2.6.2 Attainment of programme outcomes and course outcomes are evaluated by the institution

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KOMMURI PRATAP REDDY INSTITUTE OF TECHNOLOGY

CO, PO, PSO Attainment Manual

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1. INTRODUCTION

1.1 Definitions as per ABET (*Accreditation Board for Engineering and Technology*)

Program Educational Objectives:

Program Educational Objectives (PEOs) are broad statements that describe the career and professional accomplishments that the program is preparing, graduates to achieve.

Program Outcomes:

Program Outcomes (POs) are narrower statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge and behaviors that students acquire in their matriculation through the program.

Course Objectives:

Course Objectives are broad set of statements of teacher's intention, generally covering the syllabus content i.e. indicating what the teacher intends to teach. Course Objectives are written from the teacher's point of view.

Course Outcomes:

Course Outcomes (COs) are comprehensive set of statements of exactly what the students will be able to do/achieve after the successful learning of course. Outcomes are usually expressed as knowledge, skills or attitudes.

NOTE:*Course Objectives and Course Outcomes are to be framed by each teacher, at the beginning of the course.*

1.2Bloom Taxonomy

Bloom Taxonomy is used for writing the Learning/Course Outcomes. Bloom proposed that teachers should design lessons, tasks, modules, courses and programmes to help students to achieve the stated Course Outcomes. Bloom's cognitive domain is composed of 6 successive levels arranged in a hierarchy as

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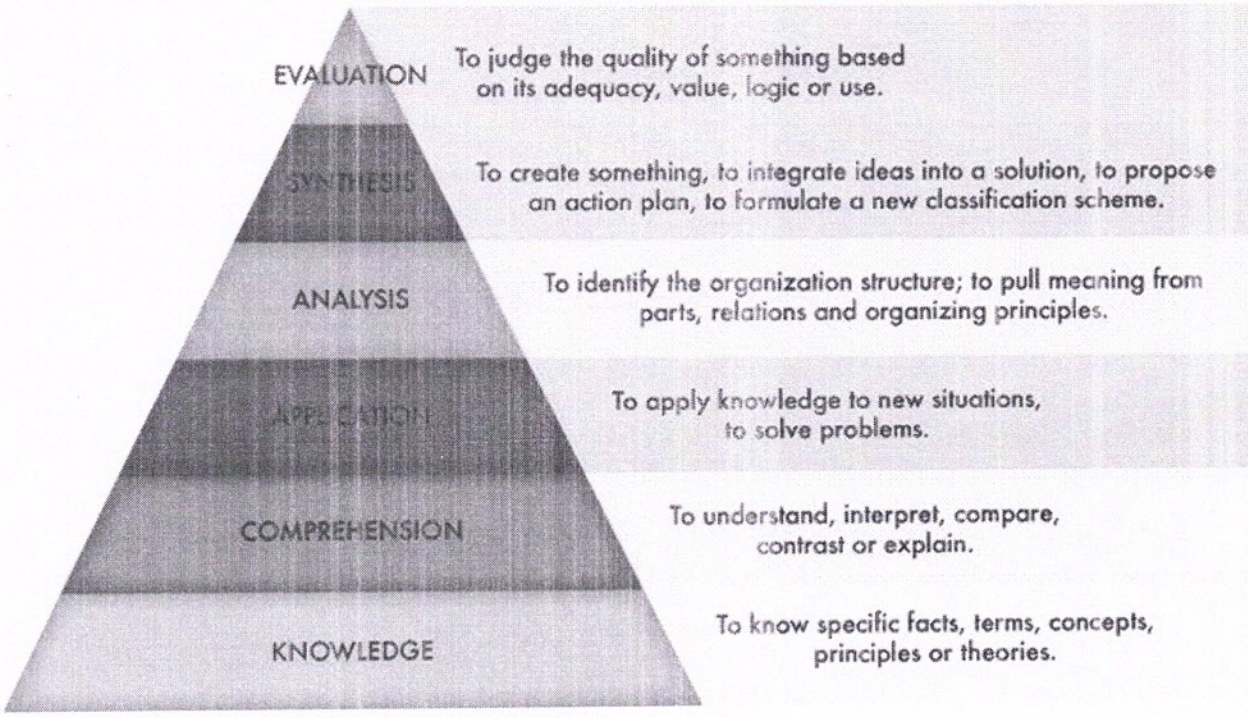
BLOOM'S TAXONOMY



Since learning outcomes are concerned with what the students can do at the end of the learning activity, use 'active' verbs along with the domain learning, for writing the 'Outcomes'. Active verbs and their usage in course outcomes are listed in the table below.

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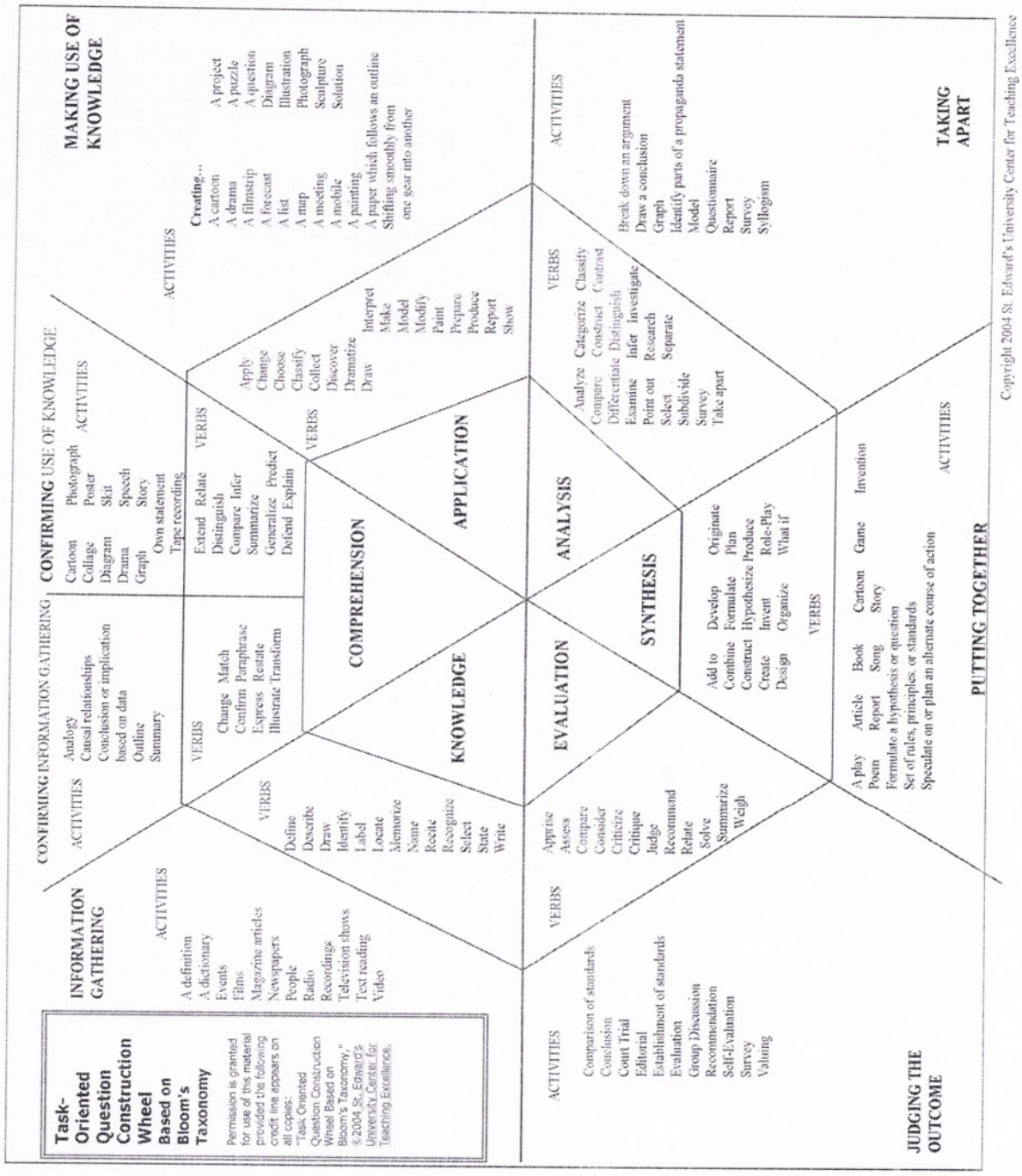

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2. VISION, MISSION, PEOs, POs AND PSOs

2.1. Institute Vision & Mission

Vision of the Institution:

To emerge as a premier institute for high quality professional graduates who can contribute to economic and social developments of the Nation.

Mission of the Institution:

Mission	Statement
M1	To have holistic approach in curriculum and pedagogy through industry interface to meet the needs of Global Competency.
M2	To develop students with knowledge, attitude, employability skills, entrepreneurship, research potential and professionally ethical citizens.
M3	To contribute to advancement of Engineering & Technology that would help to satisfy the societal needs.
M4	To preserve, promote cultural heritage, humanistic values and spiritual values thus helping in peace and harmony in the society.

2.2. Department Vision & Mission

Vision of the Department:

To impart quality technical education in Electronics and Communication with accent on creativity, innovation and research thereby producing competent engineers who can meet global challenges with societal commitment.

Mission of the Department:

Mission	Statement
M1	To impart quality education to students in Basic Sciences, Mathematics, Electronics and Communication Engineering through innovative teaching-learning processes.
M2	To facilitate students to define, design, and solve engineering problems in the field of Electronics and Communications Engineering using various Electronic Design Automation (EDA) tools.

M3	To encourage research culture among faculty and students thereby facilitating them to be creative and innovative through constant interaction with R & D organizations and Industry.
M4	To inculcate teamwork, imbibe leadership qualities, professional ethics and social responsibilities in students and faculty.

2.3. Program Educational Objectives (PEOs)

PEO's	Statement
PEO1	Graduates with fundamental and advanced knowledge in Sciences, Mathematics and in Engineering Subjects of Electronics, Communication and allied Engineering to become globally competent with a flair for lifelong learning.
PEO2	Graduates capable in design, develop creative and innovative technologies in the field of Electronics and Communication Engineering, enabling them to work in multi-disciplinary teams to meet the societal needs.
PEO3	Graduates with professional values, ethics, positive attitude, communication skills, latest technological awareness to ensure sustainable development and to succeed in their chosen profession.

