benefits of inheritance, polymorphism, classes and objects, Procedural and object oriented programming paradigms

**Java programming** - History of Java, comments, data types, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow - block scope, conditional statements, loops, break and continue statements, simple java stand alone programs, arrays, console input and output, formatting output, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection, building strings, exploring string class.

**UNIT- II**

**Inheritance** - Inheritance hierarchies, super and sub classes, Member access rules, super keyword, preventing inheritance: final classes and methods, the Object class and its methods

**Polymorphism**- dynamic binding, method overriding, abstract classes and methods.

**Interfaces** – Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface.

**Inner classes** – Uses of inner classes, local inner classes, anonymous inner classes, static inner classes, examples.

**Packages**-Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

**UNIT- III**

**Exception handling** – Dealing with errors, benefits of exception handling, the classification of exceptions- exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, re-throwing exceptions, exception specification, built in exceptions, creating

own exception sub classes.

**Multithreading** - Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, producer consumer pattern.

#### **UNIT- IV**

**Collection Framework in Java** – Introduction to Java Collections, Overview of Java Collection frame work, Generics, Commonly used Collection classes– Array List, Vector, Hash table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, calendar and Properties

**Files** – streams- byte streams, character streams, text Input/output, binary input/output, random access file operations, File management using File class.

**Connecting to Database** - JDBC Type 1 to 4 drivers, connecting to a database, querying a database and processing the results, updating data with JDBC.

#### **UNIT- V**

**GUI Programming with Java** - The AWT class hierarchy, Introduction to Swing, Swing vs. AWT, Hierarchy for Swing components, Containers – JFrame, JApplet, JDialog, JPanel, Overview of some swing components- JButton, JLabel, JTextField, JTextArea, simple swing applications, Layout management - Layout manager types – border, grid and flow

**Event handling** - Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listeners, Delegation event model, Examples: handling a button click, handling mouse events, Adapter classes.

**Applets** – Inheritance hierarchy for applets, differences between applets and applications, life cycle of an applet, passing parameters to applets, applet security issues.

#### **TEXT BOOK:**

1. Java Fundamentals – A comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

#### **REFERENCE BOOKS:**

1. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education (OR) Java: How to Program P.J.Deitel and H.M.Deitel, PHI.
2. Object Oriented Programming through Java, P.Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, Pearson Education
4. Programming in Java, S.Malhotra and S.Choudhary, Oxford Univ. Press.

**Outcomes:**

- Understanding of OOP concepts and basics of java programming (Console and GUI based).
- The skills to apply OOP and Java programming in problem solving.
- Should have the ability to extend his/her knowledge of Java programming further on his/her own.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****II Year B.Tech. CSE-II Sem****L T/P/D C****4 -/- 4****(A40009) ENVIRONMENTAL STUDIES****Objectives:**

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding of environmental policies and regulations

**UNIT-I :**

**Ecosystems:** Definition, Scope and Importance of ecosystem. Classification, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

**UNIT-II:**

**Natural Resources: Classification of Resources:** Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

**UNIT-III:**

**Biodiversity and Biotic Resources:** Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

**UNIT-IV:**

**Environmental Pollution and Control Technologies: Environmental Pollution:** Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and



characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary, Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Problems And Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

#### **UNIT-V:**

**Environmental Policy, Legislation & EIA:** Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. **EIA:** EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

#### **SUGGESTED TEXT BOOKS:**

- 1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
- 2 Environmental Studies by R. Rajagopalan, Oxford University Press.

#### **REFERENCE BOOKS:**

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B.Botkin & Edward A.Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

#### **Outcomes:**

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which inturn helps in sustainable development.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

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	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A40509) FORMAL LANGUAGES AND AUTOMATA THEORY****Objectives:**

The purpose of this course is to acquaint the student with an overview of the theoretical foundations of computer science from the perspective of formal languages.

- Classify machines by their power to recognize languages.
- Employ finite state machines to solve problems in computing.
- Explain deterministic and non-deterministic machines.
- Comprehend the hierarchy of problems arising in the computer sciences.

**UNIT- I**

**Fundamentals** : Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings, and languages, deterministic finite automaton and non deterministic finite automaton, transition diagrams and Language recognizers. **Finite Automata** : NFA with  $\epsilon$  transitions - Significance, acceptance of languages. Conversions and Equivalence : Equivalence between NFA with and without  $\epsilon$ -transitions, NFA to DFA conversion, minimisation of FSM, equivalence between two FSM's, Finite Automata with output- Moore and Melay machines.

**UNIT-II**

**Regular Languages** : Regular sets, regular expressions, identity rules, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions. Pumping lemma of regular sets, closure properties of regular sets (proofs not required) **Grammar Formalism** : Regular grammars-right linear and left linear grammars, equivalence between regular linear grammar and FA, inter conversion, Context free grammar, derivation trees, sentential forms. Right most and leftmost derivation of strings.

**UNIT- III**

**Context Free Grammars** : Ambiguity in context free grammars. Minimisation of Context Free Grammars. Chomsky normal form, Greiback normal form, Pumping Lemma for Context Free Languages. Enumeration of properties of CFL (proofs omitted). **Push Down Automata** : Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, interconversion. (Proofs not required). Introduction to DCFL and DPDA.

**UNIT- IV**

**Turing Machine** : Turing Machine, definition, model, design of TM, Computable functions, recursively enumerable languages. Church's hypothesis, counter machine, types of Turing machines (proofs not required). linear bounded automata and context sensitive language.

**UNIT- V**

**Computability Theory** : Chomsky hierarchy of languages, decidability of, problems, Universal Turing Machine, undecidability of posts. Correspondence problem, Turing reducibility, Definition of P and NP problems, NP complete and NP hard problems.

**TEXT BOOKS :**

1. "Introduction to Automata Theory Languages and Computation". Hopcroft H.E. and Ullman J. D. Pearson Education.
2. Introduction to Theory of Computation –Sipser 2nd edition Thomson.

**REFERENCE BOOKS :**

1. Introduction to Formal languages Automata Theory and Computation Kamala Krithivasan Rama R.
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
3. Theory Of Computation: A Problem-Solving Approach, Kavi Mahesh, Wiley India Pvt. Ltd.
4. "Elements of Theory of Computation", Lewis H.P. & Papadimition C.H. Pearson /PHI.
5. Theory of Computer Science – Automata languages and computation -Mishra and Chandrashekaran, 2nd edition, PHI.

**Outcomes:**

- Graduate should be able to understand the concept of abstract machines and their power to recognize the languages.
- Attains the knowledge of language classes & grammars relationship among them with the help of Chomsky hierarchy.
- Graduate will be able to understanding the pre-requisites to the course compiler or advanced compiler design.

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	<b>4</b>	<b>-/-/-</b>	<b>4</b>

**(A40508) DESIGN AND ANALYSIS OF ALGORITHMS****Objectives:**

- To analyze performance of algorithms.
- To choose the appropriate data structure and algorithm design method for a specified application.
- To understand how the choice of data structures and algorithm design methods impacts the performance of programs.
- To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
- Prerequisites (Subjects) Data structures, Mathematical foundations of computer science.

**UNIT- I**

**Introduction:** Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized complexity.

**Divide and conquer:** General method, applications-Binary search, Quick sort, Merge sort, Strassen's Matrix Multiplication.

**UNIT- II**

**Searching and Traversal Techniques:** Efficient non-recursive binary tree traversal algorithms, Disjoint set operations, union and find algorithms, Spanning trees, Graph traversals- Breadth first search and Depth first search, AND/OR graphs, game trees, Connected Components, Bi-connected components.

**UNIT- III**

**Greedy method:** General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

**Dynamic Programming:** General method, applications-Multistage graphs, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Traveling sales person problem, Reliability design.

**UNIT- IV**

**Backtracking:** General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

**Branch and Bound:** General method, applications - Traveling sales person problem, 0/1 knapsack problem-LC Branch and Bound solution, FIFO Branch and Bound solution.

#### **UNIT- V**

**NP-Hard and NP-Complete problems:** Basic concepts, Non-deterministic algorithms, NP - Hard and NP- Complete classes, NP-Hard problems, Cook's theorem.

#### **TEXT BOOKS:**

1. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Satraj Sahni and S.Rajasekharan, Universities Press, 2008.
2. Foundations of Algorithms, 4th edition, R.Neapolitan and K.Naimipour, Jones and Bartlett Learning.
3. Design and Analysis of Algorithms, P.H.Dave, H.B.Dave, Pearson Education, 2008.

#### **REFERENCE BOOKS:**

1. Computer Algorithms, Introduction to Design and Analysis, 3rd Edition, Sara Baase, Allen, Van, Gelder, Pearson Education.
2. Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia, John Wiley and sons.
3. Fundamentals of Sequential and Parallel Algorithms, K.A.Berman and J.L.Paul, Cengage Learning.
4. Introduction to the Design and Analysis of Algorithms, A.Levitin, Pearson Education.
5. Introduction to Algorithms, 3rd Edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, PHI Pvt.Ltd.
6. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson Education, 2004.

#### **Outcomes:**

- Be able to analyze algorithms and improve the efficiency of algorithms.
- Apply different designing methods for development of algorithms to realistic problems, such as divide and conquer, greedy and etc.
- Ability to understand and estimate the performance of algorithm.

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**(A40585) JAVA PROGRAMMING LAB****Objectives:**

To introduce java compiler and eclipse platform.

To impart hand on experience with java programming.

**Note:**

1. Use Linux and MySQL for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform.
2. The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.
  - 1) Use Eclipse or Netbean platform and acquaint with the various menus. Create a test project, add a test class and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.
  - 2) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, \*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.
  - 3a) Develop an applet in Java that displays a simple message.
    - b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.
  - 4) Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.
  - 5) Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.
  - 6) Write a Java program that connects to a database using JDBC and

does add, delete, modify and retrieve operations.

- 7) Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in selected color. Initially, there is no message shown.
- 8) Write a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea () that prints the area of the given shape.
- 9) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Labels in Grid Layout.
- 10) Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).
- 11) Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).
- 12) Implement the above program with database instead of a text file.
- 13) Write a Java program that takes tab separated data (one record per line) from a text file and inserts them into a database.
- 14) Write a java program that prints the meta-data of a given table

**TEXT BOOK:**

1. Java Fundamentals – A comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

**REFERENCE BOOKS:**

1. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education (OR) Java: How to Program P.J.Deitel and H.M.Deitel, PHI.
2. Object Oriented Programming through Java, P.Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, Pearson Education.
4. Programming in Java, S.Malhotra and S.Choudhary, Oxford Univ. Press.

**Outcomes:**

- Basics of java programming, multi-threaded programs and Exception handling.
- The skills to apply OOP in Java programming in problem solving.
- Ability to access data from a DB with Java programs.
- Use of GUI components (Console and GUI based).



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**(A40584) DATABASE MANAGEMENT SYSTEMS LAB****Objectives:**

This lab enables the students to practice the concepts learnt in the subject DBMS by developing a database for an example company named "Roadway Travels" whose description is as follows. The student is expected to practice the designing, developing and querying a database in the context of example database "Roadway travels". Students are expected to use "Mysql" database.

**Roadway Travels**

"Roadway Travels" is in business since 1997 with several buses connecting different places in India. Its main office is located in Hyderabad.

The company wants to computerize its operations in the following areas:

- Reservations and Ticketing
- Cancellations

**Reservations & Cancellation:**

Reservations are directly handled by booking office. Reservations can be made 30 days in advance and tickets issued to passenger. One Passenger/person can book many tickets (to his/her family).

Cancellations are also directly handed at the booking office.

In the process of computerization of Roadway Travels you have to design and develop a Database which consists the data of Buses, Passengers, Tickets, and Reservation and cancellation details. You should also develop query's using SQL to retrieve the data from the database.

The above process involves many steps like 1. Analyzing the problem and identifying the Entities and Relationships, 2. E-R Model 3. Relational Model 4. Normalization 5. Creating the database 6. Querying. Students are supposed to work on these steps week wise and finally create a complete "Database System" to Roadway Travels. Examples are given at every experiment for guidance to students.

**Experiment 1: E-R Model**

Analyze the carefully and come up with the entities in it. Identify what data has to be persisted in the database. This contains the entities, attributes etc.

Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, if any.

**Example: Entities:**

1. BUS

- 2. Ticket
- 3. Passenger

**Relationships:**

- 1. Reservation
- 2. Cancellation

**PRIMARY KEY ATTRIBUTES:**

- 1. Ticket ID (Ticket Entity)
- 2. Passport ID (Passenger Entity)
- 3. Bus\_NO (Bus Entity)

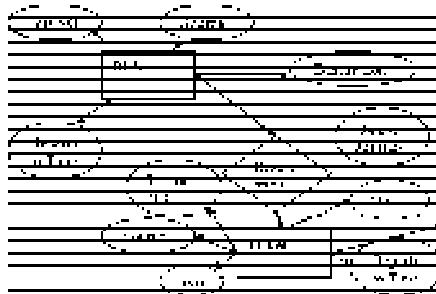
Apart from the above mentioned entities you can identify more. The above mentioned are few.

Note: The student is required to submit a document by writing the Entities and Keys to the lab teacher.

**Experiment 2: Concept design with E-R Model**

Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entities and weak entities (if any). Indicate the type of relationships (total / partial). Try to incorporate generalization, aggregation, specialization etc wherever required.

**Example: E-R diagram for bus**



Note: The student is required to submit a document by drawing the E-R Diagram to the lab teacher.

**Experiment 3: Relational Model**

Represent all the entities (Strong, Weak) in tabular fashion. Represent relationships in a tabular fashion. There are different ways of representing relationships as tables based on the cardinality. Represent attributes as columns in tables or as tables based on the requirement. Different types of attributes (Composite, Multi-valued, and Derived) have different way of representation.

Example: The passenger tables look as below. This is an example. You can

add more attributes based on your E-R model. This is not a normalized table.

Passenger

Name	Age	Sex	Address	Ticket_id	Passport ID

*Note: The student is required to submit a document by Represent relationships in a tabular fashion to the lab teacher.*

**Experiment 4: Normalization**

Database normalization is a technique for designing relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain types of logical or structural problems, namely data anomalies. For example, when multiple instances of a given piece of information occur in a table, the possibility exists that these instances will not be kept consistent when the data within the table is updated, leading to a loss of data integrity. A table that is sufficiently normalized is less vulnerable to problems of this kind, because its structure reflects the basic assumptions for when multiple instances of the same information should be represented by a single instance only.

For the above table in the First normalization we can remove the multi valued attribute Ticket\_id and place it in another table along with the primary key of passenger.

First Normal Form: The above table can be divided into two tables as shown below.

Passenger

Name	Age	Sex	Address	Passport ID

Passport ID	Ticket_id

You can do the second and third normal forms if required. Any how Normalized tables are given at the end.

**Experiment 5: Installation of Mysql and practicing DDL commands**

Installation of MySQL. In this week you will learn Creating databases, How to create tables, altering the database, dropping tables and databases if not required. You will also try truncate, rename commands etc.

Example for creation of a normalized “Passenger” table.

```
CREATE TABLE Passenger (
    Passport_id INTEGER PRIMARY KEY,
    Name VARCHAR (50) Not NULL,
    Age Integer Not NULL,
    Sex Char,
    Address VARCHAR (50) Not NULL);
```

Similarly create all other tables.

**Note: Detailed creation of tables is given at the end.**

**Experiment 6: Practicing DML commands**

DML commands are used to for managing data within schema objects. Some examples:

- SELECT - retrieve data from the a database
- INSERT - insert data into a table
- UPDATE - updates existing data within a table
- DELETE - deletes all records from a table, the space for the records remain

**Inserting values into “Bus” table:**

```
Insert into Bus values (1234,'hyderabad', 'tirupathi');
```

```
Insert into Bus values (2345,'hyderabad','Banglore');
```

```
Insert into Bus values (23,'hyderabad','Kolkata');
```

```
Insert into Bus values (45,'Tirupathi','Banglore');
```

```
Insert into Bus values (34,'hyderabad','Chennai');
```

**Inserting values into “Passenger” table:**

```
Insert into Passenger values (1, 45,'ramesh', 45,'M','abc123');
```

```
Insert into Passenger values (2, 78,'geetha', 36,'F','abc124');
```

```
Insert into Passenger values (45, 90,'ram', 30,'M','abc12');
```

```
Insert into Passenger values (67, 89,'ravi', 50,'M','abc14');
```

```
Insert into Passenger values (56, 22,'seetha', 32,'F','abc55');
```

**Few more Examples of DML commands:**

```
Select * from Bus; (selects all the attributes and display)
```

UPDATE BUS SET Bus No = 1 WHERE BUS NO=2;

### Experiment 7: Querying

In this week you are going to practice queries (along with sub queries) using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.