2.4 Program Outcomes (POs)

Engineering Graduates will be able to:

1. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

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4. Conduct investigations of complex problems: Use research-based knowledge and researchmethods including design of experiments, analysis and interpretation of data, and synthesis of theinformation to provide valid conclusions.

5. Modern Tool usage: Create, select, and apply appropriate techniques, resources, and modernengineering and IT tools including prediction and modeling to complex engineering activities with anunderstanding of the limitations.

6. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to theprofessional engineering practice.

7.Environment and Sustainability: Understand the impact of the professional engineering solutionsin societal and environmental contexts, and demonstrate the knowledge of, and need forsustainable development.

8.Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms ofthe engineering practice.

9.Individual and Team work: Function effectively as an individual, and as a member or leader indiverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineeringcommunity and with society at large, such as, being able to comprehend and write effective reportsand design documentation, make effective presentations, and give and receive clear instructions.

11. Project Management and Finance: Demonstrate knowledge and understanding of theengineering and management principles and apply these to one's own work, as a member andleader in a team, to manage projects and in multidisciplinary environments.

12. Life-long Learning: Recognize the need for, and have the preparation and ability to engage inindependent and life-long learning in the broadest context of technological change.

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3. COURSE OUTCOMES

3.1. Introduction:

Course Outcomes are statements that describe significant and essential learning that learners have achieved, and can reliably demonstrate at the end of a course. In other words, Course outcomes identify what the Student will know and be able to do by the end of a course.

A Course outcome makes clear the intended result of the learning rather than what form the instruction will take. A good course outcome states what a student will know or be able to do at the end of instruction. It focuses on student performance. Other synonyms are learning outcome or Course learning outcome.

The advantages of learning outcomes:

Benefits for the course and module designer

In terms of course and module design, the use of explicit course outcome statements can help ensure consistency of delivery across modules or programs. They can aid curriculum design by clarifying areas of overlap between existing modules, program and qualifications.

Benefits for quality assurance and standards

Quality assurance benefits from the adoption of learning outcomes via the resulting increase in transparency and better comparability of standards between and within qualifications.

Benefits for learners and employers

Learners benefit from a comprehensive set of statements of exactly what they will be able to achieve after successful study. Learning outcomes provide learners with clear information that can help them with their choice of module/unit/program/qualification to study and can lead to more effective learning.

Benefits for national and international educational transparency

Internationally, learning outcomes contribute to the mobility of students by facilitating the recognition of their qualifications and improving the transparency of qualifications and thus simplifying credit transfer.

3.2. Guidelines for writing learning outcomes:

When writing learning outcomes it may be helpful to keep the following guidelines in mind:

- Write in the future tense – preceded with "On successful completion of this module, students will be able to:"

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- Write in short clear sentences.
- Course outcomes should be as many outcomes as needed to clearly reflect what students will be able to do at the course end. Typically, an undergraduate course may have 4-6 overarching, student-centered learning outcomes.
- Use language to be understood by students, faculty and external examiners – therefore avoid jargon and abbreviations and free of ambiguous words or phrases.
- Use Bloom Taxonomy to write good course outcomes (level of student learning)
- COs should be SMART-Specific, Measurable, Attainable, Reliable, Time bound. This is made easier if COs were written with the students ability to demonstrate upon completion of the module and the assessment criteria in mind.
- Identify the most important learning requirements — each module should contain between 4 to 6 learning outcomes, and don't' try to put too much into a single learning outcome.
- Don't try to be either too broad or specific in the learning outcomes — divide your module into topics or themes you would like the students to demonstrate and write your learning outcomes around those.
- Ensure that the course outcomes written for a course should cover entire University Syllabus at minimum.

3.3. Identifying of levels of learning:

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higher forms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts (rote learning).

Bloom identified six levels within the cognitive domain, from the simple recall or recognition of facts, as the lowest level, through increasingly more complex and abstract mental levels, to the highest order, which is classified as evaluation. Descriptions of the six levels as well as verb examples that represent intellectual activity are listed here.

Bloom's Level	Related Action Verbs
Knowledge (to know specific facts,	define, identify, indicate, know, label, list,

terms,concepts, principles, or theories)	name,recall, select
Comprehension (to understand, interpret, compare and contrast, explain)	classify, compare, contrast, describe, discuss, explain,locate, paraphrase, report, review, summarize
Application (to apply knowledge to new situations, to solve problems)	apply, compute, construct, demonstrate, dramatize,give examples, investigate, predict, use
Analysis (to identify the organizational structureof something; to identify parts, relationships,and organizing principles)	analyze, appraise, categorize, determine, diagram,differentiate, experiment, question, relate, solve, test
Synthesis (to create something, to integrate ideas into a solution, to propose an action plan, to formulate a new classification scheme)	arrange, assemble, collect, compose, construct, create,design, formulate, manage, organize, perform, plan,prepare, produce, propose
Evaluation (to judge the quality of something based on its adequacy, value, logic, or use)	appraise, assess, choose, decide,

3.4. Course Outcome Statements (2018-19):

II B.Tech I SEM

Code	Name of the Subject
C211	Mathematics-IV
C212	Analog Electronics
C213	Electrical Technology
C214	Signals and Stochastic Process
C215	Network Analysis
C216	Electronic Devices & Circuits Lab
C217	Basic Simulation Lab
C218	Basic Electrical Engineering Lab

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CO	Description
C211.1	Determine whether a given function is differentiable, and if so find its derivative and Verify analyticity of functions.
C211.2	Find parameterizations of curves, and compute complex line integrals directly and calculate Taylor or Laurent series for functions.
C211.3	Use Cauchy's integral theorem and formula to compute line integrals
C211.4	Find the Fourier series representation of a function of one variable.
C211.5	Express any periodic function in term of sines and cosines and to express a non-periodic function as integral representation.
C211.6	Find the solution of the wave, diffusion and Laplace equations using the Fourier series.
C212.1	Designandanalyse thesmallsignalamplifiercircuitsapplyingthebiasing techniques. (Synthesis & Analysis)
C212.2	Combine thedifferentamplifierconfigurationstoobtaintherequiredoverall Specifications likeGain,Bandwidth,Inputand Output interfacing Impedances. (Synthesis)
C212.3	Analysethedifferentclassesof FETs, PowerAmplifiersandtunedamplifiers. (Analysis)
C212.4	GeneralizetheConceptsofnegativefeedbacktoimprovethestabilityof Amplifiersand positivefeedbacktogenerate sustainedoscillations. (Comprehension)
C212.5	Design circuits like amplifiers, oscillators using the transistors diodes and oscillators. (Synthesis)
C212.6	Design and analyse Tuned amplifiers circuit and its performance parameters (Synthesis & Analysis)
C213.1	Describe the fundamental principles of electrical machines. (Knowledge)
C213.2	Evaluate of DC/AC generators and motors performances in various applications. (Evaluation)

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C213.3	Apply ohms law & Kirchhoff's laws to AC and DC motors. (Application)
C213.4	Solve Transformer EMFs, Losses, Efficiency and regulation. (Evaluation)
C213.5	Summarize the different applications of commonly used electric machinery using their electrical and mechanical characteristics. (Comprehension)
C213.6	Describe the concept of three phase system and basic fundamental working principles of MI and MC type measuring instruments. (Knowledge)
C214.1	Explain about Vectors and signals, orthogonal functions and signal transmission in linear systems (Knowledge)
C214.2	Describe and analyse signals using Fourier series, transforms and sampling theorem (Knowledge)
C214.3	Evaluate Laplace transforms and Z-transforms (Comprehension)
C214.4	Analyse temporal characteristics of random process. (Analysis)
C214.5	Describe power spectrum properties (Evaluation)
C214.6	Describe Autocorrelation and Cross-correlation function (Knowledge)
C215.1	Apply knowledge of mathematics to solve numerical based on network simplification and it will be used to analyze the same. (Analysis)
C215.2	Recognize the features of AC & DC steady state analysis of simple circuits using time domain equations and Laplace transforms to analyze the transient analysis of RL, RC & RLC series circuits. (Knowledge)
C215.3	Ability to Design given Electrical Circuit in terms of ABCD, Z,Y and h & g Parameters and Solve the circuits. (Synthesis)
C215.4	Understand the basic concepts of control system, poles, zero and analyze system stability on that basis. (Analysis)
C215	Understand the features of two port network and to obtain their equivalent circuits.

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.5	(Application)
C215 .6	Design low pass, high pass, band pass and band elimination filter networks. (Synthesis)
C216 .1	Analyse the characteristics of various types of Diodes [Analysis]
C216 .2	Analyse the Rectifiers without and with Filters. [Analysis]
C216 .3	Compare the input and output characteristics of BJT and UJT in different configurations. [Evaluation]
C216 .4	Draw the characteristic curve for FET. [Knowledge]
C216 .5	Design a frequency response curve for BJT and FET. [Synthesis]
C216 .6	Develop the biasing circuit for Transistor and study of its characteristics. [Synthesis]
C217 .1	Analyze the generation Various Signals and Sequences in MATLAB, including the operations on Signals and Sequences and matrices. [Analysis]
C217 .2	Evaluate Sampling Theorem, Linearity and Time Invariance Properties of a given Signals/ Systems. [Evaluation]
C217 .3	Analyze the Fourier Transform of a given signal and plotting its magnitude and phase spectrum and also plot Pole-Zero Maps in Z-Plane. [Analysis]
C217 .4	Analyze and implement the convolution and correlation on signals. [Analysis]
C217 .5	Analyze temporal characteristics of random process. [Analysis]
C217 .6	Solve the noise removal on periodic signal. [Evaluation]
C218 .1	Analyse a given network by applying various electrical laws and network theorems. [Analysis]
C218	Design the response of different types of electrical circuits to different excitations.