#### Practice the following Queries:

1. Display unique PNR\_no of all passengers.
2. Display all the names of male passengers.
3. Display the ticket numbers and names of all the passengers.
4. Find the ticket numbers of the passengers whose name start with 'r' and ends with 'h'.
5. Find the names of passengers whose age is between 30 and 45.
6. Display all the passengers names beginning with 'A'
7. Display the sorted list of passengers names

#### Experiment 8 and Experiment 9: Querying (continued...)

You are going to practice queries using Aggregate functions (COUNT, SUM, AVG, and MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

1. Write a Query to display the Information present in the Passenger and cancellation tables. Hint: Use UNION Operator.
2. Display the number of days in a week on which the 9W01 bus is available.
3. Find number of tickets booked for each PNR\_no using GROUP BY CLAUSE. Hint: Use GROUP BY on PNR\_No.
4. Find the distinct PNR numbers that are present.
5. Find the number of tickets booked by a passenger where the number of seats is greater than 1. Hint: Use GROUP BY, WHERE and HAVING CLAUSES.
6. Find the total number of cancelled seats.

#### Experiment 10: Triggers

In this week you are going to work on Triggers. Creation of insert trigger, delete trigger, update trigger. Practice triggers using the above database.

**Eg: CREATE TRIGGER updcheck BEFORE UPDATE ON passenger**

**FOR EACH ROW**

**BEGIN**

**IF NEW.TickentNO > 60 THEN**

**SET New.Tickent no = Ticket no;**

```

ELSE
    SET New.Ticketno = 0;
END IF;
END;

```

#### Experiment 11: Procedures

In this session you are going to learn Creation of stored procedure, Execution of procedure and modification of procedure. Practice procedures using the above database.

```

Eg:CREATE PROCEDURE myProc()
BEGIN
SELECT COUNT(Tickets) FROM Ticket WHERE age>=40;
End;

```

#### Experiment 12: Cursors

In this week you need to do the following: Declare a cursor that defines a result set.

Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done

```

CREATE PROCEDURE myProc(in_customer_id INT)
BEGIN
DECLARE v_id INT;
DECLARE v_name VARCHAR (30);
DECLARE c1 CURSOR FOR SELECT stdId,stdFirstname FROM
students WHERE stdId=in_customer_id;
OPEN c1;
FETCH c1 into v_id, v_name;
Close c1;
END;

```

Tables

#### BUS

Bus No: Varchar: PK (public key)

Source : Varchar

Destination : Varchar

#### Passenger

PPNO: Varchar(15)) : PK

Name: Varchar(15)

Age : int (4)

Sex:Char(10) : Male / Female

Address: VarChar(20)

#### **Passenger\_Tickets**

PPNO: Varchar(15)) : PK

Ticket\_No: Numeric (9)

#### **Reservation**

PNR\_No: Numeric(9) : FK

Journey\_date : datetime(8)

No\_of\_seats : int (8)

Address : Varchar (50)

Contact\_No: Numeric (9)--> Should not be less than 9 and Should not accept any other character other than Integer

Status: Char (2) : Yes / No

#### **Cancellation**

PNR\_No: Numeric(9) : FK

Journey\_date : datetime(8)

No\_of\_seats : int (8)

Address : Varchar (50)

Contact\_No: Numeric (9)--> Should not be less than 9 and Should not accept any other character other than Integer

Status: Char (2) : Yes / No

#### **Ticket**

Ticket\_No: Numeric (9): PK

Journey\_date : datetime(8)

Age : int (4)

Sex:Char(10) : Male / Female

Source : Varchar

Destination : Varchar

Dep\_time : Varchar

#### **REFERENCE BOOKS:**

1. Introduction to SQL, Rick F.Vander Lans, Pearson education.
2. Oracle PL/SQL, B.Rosenzweig and E.Silvestrova,Pearson education.
3. Oracle PL/SQL Programming,Steven Feuerstein,SPD.
4. SQL & PL/SQL for Oracle 10g, Black Book, Dr.P.S.Deshpande, Dream

Tech.

5. Oracle Database 11g PL/SQL Programming, M.Mc Laughlin, TMH.
6. SQL Fundamentals, J.J.Patrick, Pearson Education.

**Outcomes:**

- Ability to design and implement a database schema for given problem.
- Be capable to Design and build a GUI application.
- Apply the normalization techniques for development of application software to realistic problems.
- Ability to formulate queries using SQL DML/DDDL/DCL commands.



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**(55025) PRINCIPLES OF PROGRAMMING LANGUAGES**

**UNIT I**

Preliminary Concepts: Reasons for studying, concepts of programming languages, Programming domains, Language Evaluation Criteria, influences on Language design, Language categories, Programming Paradigms – Imperative, Object Oriented, functional Programming, Logic Programming, Programming Language Implementation – Compilation and Virtual Machines, programming environments.

**UNIT II**

Syntax and Semantics: general Problem of describing Syntax and Semantics, formal methods of describing syntax - BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, attribute grammars, denotational semantics and axiomatic semantics for common programming language features.

**UNIT III**

Data types: Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization.

**UNIT IV**

Expressions and Statements: Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements, Control Structures – Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements, guarded commands.

**UNIT-V**

Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions user defined overloaded operators, co routines.

**UNIT VI**

Abstract Data types: Abstractions and encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT, object oriented programming in small talk, C++, Java, C#, Ada 95.

Concurrency: Subprogram level concurrency, semaphores, monitors, message passing, Java threads, C# threads.

**UNIT VII**

Exception handling : Exceptions, exception Propagation, Exception handler in Ada, C++ and Java.

Logic Programming Language : Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

**UNIT VIII**

Functional Programming Languages: Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages.

Scripting Language: Pragmatics, Key Concepts, Case Study : Python – Values and Types, Variables , Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library.

**TEXT BOOKS:**

1. Concepts of Programming Languages Robert .W. Sebesta 8/e, Pearson Education, 2008.
2. Programming Language Design Concepts, D. A. Watt, Wiley dreamtech, rp-2007.

**REFERENCE BOOKS:**

1. Programming Languages, 2nd Edition, A.B. Tucker, R.E. Noonan, TMH.
2. Programming Languages, K. C.Louden, 2nd Edition, Thomson, 2003.
3. LISP, Patric Henry Winston and Paul Horn, Pearson Education.
4. Programming in Prolog, W.F. Clocksin, & C.S.Mellish, 5th Edition, Springer.
5. Programming Python, M.L.Lutz, 3rd Edition, O'reilly, SPD, rp-2007.
6. Core Python Programming, Chun, II Edition, Pearson Education, 2007.
7. Guide to Programming with Python, Michael Dawson, Thomson, 2008.

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**(55026) OPERATIONS RESEARCH  
(OPEN ELECTIVE)**

**UNIT I**

Introduction to Operations Research: Basics definition, scope, objectives, phases, models and limitations of Operations Research. Linear Programming Problem – Formulation of LPP, Graphical solution of LPP, Simplex Method, Artificial variables, big-M method, two-phase method, degeneracy and unbound solutions.

**UNIT II**

Transportation Problem. Formulation, solution, unbalanced Transportation problem. Finding basic feasible solutions – Northwest corner rule, least cost method and Vogel's approximation method. Optimality test: the stepping stone method and MODI method.

**UNIT III**

Assignment model. Formulation. Hungarian method for optimal solution, Solving unbalanced problem. Traveling salesman problem and assignment problem.

**UNIT IV**

Sequencing models. Solution of Sequencing Problem – Processing n Jobs through 2 Machines – Processing n Jobs through 3 Machines – Processing 2 Jobs through m machines – Processing n Jobs through m Machines.

**UNIT V**

Dynamic programming. Characteristics of dynamic programming. Dynamic programming approach for Priority Management employment smoothing, capital budgeting, Stage Coach/Shortest Path, cargo loading and Reliability problems.

**UNIT VI**

Games Theory. Competitive games, rectangular game, saddle point, minimax (maximin) method of optimal strategies, value of the game. Solution of games with saddle points, dominance principle. Rectangular games without saddle point – mixed strategy for 2 X 2 games.



**UNIT VII**

Replacement Models. Replacement of Items that Deteriorate whose maintenance costs increase with time without change in the money value. Replacement of items that fail suddenly: individual replacement policy, group replacement policy.

**UNIT VIII**

Inventory models. Inventory costs. Models with deterministic demand—model (a) demand rate uniform and production rate infinite, model (b) demand rate non-uniform and production rate infinite, model (c) demand rate uniform and production rate finite.

**TEXT BOOKS:**

1. P. Sankara Iyer, "Operations Research", Tata McGraw-Hill, 2008.
2. A.M. Natarajan, P. Balasubramani, A. Tamilarasi, "Operations Research", Pearson Education, 2005.

**REFERENCE BOOKS:**

1. J K Sharma, "Operations Research Theory & Applications , 3e", Macmillan India Ltd, 2007.
2. P. K. Gupta and D. S. Hira, "Operations Research", S. Chand & co., 2007.
3. J K Sharma, "Operations Research, Problems and Solutions, 3e", Macmillan India Ltd.
4. N.V.S. Raju, "Operations Research", HI-TECH, 2002.
5. Panneerselvam, "Operations Research", PHI-2e, 2006, rp2008.
6. Operations Research, Ravjindran, Phillips, Solberg, 2<sup>nd</sup> edition, Wiley India.
7. Operations Research, W.L. Winston, 4<sup>th</sup> edition, Cengage Learning.
8. Col. D. S. Cheema, "Operations Research", Laxmi Publications Ltd., 2005.
9. F.S. Hillier, G.J. Lieberman, "Introduction to Operations Research—8ed", Tata McGraw-Hill, 2005, rp2007.
10. H.S. Kasana & K.D. Kumar, "Introductory Operations Research—Theory and applications", Springer, 2003, rp2005.
11. Billy E. Gillert, "Introduction to Operations Research—A Computer-Oriented Algorithmic Approach", Tata McGraw-Hill, 1979, rp2004.

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**(55027) INTELLECTUAL PROPERTY RIGHTS  
AND CYBER LAW  
(OPEN ELECTIVE)**

**UNIT-I:**

Introduction to Intellectual Property, Law of Trademarks, Trademark Selection & Searching

IP Law – Types of IP - Agencies for IP Registration – International Treaties, Purpose and Function of Trademarks – Types of marks – Acquisition of Trademark Rights – Categories of marks – Trade names and Business names – protectable matter, Selection and Evaluation of a mark - Trademark search.

**UNIT-II:**

Trademark Registration Process, Post-registration Procedures, Trademark Maintenance, Transfer of Rights to Marks

Preparing and Filing the Application - Docketing Critical Dates - Examination Process - Post-examination Procedure – Registration, Affidavit of Continued Use – Affidavit of Incontestability – Renewal of Registrations – Docketing Requirements – Loss of Trademark Rights – Trademark Use and Compliance Policies – Trademark Policing and Maintenance - Use of Marks Owned by Third Parties – Transfer of Ownership or Rights in Trademarks.

**UNIT-III:**

Inter Partes Proceedings, Infringement, Dilution, New Developments in Trademark Law

Inter Partes Proceedings – Infringement of Trademarks – Dilution of Trademarks – Related Trademark Claims. Protecting a Domain Name – Other Cyberspace Trademark issues.

**UNIT-IV:**

Law of Copyright, Subject Matter Of Copyright, Rights Afforded by

**Copyright Law**

Foundations of Copyright Law – Originality of Material – Fixation of Material – Exclusions from Copyright Protection – Compilations, Collections, and Derivative Works. Rights of Reproduction – Rights to Prepare Derivative works – Rights of Distribution – Rights to Perform the Work Publicly – Rights to Display the Work Publicly – Limitations on Exclusive Rights.

**UNIT-V:**

Copyright Ownership, Transfers, Duration, Registration, and Searching. Copyright Ownership Issues – Joint works – Ownership in Derivative works – Works Made for hire – Transfers of Copyright – Termination of Transfers of Copyright – Duration of Copyright, Copyright Registration Application – Deposit Materials – Application Process and Registration of Copyright – Searching Copyright Office Records – Obtaining Copyright Office Records and Deposit Materials – Copyright Notice.

**UNIT-VI:**

Copyright Infringement, New Developments in Copyright Law, Semiconductor Chip Protection Act  
Elements of Infringement – Contributory Infringement and Vicarious Infringement – Defenses to Infringement – Infringement Actions – Remedies for Infringement. Copyright Protection for Computer Programs – Copyright Protection for Automated Databases – Copyright in the Electronic Age – The Digital Millennium Copyright Act – Recent Developments in Copyright Law – Terms of the Trade – Vessel Hull Protection – Semiconductor Chip Protection.

**UNIT-VII:**

Law of Patents, Patent Searches, Ownership, Transfer  
Patentability – Design Patents – Double Patenting – Patent Searching – Patent Application Process – Prosecuting the Application, Post-issuance Actions, Term and Maintenance of Patents. Ownership Rights – Sole and Joint Inventors – Disputes over Inventorship – Inventions Made by Employees and Independent Contractors – Assignment of Patent Rights –

Licensing of Patent Rights – Invention Developers and Promoters.

**UNIT-VIII:**

Patent Infringement, New Developments and International Patent Law  
Direct Infringement – Inducement to Infringe – Contributory Infringement – First Sale Doctrine – Claims Interpretation – Defenses to Infringement – Remedies for Infringement – Resolving an Infringement Dispute – Patent Infringement Litigation. New Developments in Patent Law – International Patent Protection – Paris Convention – Patent Cooperation Treaty – Agreement on Trade Related Aspects of Intellectual Property Rights – Patent Law Treaty.

**TEXT BOOK:**

1. Intellectual Property Rights by Deborah E. Bouchoux, Cengage Learning.

**REFERENCES:**

1. Managing Intellectual Property – The Strategic Imperative, Second Edition by Vinod V. Sople, PHI Learning Private Limited.
2. Intellectual Property – Copyrights, Trademarks, and Patents by Richard Stim, Cengage Learning.



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**(55028) COMPUTER FORENSICS****(OPEN ELECTIVE)****UNIT-I**

Computer Forensics Fundamentals: What is Computer Forensics?, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps taken by Computer Forensics Specialists

Types of Computer Forensics Technology: Types of Military Computer Forensic Technology, Types of Law Enforcement – Computer Forensic Technology – Types of Business Computer Forensic Technology

**UNIT-II**

Computer Forensics Evidence and Capture: Data Recovery Defined – Data Back-up and Recovery – The Role of Back-up in Data Recovery – The Data-Recovery Solution

Evidence Collection and Data Seizure: Why Collect Evidence? Collection Options – Obstacles – Types of Evidence – The Rules of Evidence – Volatile Evidence – General Procedure – Collection and Archiving – Methods of Collection – Artifacts – Collection Steps – Controlling Contamination: The Chain of Custody

**UNIT-III**

Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene – Computer Evidence Processing Steps – Legal Aspects of Collecting and Preserving Computer Forensic Evidence

Computer Image Verification and Authentication: Special Needs of Evidential Authentication – Practical Consideration – Practical Implementation

**UNIT-IV**

Computer Forensics analysis and validation: Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions

Network Forensics: Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, using network tools, examining the honeynet project.

**UNIT-V**

Processing Crime and Incident Scenes: Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtaining a digital hash, reviewing a case

**UNIT-VI**

Current Computer Forensic tools: evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software

**UNIT-VII**

E-Mail Investigations: Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violations; understanding e-mail servers, using specialized e-mail forensic tools

Cell phone and mobile device forensics: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

**UNIT-VIII**

Working with Windows and DOS Systems: understanding file systems, exploring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS startup tasks, virtual machines.

**TEXT BOOK:**

1. Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi,
2. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning

**REFERENCE BOOKS:**

1. Real Digital Forensics by Keith J. Jones, Richard Bejtlich, Curtis W. Rose, Addison- Wesley Pearson Education
2. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brian Jenkinson, Springer International edition.
3. Computer Evidence Collection & Presentation by Christopher L.T. Brown, Firewall Media.
4. Homeland Security, Techniques & Technologies by Jesus Mena, Firewall Media.
5. Software Forensics Collecting Evidence from the Scene of a Digital Crime by Robert M.Slade, TMH 2005
6. Windows Forensics by Chad Steel, Wiley India Edition.

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**(55029) SOFTWARE ENGINEERING**

**UNIT I**

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, legacy software, Software myths.

A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

**UNIT II**

Process models: The waterfall model, Incremental process models, Evolutionary process models, Specialized process models, The Unified process.

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

**UNIT III**

Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System models: Context Models, Behavioral models, Data models, Object models, structured methods.

**UNIT IV**

Design Engineering: Design process and Design quality, Design concepts, the design model, pattern based software design.

Creating an architectural design: software architecture, Data design, Architectural styles and patterns, Architectural Design, assessing alternative architectural designs, mapping data flow into a software architecture.

**UNIT V**

Modeling component-level design : Designing class-based components, conducting component-level design,

Object constraint language, designing conventional components.

Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

**UNIT VI**

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Product metrics: Software Quality, Frame work for Product metrics, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

**UNIT VII**

Metrics for Process and Products: Software Measurement, Metrics for software quality.

Risk management: Reactive vs Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

**UNIT VIII**

Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

**TEXT BOOKS:**

1. Software Engineering :A practitioner's Approach, Roger S Pressman, sixth edition, McGrawHill International Edition, 2005
2. Software Engineering, Ian Sommerville, seventh edition, Pearson education, 2004.

**REFERENCE BOOKS:**

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, Rajib Mall, PHI, 2005
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition, 2006.
7. Software Engineering Foundations, Yingxu Wang, Auerbach Publications, 2008.
8. Software Engineering Principles and Practice, Hans Van Vliet, 3<sup>rd</sup> edition, John Wiley & Sons Ltd.
9. Software Engineering 3: Domains, Requirements, and Software Design, D. Bjorner, Springer International Edition.
10. Introduction to Software Engineering, R.J Leach, CRC Press.



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**(55030) MICROPROCESSORS AND INTERFACING**

**UNIT-I:**

8 bit/ 16 bit Microprocessors:

An over view of 8085, Architecture of 8086 Microprocessor, Special functions of General purpose registers. 8086 flag register and function of 8086 Flags. Addressing modes of 8086, Instruction set of 8086. Assembler directives, simple programs, procedures, and macros

**UNIT-II:**

Assembly level programming:

Assembly language programs involving logical, Branch & Call instructions, sorting, evaluation of arithmetic expressions, string manipulation

**UNIT-III:**

Modes of operation in 8086:

Pin diagram of 8086-Minimum mode and maximum mode of operation, Timing diagram. Memory interfacing to 8086 (Static RAM & EPROM), Need for DMA, DMA data transfer Method, Interfacing with 8237/8257.

**UNIT-IV:**

I/O Interface:

8255 PPI – various modes of operation and interfacing to 8086, Interfacing Keyboard, Displays, Stepper Motor and actuators, D/A and A/D converter interfacing.

**UNIT-V:**

Interrupt Control:

Interrupt structure of 8086. Vector interrupt table. Interrupt service routines. Introduction to DOS and BIOS interrupts. 8259 PIC Architecture and interfacing cascading of interrupt controller and its importance.

**UNIT-VI:**

Serial Communication control:

Serial data transfer schemes. Asynchronous and Synchronous data transfer schemes. 8251 USART architecture and interfacing. TTL to RS 232C and RS232C to TTL conversion, Sample program of serial data transfer. IEEE 488 GPIB

**UNIT-VII:**

Introduction to Microcontrollers:

Overview of 8051 microcontroller, Architecture, I/O Ports, Memory organization, addressing modes and instruction set of 8051, simple programs

**UNIT-VIII:**

Real time control:

Timer/Counter operation in 8051, Serial Communication control in 8051, Interrupt structure of 8051, Memory and I/O interfacing of 8051

**TEXT BOOKS:**

1. Advanced microprocessor and Peripherals - A.K.Ray and K.M.Bhurchandi, TMH, 2000.
2. Micro Controllers – Ajay V. Deshmukh, Tata McGraw Hill, 2005..

**REFERENCES:**

1. Micro Processors & Interfacing – Douglas V. Hall, 2007.
2. The 8088 and 8086 Micro Processors: Programming, Interfacing, Software, Hardware and Applications –Walter. A. Triebel, Avatar Singh, N.K.Srinath, 2007, Pearson.
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design - By Liu and GA Gibson, PHI, 2<sup>nd</sup> Ed.



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**(55031) OPERATING SYSTEMS**

**UNIT-I**

Operating Systems Overview- Operating systems functions, Overview of computer operating systems, protection and security, distributed systems, special purpose systems, operating systems structures-operating system services and systems calls, system programs, operating system structure, operating systems generation

**UNIT-II**

Process Management – Process concepts, threads, scheduling-criteria, algorithms, their evaluation,  
Thread scheduling, case studies UNIX, Linux, Windows

**UNIT-III**

Concurrency - Process synchronization, the critical-section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples, atomic transactions. Case studies UNIX, Linux, Windows

**UNIT-IV**

Memory Management – Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-replacement, algorithms, Allocation of frames, Thrashing case studies UNIX, Linux, Windows

**UNIT-V**

Principles of deadlock – system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock,

**UNIT-VI**

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, file system implementation, directory implementation, allocation methods, free-space management,

efficiency and performance, case studies. UNIX, Linux, Windows

**UNIT-VII**

Mass-storage structure- overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure.

I/O systems- Hardware, application I/O interface, kernel I/O subsystem, Transforming I/O requests to Hardware operations, STREAMS, performance.

**UNIT-VIII**

Protection - Protection, Goals of Protection, Principles of Protection, Domain of protection Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability-Based systems, Language – Based Protection,

Security- The Security problem, program threats, system and network threats cryptography as a security tool, user authentication, implementing security defenses, firewalling to protect systems and networks, computer –security classifications, case studies UNIX, Linux, Windows

**TEXT BOOKS:**

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 8th edition, John Wiley.
2. Operating systems- A Concept based Approach-D.M.Dhamdhare, 2<sup>nd</sup> Edition, TMH

**REFERENCES:**

1. Operating Systems – Internals and Design Principles, Stallings, sixth Edition–2009, Pearson education.
2. Modern Operating Systems, Andrew S Tanenbaum 2nd edition PHL
3. Principles of Operating Systems, B.L. Stuart, Cengage learning, India Edition.
4. Operating Systems, A.S.Godbole, 2nd Edition, TMH
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHL
6. Operating Systems, G.Nutt, N.Chaki and S.Neogy, 3<sup>rd</sup> Edition, Pearson Education.
7. Operating Systems, R.Elmasri, A.G.Carrick and D.Levine, Mc Graw Hill.
8. Operating Systems, S.Haldar, A.A.Aravind, Pearson education.

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**(55032) DATA COMMUNICATION AND COMPUTER**

**NETWORKS**

**UNIT-I**

Introduction: Data Communications, Networks, The Internet, Protocols and Standards, Network Models, Layered Tasks, The OSI Model, Layers in the OSI Model, TCP/IP Protocol Suite, Addressing, Physical Layer and Media, Data and Signals, Analog and Digital, Periodic Analog Signals, Digital Signals, Transmission impairment, Data Rate Limits, Performance, Digital Transmission, Digital-to-Digital Conversion, Analog-to-Digital Conversion, Analog Transmission, Digital-to-analog Conversion, Analog-to-analog Conversion

**UNIT-II**

Bandwidth utilization: Multiplexing and Spreading, Multiplexing, Spread Spectrum, Transmission Media, Guided Media, Unguided Media: Wireless, Switching, Circuit-Switched Networks, Datagram Networks, Virtual-Circuit Networks, Structure of a Switch, Using Telephone and Cable Networks for Data Transmission, Telephone Networks, Dial-up Modems, Digital Subscriber Line, Cable TV Networks, Cable TV for Data Transfer

**UNIT-III**

Error Detection and Correction, Introduction, Block Coding, Linear Block Codes, Cyclic Codes, Checksum, Data Link Control, Framing, Flow and Error Control, Protocols, Noiseless Channels, HDLC, Point-to-Point Protocol, Multiple Access, Random Access, Aloha, Controlled Access, Channelization, IEEE Standards, Standard Ethernet, Changes in the Standard, Fast Ethernet, Gigabit Ethernet, IEEE 802.11, Bluetooth

**UNIT-IV**

Connecting LANs, Backbone Networks, and Virtual LANs, Connecting

Devices, Backbone Networks, Virtual LANs, Cellular Telephony, Satellite Networks, Sonet/SDH, Architecture, Sonet Layers, Sonet Frames, STS Multiplexing, Sonet Networks, Virtual Tributaries, Virtual-Circuit Networks: Frame Relay and ATM, Frame Relay, ATM, ATM LANs

**UNIT-V**

Network Layer: Logical Addressing, IPv4 Addresses, IPv6 Addresses, Network Layer: Internet Protocol, Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6, Network Layer: Address Mapping, Error Reporting and Multicasting, Address Mapping, ICMP, IGMP, ICMPv6, Network Layer: Delivery, Forwarding and Routing, Delivery, Forwarding, Unicast Routing Protocols, Multicast Routing Protocols

**UNIT-VI**

Transport Layer: Process-Process Delivery: UDP, TCP and SCTP, Process-to-Process Delivery, User Datagram Protocol (UDP), TCP, SCTP, Congestion Control and Quality of Service, Data Traffic, Congestion, Congestion Control, Two Examples, Quality Service, Techniques to improve QoS, Integrated Services, Differentiated Services, QoS in Switched Networks

**UNIT-VII**

Application Layer: Domain Name System, Name Space, Domain Name Space, Distribution of Name Space, DNS in the Internet, Resolution, DNS Messages, Types of Records, Registrars, Dynamic Domain Name System (DDNS), Encapsulation, Remote Logging, Electronic Mail and File Transfer, Remote Logging, Telnet, Electronic Mail, File Transfer

**UNIT-VIII**

WWW and HTTP: Architecture, Web Documents, HTTP, Network Management: SNMP, Network Management System, Simple Network Management Protocol (SNMP), Multimedia, Digitizing Audio and Video, Audio and Video Compression, Streaming Stored Audio/Video, Streaming Live Audio/Video, Real-Time Interactive Audio/Video, RTP, RTCP, Voice over IP.



**TEXT BOOKS:**

1. Data Communications and Networking, Fourth Edition by Behrouza A. Forouzan, TMH.
2. Computer Networks, A.S.Tanenbaum, 4<sup>th</sup> edition, Pearson education.

**REFERENCE BOOKS:**

1. Introduction to Data communications and Networking, W.Tomasi, Pearson education.
2. Data and Computer Communications, G.S.Hura and M.Singhal, CRC Press, Taylor and Francis Group.
3. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
4. Understanding communications and Networks, 3rd Edition, W.A.Shay, Cengage Learning.
5. Computer Networks, L.L.Peterson and B.S.Davie, 4<sup>th</sup> edition, ELSEVIER.
6. Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose, K.W.Ross, 3<sup>rd</sup> Edition, Pearson Education.
7. Data communications and computer Networks, P.C.Gupta, PHI.
8. Fundamentals of Business Data Communications, 10<sup>th</sup> edition, J.Fitzgerald and A.Dennis, Wiley India.

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**(55608) MICROPROCESSORS AND INTERFACING LAB**

Minimum of 12 experiments are to be conducted.

1. Write and execute an Assembly language Program (ALP) to 8086 processor to add, subtract and multiply two 16 bit unsigned numbers. Store the result in extra segment.
2. Write and execute an Assembly language Program (ALP) to 8086 processor to divide a 32 bit unsigned number by a 16 bit unsigned number. Store the result in stack segment.
3. Write and execute an Assembly language Program (ALP) to 8086 processor to sort the given array of 32 bit numbers in ascending and descending order.
4. Write and execute an Assembly language Program (ALP) to 8086 processor to pick the median from the given array of numbers.
5. Write and execute an Assembly language Program (ALP) to 8086 processor to find the length of a given string which terminates with a special character.
6. Write and execute an Assembly language Program (ALP) to 8086 processor to reverse the given string and verify whether it is a palindrome.
7. Write and execute an Assembly language Program (ALP) to 8086 processor to verify the password.
8. Write and execute an Assembly language Program (ALP) to 8086 processor to insert or delete a character/ number from the given string.
9. Write and execute an Assembly language Program (ALP) to 8086 processor to call a delay subroutine and display the character on the LED display.

10. Interface a keypad to 8086 microprocessor and display the key number pressed on the 7-segment display which is also interfaced to 8086.
11. Write an interrupt service routine to 8086 when ever there is an interrupt request on interrupt pin, which displays "hello" on a LCD.
12. Interface an 8086 microprocessor trainer kit to PC and establish a communication between them through RS 232.
13. Interface DMA controller to 8086 and transfer bulk data from memory to I/O device.
14. Interface a stepper motor to 8086 and operate it in clockwise and anti-clock wise by choosing variable step-size.
15. Interface an 8 bit ADC to 8086 and generate digital output and store it in memory for the given square/ ramp/ triangle wave form inputs.
16. Interface an ADC to 8086 and generate step, ramp, triangle and square waveforms with different periods.

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**(55609) COMPUTER NETWORKS AND  
OPERATING SYSTEMS LAB**

**Objective:**

- To Understand the functionalities of various layers of OSI model
- To understand the operating System functionalities

**System/ Software Requirement**

- Intel based desktop PCs LAN CONNECTED with minimum of 166 MHZ or faster processor with atleast 64 MB RAM and 100 MB free disk space

**Part - A**

1. Implement the data link layer framing methods such as character, character stuffing and bit stuffing.
2. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.
3. Implement Dijkstra 's algorithm to compute the Shortest path thru a graph.
4. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table at each node using distance vector routing algorithm
5. Take an example subnet of hosts . Obtain broadcast tree for it.
6. Take a 64 bit playing text and encrypt the same using DES algorithm.
7. Write a program to break the above DES coding
8. Using RSA algorithm Encrypt a text data and Decrypt the same .

**Part -B**

1. Simulate the following CPU scheduling algorithms  
a) Round Robin b) SJF c) FCFS d) Priority
2. Simulate all file allocation strategies  
a) Sequential b) Indexed c) Linked
3. Simulate MVT and MFT
4. Simulate all File Organization Techniques  
a) Single level directory b) Two level c) Hierarchical d) DAG
5. Simulate Bankers Algorithm for Dead Lock Avoidance
6. Simulate Bankers Algorithm for Dead Lock Prevention
7. Simulate all page replacement algorithms  
a) FIFO b) LRU c) LFU Etc. ...
8. Simulate Paging Technique of memory management.

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**(56028) OBJECT ORIENTED ANALYSIS AND DESIGN**

**UNIT - I**

Introduction to UML : Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

**UNIT - II**

Basic Structural Modeling : Classes, Relationships, common Mechanisms, and diagrams.

Advanced Structural Modeling : Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

**UNIT - III**

Class & Object Diagrams : Terms, concepts, modeling techniques for Class & Object Diagrams.

**UNIT - IV**

Basic Behavioral Modeling-I : Interactions, Interaction diagrams.

**UNIT - V**

Basic Behavioral Modeling-II : Use cases, Use case Diagrams, Activity Diagrams.

**UNIT - VI**

Advanced Behavioral Modeling : Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

**UNIT-VII**

Architectural Modeling : Component, Deployment, Component diagrams and Deployment diagrams.



**UNIT - VIII**

Case Study : The Unified Library application.

**TEXT BOOKS:**

1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit. WILEY-Dreamtech India Pvt. Ltd.

**REFERENCE BOOKS:**

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Object-Oriented Analysis and Design with the Unified Process By John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.
5. Learning UML 2.0, Russ Miles and Kim Hamilton, O'Reilly, SPD.
6. Applying UML and Patterns: An introduction to Object - Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
7. UML and C++, R.C.Lee, and W.M.Tepfenhart, PHI.
8. Object Oriented Analysis, Design and Implementation, B.Dathan, S.Ramath, Universities Press.
9. OODesign with UML and Java, K.Barclay J.Savage, Elsevier.
10. Mark Priestley: Practical Object-Oriented Design with UML, TMH.