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.2	[Synthesis]
C218 .3	Solve the measurement, calculation and relation between the basic electrical parameters. [Evaluation]
C218 .4	Describe the basic characteristics of transformers and electrical machine. [Knowledge]
C218 .5	Analyze the performance characteristics of AC electrical machines. [Analysis]
C218 .6	Analyse the performance characteristics of DC electrical machines. [Analysis]

II B.Tech II SEM

Code	Name of the Subject
C221	Switching Theory and Logic Design
C222	Pulse and Digital Circuits
C223	Control Systems
C224	Analog Communications
C225	Business Economics and Financial Analysis
C226	Analog Communications Lab
C227	Pulse and Digital Circuits Lab
C228	Analog Electronics Lab
C229	Gender Sensitization

CO	Description
C221.1	Manipulate the numericinformationindifferentforms and solve the simpleBoolean expressionsusing thetheoremsandpostulates of Booleanalgebra [Comprehension]
C221.2	Solve the Boolean Expressions using mapping method Evaluation]
C221.3	Designandanalyse Combinational circuits [Synthesis & Analysis]
C221.4	Designandanalyse sequentialcircuits and its applications. [Synthesis & Analysis]
C221.5	Develop StandardsequentialFunctions/buildingblockstobuildcomplexcircuits.

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	[Synthesis]
C221.6	Design and analyse the Moore, Mealy State models &FSM Charts. [Synthesis]
C222.1	Understand the applications of diode as integrator, differentiator, clippers and clamper circuits.
C222.2	Learn various switching devices such as diodes, transistors, SCR etc.
C222.3	Design multivibrators for various applications and synchronization techniques.
C222.4	Study general features of time base signal and methods of generating time base waveforms.
C222.5	Study principles of sampling gates and reduction in pedestal in gating circuits.
C222.6	Realization of basic logic gates using diodes and transistors. Also study of different logic families.
C223.1	Formulate transfer functions for given control system problems and improves the system Performance by selecting a suitable controller and/or a Compensator for a Specific application.
C223.2	Analyze the system response and stability in time domain specifications
C223.3	Analyze the system response and stability in Frequency domain specifications
C223.4	Apply various control strategies to different applications (example: Power systems, Electrical drives etc…) & To design Lead, Lag, and Lead-Lag systems in control systems (application (Application & Synthesis)
C223.5	Analyze the system response and stability of systems represented in state space form and to design Compensators for systems modeled in state space form.
C223.6	Analyze the system at the verge of stability by using frequency domain as well as time domain
C224.1	Explain the Amplitude modulation and demodulation of analog signals (knowledge)
C224.2	Evaluates DSB-SC and SSB and VSB modulation and Demodulation methods (evaluation)
C224.3	Describe the characteristics of noise present in analog systems. (Knowledge)
C224.4	Analyze Signal to Noise ratio of AM, DSB, SSB and FM modulation systems (Analysis)

C224.5	Enumerate the characteristics of Receivers (Application)
C224.6	Analyze and design Pulse Modulation Systems (design)
C225.1	Determine the objectives and able to know the nature and scope of Business Economics. (Comprehension)
C225.2	Predict the demand of products and services by using different methods. (Knowledge)
C225.3	Gain knowledge on price and market structure, behavior of consumer and producer under competitive market situations. . (Knowledge)
C225.4	Examine Optimum Production, economies of scale, production, production functions, and optimum size of the firm, cost, cost behavior and Break Even Point. (Evaluation)
C225.5	Discuss the process & principles of accounting and prepare Journal, Ledger, Trial Balance, Manufacturing A/c, Trading A/c., Profit & Loss A/c. and Balance Sheet of an enterprise. (Application)
C225.6	Analyze, interpret & comment on the financial statements of a business enterprise by using liquidity leverage, coverage and turnover & profitability ratios. (Analysis)
C226.1	Apply the modulation techniques and Evaluate the analog Communication Systems-Amplitude and Frequency Modulation and Demodulation in both Time and Frequency domain. (Application) (Evaluation)
C226.2	Study of frequency modulation & demodulation, spectrum analyzer and receiver techniques (knowledge)(application)
C226.3	Describe the characteristics of pre-Emphasis and de-Emphasis techniques and signal strengthening techniques in analog systems. (Knowledge)
C226.4	Apply different multiplexing techniques like TDMA & FDMA (Application)
C226.5	Design and Develop different pulse modulation and demodulation techniques and signal multiplexing for various applications. (Synthesis)
C226.6	Design different types of circuits using matlab. (Design)
C227.1	Apply diode as integrator, differentiator, clippers and clamper circuits. (Application)
C227.2	Describe various switching devices such as diodes, transistors, Comparators etc. (Knowledge)

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C227.3	Design of Multivibrators for various applications and synchronization techniques. (Synthesis)
C227.4	Summarize general features of time base signal and methods of generating time base waveforms. (Comprehension)
C227.5	Analyze the output-voltage wave form of Boot strap and Miller sweep circuits. (Analysis)
C227.6	Prepare basic logic gates using diodes and transistors. Also study of different logic families. (Application)
C228.1	Design and analyze the small signal amplifier circuits applying the biasing techniques. [Synthesis & Analysis]
C228.2	Combine the different amplifier configurations to obtain the required overall specifications like Gain, Bandwidth, Input and Output interfacing Impedances. [Synthesis]
C228.3	Analyze the different classes of FETs, Power Amplifiers. [Analysis]
C228.4	Generalize the Concepts of negative feedback to improve the stability of Amplifiers and positive feedback to generate sustained oscillations. [Comprehension]
C228.5	Design circuits like large signal power amplifiers using transistor and diodes [Synthesis]
C228.6	Design and analyze the Oscillator circuits. [Synthesis] [Analysis]
C229.1	Understanding of important issues related to gender in contemporary India. (Knowledge)
C229.2	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. (Distinguish)
C229.3	Attain a finer grasp of how gender discrimination works in our society and how to counter it. (Analysis)
C229.4	Acquire insight into the gendered division of labour and its relation to politics and economics. (Comprehension)
C229.5	Providing accounts of studies and movements as well as the new laws that provide protection and relief to women (Synthesis)

C229.6	Explaining about relationships of Mothers and Fathers and recall about Marrykom and Onler life stories (Evaluation)

III B.Tech I SEM

Code	Name of the Subject
C311	Electromagnetic Theory and Transmission Lines
C312	Linear & Digital IC Applications
C313	Digital Communications
C314	Fundamentals of Management
C315	Operating Systems
C316	Linear IC Applications Lab
C317	Digital IC Applications Lab
C318	Digital Communications Lab
C319	Professional Ethics

CO	Description
C311.1	Determine the relationship between Time varying electric and magnetic filed and electromotive force. (Knowledge)
C311.2	Determine Maxwell's equations and their applications in electromagnetic problems. (Knowledge)
C311.3	Analyse the basic transmission lines in Phasor domain,Biot - Savart's Law, Maxwell's Equations, Faraday's Law and Transformer EMF. (Analysis)
C311.4	Demonstrate the reflection and Refraction of waves at boundaries, **EM Wave Characteristics – I & II,** Poynting Vector and Poynting Theorem Applications, (Comprehension)
C311.5	Apply Maxwell's Equation to describe how to propagate the electromagnetic waves in vacuum, Condition for Distortion less and Minimum Attenuation. (Application)
C311.6	AnalyzeSingle and Double Stub Matching, Impedance Transformations, Significance of Z_{min} and Z_{max} and relevant problems. (Analysis and Application)

C312.1	Explain about the op-amp characteristics and different modes of operation. (Knowledge)
C312.2	Analyze the functionality of various circuits designed using op-amp. (Analysis)
C312.3	Describe the operation of Analog and Digital Convertors circuits using Op amp's. (Comprehension)
C312.4	Design and analyze various logic families and their applications (Analysis)
C312.5	Summarize the characteristics of various Sequential Logic IC's (Evaluation)
C312.6	Discuss about the memories and architectures. (Synthesis)
C313.1	Define Sampling theorem, pulse code modulation and explain the various aspects of sampling theorem. (Knowledge, Comprehension)
C313.2	Apply different digital modulation schemes, and compare advantages/ disadvantages of each (Application)
C313.3	Define baseband transmission and analyze the error performance of various digital modulation techniques and understand the concepts. (Knowledge, Analysis)
C313.4	Construct various error detecting and error correcting codes (Synthesis)
C313.5	Solve error rate in coded and uncoded transmission. (Evaluation)
C313.6	Explain spread spectrum and pseudo noise sequence. (Comprehension)
C314.1	Describe scope, role and functions of a manager and significance of Management.
C314.2	Implement basic 14 principles of Management.
C314.3	Identify the importance of Planning applying Planning as an effective decision making tool.
C314.4	Discuss the Principles of Organization and to study HRM by Recruitment, Selection, and Training & Development.
C314.5	Support confidence to tackle employee's grievances & customer complaints and know the individual process in organization, to plan, develop & monitor performance appraisal.
C314.6	Create various statements related to the financial position of an organization.
C315.1	Apply optimization techniques for the improvement of OS performance and Memory management (Application)

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C315.2	Identify to design and solve synchronization problems (knowledge)
C315.3	Illustrate about minimization of turnaround time rating time, response time and also minimization of throughput by keeping CPU as busy as possible. (Comprehension)
C315.4	Identify the access controls to protect files (knowledge)
C315.5	Distinguish between different operating systems (Comprehension).
C315.6	Identify the design of deadlock in process (knowledge)
C316.1	Hypothesize the op-amp characteristics and different modes of operation. (Synthesis)
C316.2	Analyze the functionality of various circuits designed using op-amp. (Analysis)
C316.3	Solve and apply the operation of Analog and Digital Convertors circuits using Opamp's. (Application)
C316.4	Design and analyze various logic families and their applications (Analysis)(Synthesis)
C316.5	Apply the characteristics of various Sequential Logic IC's (Application)
C316.6	Analyze and design nonlinear applications like multiplier, comparator and etc. using Op-Amp (Analysis)(Synthesis)
C317.1	Design various combinational circuits like Encoder/Decoder, Mux/Demux, and Adder/Subtractor. (Synthesis)
C317.2	Design various Sequential circuits like Counters in synchronous and Asynchronous modes. (Synthesis)
C317.3	Develop various circuits by using NAND/NOR Gates. (Synthesis)
C317.4	Describe various conversions by using binary digits. (Knowledge)
C317.5	Create various binary sequences randomly. (Synthesis)
C317.6	Draw characteristics by using different IC's. (Knowledge)
C318.1	Define Sampling theorem, pulse code modulation and explain the various aspects of sampling theorem. (Knowledge, Comprehension)
C318.2	Apply different digital modulation schemes like Delta, Adaptive Delta Modulation , and compare advantages/ disadvantages of each (Application)
C318.3	Define baseband transmission and analyze the error performance of various digital