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**(56029) VLSI DESIGN****Unit I**

Introduction: Introduction to IC Technology – MOS, PMOS, NMOS, CMOS &amp; BiCMOS

Technologies: Oxidation, Lithography, Diffusion, Ion implantation, Metallization, Encapsulation, Probe testing, Integrated Resistors and Capacitors, CMOS Nanotechnology

**Unit II**Basic Electrical Properties: Basic Electrical Properties of MOS and BiCMOS Circuits:  $I_{on}$ - $V_{gs}$  relationships, MOS transistor threshold Voltage,  $E_{ox}$ ,  $E_{si}$ , Figure of merit  $f_0$ ; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.**Unit III**VLSI Circuit Design Processes: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, 2  $\mu$ m CMOS Design rules for wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits.**Unit IV**

Gate Level Design: Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Time delays, Driving large capacitive loads, Wiring capacitance, Fan – in, Fan – out, Choice of layers.

**Unit V:**

Data Path Subsystems: Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters.

**Unit VI:**

Array Subsystems: SRAM, DRAM, ROM, Serial Access Memories, Content

Addressable Memory.

#### Unit VII:

Semiconductor Integrated Circuit Design: PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach, Parameters influencing low power design.

#### Unit VIII

CMOS Testing: CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chip level Test Techniques, System-level Test Techniques, Layout Design for improved Testability.

#### TEXT BOOKS:

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Douglas and A. Pucknell, PHI, 2005 Edition
2. VLSI Design- K. Lal Kishore, V. S. V. Prabhakar, I.K International, 2009.
3. CMOS VLSI Design – A circuits and systems perspective, Neil H. E. Weste, David Harris, Ayan Banerjee, pearson, 2009.

#### REFERENCES:

1. CMOS logic circuit Design - John .P. Uyemura, Springer, 2007.
2. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.
3. VLSI Design – A. Albert Raj, Latha, PHI, 2008
4. Introduction to VLSI – Mead & Convey, BS Publications, 2010
5. VLSI Design – M. Micheal Vai, CRC Press, 2009.

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### (56030) NETWORK SECURITY

#### UNIT-I

Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

#### UNIT-II

Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key-distribution Approaches of Message Authentication, Secure Hash Functions and HMAC.

#### UNIT-III

Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service.

#### UNIT-IV

Email privacy: Pretty Good Privacy (PGP) and S/MIME.

#### UNIT-V

IP Security Overview; IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

#### UNIT-VI

Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).



**UNIT - VII**

Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3.

Intruders, Viruses and related threats.

**UNIT - VIII**

Firewall Design principles, Trusted Systems, Intrusion Detection Systems.

**TEXTBOOKS:**

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W. Manziuk and Ryan Permech, Wiley Dreamtech

**REFERENCES:**

1. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning.
2. Network Security - Private Communication in a Public World by Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.
3. Cryptography and network Security, Third edition, Stallings, PHI/ Pearson
4. Principles of Information Security, Whitman, Cengage Learning.
5. Cryptography and network Security, B.A. Forouzan, D. Mukhopadhyay, 2<sup>nd</sup> edition, TMH.
6. Introduction to Cryptography, Buchmann, Springer.
7. Fundamentals of Network Security by Eric Maiwald (Dreamtech press)
8. Information Systems Security, Godbole, Wiley Student Edition.
9. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
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III Year B.Tech. CSE-II Sem	L	T/P/D	C
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**(56031) COMPILER DESIGN****UNIT - I**

Overview of Compilation: Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation – LEX lexical analyzer generator.

**UNIT - II**

Top down Parsing : Context free grammars, Top down parsing – Backtracking, LL (1), recursive descent parsing, Predictive parsing, Preprocessing steps required for predictive parsing.

**UNIT - III**

Bottom up parsing : Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing , handling ambiguous grammar, YACC – automatic parser generator.

**UNIT - IV**

Semantic analysis : Intermediate forms of source Programs – abstract syntax tree, polish notation and three address codes. Attributed grammars, Syntax directed translation, Conversion of popular Programming languages language Constructs into Intermediate code forms, Type checker.

**UNIT - V**

Symbol Tables : Symbol table format, organization for block structures languages, hashing, tree structures representation of scope information. Block structures and non block structure storage allocation: static, Runtime stack and heap storage allocation, storage allocation for arrays, strings and records.

**UNIT - VI**

Code optimization : Consideration for Optimization, Scope of Optimization,

local optimization, loop optimization, frequency reduction, folding, DAG representation.

#### UNIT – VII

Data flow analysis : Flow graph, data flow equation, global optimization, redundant sub-expression elimination, Induction variable elements, Live variable analysis, Copy propagation.

#### UNIT – VIII

Object code generation : Object code forms, machine dependent code optimization, register allocation and assignment generic code generation algorithms, DAG for register allocation.

#### TEXT BOOKS :

1. Principles of compiler design -A.V. Aho . J.D.Ullman; Pearson Education.
2. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.

#### REFERENCES:

1. lex & yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
2. Modern Compiler Design- Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, Wiley dreamtech.
3. Engineering a Compiler-Cooper & Linda, Elsevier.
4. Compiler Construction, Louden, Thomson.

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III Year B.Tech. CSE - II Sem

L	T/P/D	C
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#### (56023) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

##### Unit I

Introduction to Managerial Economics:

Definition, Nature and Scope of Managerial Economics–Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

##### Unit II

Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

##### Unit III

Theory of Production and Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Cost concepts, Opportunity cost, Fixed vs. Variable costs, Explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems)- Managerial Significance and limitations of BEA.

##### Unit IV

Introduction to Markets & Pricing Policies:

Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.



Objectives and Policies of Pricing- Methods of Pricing: Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Two-Part Pricing, Block Pricing, Bundling Pricing, Peak Load Pricing, Cross Subsidization.

#### Unit V

Business & New Economic Environment: Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario.

#### Unit VI

Capital and Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance.

Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

#### Unit VII

Introduction to Financial Accounting: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

#### Unit VIII

Financial Analysis through ratios: Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt-Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Profit Ratio, P/E Ratio and EPS).

#### TEXT BOOKS:

1. Aryasri: Managerial Economics and Financial Analysis, TMH, 2009.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.

#### REFERENCES:

1. Raghunatha Reddy & Narasimbachary: Managerial Economics & Financial Analysis, Scitech, 2009.
2. V.Rajasekarn & R.Lalitha, Financial Accounting, Pearson Education, New Delhi, 2010.
3. Suma Damodaran, Managerial Economics, Oxford University Press, 2009.
4. Dornick Salvatore: Managerial Economics in a Global Economy, 4th Edition, Cengage, 2009.
5. Subhash Sharma & MP Vittal, Financial Accounting for Management, Text & Cases, Macmillan, 2008.
6. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2008.
7. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2009.
8. Dwivedi: Managerial Economics, Vikas, 2009.
9. M.Kasi Reddy, S.Saraswathi: Managerial Economics and Financial Accounting, PHI, 2007.
10. Erich A. Helfert: Techniques of Financial Analysis, Jaico, 2007.

Prerequisites: Nil

Objective: To explain the basic principles of managerial economics, accounting and current business environment underlying business decision making.

Codes/Tables: Present Value Tables need to be permitted into the examinations Hall.

Question Paper Pattern: 5 Questions to be answered out of 8 questions .Out of eight questions 4 questions will be theory questions and 4 questions should be problems.

Each question should not have more than 3 bits.

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III Year B.Tech. CSE - II Sem	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>3</b>	<b>1/-/-</b>	<b>3</b>

**(56032) WEB TECHNOLOGIES**

**UNIT-I:**

HTML: Common tags- List, Tables, images, forms, Frames; Cascading Style sheets;

**UNIT-II:**

Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script

**UNIT-III:**

XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX

**UNIT-IV:**

Java Beans; Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizes, Java Beans API, Introduction to EJB's

**UNIT-V:**

Web Servers and Servlets: Tomcat web server, Introduction to Servlets; Lifecycle of a Servlet, JSDK, The Servlet API, The javax.servelet Package, Reading Servlet parameters, Reading Initialization parameters, The javax.servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues,

**UNIT-VI:**

Introduction to JSP: The Problem with Servlet, The Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC Setting Up and JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat

**UNIT-VII:**

JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations

**UNIT-VIII:**

Database Access : Database Programming using JDBC, Studying Javax.sql.<sup>®</sup> package, Accessing a Database from a JSP Page, Application – Specific Database Actions, Deploying JAVA Beans in a JSP Page, Introduction to struts framework.

**TEXT BOOKS:**

1. Programming world wide web-Sebesta, Pearson
2. Java: the complete reference, 7<sup>th</sup> edition, Herbert Schildt, TMH.
3. Core SERVLETS AND JAVA SERVER PAGES VOLUME 1: CORE TECHNOLOGIES By Marty Hall and Larry Brown Pearson (UNITs 5,6,7,8)

**REFERENCE BOOKS:**

1. Web Programming, building internet applications, Chris Bates 2<sup>nd</sup> edition, WILEY Dreamtech
2. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education Asia.
3. Jakarta Struts Cookbook , Bill Siggeikow, S P D O'Reilly for chap 8.
4. Murach's beginning JAVA/JDK 5, Murach, SPD
5. An Introduction to web Design and Programming – Wang-Thomson
6. Web Applications Technologies Concepts-Knuckles, John Wiley
7. Programming world wide web-Sebesta, Pearson
8. Web Warrior Guide to Web Programming-Bai/Ekedaw-Thomas
9. Beginning Web Programming-Jon Duckett WROX.
10. Java Server Pages, Pekowsky, Pearson.



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III Year B.Tech, CSE - II Sem	L	T/P/D	C
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**(56609) ADVANCED ENGLISH COMMUNICATION**

**SKILLS LAB**

**1. Introduction**

The introduction of the English Language Lab is considered essential at 3<sup>rd</sup> year level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

- Gather ideas and information, to organise ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice versa.
- To take part in social and professional communication.

**2. Objectives:**

This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.

**3. Syllabus:**

The following course content is prescribed for the Advanced Communication Skills Lab:

- Functional English - starting a conversation - responding appropriately and relevantly - using the right body language - role play in different situations.
- Vocabulary Building - synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases.
- Reading Comprehension - reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, Critical reading.
- Writing Skills - structure and presentation of different types of writing - Resume writing / e-correspondence/Technical report writing/Portfolio writing - planning for writing - research abilities/data collection/organizing data/tools/analysis - improving one's writing.
- Group Discussion - dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.
- Presentation Skills - Oral presentations (individual and group) through JAM sessions/seminars and written presentations through posters/projects/reports/PPTs/e-mails/assignments etc.
- Interview Skills - concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.

**4. Minimum Requirement:**

The English Language Lab shall have two parts:

- i) The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.
- ii) The Communication Skills Lab with movable chairs and audio-visual aids with a P.A System, a T.V., a digital stereo-audio & video system and camcorder etc.

**System Requirement ( Hardware component):**

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

- i) P – IV Processor
- a) Speed – 2.8 GHZ
- b) RAM – 512 MB Minimum
- c) Hard Disk – 80 GB
- ii) Headphones of High quality

**5. Suggested Software:**

The software consisting of the prescribed topics elaborated above should be procured and used.

**Suggested Software:**

- Clarity Pronunciation Power – part II
- Oxford Advanced Learner's Compass, 7<sup>th</sup> Edition
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL & GRE( KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- The following software from 'train2success.com'
- Preparing for being Interviewed,
- Positive Thinking,
- Interviewing Skills,
- Telephone Skills,
- Time Management
- Team Building,
- Decision making
- English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

**6. Books Recommended:**

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.

2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
3. English Language Communication : A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
4. English Vocabulary in Use series, Cambridge University Press 2008.
5. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
6. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
7. Handbook for Technical Writing by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
8. Job Hunting by Colm Downes, Cambridge University Press 2008.
9. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
10. English for Technical Communication for Engineering Students, Aysa Vishwamohan, Tata Mc Graw-Hil 2009.
11. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/ Cambridge University Press.
12. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

**DISTRIBUTION AND WEIGHTAGE OF MARKS:**

Advanced Communication Skills Lab Practicals:

1. The practical examinations for the English Language Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.



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III Year B.Tech. CSE -II Sem

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**(56610) WEB TECHNOLOGIES AND  
COMPILER DESIGN LAB**

**Objective:**

To create a fully functional website with MVC architecture. To Develop an online Book store using we can sell books (Ex amazon .com).

**Hardware and Software required :**

1. A working computer system with either Windows or Linux
2. A web browser either IE or firefox
3. Tomcat web server and Apache web server
4. XML editor like Altova Xml-spy [www.Altova.com/XMLSpy - free ] , Stylusstudio , etc.,
5. A database either Mysql or Oracle
6. JVM(Java virtual machine) must be installed on your system
7. BDK(Bean development kit) must be also be installed

**Week-1:**

Design the following static web pages required for an online book store web site.

**1)HOMEPAGE:**

The static home page must contain three frames.

Top frame : Logo and the college name and links to Home page, Login page, Registration page.

Catalogue page and Cart page (the description of these pages will be given below).

Left frame : At least four links for navigation, which will display the catalogue of respective links.

For e.g. When you click the link "CSE" the catalogue for CSE Books should be displayed in the Right frame.

Right frame: The pages to the links in the left frame must be loaded here. Initially this page contains description of the web site.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE	Description of the Web Site			
BCE				
EEE				
CIVIL				

Fig 1.1

**2) LOGIN PAGE:**

This page looks like below:




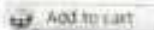



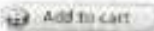
Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE	Login: <input type="text"/> Password: <input type="password"/>  <input type="button" value="Submit"/> <input type="button" value="Reset"/>			
BCE				
EEE				
CIVIL				

**3)CATOLOGUEPAGE:**

The catalogue page should contain the details of all the books available in the web site in a table.

The details should contain the following:

1. Snap shot of Cover Page.
2. Author Name.
3. Publisher.
4. Price.
5. Add to cart button.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE		Book : XML Bible Author : Wriston	\$40.5	
ECE		Publication : Wiley		
EEE				
CIVIL		Book : AI Author : S.Russel	\$63	
		Publication : Princeton hall		
		Book : Java 2 Author : Watson	\$35.5	
		Publication : BPB publicarions		
		Book : HTML in 24 hours Author : Sam Peter	\$50	
		Publication : Sam publication		

Note: Week 2 contains the remaining pages and their description.

Week-2:

#### 4) CART PAGE:

The cart page contains the details about the books which are added to the cart.

The cart page should look like this:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE	Book name	Price	Quantity	Amount
ECE	Java 2	\$35.5	2	\$70
EEE	XML bible	\$40.5	1	\$40.5
CIVIL			<b>Total amount</b>	<b>\$130.5</b>

#### 5) REGISTRATION PAGE:

Create a "registration form" with the following fields

- 1) Name (Text field)
- 2) Password (password field)
- 3) E-mail id (text field)
- 4) Phone number (text field)
- 5) Sex (radio button)
- 6) Date of birth (3 select boxes)
- 7) Languages known (check boxes – English, Telugu, Hindi, Tamil)
- 8) Address (text area)

#### WEEK 3:

#### VALIDATION:

Write JavaScript to validate the following fields of the above registration page.

1. Name (Name should contains alphabets and the length should not be less than 6 characters).
2. Password (Password should not be less than 6 characters length).
3. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)
4. Phone number (Phone number should contain 10 digits only).

Note : You can also validate the login page with these parameters.

#### Week-4:

Design a web page using CSS (Cascading Style Sheets) which includes the following:

- 1) Use different font, styles:

In the style definition you define how each selector should work (font, color etc.).

Then, in the body of your pages, you refer to these selectors to activate the styles.



For example:

```
<HTML>
<HEAD>
<style type="text/css">
B.headline {color:red; font-size:22px; font-family:arial; text-
decoration:underline;}
</style>
</HEAD>
<BODY>
<h1>This is normal bold</h1><br>
Selector {color:value}
For example:
<html>
<head>
<style type="text/css">
a:link {cursor:crosshair}
a:link {color:red; text-decoration:underline;}
</style>
</head>
</html>
```

2) Set a background image for both the page and single elements on the page.

You can define the background image for the page like this:

```
BODY {background-image:url (myimage.gif);}
```

3) Control the repetition of the image with the background-repeat property. As background-repeat: repeat

Tiles the image until the entire page is filled, just like an ordinary background image in plain HTML.