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	modulation techniques and understand the concepts TDM and FDM. (Knowledge, Analysis)
C318.4	Design ASK,FSK,PSK keying Techniques Construct various error detecting and error correcting codes (Synthesis)
C318.5	Solve Error rate in coded and uncoded transmission and generation OFDM. (Evaluation)
C318.6	Explain spread spectrum and pseudo noise sequence. (Comprehension)
C319.1	Engage in informed critical reflection on the nature of professionalism and ethical challenges inherent in professionalism.(Comprehension)
C319.2	Get Knowledge of prominent normative ethics frameworks – consequentialist, deontological, virtue, and contractualism. (Knowledge)
C319.3	Bring to bear ethical analysis and reasoning in the light of normative ethics frameworks on a selection of ethical challenges and dilemmas across the chosen range of professions. (Evaluation)
C319.4	Awareness of types of ethical challenges and dilemmas confronting members of a range of professions (business, media, police, law, medicine, research). (Analysis)
C319.5	Research appropriate material in relation to set questions in writing essays meeting the highest standards of rigor and clarity. (Application)
C319.6	Relate ethical concepts and materials to ethical problems in specific professions and professionalism. (synthesis)

III B.Tech II SEM

Code	Name of the Subject
C321	Intellectual Property Rights
C322	Computer Organization & Operating Systems
C323	Antenna & Wave Propagation
C324	Microprocessor & Microcontrollers
C325	Digital Signal Processing
C326	Digital Signal Processing Lab
C327	Microprocessor & Microcontrollers Lab

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C328	Advanced English Communication Skills Lab

CO	Description
C321.1	Acquire basic knowledge about four types of intellectual property right and different international organizations
C321.2	Get knowledge on trademarks and can apply in trademark registration
C321.3	Get knowledge on copyrights and can apply ownership rights
C321.4	Evaluate different types of patents and can apply in ownership rights and transfer
C321.5	Examine false advertising in the market and trade secret protection
C321.6	Anticipate critical analysis arguments relating to the new development in intellectual property rights
C322.1	Describe organization of digital computers and explain the basic principles and operations of different components. [Knowledge]
C22.2	Compare various data representations and understand how arithmetic and logical operations are performed by computers. [Analysis]
C322.3	Illustrate the hierarchical memory system including cache memories and virtual memory. [Comprehension]
C322.4	Demonstrate Different ways of Communicating with I/O Devices and standard I/ O interfaces. [Application]
C322.5	List the objectives and functions of modern operating systems. [Knowledge]
C322.6	Analyze different File System Structures [Analysis]
C323.1	Explain the mechanism of radiation; distinguish between characteristics and parameters of different antennas.
C323.2	Distinguish between Short dipoles, half wave dipoles, quarter wave monopole and smart loops. Also derive their radiation patterns.
C323.3	Characterize the antenna based on frequency and geometry. Establish the radiation pattern of folded dipole, Yagi-Uda antenna, helical antenna and horn antenna.
C323.4	Analyzemicrostrip patch antenna and parabolic reflector antenna. Design and find radiation pattern of them. Study of microwave measurement setup.

C323.5	Estimate the array factor and characteristics. Sketch the pattern for two element array, N element BSA, EFA, modified EFA and binomial arrays.
C323.6	Classify different wave propagation, identify their frequency ranges and determine characteristic features of them.
C324.1	Describe the internal architecture and Organization of 8086 and develop Assembly language programs using 8086 instruction set [Knowledge]
C324.2	Explain the internal architecture of 8051 and develop programs using 8051 instruction set [Analysis]
C324.3	Evaluate the interfacing techniques to 8051 and can develop assembly language programming to design micro controller based systems [Application]
C324.4	Describe serial communication interfaces such as SPI,I2C,RS-232 and USB (knowledge)
C324.5	Analyze the architecture of AVR family microcontroller [Analysis]
C324.6	Analyze the Architecture of Cortex processors and OMAP processors [Application]
C325.1	Express time, frequency, and z-transform analysis on signals and systems. [Comprehension]
C325.2	Identify the fast computation of DFT and appreciate the FFT processing. [Knowledge]
C325.3	Summarize the significance of various filter structures and their advantages. [Evaluation]
C325.4	Design IIR digital filters using Step & Impulse Invariant Method & Bilinear Transformation Method. [Synthesis]
C325.5	Design FIR digital filter for a given specifications. [Synthesis]
C325.6	Differentiate the tradeoffs between normal and multi rate DSP techniques and finite length word effects. [Analysis]
C326.1	Develop the generation of digital signals using MATLAB. (Synthesis)
C326.2	Apply different operations on signals using MATLAB. (Application)on trademarks and can apply in trademark registration
C326.3	Design the computation of DFT and FFT processing. (Synthesis)
C326.4	Analyze various signals in transform domain (Analysis)

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C326.5	Design IIR, and FIR filters for band pass, band stop, low pass and high pass filters [Synthesis]
C326.6	Apply multirate signal processing on signals.(Application)
C327.1	Apply the fundamentals of assembly level programming of microprocessors(knowledge)
C327.2	Develop programs using instruction set of 8086.(Application)
C327.3	Build and simulate programs using instruction set of 8051.(Comprehension)
C327.4	Contrast how different I/O devices can be interfaced to processor and explore several techniques of interfacing.(Analysis)
C327.5	Experiment with standard microprocessor interfaces including GPIO, serial ports, digital-to-analog converters and analog-to-digital converters(Application)
C327.6	Make use of standard test and measurement equipment to evaluate digital interfaces.(Application)
C328.1	Apply one-word substitutes, idioms and phrases for effective communication.
C328.2	Apply right body language for role plays/conversations
C328.3	Comprehend the given passage/text for effective communication.
C328.4	Examine the format of report writing, letter writing, resume writing and e-correspondence.
C328.5	Develop interest in making presentations through posters/projects/reports
C328.6	Assess speaking abilities especially in group discussions and interviews.

IV B.Tech I SEM

Code	
C411	Management Science
C412	Microwave Engineering
C413	Computer Networks
C414	Cellular Mobile Communications
C415	Object Oriented Programming Through Java
C416	Embedded System Design

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C417	Advanced English Communication Skills Lab
C418	Microwave & Digital Communications Lab

CO	Description
C411.1	Describe the concept of management, administration, organization, objectives, nature, scope, role, responsibilities & approaches of a management.
C411.2	Formulate Materials/Purchases/Stores/Inventory Management
C411.3	Carry out Production & Operations through Work study, Method study & Work Measurement.
C411.4	Interpret HRM/PMIR principles using recruitment, Selection, training & development as tools.
C411.5	Apply the concept of PERT / CPM in project planning & monitoring Case Study.
C411.6	Formulate strategies for management using SWOT, CPP Techniques
C412.1	Understand the significance of microwave, microstrip lines, cavity resonators, waveguide components and applications. (Knowledge & Comprehension)
C412.2	Analyze the characteristics of microwave tubes like klystron, magnetron, travelling wave tube, etc., and compare them. (Evaluation &*Analysis)*
C412.3	Compare and explain various microwave tubes, Helix TTS and Reflex Klystrons. (Evaluation*)*
C412.4	UnderstandBasic Modes of Operation – Gunn Oscillation Modes, LSA Mode, and Introduction to Avalanche Transit Time Devices. (Knowledge)
C412.5	Evaluate Measurement of Attenuation, Frequency, Standing wave Measurements. (Evaluation*)*
C412.6	Evaluate Measurement of Low and High VSWR, Cavity Q and Impedance Measurements. (Evaluation)
C413.1	Identify the use of layered approach on different networks (knowledge)
C413.2	Apply different techniques to gain knowledge about media (Application)
C413.3	Evaluate various multiple access protocols. (Evaluation)
C413.4	Illustrate different routing algorithms. (comprehension)

C413.5	Apply various connection oriented and connection less services in TCP. (Application)
C413.6	Examine TELNET, DNS, FTP, HTTP and several network services. (Analysis)
C414.1	Hypothesize the limitations of conventional Mobile Telephone Systems and understand the basic cellular mobile system. (Synthesis)
C414.2	Understand cell coverage for signal and traffic, diversity techniques and mobile antennas. (Analysis)
C414.3	Identify the Signal reflections in flat and hilly terrain, effect of human made structures, Phase difference between direct and reflected path. (Knowledge)
C414.4	Summarize the concept of frequency management, Channel assignment strategies Channel sharing and borrowing, Sectorization, Channel assignments to cell sites in mobile communications. (Evaluation)
C414.5	Analyze the procedure of handoff initiation and its types like delaying handoff, Advantages of handoff, Power difference handoff. (Analysis)
C414.6	Illustrate Uniqueness of mobile radio environment- fading- Factors Time dispersion parameters, Coherence bandwidth, Doppler spread and coherence time. (Comprehension)
C415.1	Identify the behaviour of programs involving the basic programming constructs like Data types, Control structures, Arrays, Variables, String handling and Garbage collection. (Knowledge)
C415.2	Explain the concepts of classes, objects, methods, constructors, overloading and overriding along with the access control. (Comprehension)
C415.3	Use the data abstraction, inheritance, polymorphism, encapsulation principles in structuring java applications. (Application)
C415.4	Develop java programs using multi-threading and files. (Synthesis)
C415.5	Develop Java programs using Collections and database concepts with necessary exception handling mechanisms to avoid abnormal termination of programs. (Synthesis)
C415.6	Develop graphical user interface applications using AWT, Swings and Applets. (Synthesis)

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C416.1	Discover the Major Application Area of Embedded systems and definition of embedded systems (Applications, Knowledge)
C416.2	Compare Embedded system vs. General computing System and define memory according to the type of interface (comprehension, Knowledge)
C416.3	Classify and Find out the difference between embedded system and RTOS and define the Real time clock(Analysis, Knowledge)
C416.4	Identify the different Memories and Memory Selection for Embedded systems and applications of RTOS (Knowledge, Applications)
C416.5	Design Embedded Firm ware Designapproaches and Development languages and Explain the shared memory (Synthesis, Knowledge)
C416.6	Explain various Task communication and message passing techniques, different types of sockets and Remote. (Distinguish)
C417.1	Apply one-word substitutes, idioms and phrases for effective communication.
C417.2	Apply right body language for role plays/conversations.
C417.3	Comprehend the given passage/text for effective communication.
C417.4	Examine the format of report writing, letter writing, resume writing and e-correspondence.
C417.5	Develop interest in making presentations through posters/projects/reports.
C417.6	Assess speaking abilities especially in group discussions and interviews.
C418.1	Understand the significance of microwave, micro strip lines, cavity resonators with frequency measurement waveguide components and applications. (Knowledge & Comprehension) electromagnetic problems. (Knowledge)
C418.2	Analyze the characteristics of microwave tubes like klystron, magnetron, travelling wave tube, directional coupler etc., and compare them. (Evaluation & Analysis)
C418.3	Compare and explain various microwave tubes, Helix TTS and Reflex Klystrons, Gunn diode,VSWR.(Evaluation)
C418.4	Define Sampling theorem, pulse code modulation, delta modulation and explain the various aspects of sampling theorem. (Knowledge, Comprehension)
C418.5	Apply different digital modulation schemes, like TDM, and compare advantages/

	disadvantages of each (Application)
C418.6	Define baseband transmission and analyze the error performance of various digital modulation techniques like FSK, BPSK, PSK and understand the concepts. (Knowledge, Analysis)

IV B.Tech II SEM

Code	Name of the Subject
C421	Satellite Communications
C422	Radar Systems
C423	Wireless communications & Networks
C424	Industry Oriented Mini Project
C425	Seminar
C426	Major Project
C427	Comprehensive Viva

CO	Description
C421.1	Explain the historical background, basic concepts and frequency allocations for satellite communication. (Comprehension)
C421.2	Define demonstrate orbital mechanics, launch vehicles and launchers. (Knowledge)
C421.3	Show to visualize satellite sub system like telemetry, tracking, command and monitoring power systems etc. (Application)
C421.4	Classify various multiple access systems for satellite communication systems and satellite packet communications. (Analysis)
C421.5	Design satellite navigation and GPS and satellite packet communications. (Synthesis)
C421.6	Explain various message transmission techniques by using satellite packet communications. (Distinguish)
C422.1	Understand radar fundamentals and analysis of the radar signals. (Knowledge)
C422.2	Compare various types of radars like MTI, Doppler and Tracking radars.

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	(Comprehension)
C422.3	Explain the operation of MTI &Pulse Doppler Radar and applications of various types of Radar. (Application)
C422.4	Classify the difference between different types of trackers (Analysis)
C422.5	Design branch type and balanced type circulators as duplexers.(Synthesis)
C422.6	Compare various types of radar and its tracking system (Evaluation)
C423.1	Understand the Design fundamentals of Cellular Concept in wireless communication networks(Comprehension)
C423.2	Describe various Models of Large Scale Path Loss in mobile radio propagation. (Knowledge).
C423.3	Define various Parameters of small scale Path Loss in mobile radio propagation. (Knowledge).
C423.4	Analyze various Techniques to avoid fading and interference effects.(Analysis)
C423.5	Collect and demonstrate wireless wide area networks and WLAN s with their specifications.(Applications).
C423.6	Familiar with some of the existing and emerging Wireless Standards IEEE802.11. (Knowledge).
C424.1	Recognize uncertainty of open ended investigations like technical problems and difficulties in collecting the required data (knowledge)
C424.2	Design chip and Execute while doing mini project (Synthesis).
C424.3	Apply practical knowledge in spite of theoretical concepts he/she acquired (Application).
C424.4	Recognize importance of teamwork by working in team while doing projects and improve their communication skills. (Knowledge).
C424.5	You are able to differentiate open ended projects and set of practical's (Analysis).
C424.6	Asses different tools /soft ware's and protocols which used in the project (Evaluation).
C425.1	Develop oral and written communication skills. (Synthesis)
C425.2	Investigate an appreciation of the self in relation to its larger diverse social and academic contexts. (Analysis)

C425.3	Identify, understand and discuss current, real-world issues. (Knowledge)
C425.4	Distinguish and integrate differing forms of knowledge and academic disciplinary approaches. (Analysis)
C425.5	Apply principles of ethics and respect in interaction with others. (Application)
C425.6	Write technical documents and give oral presentations related to the work completed. (Knowledge)
C426.1	Apply practical knowledge in spite of theoretical concepts he/she acquired (Application).
C426.2	Recognize uncertainty of open ended investigations like technical problems and difficulties in collecting the required data (knowledge).
C426.3	Differentiate open ended projects and set of practical's (Analysis).
C426.4	Develop their communication and team work skills (synthesis).
C426.5	Asses different tools /software's and protocols which used in the project (Evaluation).
C426.6	Analyze their Software results and dump into hardware for testing (Analysis).
C427.1	Expose students to the 'real' working environment (knowledge)
C427.2	Develop presentation skills and import a knowledge able society (synthesis).
C427.3	Develop verbal and nonverbal communication. (Synthesis).
C427.4	Apply recent trends and technologies in area of electronics and communication (Application).
C427.5	Recognize problems after doing research literature survey using various resources. (Evaluation).
C427.6	Define organization structure, business operations and administrative functions. (Knowledge)

Laboratory Course Outcomes:

The associated course outcomes are taken as governing course outcomes for the Laboratories. For example Analog Communications lab – All COs of Analog Communications theory course will be taken.

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In case, of a particular lab is associated with more than one theory course, All the Course CO's of the associated theory courses will be considered.

Project Course Outcomes:

Project work done by the students in the final semester of the degree typically applies many Course outcomes attained by them in previous semesters. Each project guide frames the specific outcomes expected from the project. As guideline, following outcomes are taken for the Project.

CO	Description
C426.1	Apply practical knowledge in spite of theoretical concepts he/she acquired (Application).
C426.2	Recognize uncertainty of open-ended investigations like technical problems and difficulties in collecting the required data (knowledge).
C426.3	Differentiate open ended projects and set of practicals (Analysis).
C426.4	Develop their communication and team work skills (synthesis).
C426.5	Asses different tools /software's and protocols which used in the project (Evaluation).
C426.6	Analyze their Software results and dump into hardware for testing (Analysis).

4. ASSESSMENT OF COURSE OUTCOMES

4.1 Introduction

Assessment is a mechanism for providing instructors with data for improving their teaching methods and for guiding and motivating students to be actively involved in their own learning. As such, assessment provides important feedback to both instructors and students. The techniques of outcomes assessment as a means of measuring student learning and the use of that information to improve teaching are considered first.

Assessment gives us essential information about what our students are learning and about the extent to which we are meeting our teaching goals. The following three tools are used to assess the Course Outcomes. Theory Courses, Lab Courses and Projects.

The tools used for theory Courses are:

1. Internal Tests (Consisting of Subjective, Objective Examinations & Assignments)
2. University Examinations.

The tools used for Lab Courses are:

1. Experiment wise marks
2. Viva Voice
3. Internal Exam
4. External Exam

The tools used for Project are:

1. Review 1
2. Review 2
3. Day to Day Evaluation
4. University Examination

4.2 COs Assessment Process-Theory Courses:

The attainment process of COs is taken from three assessment Tools-Internal Tests, University Results,and Course Outcome Feedback.Internal Tests, University Results comes under direct attainment.

Assessment Tool -Internal Tests:

As per the Curriculum of JNTU Hyderabad, The student has to write two internal examinations per the Course. Each exam conducted for 25 Marks. First two and half Units in MID –I and last two and half Units syllabus covered in MID-II. Faculty will set the Question paper accordingly.

The marks obtained for each question and corresponding CO are collected from each student and then CO attainment is calculated.

The course outcomes are written by the respective faculty member using action verbs of learning levels. Then, a correlation is established between COs and POs in the scale of 1 to 3, 1 being the slight (low), 2 being moderate (medium) and 3 being substantial (high). A mapping matrix is prepared in this regard for every course in the program. The model MID exam CO attainment form is given in Annexure-I (Form 1 & Form 2)

Attainment Level 1: below 50% of students score more than 50% marks out of the maximum relevant marks.

Attainment Level 2: 50% to 75% of students score more than 50% marks out of the maximum relevant marks.

Attainment Level 3: more than 75% of students score more than 50% marks out of the maximum relevant marks.

Thus, the average of percentage of students attaining all the COs decides the CO attainment level.

Sample Internal tests analysis: Digital Signal Processing (III B.TECH II SEM, 2018-19)

CO Code	Course Outcome	% Students attained CO	CO attainment
C325.1	Express time, frequency, and z-transform analysis on signals and systems. (Comprehension)	75%	3.00
C325.2	Identify the fast computation of DFT and appreciate the FFT processing. (Knowledge)	81%	3.00
C325.3	Summarize the significance of various filter structures and their advantages. (Evaluation)	87%	3.00
C325.4	Design IIR digital filters using Step & Impulse Invariant Method &Bilinear Transformation Method. (Synthesis)	79%	3.00
C325.5	Design FIR digital filter for a given specifications. (Synthesis)	76%	3.00

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C325.6	Differentiate the trade-offs between normal and multi rate DSP techniquesand finite length word effects. (Analysis)	79%	3.00

Assessment Tool - University Results:

At the end of the Semester University conducts examination for 75 marks. The marks Obtained for each student are calculated to measure the attainment. After the declaration of the university results, the percentage of students who attained the COs is computed. Here, it is assumed that the questions answered by a student cover all the course outcomes defined for that course. The percentage of students who achieve a set target (usually, 40% of the maximum marks) calculated and that value decides the level of attainment of COs which correlated to that question.

Attainment Level 1: below 50% of students score more than 40% marks out of the maximum relevant marks.

Attainment Level 2: 50% to 75 % of students score more than 40% marks out of the maximum relevant marks.