4) Define styles for links as

```
A:link
A:visited
A:active
A:hover
```

Example:

```
<style type="text/css">
A:link {text-decoration: none}
A:visited {text-decoration: none}
A:active {text-decoration: none}
A:hover {text-decoration: underline; color: red;}
</style>
```

5) Work with layers:

For example:

LAYER 1 ON TOP:

```
<div style="position:relative; font-size:50px; z-index:2;">LAYER 1</div>
<div style="position:relative; top:-50; left:5; color:red; font-size:80px; z-
index:1">LAYER 2</div>
```

LAYER 2 ON TOP:

```
<div style="position:relative; font-size:50px; z-index:3;">LAYER 1</div>
<div style="position:relative; top:-50; left:5; color:red; font-size:80px; z-
index:4">LAYER 2</div>
```

6) Add a customized cursor:

```
Selector {cursor:value}
For example:
<html>
<head>
<style type="text/css">
```

```

xlink {cursor:crosshair}
hlink {cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
</b>
<a href="mypage.htm" class="hlink">HELP LINK</a>
</b>
</body>
</html>

```

**Week-5:**

Write an XML file which will display the Book information which includes the following:

- 1) Title of the book
- 2) Author Name
- 3) ISBN number
- 4) Publisher name
- 5) Edition
- 6) Price

Write a Document Type Definition (DTD) to validate the above XML file.

Display the XML file as follows.

The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns.

Use XML schemas XSL and CSS for the above purpose.

Note: Give at least for 4 books. It should be valid syntactically.

Hint: You can use some xml editors like XML-spy

**Week-6:****VISUAL BEANS:**

Create a simple visual bean with a area filled with a color.

The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle, if it is false.

The color of the area should be changed dynamically for every mouse click. The color should also be changed if we change the color in the "property window".

**Week-7:**

1) Install TOMCAT web server and APACHE.

While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port.

2) Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root.

Access the pages by using the urls : <http://localhost:4040/rama/books.html> (for tomcat)

<http://localhost:8080/books.html> (for Apache)

**Week-8:****User Authentication :**

Assume four users user1,user2,user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a servlet for doing the following.

1. Create a Cookie and add these four user id's and passwords to this Cookie.
2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.

If he is a valid user(i.e., user-name and password match) you should welcome him by name(user-name) else you should display " You are not an authenticated user "

Use init-parameters to do this. Store the user-names and passwords in the webinf.xml and access them in the servlet by using the getInitParameters() method.



**Week-9:**

Install a database(Mysql or Oracle).

Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form).

Practice 'JDBC' connectivity.

Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.

Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).

**Week-10:**

Write a JSP which does the following job:

Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database ( similar to week8 instead of cookies).

**Week-11:**

Create tables in the database which contain the details of items (books in our case like Book name , Price, Quantity, Amount ) of each category. Modify your catalogue page (week 2)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.

**Week-12:**

HTTP is a stateless protocol. Session is required to maintain the state.

The user may add some items to cart from the catalog page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time(i.e., from different systems in the LAN using the ip-address instead of localhost). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated (by using the method session.invalidate() ).

Modify your catalogue and cart JSP pages to achieve the above mentioned functionality using sessions.

**Compiler Design Lab****Objective :**

- To provide an understanding of the language translation peculiarities by designing a complete translator for a mini language.

**Recommended Systems/Software Requirements:**

- Intel based desktop PC with minimum of 166 MHZ or faster processor with atleast 64 MB RAM and 100 MB free disk space
- C++ compiler and JDK kit

Consider the following mini Language, a simple procedural high-level language, only operating on integer data, with a syntax looking vaguely like a simple C crossed with Pascal. The syntax of the language is

defined by the following BNF grammar:

```

<program> ::= <block>
<block> ::= { <variabledefinition> <slis> }
| { <slis> }
<variabledefinition> ::= int <vardeflist> ;
<vardeflist> ::= <vardec> | <vardec> , <vardeflist>
<vardec> ::= <identifier> | <identifier> [ <constant> ]
<slis> ::= <statement> | <statement> : <slis>
<statement> ::= <assignment> | <ifstatement> | <whilestatement>
| <block> | <printstatement> | <empty>
<assignment> ::= <identifier> = <expression>
| <identifier> [ <expression> ] = <expression>
<ifstatement> ::= if <bexpression> then <slis> else <slis> endif
| if <bexpression> then <slis> endif
<whilestatement> ::= while <bexpression> do <slis> enddo
<printstatement> ::= print ( <expression> )
<expression> ::= <expression> <addingop> <term> | <term> [ <addingop>
<term>
<bexpression> ::= <expression> <relop> <expression>
<relop> ::= < < <= <= > > | !=
<addingop> ::= + | -
<term> ::= <term> <multop> <factor> | <factor>
<multop> ::= * | /
<factor> ::= <constant> | <identifier> | <identifier> [ <expression> ]
| ( <expression> )

```

`<constant> ::= <digit> | <digit> <constant>`  
`<identifier> ::= <identifier> <letterordigit> | <letter>`  
`<letterordigit> ::= <letter> | <digit>`  
`<letter> ::= a|b|c|d|e|f|g|h|i|j|k|l|m|n|o|p|q|r|s|t|u|v|w|x|y|z`  
`<digit> ::= 0|1|2|3|4|5|6|7|8|9`

`<empty>` has the obvious meaning

Comments (zero or more characters enclosed between the standard C/Java-style comment brackets /

\*...\*/) can be inserted. The language has rudimentary support for 1-dimensional arrays. The declaration `int a[3]` declares an array of three elements, referenced as `a[0]`, `a[1]` and `a[2]`. Note also that you should worry about the scoping of names.

A simple program written in this language is:

```

int a[3],t1,t2;
t1=2;
a[0]=1; a[1]=2; a[2]=3;
t2=(a[2]+t1*6)/(a[2]+t1);

```

```

if t2>5 then
print(t2);
else {
int t3;
t3=99;
t2=25;
print(-t1+t2*t3); /* this is a comment
on 2 lines */
} endif }

```

1. Design a Lexical analyzer for the above language. The lexical analyzer should ignore redundant spaces, tabs and newlines. It should also ignore comments. Although the syntax specification states that identifiers can be arbitrarily long, you may restrict the length to some reasonable value.
2. Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generating tools.
3. Design Predictive parser for the given language
4. Design LALR bottom up parser for the above language.
5. Convert the BNF rules into Yacc form and write code to generate

abstract syntax tree.

6. Write program to generate machine code from the abstract syntax tree generated by the parser. The following instruction set may be considered as target code.

The following is a simple register-based machine, supporting a total of 17 instructions. It has three distinct internal storage areas. The first is the set of 8 registers, used by the individual instructions as detailed below, the second is an area used for the storage of variables and the third is an area used for the storage of program. The instructions can be preceded by a label. This consists of an integer in the range 1 to 9999 and the label is followed by a colon to separate it from the rest of the instruction. The numerical label can be used as the argument to a jump instruction, as detailed below.

In the description of the individual instructions below, instruction argument types are specified as follows :

**R**

specifies a register in the form R0, R1, R2, R3, R4, R5, R6 or R7 (or r0, r1, etc.).

**L**

specifies a numerical label (in the range 1 to 9999).

**V**

specifies a "variable location" (a variable number, or a variable location pointed to by a register - see below).

**A**

specifies a constant value, a variable location, a register or a variable location pointed to by a register (an indirect address). Constant values are specified as an integer value, optionally preceded by a minus sign, preceded by a # symbol. An indirect address is specified by an @ followed by a register.

So, for example, an A-type argument could have the form 4 (variable number 4), #4 (the constant value 4), r4 (register 4) or @r4 (the contents of register 4 identifies the variable location to be accessed).

The instruction set is defined as follows:

**LOAD,R**

loads the integer value specified by A into register R.

**STORE,R,V**

stores the value in register R to variable V.

**OUTR**

outputs the value in register R.

**NEGR**

negates the value in register R.

**ADDA,R**

adds the value specified by A to register R, leaving the result in register R.

**SUBA,R**

subtracts the value specified by A from register R, leaving the result in register R.

**MULA,R**

multiplies the value specified by A by register R, leaving the result in register R.

**DIVA,R**

divides register R by the value specified by A, leaving the result in register R.

**JMPL**

causes an unconditional jump to the instruction with the label L.

**JEQL**

jumps to the instruction with the label L if the value in register R is zero.

**JNERL**

jumps to the instruction with the label L if the value in register R is not zero.

**JGERL**

jumps to the instruction with the label L if the value in register R is greater than or equal to zero.

**JGTRL**

jumps to the instruction with the label L if the value in register R is greater than zero.

**JLERL**

jumps to the instruction with the label L if the value in register R is less than or equal to zero.

**JLTRL**

jumps to the instruction with the label L if the value in register R is less than zero.

**NOP**

is an instruction with no effect. It can be tagged by a label.

**STOP**

stops execution of the machine. All programs should terminate by executing a STOP instruction.



## IV YEAR I SEMESTER

## COURSE STRUCTURE

Code	Subject	L	T/P/D	C
57046	Linux Programming	4	1	4
57047	Software Testing Methodologies	4	1	4
57048	Data Warehousing and Data Mining	4	-	4
57049	Computer Graphics	3	1	3
	<b>ELECTIVE-I</b>	3	1	3
57050	Advanced Computer Architecture			
57051	Cloud Computing			
57052	Distributed Computing			
57053	Mobile Computing			
	<b>ELECTIVE-II</b>	3	1	3
57054	Design Patterns			
57055	Machine Learning			
57056	Soft Computing			
57057	Information Retrieval Systems			
57609	Linux Programming and Data Mining Lab	-	3	2
57610	Case Tools & Software Testing Lab	-	3	2
	<b>Total</b>	<b>21</b>	<b>11</b>	<b>25</b>

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	4	1/-/-	4

**(57046) LINUX PROGRAMMING**

**UNIT - I**

Linux Utilities-File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities, sed – scripts, operation; addresses, commands, applications, awk – execution, fields and records, scripts, operation, patterns, actions, functions, using system commands in awk.

**UNIT-II**

Working with the Bourne again shell(bash): Introduction, shell responsibilities, pipes and input Redirection, output redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts.

**UNIT - III**

Files: File Concept, File System Structure, Inodes, File Attributes, File types, Library functions, the standard I/O and formatted I/O in C, stream errors, kernel support for files, System calls, file descriptors, low level file access – File structure related system calls(File APIs), file and record locking, file and directory management – Directory file APIs, Symbolic links & hard links.

**UNIT - IV**

Process – Process concept, Kernel support for process, process attributes, process control - process creation, waiting for a process, process termination, zombie process, orphan process, Process APIs.

Signals– Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions.

**UNIT - V**

Interprocess Communication : Introduction to IPC, Pipes, FIFOs, Introduction to three types of IPC-message queues, semaphores and shared memory.

Message Queues- Kernel support for messages, Unix system V APIs for messages, client/server example.

#### UNIT-VI

Semaphores- Kernel support for semaphores, Unix system V APIs for semaphores.

Shared Memory- Kernel support for shared memory, Unix system V APIs for shared memory, semaphore and shared memory example.

#### UNIT-VII

Multithreaded Programming: Differences between threads and processes, Thread structure and uses, Threads and Lightweight Processes, POSIX Thread APIs, Creating Threads, Thread Attributes, Thread Synchronization with semaphores and with Mutexes, Example programs.

#### UNIT-VIII

Sockets: Introduction to Sockets, Socket Addresses, Socket system calls for connection oriented protocol and connectionless protocol, example client/server programs.

#### TEXT BOOKS:

1. Unix System Programming using C++, T.Chan, PHL(UNIT III to UNIT VIII)
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH.
3. Beginning Linux Programming, 4<sup>th</sup> Edition, N.Matthew, R.Stones,Wrox, Wiley India Edition.

#### REFERENCE BOOKS:

1. Linux System Programming, Robert Love, O'Reilly, SPD.
2. Advanced Programming in the Unix environment, 2<sup>nd</sup> Edition, W.R.Stevens, Pearson Education.
3. Unix Network Programming, W.R.Stevens,PHL.
4. Unix for programmers and users, 3<sup>rd</sup> Edition, Graham Glass, King Ables, Pearson Education.
5. Unix and Shell programming, B.A.Forouzan and R.F.Gilberg, Cengage Learning.
6. Unix The Text book, 2<sup>nd</sup> edition, S.M.Sarwar, R.Koretsky, S.A.Sarwar, Pearson Education.
7. Unix Internals, U.Vihalia, Pearson Education.
8. Unix shell Programming, S.G.Kochan and P.Wood, 3<sup>rd</sup> edition, Pearson Education.

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IV Year B.Tech. CSE - I Sem	L	T/P/D	C
	4	1/-	4

#### (57047) SOFTWARE TESTING METHODOLOGIES

##### UNIT-I

Introduction:- Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs.

##### UNIT-II

Flow graphs and Path testing:- Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

##### UNIT-III

Transaction Flow Testing:- transaction flows, transaction flow testing techniques. Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

##### UNIT-IV

Domain Testing:- domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

##### UNIT-V

Paths, Path products and Regular expressions:- path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

##### UNIT-VI

Logic Based Testing:- overview, decision tables, path expressions, kv charts, specifications.

##### UNIT-VII

State, State Graphs and Transition testing:- state graphs, good & bad state graphs, state testing. Testability tips.



**UNIT - VIII**

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter or Win-runner).

**TEXT BOOKS:**

1. Software Testing techniques – Boris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

**REFERENCE BOOKS:**

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing, 3<sup>rd</sup> edition, P.C.Jorgensen, Aurbach Publications (Dist.by SPD).
3. Software Testing, N.Chauhan, Oxford University Press.
4. Introduction to Software Testing, P.Ammann & J.Offutt, Cambridge Univ.Press.
5. Effective methods of Software Testing, Perry, John Wiley, 2<sup>nd</sup> Edition, 1999.
6. Software Testing Concepts and Tools, P.Nageswara Rao, dreamtech Press.
7. Software Testing, M.G.Limaye, TMH.
8. Software Testing, S.Desikan, G.Ramesh, Pearson.
9. Foundations of Software Testing, D.Graham & Others, Cengage Learning.
10. Foundations of Software Testing, A.P.Mathur, Pearson.

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<b>L</b>	<b>T/P/D</b>	<b>C</b>
4	-/-	4

**(57048) DATA WAREHOUSING AND DATA MINING****UNIT I**

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Major issues in Data Mining.  
Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

**UNIT II**

Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining  
Data Cube Computation and Data Generalization: Efficient Methods for Data Cube Computation, Further Development of Data Cube and OLAP Technology, Attribute-Oriented Induction.

**UNIT III**

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent Itemset Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining

**UNIT IV**

Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Backpropagation, Support Vector Machines, Associative Classification, Lazy Learners, Other Classification Methods, Prediction, Accuracy and Error measures, Evaluating the accuracy of a Classifier or a Predictor, Ensemble Methods

**Unit V**

Cluster Analysis Introduction :Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Clustering High-Dimensional Data, Constraint-Based Cluster Analysis, Outlier Analysis.

**UNIT VI**

Mining Streams, Time Series and Sequence Data: Mining Data Streams, Mining Time-Series Data, Mining Sequence Patterns in Transactional Databases, Mining Sequence Patterns in Biological Data, Graph Mining, Social Network Analysis and Multirelational Data Mining.

**UNIT VII**

Mining Object, Spatial, Multimedia, Text and Web Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web.

**UNIT VIII**

Applications and Trends in Data Mining: Data Mining Applications, Data Mining System Products and Research Prototypes, Additional Themes on Data Mining and Social Impacts of Data Mining.

**TEXT BOOKS:**

1. Data Mining – Concepts and Techniques – Jiawei Han & Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2<sup>nd</sup> Edition, 2006.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.

**REFERENCE BOOKS:**

1. Data Mining Techniques – Arun K.Pujari, 2<sup>nd</sup> edition, Universities Press.
2. Data Warehousing in the Real World – Sam Aathory & Dennis Murray Pearson Edn Asia.
3. Insight into Data Mining, K.P.Soman, S.Diwakar, V.Ajay, PHI, 2008.
4. Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley student Edition
5. The Data Warehouse Life cycle Tool kit – Ralph Kimball Wiley student edition
6. Building the Data Warehouse By William H Inmon, John Wiley & Sons Inc, 2005.
7. Data Mining Introductory and advanced topics – Margaret H Durham, Pearson education
8. Data Mining, V.Pudi and P.Radha Krishna, Oxford University Press.
9. Data Mining: Methods and Techniques, A.B.M Shawkat Ali and S.A.Wasimi, Cengage Learning
10. Data Warehouse 2.0, The Architecture for the next generation of Data Warehousing, W.H.Inmon, D.Strauss, G.Neushloss, Elsevier, Distributed by SPD.