Attainment Level 3: More than 75% of students score more than 40% marks out of the maximum relevant marks.

The model University exam CO attainment form is given in Annexure-I (Form 3)

Sample University Result Analysis: Digital Signal Processing (III B.TECH II SEM, 2018-19)

CO Code	Course Outcome	CO attainment
C325.1	Express time, frequency, and z-transform analysis on signals and systems. (Comprehension)	3.00
C325.2	Identify the fast computation of DFT and appreciate the FFT processing. (Knowledge)	3.00
C325.3	Summarize the significance of various filter structures and their advantages. (Evaluation)	3.00
C325.4	Design IIR digital filters using Step & Impulse Invariant Method &Bilinear Transformation Method. (Synthesis)	3.00
C325.5	Design FIR digital filter for a given specifications. (Synthesis)	3.00
C325.6	Differentiate the trade-offs between normal and multi rate	3.00

	DSP techniquesand finite length word effects. (Analysis)	

Overall attainment calculations:

To calculate overall attainment, 60% weightage to Internal Tests, 40% Weightage to University Results.

Overall Course Outcome Attainment

The overall CO attainment level in the course considered is then computed as

Overall CO attainment= 60% of CO attainment level in Internal tests + 40% of CO attainment level in University test.The model overall CO attainment form is given in Annexure-I (Form 4)

Overall Attainment Level	Percentage students attained course attainment
Level 1	<50%
Level 2	50-75%
Level 3	>75%

The above procedure of computing overall CO attainment is to be repeated for each course from first year in an academic year (Including opted electives, Project work and technical seminars in final year).

CO	Assessment Tool	Assessment Criteria	Weightage	Data collection	Faculty responsible
Course name	Internal tests (Consisting of Subjective, Objective Examinations & Assignments)	% of students scored set target marks (50%) in Internal Exams.	60%	Once in a semester	Course In Charge
	University Results	% of students scored set target marks (50%) in University Exams.	40%	Once in a semester	Course In Charge

Overall CO attainment analysis: Digital Signal processing (III B.TECH II SEM, 2018-19)

CO Code	Internal Assessment Rating (60%)	University Assessment Rating (40%)	Overall CO Attainment (100%)	Remarks

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C325.1	1.80	1.20	3.00	Level 3
C325.2	1.80	1.20	3.00	Level 3
C325.3	1.80	1.20	3.00	Level 3
C325.4	1.80	1.20	3.00	Level 3
C325.5	1.80	1.20	3.00	Level 3
C325.6	1.80	1.20	3.00	Level 3
Average	1.80	1.20	3.00	Level 3

COs Assessment process- Laboratories:

Out of 75 marks for each lab, 25 marks are for internal and 50 marks are for External Examination. In internal 25 marks, 10 marks for record and observation, 5 marks for viva and 10 marks for internal examination. By recording all three marks for each student, the CO attainment is calculated. The calculation process is as follows day to day evaluation (20%), Internal Exam (30%), External Exam (50%) and Total 100%. The model lab CO attainment form is given in Annexure-I (Form 8).

Level	Percentage attained
Level 1	<=90% Students
Level 2	90-95% Students
Level 3	>=95% Students

COs Assessment process-project work:

Commonly six COs are given to each project and first three COs are evaluated in Review 1 and last three are evaluated in Review 2 by PRC for 50 marks each and from both reviews the average is 50 marks. University will conduct external viva voice for 150 marks. The average of Review 1, Review 2 and University viva voice is calculated. By considering 25% weight age to internal reviews and 75% weight age to university viva voice marks total percentage of attainment is calculated.

Attainment Level 1: Attainment is less than or equal to 75%

Attainment Level 2: Attainment is in between 75% to 85%

Attainment Level 3: Attainment is more than or equal to 85%

The model Project- CO attainment form is given in Annexure-I (Form-10).

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5. ASSESSMENT OF PROGRAM OUTCOMES/PROGRAM SPECIFIC OUTCOMES

5.1. Introduction

In quality teaching and learning process, mapping and attainment is becoming an important process. The compliance of continuous improvement can be done by deciding action plan for weak attainment and is a key factor leading to continuous student learning.

Program Outcomes (PO's) are one step broader statements than CO's that describe what students are expected to know and be able to do upon the graduation. These relate to the skills, knowledge, and behavior that students acquire in their matriculation through the program.

The program outcomes are assessed with the help of course outcomes of the relevant courses through direct and indirect methods.

Direct Assessment Method:

Direct measures are provided through direct examinations or observations of student knowledge or skills against measurable course outcomes. The knowledge and skills described by the course outcomes are mapped to specific problems on internal exams/home assignment/group task. Throughout the semester the faculty records the performance of each student on each course outcome. At the end of the semester students receive grades from external exams.

Tools	Weightage
Theory courses	50%
Lab Courses	20%
Project	20%
Comprehensive viva	5%
Seminar	5%

Indirect assessment methods:

Indirect assessment strategies are implemented by embedding them in the course end survey. Graduate survey and Alumni survey. Finally, Program outcomes are assessed with above mentioned data and program assessment committee concludes the PO/PSO attainment levels are

- Alumni Feedback
- Exit Survey Feedback
- Employer Feedback
- Curricular/Extra Curricular activities feedback

70% weight age is given for direct assessment and 30% for indirect assessment

5.2. CO-PO Mapping

- PO's are attained through the CO's. So determine the POs corresponding set CO's.
- Every Course leads to some outcomes. All the courses together must cover all the PO's and PSO's.
- A PO can have contributors from many CO's.

While mapping CO's with PO's the following points to be observed.

- Is CO reflects the intended measurement from PO?
- Does the assessment correlates well with the CO?

Sample CO-PO Mapping:

Step 1: From a table between COs and POs with correlation by verifying the reasons

Sample course outcome: Digital Signal Processing (III B.TECH II SEM, 2018-19)

Code	Course Outcome	Taxonomy Level
C325.1	Express time, frequency, and z-transform analysis on signals and systems.	Comprehension
C325.2	Identify the fast computation of DFT and appreciate the FFT processing.	Knowledge
C325.3	Summarize the significance of various filter structures and their advantages.	Evaluation
C325.4	Design IIR digital filters using Step & Impulse Invariant Method &Bilinear Transformation Method.	Synthesis
C325.5	Design FIR digital filter for a given specifications.	Synthesis
C325.6	Differentiate the trade-offs between normal and multi rate DSP techniquesand finite length word effects.	Analysis

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Step 2: Depending on correlation level assign level of mapping at corresponding points.

Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
C325.1	3	-	3	-	-	-	-	-	-	-	-	-	3	-	-
C325.2	-	3	-	-	-	3	-	-	-	-	-	-	-	3	-
C325.3	3	-	-	-	-	-	-	-	-	-	-	-	3	2	-
C325.4	-	-	3	2	-	-	-	-	-	-	-	-	3	-	-
C326.5	2	-	3	-	-	-	-	-	-	-	-	-	3	-	-
Guest Lecture	-	-	-	3	3	-	-	-	-	-	-	3	-	3	-
C325.6	3	2	-	-	-	-	-	-	-	-	-	-	3	2	-
C325	2.75	2.5	3	2.5	3	3	-	-	-	-	-	3	3	2.5	-

Level of mapping- 1.Slight (Low) 2. Moderate (Medium) 3.Substantial (High)

Step 3: Justification for the mapping of CO with the PO /PSO will be recorded.

C325.1: Express time, frequency, and z-transform analysis on signals and systems.

[PO1]: Students can get the basic knowledge on different signals and systems

[PO3]: Design the various digital filters such as Direct, Canonic, Cascade, Parallel form.

[PSO1]: Apply time and frequency analysis on digital signals.

5.3. PO attainment from theory course:

The process of attainment of POs starts from writing appropriate COs for each course of the program. The course outcomes are written by the respective faculty member using action verbs of learning levels. Then, a correlation is established between COs and POs in the scale of 1 to 3, 1 being the slight (Low), 2 being moderate (Medium), 3 being Substantial (High). A mapping matrix is prepared in this regard for every course in the program.

Program outcomes and Program specific outcomes are attained through the attainment of CO's. This is called direct attainment of PO's.

At the end of the course, Feedbacks are collected based on CO's. Each CO is asked as question and that questionnaire has been send to student. For example, if a course has six COs then six questions asked.

Considering the CO attainment and the mapping to POs, overall PO attainment is calculated.

For example, PO1 is mapped to CO1, CO3, CO5 and CO5 with mapping correlation level 2.75

CO attainment average= 3.00

Considering the mapping correlation, PO1 attainment from DSP course= 2.75*3/3=2.75

For example, PO2 is mapped to CO2 and CO6 with mapping correlation level 2.50.

CO attainment average=3.00

Considering the mapping correlation, PO2 attainment from DSP course= 2.5*3/3=2.5

Overall PO attainment from DSP Course is:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO attainment	2.75	2.50	3.00	2.50	3.00	3.00	-	-	-	-	-	3.00	3.00	2.50	-

Similar approach is followed for all courses as a table of PO attainment from the courses is prepared.

5.4. PO attainment from lab course:

The process of attainment of POs starts from writing appropriate COs for each course of the program. The course outcomes are written by the respective faculty member using action verbs of learning levels. Then, a correlation is established between COs and POs in the scale of 1 to 3, 1 being the slight (Low), 2 being moderate (Medium), 3 being Substantial (High). A mapping matrix is prepared in this regard for every course in the program.

Program outcomes and Program specific outcomes are attained through the attainment of CO's. This is called direct attainment of PO's.

For example, if a lab has six COs then six questions asked.

Considering the CO attainment and the mapping to PO's, overall PO attainment is calculated for DICA Lab:

For example, PO1 is mapped to CO1, CO2, CO4, CO5 and CO6 with mapping correlation level 1.8.

CO attainment average= 2.64

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Considering the mapping correlation, PO1 attainment from DICA lab= 1.8*2.64/3=1.58

For example, PO2 is mapped to CO1, CO2, CO4 with mapping correlation level 1.67.