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<b>IV Year B.Tech. CSE - I Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	<b>3</b>	<b>1/-/-</b>	<b>3</b>

**(57049) COMPUTER GRAPHICS**

**UNIT I**

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices.

**UNIT II**

Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

**UNIT III**

2-D Geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

**UNIT IV**

2-D Viewing : The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland-Hodgeman polygon clipping algorithm.

**UNIT V**

3-D Object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces, Basic illumination models, polygon rendering methods.

**UNIT VI**

3-D Geometric transformations: Translation, rotation, scaling, reflection and



shear transformations, composite transformations, 3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

#### UNIT VII

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods.

#### UNIT VIII

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

#### TEXT BOOKS:

1. "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson education.
2. "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.

#### REFERENCE BOOKS:

1. "Computer Graphics Second edition", Zhiqiang Xiang, Ray Plustock, Schaum's outlines, Tata Mc Graw hill edition.
2. "Procedural elements for Computer Graphics", David F Rogers, Tata Mc Graw hill, 2nd edition.
3. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
4. "Principles of Computer Graphics", Shalini, Govil-Pai, Springer.
5. "Computer Graphics", Steven Harrington, TMH.
6. Computer Graphics, F.S.Hill, S.M.Keiley PHL.
7. Computer Graphics, P.Shirley, Steve Marschner & Others, Cengage Learning.
8. Computer Graphics & Animation, M.C.Trivedi, Jaico Publishing House.
9. An Integrated Introduction to Computer Graphics and Geometric Modelling, R.Goldman, CRC Press, Taylor & Francis Group.
10. Computer Graphics, Rajesh K.Maurya, Wiley India.

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IV Year B.Tech. CSE - I Sem	L	T/P/D	C
	3	1/-	3

#### (57050) ADVANCED COMPUTER ARCHITECTURE (ELECTIVE-I)

##### Unit-I

Theory of Parallelism, Parallel computer models, The State of Computing, Multiprocessors and Multicomputers, Multivector and SIMD Computers, PRAM and VLSI models, Architectural development tracks, Program and network properties, Conditions of parallelism, Program partitioning and Scheduling, Program flow Mechanisms, System interconnect Architectures.

##### Unit-II

Principals of Scalable performance, Performance metrics and measures, Parallel Processing applications, Speed up performance laws, Scalability Analysis and Approaches, Hardware Technologies, Processes and Memory Hierarchy, Advanced Processor Technology, Superscalar and Vector Processors, Memory Hierarchy Technology, Virtual Memory Technology.

##### Unit-III

Bus-Cache and Shared-memory, Backplane bus systems, Cache Memory organizations, Shared-Memory Organizations, Sequential and weak consistency models, Pipelining and superscalar techniques, Linear Pipeline Processors, Non-Linear Pipeline Processors, Instruction Pipeline design, Arithmetic pipeline design, superscalar pipeline design.

##### Unit-IV

Parallel and Scalable Architectures, Multiprocessors and Multicomputers, Multiprocessor system interconnects, cache coherence and synchronization mechanism, Three Generations of Multicomputers, Message-passing Mechanisms, Multivector and SIMD computers, Vector Processing Principals, Multivector Multiprocessors, Compound Vector processing, SIMD computer Organizations, The connection machine CM-5.

##### Unit-V

Scalable, Multithreaded and Dataflow Architectures, Latency-hiding techniques, Principals of Multithreading, Fine-Grain Multicomputers, Scalable and multithreaded Architectures, Dataflow and hybrid

Architectures.

#### Unit – VI

Software for parallel programming, Parallel models, Languages and Compilers, Parallel Programming models, Parallel languages and compilers, Dependence analysis and data arrays, code optimization and scheduling, Loop Parallelization and pipelining.

#### Unit – VII

Parallel Program development and Environments, Parallel Programming Environments, Synchronization and Multiprocessing modes, Shared-Variable program structures, Message-passing program development, Mapping program onto multicomputers.

#### Unit – VIII

Instruction level parallelism, Introduction, Basic Design issues, Problem Definition, Model of typical processor, Compiler-Detector Instruction level parallelism, Operand forwarding, Recorder Buffer, Register Re-naming, Tomasulo's Algorithm, Branch Prediction, Limitations in exploiting instruction level parallelism, Thread level parallelism, Recent Advances in computer Architecture, Brief overview of Technology, Forms of Parallelism.

#### TEXT BOOK:

1. Advanced Computer Architecture Second Edition, Kai Hwang, Tata McGraw Hill Publishers.

#### REFERENCE BOOKS:

1. Computer Architecture, Fourth edition, J.L.Hennessy and D.A, Patterson, ELSEVIER.
2. Advanced Computer Architectures, S.G.Shiva, Special Indian edition, CRC, Taylor & Francis.
3. Introduction to High Performance Computing for Scientists and Engineers, G.Hager and G.Wellein, CRC Press, Taylor & Francis Group.
4. Advanced Computer Architecture, D.Sima, T .Fountain, P.Kacsuk, Pearson education.
5. Computer Architecture, B.Parhami, Oxford Univ. Press.

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#### (57051) CLOUD COMPUTING (ELECTIVE-I)

#### UNIT-I

Introductory concepts and overview: Distributed systems – Parallel computing architectures: Vector processing, Symmetric multi processing and Massively parallel processing systems – High performance Cluster computing – Grid computing – Service Oriented Architecture overview – Virtualization.

#### UNIT-II

Overview of Cloud Computing: Meaning of the terms cloud and cloud computing – cloud based service offerings – Grid computing Vs Cloud computing – Benefits of cloud model – limitations – legal issues – Key characteristics of cloud computing – Challenges for the cloud – The evolution of cloud computing.

#### UNIT-III

Web services delivered from the cloud: Infrastructure as a service – Platform-as-a-service – Software-as-a-service. Building Cloud networks: Evolution from the MSP model to cloud computing and software-as-a-service – The cloud data center – SOA as step toward cloud computing – Basic approach to a data center based SOA.

#### UNIT-IV

Federation Presence, Identity and Privacy in the cloud: Federation in the cloud – Presence in the cloud – Privacy and its relation to cloud based information system. Security in the Cloud: Cloud security challenges – Software-as-a-service security

#### UNIT-V

Common Standards in Cloud computing: The open cloud consortium – The



distributed management task force – standards for application developers  
– standards for messaging – standards for security

**UNIT – VI**

End user access to cloud computing: youtube – zimbra – Facebook – Zoho  
– DimDim Collaboration

Mobile internet devices and the cloud: Smartphone – mobile operating  
systems for smart phones – Mobile Platform virtualization – Collaboration  
applications for mobile platforms – Future trends

**UNIT – VII**

Virtualization: Adding guest Operating system. Cloud computing case  
studies 1: Amazon EC2 – Amazon simple DB – Amazon S3 – Amazon Cloud  
Front – Amazon SQS

**UNIT – VIII**

Cloud computing case studies 2: Google App Engine- Google web tool kit –  
Microsoft Azure Services platform – Windows live – Exchange on line –  
Sharepoint services – Microsoft dynamic CRM – salesforce.com CRM –  
App Exchange

**TEXT BOOKS:**

1. Cloud Computing implementation, management and security by John  
W. Rittinghouse, James F. Ransome, CRC Press, Taylor & Francis  
group, 2010
2. Cloud Computing a practical approach by Anthony T. velte, Toby  
J. velte Robert Elsenpeter, Tata Mc Graw Hill edition, 2010

**REFERENCES:**

1. Cloud Application Architectures by George Reese, O'Reilly publishers
2. Cloud computing and SOA convergence in your enterprise, by David  
S. Lindicum, Addison- Wesley

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(57052) DISTRIBUTED COMPUTING  
(ELECTIVE -I)

**UNIT I**

## Introduction

Definitions, The different forms of computing – Monolithic, Distributed,  
Parallel and cooperative computing, the meaning of Distributed computing,  
Examples of Distributed systems, the strengths and weaknesses of  
Distributed computing, operating system concepts relevant to distributed  
computing, Network basics, the architecture of distributed applications,  
Interprocess Communications – An Archetypal IPC Program Interface, Event  
Synchronization, Timeouts and Threading, Deadlocks and Timeouts, Data  
representation,  
Data Encoding, Text-Based Protocols, Request-Response Protocols, Event  
Diagram and Sequence Diagram, Connection-Oriented versus  
Connectionless IPC, The Evolution of Paradigms for IPCs.

**UNIT II**

## Distributed Computing Paradigms

Paradigms and Abstraction, Paradigms for Distributed Applications –  
Message Passing Paradigm, The Client-Server Paradigm, The peer-to-peer  
Paradigm, Message system (or MOM) Paradigm – the point-to-point message  
model and the publish/subscribe message model, RPC model, The Distributed  
Objects Paradigms – RMI, ORB, the object space Paradigm, The Mobile  
Agent Paradigm, the Network Services Paradigm, The collaborative  
application ( Groupware Paradigm) ,choosing a Paradigm for an  
application.

**UNIT III**

The Socket API-The Datagram Socket API, The Stream-Mode Socket

API, Client-Server Paradigm Issues, Connection-Oriented and Connectionless Servers, Iterative and Concurrent Servers.

Group Communication-Unicasting versus Multicasting, Multicast API, Connectionless versus Connection-Oriented Multicast, Reliable Multicasting versus Unreliable Multicasting, The Java Basic Multicast API.

#### UNIT IV

Distributed Objects Paradigm (RMI)

Message passing versus Distributed Objects, An Archetypal Distributed Object Architecture, Distributed Object Systems, RPC, RMI, The Java RMI Architecture, Java RMI API, A sample RMI Application, steps for building an RMI application, testing and debugging, comparison of RMI and socket API

#### UNIT V

Distributed Object Paradigm (CORBA)

The basic Architecture, The CORBA object interface, Inter-ORB protocols, object servers and object clients, CORBA object references, CORBA Naming Service and the Interoperable Naming Service, CORBA object services, object Adapters, Java IDL, An example CORBA application.

#### UNIT VI

Grid Computing

Introduction, Grid Computing Anatomy – The Grid Problem, The Concept of Virtual Organizations, Grid Architecture, Grid Architecture and relationship to other Distributed Technologies, Grid computing road map. Merging the Grid services Architecture with the Web Services Architecture.

#### UNIT VII

Open Grid Service Architecture – Introduction, Architecture and Goal, Sample Use cases: Commercial Data Center, National Fusion Collaboratory, Online Media and Entertainment. OGSA platform Components, Open Grid Services Infrastructure.

#### UNIT VIII

Globus GT 3 Toolkit – Architecture, Programming Model. A sample

implementation.

#### TEXT BOOKS:

1. Distributed Computing, Principles and Applications, M.L.Liu, Pearson Education.
2. Grid Computing, Joshy Joseph & Craig Fellenstein, Pearson education, 2004

#### REFERENCE BOOKS:

1. A Networking Approach to Grid Computing, D.Minoli, Wiley & sons.
2. Grid Computing: A Practical Guide to Technology and Applications, A.Abbas, Firewall Media.
3. Java Network Programming, E.R.Harold, 2nd edition, O'Reilly, SPD.
4. Distributed Systems, Concepts and Design, 3rd edition, G.Coulouris, J.Dollimore and Tim Kindbirg, Pearson Education.
5. Java Programming with CORBA, 3rd edition, Brose, Vogel, Duddy, Wiley Dreamtech.
6. Client/Server Programming with Java and CORBA, second edition, R.Orfali & Dan Harkey, John Wiley & sons.
7. Grid Computing – Making the global infrastructure a reality, Fran Berman, Geoffrey C Fox, Anthony JG Hey, Wiley India, 2010



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IV Year B.Tech. CSE - I Sem	1.	T/P/D	C
	3	1/-/-	3

**(57053) MOBILE COMPUTING  
(ELECTIVE - I)**

**UNIT I**

## Introduction:

Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.

GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS, CSHSD, DECT.

**UNIT-II**

(Wireless) Medium Access Control (MAC)

Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA. MAC protocols for GSM, Wireless LAN (IEEE802.11), Collision Avoidance (MACA, MACAW) Protocols.

**UNIT-III**

Mobile IP Network Layer

IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunnelling and Encapsulation, Route Optimization, DHCP.

**UNIT-IV**

Mobile Transport Layer

Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

**UNIT V**

Database Issues

Database Hoarding & Caching Techniques, C – S Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

**UNIT VI**

Data Dissemination and Synchronization, Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination Broadcast Models, Selective Tuning and Indexing Methods, Digital Audio and Video Broadcasting (DAB & DVB), Data Synchronization – Introduction, Software, and Protocols

**UNIT VII**

Mobile Ad hoc Networks (MANETs)

Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc., Mobile Agents, Service Discovery.

**UNIT-VIII**

Protocols and Platforms for Mobile Computing WAP, Bluetooth, XML, J2ME, JavaCard, PalmOS, Windows CE, SymbianOS, Linux for Mobile Devices.

**TEXT BOOKS**

1. Raj Kamal, "Mobile Computing", Oxford University Press, 2007, ISBN: 0195686772

**REFERENCE BOOKS**

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2004.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002, ISBN 0471419028.
3. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, Oct 2004.

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**(57054) DESIGN PATTERNS  
(ELECTIVE - II)**

**UNIT-I**

Introduction : What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

**UNIT-II**

A Case Study : Designing a Document Editor : Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary .

**UNIT-III**

Creational Patterns : Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

**UNIT-IV**

Structural Pattern Part-I : Adapter, Bridge, Composite.

**UNIT-V**

Structural Pattern Part-II : Decorator, façade, Flyweight, Proxy.

**UNIT-VI**

Behavioral Patterns Part-I : Chain of Responsibility, Command, Interpreter, Iterator.

**UNIT-VII**

Behavioral Patterns Part-II : Mediator, Memento, Observer, State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns.

**UNIT-VIII**

What to Expect from Design Patterns, A Brief History, The Pattern Community An Invitation, A Parting Thought.

**TEXT BOOK :**

1. Design Patterns By Erich Gamma, Pearson Education
2. Head First Design Patterns By Eric Freeman-Oreilly-SPD.

**REFERENCES:-**

1. Pattern's in JAVA Vol-I By Mark Grand ,Wiley DreamTech.
2. Pattern's in JAVA Vol-II By Mark Grand ,Wiley DreamTech.
3. JAVA Enterprise Design Patterns Vol-III By Mark Grand ,Wiley DreamTech.
4. Design Patterns Explained By Alan Shalloway,Pearson Education.
5. Pattern Oriented Software Architecture,F.Buschmann&others,John Wiley & Sons.



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**(57055) MACHINE LEARNING  
(ELECTIVE - II)**

**UNIT-I**

Introduction: An illustrative learning task, and a few approaches to it. What is known from algorithms? Theory, Experiment, Biology, Psychology.

**UNIT-II**

Concept Learning: Version spaces, Inductive Bias, Active queries, Mistake bound/ PAC model, basic results, Overview of issues regarding data sources, success criteria.

**UNIT-III**

Decision Tree Learning: - Minimum Description Length Principle, Occam's razor, Learning with active queries

**UNIT-IV**

Neural Network Learning: Perceptions and gradient descent back propagation.

**UNIT-V**

Sample Complexity and Over fitting, Errors in estimating means, Cross Validation and jackknifing VC dimension, Irrelevant features: Multiplicative rules for weight tuning.

**UNIT-VI**

Bayesian Approaches: The basics Expectation Maximization, Hidden Markov Models

**UNIT-VII**

Instance-based Techniques: Lazy vs. eager generalization, K nearest neighbor, case- based reasoning

**UNIT-VIII**

Genetic Algorithms: Different search methods for induction - Explanation-based Learning: using prior knowledge to reduce sample complexity.

**TEXT BOOKS:**

1. Tom Michel, Machine Learning, McGraw Hill, 1997
2. Trevor Hastie, Robert Tibshirani & Jerome Friedman, The Elements of Statistically Learning, Springer Verlag, 2001

**REFERENCE BOOKS:**

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.
2. Richard o. Duda, Peter E. Hart and David G Stork, pattern classification, John Wiley & Sons Inc., 2001
3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995

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(57056) SOFT COMPUTING  
(ELECTIVE - II)

**UNIT-I**

AI Problems and Search: AI problems, Techniques, Problem Spaces and Search, Heuristic Search Techniques- Generate and Test, Hill Climbing, Best First Search Problem reduction.

**UNIT-II**

Constraint Satisfaction and Means End Analysis. Approaches to Knowledge Representation- Using Predicate Logic and Rules.

**UNIT-III**

Artificial Neural Networks: Introduction, Basic models of ANN, important terminologies, Supervised Learning Networks, Perceptron Networks, Adaptive Linear Neuron, Backpropagation Network.

Associative Memory Networks, Training Algorithms for pattern association, BAM and Hopfield Networks.

**UNIT-IV**

Un-supervised Learning Network- Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks.

**UNIT-V**

Adaptive Resonance Theory Networks, Special Networks-Introduction to various networks.

Introduction to Classical Sets ( crisp Sets)and Fuzzy Sets- operations and Fuzzy sets. Classical Relations.

**UNIT-VI**

Fuzzy Relations- Cardinality, Operations, Properties and composition.

Tolerance and equivalence relations.

Membership functions: Features, Fuzzification, membership value assignments, Defuzzification.

**UNIT-VII**

Fuzzy Arithmetic and Fuzzy Measures, Fuzzy Rule Base and Approximate Reasoning Fuzzy Decision making.

**UNIT-VIII**

Fuzzy Logic Control Systems, Genetic Algorithm- Introduction and basic operators and terminology Applications: Optimization of TSP, Internet Search Technique

**TEXT BOOKS:**

1. Principles of Soft Computing- S N Sivanandam, S N Deepa. Wiley India, 2007
2. Soft Computing and Intelligent System Design -Fakhreddine O Karray, Clarence D Silva., Pearson Edition, 2004.

**REFERENCES:**

1. Computational Intelligence, Amit Konar, Springer.
2. Artificial Intelligence and Soft Computing- Behavioural and Cognitive Modelling of the Human Brain- Amit Konar, CRC press, Taylor and Francis Group.
3. Artificial Intelligence- Elaine Rich and Kevin Knight, TMH, 1991, 2008.
4. Artificial Intelligence- Patric Henry Winston - Third Edition, Pearson Education.
5. A first course in Fuzzy Logic- Hung T Nguyen and Elbert A Walker, CRC. Press Taylor and Francis Group.

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**(57057) INFORMATION RETRIEVAL SYSTEMS**

**(ELECTIVE - II)**

**UNIT I**

Introduction, Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses, Information Retrieval System Capabilities - Search, Browse, Miscellaneous.

**UNIT II**

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction, Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure.

**UNIT III**

Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages

**UNIT IV**

Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

**UNIT V**

User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, Weighted searches of Boolean systems, Searching the Internet and hypertext.

Information Visualization: Introduction, Cognition and perception, Information visualization technologies.

**UNIT VI**

Text Search Algorithms: Introduction, Software text search algorithms.

Hardware text search systems.

Information System Evaluation: Introduction, Measures used in system evaluation, Measurement example - TREC results.

**UNIT VII**

Multimedia Information Retrieval - Models and Languages - Data Modeling, Query Languages, Indexing and Searching.

**UNIT VIII**

Libraries and Bibliographical Systems - Online IR Systems, OPACs, Digital Libraries.

**TEXTBOOKS**

1. Information Storage and Retrieval Systems: Theory and Implementation By Kowalski, Gerald, Mark T Maybury, Springer.
2. Modern Information Retrieval By Ricardo Baeza-Yates, Pearson Education, 2007.
3. Information Retrieval: Algorithms and Heuristics By David A Grassman and Ophir Frieder, 2<sup>nd</sup> Edition, Springer.

**REFERENCE BOOKS**

1. Information Retrieval Data Structures and Algorithms By William B Frakes, Ricardo Baeza-Yates, Pearson Education, 1992.
2. Information Storage & Retrieval By Robert Korfhage - John Wiley & Sons.
3. Introduction to Information Retrieval By Christopher D. Manning and Prabhakar Raghavan, Cambridge University Press, 2008.
4. Natural Language Processing and Information Retrieval. T.Siddiqui and U.S.Tiwary, Oxford Univ. Press.



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**(57609) LINUX PROGRAMMING AND DATA MINING LAB**

- LINUX PROGRAMMING:
  - Note: Use Bash for Shell scripts.
1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
  2. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
  3. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
  4. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
  5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
  6. Write a shell script to list all of the directory files in a directory.
  7. Write a shell script to find factorial of a given integer.
  8. Write an awk script to count the number of lines in a file that do not contain vowels.
  9. Write an awk script to find the number of characters, words and lines in a file.
  10. Write a c program that makes a copy of a file using standard I/O and system calls.
  11. Implement in C the following Unix commands using System calls  
A. cat      B. ls      C. mv
  12. Write a program that takes one or more file/directory names as command line input and reports the following information on the file.

- A. File type.
  - B. Number of links.
  - C. Time of last access.
  - D. Read, Write and Execute permissions.
13. Write a C program to emulate the Unix ls -l command.
  14. Write a C program to list for every file in a directory, its inode number and file name.
  15. Write a C program that demonstrates redirection of standard output to a file. Ex: ls > fl.
  16. Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen.
  17. Write a C program to create a Zombie process.
  18. Write a C program that illustrates how an orphan is created.
  19. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex: ls -l | sort
  20. Write C programs that illustrate communication between two unrelated processes using named pipe.
  21. Write a C program to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.
  22. Write a C program that receives the messages (from the above message queue as specified in (21)) and displays them.
  23. Write a C program to allow cooperating processes to lock a resource for exclusive use, using a) Semaphores, b) flock or lockf system calls.
  24. Write a C program that illustrates suspending and resuming processes using signals.
  25. Write a C program that implements a producer-consumer system with two processes. (using Semaphores).
  26. Write client and server programs (using c) for interaction between server and client processes using Unix Domain sockets.
  27. Write client and server programs (using c) for interaction between server and client processes using Internet Domain sockets.
  28. Write a C program that illustrates two processes communicating using shared memory.

**TEXT BOOKS:**

1. Advanced Unix Programming, N.B.Venkateswarala, BS Publications.

2. Unix and Shell programming, B. A. Forouzan and R. F. Gilberg, Cengage Learning.
3. Unix and Shell Programming, M.G. Venkatesh Murthy, Pearson Education, 2005.
4. Unix Shells by Example, 4th Edition, Ellie Quigley, Pearson Education.
5. Sed and Awk, O. Dougherty & A. Robbins, 2<sup>nd</sup> edition, SPD.

### Data Mining Lab:

#### Credit Risk Assessment:

Description: The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the bank's profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.

To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.
2. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

### The German Credit Data:

Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany, credit dataset (original) Excel spreadsheet version of the German credit data. (Download from web)

In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer !)

#### A few notes on the German dataset

- DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
- owns\_telephone. German phone rates are much higher than in Canada so fewer people own telephones.
- foreign\_worker. There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.
- There are 20 attributes used in judging a loan applicant. The goal is to classify the applicant into one of two categories, good or bad.

#### Subtasks : (Turn in your answers to the following tasks)

1. List all the categorical (or nominal) attributes and the real-valued attributes separately.
2. What attributes do you think might be crucial in making the credit assessment? Come up with some simple rules in plain English using your selected attributes.
3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training.
4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy?
5. Is testing on the training set as you did above a good idea? Why or Why not?



6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what is cross-validation briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why? (10 marks)
7. Check to see if the data shows a bias against "foreign workers" (attribute 20), or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss.
8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)
9. Sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifications equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)?
10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model?
11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees

using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase?

12. (Extra Credit): How can you convert a Decision Trees into "if-then-else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules.PART. train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one! Can you predict what attribute that might be in this dataset? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR.

#### Task Resources:

Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)

- Decision Trees (Source: Tan, MSU)
- Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)
- Weka resources:
  - o Introduction to Weka (html version) (download ppt version)
  - o Download Weka
  - o Weka Tutorial
  - o ARFF format
  - o Using Weka from command line

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**(57610) CASE TOOLS AND SOFTWARE TESTING LAB**

**Case Tools Lab**

Students are divided into batches of 5 each and each batch has to draw the following diagrams using UML for an ATM system whose description is given below.

UML diagrams to be developed are:

- |                       |                           |
|-----------------------|---------------------------|
| 1. Use Case Diagram.  | 2. Class Diagram.         |
| 3. Sequence Diagram.  | 4. Collaboration Diagram. |
| 5. State Diagram.     | 6. Activity Diagram.      |
| 7. Component Diagram. | 8. Deployment Diagram.    |
| 9. Test Design.       |                           |

**Description for an ATM System**

The software to be designed will control a simulated automated teller machine (ATM) having a magnetic stripe reader for reading an ATM card, a customer console (keyboard and display) for interaction with the customer, a slot for depositing envelopes, a dispenser for cash (in multiples of Rs. 100, Rs. 500 and Rs. 1000), a printer for printing customer receipts, and a key-operated switch to allow an operator to start or stop the machine. The ATM will communicate with the bank's computer over an appropriate communication link. (The software on the latter is not part of the requirements for this problem.)

The ATM will service one customer at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN) - both of which will be sent to the bank for validation as part of each transaction. The customer will then be able to perform one or more transactions. The card will be retained in the machine until the customer indicates that he/she desires no further transactions, at which point it will be returned - except as noted below.

The ATM must be able to provide the following services to the customer:

1. A customer must be able to make a cash withdrawal from any suitable account linked to the card, in multiples of Rs. 100 or Rs. 500 or Rs. 1000. Approval must be obtained from the bank before cash is dispensed.
2. A customer must be able to make a deposit to any account linked to the card, consisting of cash and/or checks in an envelope. The customer will enter the amount of the deposit into the ATM, subject to manual verification when the envelope is removed from the machine by an operator. Approval must be obtained from the bank before physically accepting the envelope.
3. A customer must be able to make a transfer of money between any two accounts linked to the card.
4. A customer must be able to make a balance inquiry of any account linked to the card.
5. A customer must be able to abort a transaction in progress by pressing the Cancel key instead of responding to a request from the machine.

The ATM will communicate each transaction to the bank and obtain verification that it was allowed by the bank. Ordinarily, a transaction will be considered complete by the bank once it has been approved. In the case of a deposit, a second message will be sent to the bank indicating that the customer has deposited the envelope. (If the customer fails to deposit the envelope within the timeout period, or presses cancel instead, no second message will be sent to the bank and the deposit will not be credited to the customer.)

If the bank determines that the customer's PIN is invalid, the customer will be required to re-enter the PIN before a transaction can proceed. If the customer is unable to successfully enter the PIN after three tries, the card will be permanently retained by the machine, and the customer will have to contact the bank to get it back.

If a transaction fails for any reason other than an invalid PIN, the ATM will display an explanation of the problem, and will then ask the customer whether he/she wants to do another transaction.

The ATM will provide the customer with a printed receipt for each successful



transaction.

The ATM will have a key-operated switch that will allow an operator to start and stop the servicing of customers. After turning the switch to the "on" position, the operator will be required to verify and enter the total cash on hand. The machine can only be turned off when it is not servicing a customer. When the switch is moved to the "off" position, the machine will shut down, so that the operator may remove deposit envelopes and reload the machine with cash, blank receipts, etc.

### Software Testing Lab

#### List of Experiments

1. Write programs in 'C' Language to demonstrate the working of the following constructs:  
i) do...while ii) while...do iii) if...else iv) switch v) for
2. "A program written in 'C' language for Matrix Multiplication fails"  
Introspect the causes for its failure and write down the possible reasons for its failure.
3. Take any system (e.g. ATM system) and study its system specifications and report the various bugs.
4. Write the test cases for any known application (e.g. Banking application)
5. Create a test plan document for any application (e.g. Library Management System)
6. Study of any testing tool (e.g. Win runner)
7. Study of any web testing tool (e.g. Selenium)
8. Study of any bug tracking tool (e.g. Bugzilla, bugbit)
9. Study of any test management tool (e.g. Test Director)
10. Study of any open source-testing tool (e.g. Test Link)
11. Take a mini project (e.g. University admission, Placement Portal) and execute it. During the Life cycle of the mini project create the various testing documents\* and final test report document.

\*Note: To create the various testing related documents refer to the text "Effective Software Testing Methodologies by William E. Perry"



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**(58007) MANAGEMENT SCIENCE**

**Unit I**

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Introduction to Management: Entrepreneurship and organization - Nature and Importance of Management, Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Social responsibilities of Management.

**Unit II**

Designing Organisational Structures: Departmentation and Decentralisation, Types of Organisation structures - Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organisation, Cellular Organisation, team structure, boundaryless organization, inverted pyramid structure, lean and flat organization structure and their merits, demerits and suitability.

**Unit III**

Operations Management: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement-Statistical Quality Control:  $\bar{X}$  chart, R chart, c chart, p chart, (simple Problems), Acceptance Sampling, Deming's contribution to quality.

**Unit IV**

- A) Materials Management: Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records - Supply Chain Management
- B) Marketing: Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle., Channels of distribution.

**Unit V**

Human Resources Management (HRM): Evolution of HRM, Concepts of HRM, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

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**Unit VI**

Project Management (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing, (simple problems)

**Unit VII**

Strategic Management: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

**Unit VIII**

Contemporary Management Practices: Basic concepts of Just-In-Time (JIT) System, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levels, Value Chain Analysis, Enterprise Resource Planning (ERP), Performance Management, Business Process outsourcing (BPO), Business Process Re-engineering 5S Model, Deming's PDCA, Kaizen, Poka-Yoke, Muda, Benchmarking, Balanced Score Card.

**TEXTBOOK:**

1. Aryasri: Management Science, TMH, New Delhi, 2009

**REFERENCE BOOKS:**

1. Stoner, Management, Pearson, 2009
2. Kotler Philip & Keller Kevin Lane: Marketing Management PHI, 2009.
3. Koontz, Weihrich, & Aryasri: Principles of Management, TMH, 2009.

4. Thomas N. Duening & John M. Ivancevich Management—Principles and Guidelines, Cengage, 2009.
5. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2009.
6. Memoria & S.V.Ganker, Personnel Management, Himalaya, 2009.
7. Schermerhorn: Management, Wiley, 2009.
8. Parnell: Strategic Management, Biztantra, 2009.
9. L.S.Srinath: PERT/CPM, Affiliated East-West Press, 2009.
10. William J. Stevenson & Ceyhan Ozgur: Introduction to Management Science, TMH, 2007.

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**Pre-requisites: Managerial Economics**

Objective: To familiarize with the process of management and to provide basic insights into select contemporary management practices.

Codes/Tables: Normal Distribution Function Table need to be permitted into the examination Hall.

Question Paper Pattern: 5 Questions to be answered out of 8 questions. The question paper should contain atleast 2 practical problems, one each from units – III & VI

Each question should not have more than 3 bits.

Unit VIII will have only short questions, not essay questions.



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<b>IV Year B.Tech. CSE - II Sem</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
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**(58035) WEB SERVICES  
(ELECTIVE – III)**

[www.jntuworld.com](http://www.jntuworld.com)

**UNIT-I**

Evolution and Emergence of Web Services - Evolution of distributed computing, Core distributed computing technologies – client/server, CORBA, JAVARMI, Micro Soft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA).

**UNIT-II**

Introduction to Web Services – The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

**UNIT-III**

Web Services Architecture – Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication, basic steps of implementing web services, developing web services enabled applications.

**UNIT-IV**

Core fundamentals of SOAP – SOAP Message Structure, SOAP encoding, SOAP message exchange models, SOAP communication and messaging, SOAP security.

**UNIT-V**

Developing Web Services using SOAP – Building SOAP Web Services, developing SOAP Web Services using Java, limitations of SOAP

**UNIT-VI**

Describing Web Services – WSDL – WSDL in the world of Web Services, Web Services life cycle, anatomy of WSDL definition document, WSDL bindings, WSDL Tools, limitations of WSDL.

**UNIT-VII**

Discovering Web Services – Service discovery, role of service discovery in a SOA, service discovery mechanisms, UDDI – UDDI Registries, uses of UDDI Registry, Programming with UDDI, UDDI data structures, support for categorization in UDDI Registries, Publishing API, Publishing information to a UDDI Registry, searching information in a UDDI Registry, deleting information in a UDDI Registry, limitations of UDDI.

**UNIT-VIII**

[www.jntuworld.com](http://www.jntuworld.com)

Web Services Interoperability – Means of ensuring Interoperability, Overview of .NET and J2EE, Web Services Security – XML security framework, XML encryption, XML digital signature, XKMS structure, guidelines for signing XML documents.

**TEXT BOOKS:**

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Srganesh, Wiley India, rp – 2008.
2. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education, 2008.
3. XML, Web Services, and the Data Revolution, F.P.Coyle, Pearson Education.