CO attainment average= 2.64

Considering the mapping correlation, PO2 attainment from DICA lab= 1.67*2.64/3=1.47

Overall PO attainment from DICA Lab is:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO attainment	1.58	1.47	2.42	0.88	1.76	1.76	-	-	0.88	-	-	-	2.46	1.76	1.47

Similar approach is followed for all courses as a table of PO attainment from the courses is prepared.

5.5. PO attainment from project work:

Each project was mapped to program outcomes by faculty who guided the project and also by students considering the PO mapping of each project and the attainment from each project, overall PO attainment is estimated.

5.6. PO attainment from stakeholder feedbacks:

Indirect methods such as surveys and feedbacks taken the stakeholders to identify the student learning. They assess opinions or thoughts about the graduate's knowledge or skills and their values by different stakeholders. For determining indirect attainment of POs and PSOs, student exit feedback, employer feedback, Alumni feedback, and Co/Extra Curricular feedback was considered (which includes attainments from both curricular & co/extracurricular activities).

S. No.	Indirect assessment method	Weightage	Method description
1	Alumni feedback	25%	Collect variety of information about program satisfaction and college from the Alumni students.
2	Exit student feedback	25%	Collect when the student complete his/her degree and leaving the institution.
3	Employer feedback	25%	Collect variety of information about the graduate's skills, capabilities and opportunities (during the

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			placement drives, also from the employers where the graduates are contributing)
4	Curricular/Extra Curricular feedback	25%	Collect the curricular and extracurricular activities of students participated in the college or outside the college.

Various parameters were considered for framing the feedback form from the stakeholders. All questions were mapped to the relevant PO's. Average of all the feedback for each question was taken and the same was assigned to the relevant PO. In case of multiple questions were present for the same PO, average was taken.

5.7. Overall PO Attainment:

PO attainment Level

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C211 (M-IV)	3	2.5	1.5	-	-	-	-	-	-	-	-	-
C212 (AE)	2.4	2	2.13	1.73	1.68	2.8	-	-	-	-	-	0.93
C213 (ET)	2.08	1.94	2.36	1.39	1.46	1.67	1.67	-	-	-	1.67	0.83
C214 (SSP)	1.20	1.75	1.80	1.33	-	-	-	-	-	-	-	1.33
C215 (NA)	1.79	1.53	2.11	-	1.73	1.53	-	-	-	-	-	-
C216 (EDCLab)	2.7	2.7	2.1	-	-	-	-	-	1.8	1.8	-	1.8
C217 (BS Lab)	2.28	2.28	1.52	1.52	2.28	-	-	-	1.52	0.76	-	1.52
C218(BEE Lab)	2.16	2.1	1.8	2.1	2.7	2.1	-	-	1.8	2.1	2.7	2.25
C219(EST)	-	-	-	-	-	-	3	-	-	-	-	-
C221 (STLD)	2	1.3	1.75	1.8	1.12	0.7	-	-	-	-	-	2.1
C222 (PDC)	1.53	1.53	2	1.39	1.67	0.83	1.67	-	-	-	0.83	0.83
C223 (CS)	1.56	1.95	2.34	-	2.18	1.56	-	-	-	-	-	-
C224 (AC)	1.73	2.6	2.34	1.73	1.73	1.73	-	-	2.6	-	-	2.6
C225 (BEFA)	1.69	1.55	1.93	1.6	2.25	1.21	0.97	1.6	1.69	1.93	1.6	1.21
C226 (AC Lab)	2.7	2.7	2.25	-	2.1	-	-	-	-	-	-	2.7
C227(PDC Lab)	2.21	1.3	2.21	1.43	1.17	0.78	1.56	-	-	-	0.78	0.78
C228 (AE Lab)	2.25	1.8	1.95	1.5	1.35	-	-	-	-	-	-	0.9
C229(GS Lab)	-	-	-	-	-	2.61	1.74	1.74	1.74	0.87	1.74	-

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C311 (EMTL)	2.08	2	1.6	2.4	1.6	-	-	-	-	-	-	0.8
C312(LDICA)	2	1.66	2	1.16	1	1	-	-	-	-	-	1
C313 (DC)	2.60	2.17	2.60	-	1.73	-	-	-	-	-	-	2.60
C314 (FOM)	3	3	-	2	-	2.5	-	2	2	-	2	-
C315 (OS)	2.6	1.7	2.08	1.7	1.9	-	-	-	-	-	-	1.73
C316 (LICA Lab)	2.05	2.8	2.23	-	2.3	-	-	-	-	-	-	2.2
C317(DICA Lab)	1.58	1.47	2.42	0.88	1.76	1.76	-	-	0.88	-	-	-
C318(DC Lab)	2.55	2.1	-	-	1.8	-	-	-	-	-	-	-
C319 (PE)	-	-	2	-	-	1.66	2.66	2.4	-	-	-	1.66
C321 (IPR)	2.8	1.9	-	-	-	0.9	-	1.9	1.9	-	-	1.87
C322 (CO&OS)	2.02	2.25	2.02	2.17	2.6	2.6	-	-	1.73	-	-	2.6
C323 (AWP)	1.57	1.15	1.47	1.17	1.47	0.73	1.47	-	-	-	-	0.73
C324 (MPMC)	1.47	2.45	2.21	1.63	1.63	1.63	-	-	2.45	-	-	2.45
C325 (DSP)	2.75	2.5	3	2.5	3	3	-	-	-	-	-	3
C326 (DSP Lab)	2.67	2.67	2.45	1.78	2.67	-	-	-	1.78	0.89	-	1.78
C327(MPMCLab)	1.43	1.6	2.15	-	2.4	-	-	-	-	-	2.2	-
C328(AECS Lab)	0.83	0.83	-	0.83	1.25	-	0.83	1.67	1.25	1.83	1.25	1.11
C411(MS)	1.59	1.83	-	1.47	-	1.47	-	2.2	1.47	-	1.47	-
C412(MWE)	1.52	1.52	1.3	1.95	1.79	-	-	-	1.3	-	-	1.95
C413(CN)	2	2.3	2.5	2	2.5	-	2	-	-	2	-	-
C414(CMC)	2.9	1.9	2.18	1.9	1.9	-	-	-	-	-	-	1.93
C415(JAVA)	2.20	1.91	2.20	2.20	-	-	-	-	-	-	-	1.47
C416(ESD)	2.1	1.73	2.31	2.6	2.38	-	-	-	-	-	-	-
C417(ACS Lab)	0.85	0.85	-	0.85	1.27	-	0.85	1.69	1.27	1.86	1.27	1.13
C418(MWE&DC Lab)	2.65	1.8	2.21	1.8	1.8	0.9	-	-	-	-	-	-
C421(SC)	1.89	1.83	1.96	2.2	1.83	-	-	-	-	-	-	-
C422(RS)	1.9	1.63	-	-	1.63	-	-	-	-	2.1	-	2.1
C423(WCN)	2.33	1	2	2.25	2.33	2.33	1	-	-	1.5	-	1.5
C424(IOMP)	1.71	1.83	1.71	1.71	1.71	1.71	1.60	2	1.71	1.71	1.50	1.83
C425(SEM)	3	3	-	3	-	3	-	3	3	3	2	3

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C426(MP)	2.7	3	2.7	2.67	2.7	2.7	2.71	2.78	2.83	2.7	2.67	2.7
C427(CV)	3	3	2	2.5	-	2	-	-	-	3	3	3
Direct attainment	1.5	1.41	1.45	1.25	1.34	1.21	1.18	1.39	1.3	1.29	1.15	1.25

PSO Attainment Level

Course	PSO1	PSO2	PSO3
C211 (M-IV)	-	-	2
C212 (AE)	2.53	2.4	1.24
C213 (ET)	2.22	1.94	1.11
C214 (SSP)	1.93	1.67	-
C215 (NA)	1.53	1.53	1.53
C216 (EDCLab)	2.7	2.7	-
C217 (BS Lab)	2.28	2.28	-
C218(BEE Lab)	2.48	2.25	1.8
C219(EST)	-	-	-
C221 (STLD)	1.6	1.5	0.93
C222 (PDC)	2.22	1.39	0.97
C223 (CS)	1.56	1.56	1.56
C224 (AC)	2.51	2.17	-
C225 (BEFA)	-	0.97	0.97
C226 (AC Lab)	2.48	2.48	-
C227(PDC Lab)	2.21	1.56	1.17
C228 (AE Lab)	2.4	2.25	1.8
C229(GS Lab)	-	-	1.31
C311 (EMTL)	1.8	1.44	1
C312(LDICA)	2.33	2	1.33
C313 (DC)	2.60	-	-
C314 (FOM)	-	-	2.67
C315 (OS)	1.87	1.56	0.87
C316 (LICA Lab)	2.6	2	1.9
C317(DICA Lab)	2.46	1.76	1.47
C318(DC Lab)	2.7	2.4	-
C319 (PE)	-	-	1

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C321 (IPR)	-	-	2.64
C322 (CO&OS)	2.6	2.02	-
C323 (AWP)	1.88	1.36	0.84
C324 (MPMC)	2.12	1.72	-
C325 (DSP)	3	2.5	2.67
326 (DSP Lab)	2.67	2.67	-
C327(MPMCLab)	1.8	2.2	-
C328(AECS Lab)	-	-	0.83
C411(MS)	-	-	1.96
C412(MWE)	1.73	1.19	0.87
C413(CN)	1.66	2	1.5
C414(CMC)	2.35	2.74	1.93
C415(JAVA)	1.22	-	1.22
C416(ESD)	2.23	2.35	1.73
C417(ACS Lab)	-	-	0.85
C418(MWE&DC Lab)	2.7	2.7	-
C421(SC)	1.89	2.08	1.47
C422(RS)	2.1	-	-
C423(WCN)	1.5	1	2.5
C424(IOMP)	1.71	1.71	1.83
C425(SEM)	3	-	2.5
C426(MP)	2.7	2.7	2.7
C427(CV)	3	3	2.5
Direct Attainment Level	1.56	1.40	1.1

Indirect attainment Level

PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Employer feedback	2.39	2.36	2.37	2.37	2.40	2.23	2.41	2.21	2.30	2.36	2.30	2.36
Alumni feedback	2.47	2.53	2.59	2.35	2.47	2.47	2.47	2.53	2.47	2.53	2.47	2.47
Exit feedback	2.48	2.62	2.57	2.48	2.67	2.52	1.9	2	2.43	2.52	2.38	2.57
Co/Extra-curricular	-	-	-	-	3	2.38	1.5	3	2.29	2	2	2.4