**REFERENCES:**

1. Building Web Services with Java, 2<sup>nd</sup> Edition, S. Graftam and others, Pearson Edn., 2008.
2. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly, SPD.
3. McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers, 2005.
4. J2EE Web Services, Richard Monson-Haefel, Pearson Education.
5. Web Services, G. Alonso, F. Casati and others, Springer, 2005.

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(58036) SEMANTIC WEB AND SOCIAL NETWORKS  
(ELECTIVE - III)

**Unit I:**

Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of Today's Web, The Next Generation Web

**Unit II:**

Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

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**Unit III:**

Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web - Resource Description Framework (RDF) / RDF Schema, Ontology Web Language (OWL), UML, XML/XML Schema.

**Unit IV:**

Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping.

**Unit V**

Logic, Rule and Inference Engines, Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base

**Unit VI:**

XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods.

**Unit VII:**

What is social Networks analysis, development of the social networks

analysis, Electronic Sources for Network Analysis - Electronic Discussion networks.

**Unit VIII**

Blogs and Online Communities, Web Based Networks, Building Semantic Web Applications with social network features.

**TEXT BOOKS:** [www.jntuworld.com](http://www.jntuworld.com)

1. Thinking on the Web - Berners Lee, Godel and Turing, Wiley interscience, 2008.
2. Social Networks and the Semantic Web, Peter Mika, Springer, 2007.

**REFERENCE BOOKS:**

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J.Davies, Rudi Studer, Paul Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services - Liyang Lu Chapman and Hall/CRC Publishers, (Taylor & Francis Group)
3. Information Sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
4. Programming the Semantic Web, T.Segaran, C.Evans, J.Taylor, O'Reilly, SPD.



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**(58037) SCRIPTING LANGUAGES (ELECTIVE - III)**

**UNIT - I :** Introduction to PERL and Scripting

Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures: arrays, list, hashes, strings, pattern and regular expressions, subroutines.

**UNIT - II :** Advanced perl

Finer points of looping, pack and unpack, filesystem, eval, datastructures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

**UNIT - III :** PHP Basics

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PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Datatypes, Variables, Constants, expressions, string interpolation, control structures - Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

**UNIT - IV :** Advanced PHP Programming

PHP and Web Forms, Files, PHP Authentication and Methodologies - Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World.

**UNIT - V :** TCL

TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.

**UNIT VI - Tk**

Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding, Peri-Tk.

**UNIT - VII :** Python

Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling.

**UNIT - VIII**

Integrated Web Applications in Python - Building Small, Efficient Python Web Systems, Web Application Framework.

**TEXT BOOKS:**

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL, 3<sup>rd</sup> Edition, Jason Gilmore, Apress Publications (Dream tech.).

**REFERENCE BOOKS:**

[www.jntuworld.com](http://www.jntuworld.com)

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J. Lee and B. Ware (Addison Wesley) Pearson Education.
2. Programming Python, M. Lutz, SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1, L. Bayross and S. Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.
6. Guide to Programming with Python, M. Dawson, Cengage Learning.
7. Perl by Example, E. Quigley, Pearson Education.
8. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD.
9. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
10. PHP and MySQL by Example, E. Quigley, Prentice Hall (Pearson).
11. Perl Power, J. P. Flynn, Cengage Learning.
12. PHP Programming solutions, V. Vaswani, TMH.

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**(58038) MULTIMEDIA & RICH INTERNET APPLICATIONS  
(ELECTIVE - III)**

**UNIT-I**

Fundamental concepts in Text and Image: Multimedia and hypermedia, World Wide Web, overview of multimedia software tools, Graphics and image data representation graphics/image data types, file formats, Color in image and video; color science, color models in images, color models in video.

**UNIT-II**

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

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**UNIT III**

Multimedia Data Compression: Lossless compression algorithms, Lossy compression algorithms, Image compression standards.

**UNIT IV**

Basic Video compression techniques, Case study: MPEG Video Coding I, Basic Audio compression techniques, Case study: MPEG Audio compression.

**UNIT - V****Web 2.0**

What is web 2.0, Search, Content Networks, User Generated Content, Blogging, Social Networking, Social Media, Tagging, Social Marking, Rich Internet Applications, Web Services, Mashups, Location Based Services, XML, RSS, Atom, JSON, and VoIP, Web 2.0 Monetization and Business Models, Future of the Web.

**UNIT - VI**

Rich Internet Applications (RIAs) with Adobe Flash : Adobe Flash- Introduction, Flash Movie Development, Learning Flash with Hands-on Examples, Publish your flash movie, Creating special effects with Flash, Creating a website splash screen, action script, web sources.

**UNIT - VII**

Rich Internet Applications (RIAs) with Flex 3- Introduction, Developing with Flex 3, Working with Components, Advanced Component Development.

Visual Effects and Multimedia.

**UNIT-VIII**

Ajax- Enabled Rich Internet Application : Introduction, Traditional Web Applications vs Ajax Applications, Rich Internet Application with Ajax, History of Ajax, Raw Ajax example using XMLHttpRequest object, Using XML, Creating a full scale Ajax Enabled application, Dojo Toolkit.

**TEXT BOOKS:**

1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHI Learning, 2004
2. Professional Adobe Flex 3, Joseph Balderson, Peter Ent, et al, Wrox Publications, Wiley India, 2009.
3. AJAX, Rich Internet Applications, and Web Development for Programmers, Paul J Deitel and Harvey M Deitel, Deitel Developer Series, Pearson Education

[www.jntuworld.com](http://www.jntuworld.com)

**REFERENCES:**

1. Multimedia Communications: Applications, Networks, Protocols and Standards, Fred Halsall, Pearson Education, 2001, rp 2005.
2. Multimedia Making it work, Tay Vaughan, 7<sup>th</sup> edition, TMH, 2008.
3. Introduction to multimedia communications and Applications, Middleware, Networks, K.R.Rao, Zoran, Dragored, Wiley India, 2006, rp. 2009.
4. Multimedia Computing, Communications & Applications, Ralf Steinmetz and Klara Nahrstedt, Pearson Education, 2004
5. Principles of Multimedia, Ranjan Parekh, TMH, 2006.
6. Multimedia in Action, James E. Shuman, Cengage Learning, 198, rp 2008.
7. Multimedia Systems design, Prabhat K. Andleigh, Kiran Thakrar, PHI, 1986.
8. Multimedia and Communications Technology, Steve Heath, Elsevier, 1999, rp 2003.
9. Adobe Flash CS3 Professional, Adobe press, Pearson Education, 2007.
10. Flash CS3 Professional Advanced, Russel Chun, Pearson Education, 2007.
11. Flash CS5, Chris Grover, O'Reilly, SPD, 2010.
12. SAMS Teach yourself Adobe flash CS3, Pearson Education, 2007.
13. Flex 4 Cookbook, Joshua Noble, et al, O'Reilly, SPD 2010.
14. Flex3 - A beginner's guide, Michele E. Davis, Jon A. Phillips, TMH, 2008.
15. Mastering Dojo, R.Gill, C. Riecke and A. Russell, SPD.



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**(58039) ADHOC AND SENSOR NETWORKS  
(ELECTIVE-IV)**

**UNIT I**

Introduction to Ad Hoc Wireless Networks

Characteristics of MANETs, Applications of MANETs, Challenges.

**UNIT II**

Routing in MANETs

Topology-based versus Position-based approaches, Topology based routing protocols, Position based routing, Other Routing Protocols.

**UNIT III**

Data Transmission in MANETs

The Broadcast Storm, Multicasting, Geocasting

TCP over Ad Hoc Networks

TCP Protocol overview, TCP and MANETs, Solutions for TCP over Ad Hoc

**UNIT IV**

Basics of Wireless Sensors and Applications

The Mica Mote, Sensing and Communication Range, Design Issues, Energy consumption, Clustering of Sensors, Applications

**UNIT V**

Data Retrieval in Sensor Networks

Classification of WSNs, MAC layer, Routing layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

**UNIT VI**

Security

Security in Ad hoc Wireless Networks, Key Management, Secure Routing, Cooperation in MANETs, Intrusion Detection Systems.

**UNIT VII**

Sensor Network Platforms and Tools

Sensor Network Hardware, Sensor Network Programming Challenges, Node-Level Software Platforms

[www.jntuworld.com](http://www.jntuworld.com)

**UNIT VIII**

Operating System – TinyOS

Imperative Language: nesC, Dataflow style language: TinyGALS, Node-Level Simulators, ns-2 and its sensor network extension, TOSSIM

**TEXT BOOKS:**

1. Ad Hoc and Sensor Networks – Theory and Applications, Carlos Corderio Dharma P. Aggarwal, World Scientific Publications / Cambridge University Press, March 2006
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science imprint, Morgan Kaufmann Publishers, 2005, rp2009

**REFERENCE BOOKS:**

1. Adhoc Wireless Networks – Architectures and Protocols, C.Siva Ram Murthy, B.S.Murthy, Pearson Education, 2004
2. Wireless Sensor Networks – Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010
3. Wireless Ad hoc Mobile Wireless Networks – Principles, Protocols and Applications, Subir Kumar Sarkar, et al., Auerbach Publications, Taylor & Francis Group, 2008.
4. Ad hoc Networking, Charles E. Perkins, Pearson Education, 2001.
5. Wireless Ad hoc Networking, Shih-Lin Wu, Yu-Chee Tseng, Auerbach Publications, Taylor & Francis Group, 2007
6. Wireless Ad hoc and Sensor Networks – Protocols, Performance and Control, Jagannathan Sarangapani, CRC Press, Taylor & Francis Group, 2007, rp 2010.
7. Security in Ad hoc and Sensor Networks, Raheem Beyali, et al., World Scientific Publications / Cambridge University Press, 2010
8. Ad hoc Wireless Networks – A communication-theoretic perspective, Ozan K. Tonguz, Gialuigi Ferrari, Wiley India, 2006, rp2009.
9. Wireless Sensor Networks – Signal processing and communications perspectives, Ananthram Swami, et al., Wiley India, 2007, rp2009.

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**(58040) STORAGE AREA NETWORKS  
(ELECTIVE - IV)**

**Unit I:**

Review data creation and the amount of data being created and understand the value of data to a business, challenges in data storage and data management, Solutions available for data storage, Core elements of a data center infrastructure, role of each element in supporting business activities

Unit II: [www.jntuworld.com](http://www.jntuworld.com)

Hardware and software components of the host environment, Key protocols and concepts used by each component, Physical and logical components of a connectivity environment, Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications.

**Unit III:**

Concept of RAID and its components, Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Compare and contrast integrated and modular storage systems, High-level architecture and working of an intelligent storage system

**Unit IV:**

Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN, Benefits of the different networked storage options, Understand the need for long-term archiving solutions and describe how CAS fulfills the need, Understand the appropriateness of the different networked storage options for different application environments

**Unit V:**

List reasons for planned/unplanned outages and the impact of downtime,

Impact of downtime, Differentiate between business continuity (BC) and disaster recovery (DR), RTO and RPO, Identify single points of failure in a storage infrastructure and list solutions to mitigate these failures.

**Unit VI:**

Architecture of backup/recovery and the different backup/recovery topologies, replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities

**Unit VII**

Identify key areas to monitor in a data center, Industry standards for data center monitoring and management, Key metrics to monitor for different components in a storage infrastructure, Key management tasks in a data center, Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain

**Unit VIII:**

Virtualization technologies, block-level and file-level virtualization technologies and processes.

**Case Studies** [www.jntuworld.com](http://www.jntuworld.com)

The technologies described in the course are reinforced with EMC examples of actual solutions.

Realistic case studies enable the participant to design the most appropriate solution for given sets of criteria.

**TEXT BOOKS:**

1. EMC Corporation, Information Storage and Management, Wiley.

**REFERENCE BOOKS:**

1. Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, Osborne, 2003.
2. Marc Farley, "Building Storage Networks", Tata McGraw Hill, Osborne, 2001.
3. Meeta Gupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002.



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**(58041) DATA BASE SECURITY  
(ELECTIVE - IV)**

**UNIT I**

Introduction  
Introduction to Databases Security Problems in Databases Security Controls  
Conclusions

**UNIT II**

[www.jntuworld.com](http://www.jntuworld.com)

Security Models -1  
Introduction Access Matrix Model Take-Grant Model Acten Model PN Model Hartson and Hsiao's Model Fernandez's Model Bussolati and Martella's Model for Distributed databases

**UNIT III**

Security Models -2  
Bell and LaPadula's Model Biba's Model Dion's Model Sea View Model Jajodia and Sandhu's Model The Lattice Model for the Flow Control conclusion

**UNIT IV**

Security Mechanisms  
Introduction User Identification/Authentication Memory Protection Resource Protection Control Flow Mechanisms Isolation Security Functionalities in Some Operating Systems Trusted Computer System Evaluation Criteria

**UNIT V**

Security Software Design  
Introduction A Methodological Approach to Security Software Design Secure Operating System Design Secure DBMS Design Security Packages

## Database Security Design

**UNIT VI**

Statistical Database Protection & Intrusion Detection Systems  
Introduction Statistics Concepts and Definitions Types of Attacks Inference Controls evaluation Criteria for Control Comparison Introduction IDES System RETISS System ASES System Discovery

**UNIT VII**

[www.jntuworld.com](http://www.jntuworld.com)

Models For The Protection Of New Generation Database Systems -1  
Introduction A Model for the Protection of Frame Based Systems A Model for the Protection of Object-Oriented Systems SORION Model for the Protection of Object-Oriented Databases

**UNIT VIII**

Models For The Protection Of New Generation Database Systems -2  
A Model for the Protection of New Generation Database Systems: the Orion Model Jajodia and Kogan's Model A Model for the Protection of Active Databases Conclusions

**TEXT BOOKS:**

1. Database Security by Castano Pearson Edition (1/e)
2. Database Security and Auditing: Protecting Data Integrity and Accessibility, 1st Edition, Hassan Afyouni, THOMSON Edition

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**(58042) EMBEDDED SYSTEMS  
(ELECTIVE-IV)**

**Unit - I**

Embedded Computing : Introduction, Complex Systems and Microprocessor, The Embedded System Design Process, Formalisms for System Design, Design Examples. (Chapter 1 from Text Book 1, Wolf).

**Unit - II**

[www.jntuworld.com](http://www.jntuworld.com)

The 8051 Architecture : Introduction, 8051 Micro controller Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts. (Chapter 3 from Text Book 2, Ayala).

**Unit - III**

Basic Assembly Language Programming Concepts : The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051, Data Transfer and Logical Instructions. (Chapters 4,5 and 6 from Text Book 2, Ayala).

**Unit - IV**

Arithmetic Operations, Decimal Arithmetic, Jump and Call Instructions, Further Details on Interrupts. (Chapter 7 and 8 from Text Book 2, Ayala)

**Unit - V**

Applications : Interfacing with Keyboards, Displays, D/A and A/D Conversions, Multiple Interrupts, Serial Data Communication. (Chapter 10 and 11 from Text Book 2, Ayala).

**Unit - VI**

Introduction to Real - Time Operating Systems : Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes

and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment.

(Chapter 6 and 7 from Text Book 3, Simon).

**Unit - VII**

Basic Design Using a Real-Time Operating System : Principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations, Saving Memory and Power, An example RTOS like uC-OS (Open Source); Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded

Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System. (Chapter 8,9,10 & 11 from Text Book 3, Simon).

**Unit - VIII**

Introduction to advanced architectures : ARM and SHARC, Processor and memory organization and Instruction level parallelism; Networked embedded systems; Bus protocols, I2C bus and CAN bus; Internet-Enabled Systems; Design Example-Elevator Controller. (Chapter 8 from Text Book 1, Wolf).

**TEXT BOOKS:**

[www.jntuworld.com](http://www.jntuworld.com)

1. Computers and Components, Wayne Wolf, Elsevier.
2. The 8051 Microcontroller, Kenneth J. Ayala, Thomson.

**REFERENCES:**

1. Embedding system building blocks, Labrosse, via CMP publishers.
2. Embedded Systems, Raj Kamal, TMH.
3. Micro Controllers, Ajay V Deshmukhi, TMH.
4. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley.
5. Microcontrollers, Raj kamal, Pearson Education.
6. An Embedded Software Primer, David E. Simon, Pearson Education.

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(58617) INDUSTRY ORIENTED MINI PROJECT

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(58618) SEMINAR

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(58619) PROJECT WORK

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(58620) COMPREHENSIVE VIVA