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feedback												
Average	2.45	2.5	2.51	2.4	2.64	2.4	2.07	2.44	2.37	2.35	2.29	2.45

PSO

	PSO1	PSO2	PSO3
Employer feedback	2.31	2.35	2.35
Alumni feedback	2.59	2.47	2.41
Exit feedback	2.52	2.71	2.38
Co/Extra-curricular feedback	3.00	-	2.00
Average	2.61	2.51	2.29

Overall attainment Level:

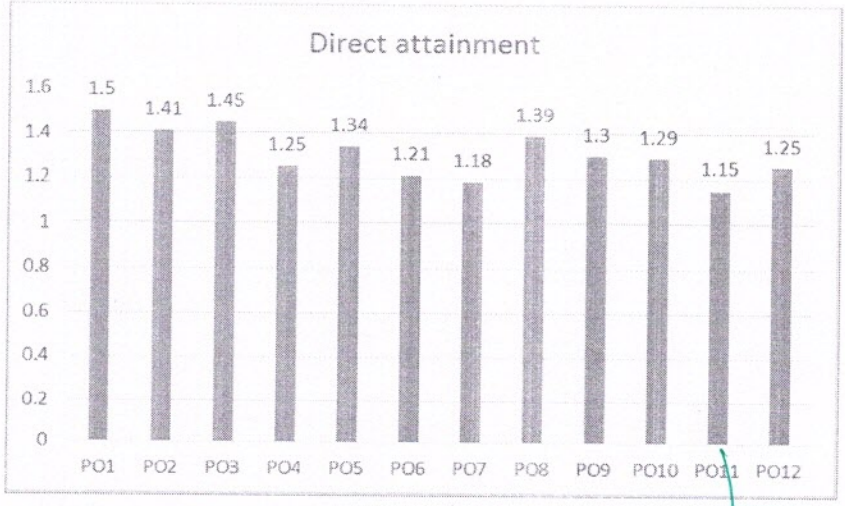
PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Direct (a)	1.5	1.41	1.45	1.25	1.34	1.21	1.18	1.39	1.3	1.29	1.15	1.25
Indirect (b)	2.45	2.5	2.51	2.4	2.64	2.4	2.07	2.44	2.37	2.35	2.29	2.45
Overall (0.7*a+0.3*b)	2.23	2.16	2.2	1.97	2.13	1.93	1.80	2.12	2.01	1.99	1.83	1.98

PSO

Parameter	PSO1	PSO2	PSO3
Direct (a)	1.56	1.4	1.1
Indirect (b)	2.61	2.51	2.29
Overall (0.7*a+0.3*b)	2.34	2.15	1.78

Graph for CO-PO Attainment:



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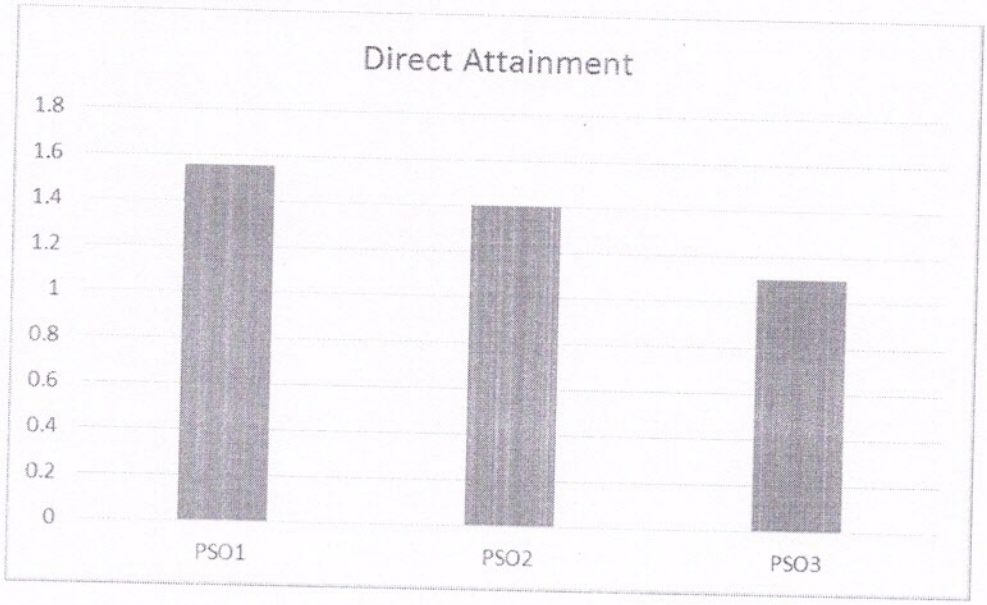
Graph for CO-PSO Attainment:



5.8. Courses contributing each PO:

Courses mapped with POs

S. No.	PO	Courses	Number of courses mapped
1	PO1	C211, C215(5), C221, C225(5), C311, C315(5), C321, C325(5), C411, C416(6), C421, C423(3), C216, C217, C218, C226, C227, C228, C316, C317, C318, C326, C327, C328, C417, C418, C424, C427(4)	47
2	PO2	C211, C215 (5), C221, C225 (5), C311, C315 (5), C32 (5), C411, C416(6), C421, C423(3), C216, C217, C21 C227, C228, C316, C317, C318, C326, C327, C328, C417, C418, C424, C427(4)	47
3	PO3	C211, C215(5), C221, C225(5), C311, C313(3), C315, C319, C322, C325(4), C412, C416(5), C421, C423, C216, C217, C218, C226, C227, C228,C316, C317, C326, C327, C418, C424, C426, C427	40
4	PO4	C212, C214(3), C221, C222, C224, C225, C311, C312, C314, C315, C322, C325(4), C411, C416(6), C421, C423, C217, C218, C227, C228, C317, C326, C328, C417, C418, C424, C427(4)	36
5	PO5	C212, C213, C215, C221, C225(5), C311, C313(3), C315, C322, C324, C325, C412, C414(3), C416,	37

		C421, C423(3), C217, C218, C226, C227, C228, C316, C317, C318, C326, C327, C328, C417, C418, C424, C426	
6	PO6	C212, C213, C215, C221, C225(5), C312, C314, C319, C321, C325(5), C411, C423, C218, C227, C229, C317, C418, C424, C427(4)	27
7	PO7	C213, C219, C222, C225, C319,C323, C413, C423, C227, C229, C328, C417, C424, C426	14
8	PO8	C225, C314, C319, C321, C411, C229, C328, C417, C424, C426(3)	11
9	PO9	C224, C225, C314, C321, C322, C324, C411, C412, C216, C217, C218, C229, C317, C326, C328, C417, C424, C426(3)	19
10	PO10	C225, C413, C422, C423, C216, C217, C218, C229, C326, C328, C417, C424, C427(4)	15
11	PO11	C213, C222, C225, C314, C411, C218, C227, C229, C327, C328, C417, C424, C427(4)	15
12	PO12	C212, C214(3), C222, C224, C225, C311, C313(3), C315, C319, C321,C325(5), C412, C414, C415, C422, C423, C216, C217, C218, C226, C227, C228, C316, C326, C328, C417, C424, C427(4)	35
13	PSO1	C212, C215(4), C221, C224(4), C311, C313(3), C315, C322, C325(4), C412, C416(5), C421, C423(4), C216, C217, C218, C226, 227, C228, C316, C317, C318, C326, C327, C418, C424, C427(4)	41
14	PSO2	C212, C215(4), C221, C225(5), C311, C312, C315, C322, C323, C325(3), C412, C414(3), C416, C421, C423, C216, C217, C218, C226, C227, C228, C316, C317, C318, C326, C327, C418, C424, C426, C427	37
15	PSO3	C211, C213(3), C215, C221, C223(3), C225, C311, C312, C314, C315, C319, C321, C323, C325, C411, C416(6), C421, C423, C218, C227, C228, C229, C316, C317, C328, C417, C424, C427(4)	36

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5.9. Continuous improvements

POs	Target Level	Attainment Level	Observations
PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.			
PO1	2.12	2.23	Course outcome attainment was low for SSP Course.
Action 1: More practice problems on Fourier Transforms, Z-Transforms need to be included.			
PO2. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.			
PO2	2.12	2.16	Course outcome attainment was low for WCN, AWP courses.
Action 1: Appropriate web references are not identified for the specifications of WLAN. **Action 2:**Tutorials need to be included.			
PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.			
PO3	2.12	2.10	Course outcome attainment was low for MWE, AWP, M-IV courses.
Action 1: Questions related to the course outcomes should be accommodated in mid question paper with Blooms taxonomy level. **Action 2:** Number of books referred while drafting the lecture notes was insufficient.			
PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.			
PO4	2.12	1.97	Course outcome attainment was low for LDICA, AWP courses.
Action 1: More practice is required on design problems. **Action 2:** Taxonomy level of CO and given question are different.			
PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.			
PO5	2.12	2.03	Course outcome attainment was low for LDICA, STLD courses.
Action 1: Appropriate identification of weak students is missing **Action 2:** TBS should address the usage of modern tools in the design of Digital Circuits.			
PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.			
PO6	1.97	1.94	Course outcome attainment was low for STLD,

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			PDC, IPR, AWP courses.
Action 1: Activity related to the societal, health, safety, legal and cultural issues was missing. **Action 2:** CO is framed at some level and the syllabus is at different level **Action 3:** May be C222.5 was wrongly mapped			
PO7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental context, and demonstrate the knowledge of, and need for sustainable development.			
PO7	1.97	1.81	Course outcome attainment was low for BEFA, WCN courses.
Action 1: Lack of Tutorials **Action 2:**The question given in university question paper partially cover the CO2			
PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.			
PO8	1.97	2.10	Course outcome attainment was low for BEFA course.
Action 1: Lack of tutorial on the topic responsibilities and norms of the engineering practices in development of products.			
PO9. Individual and team network: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.			
PO9	1.97	2.02	Course outcome attainment was low for MWE, MS courses.
Action 1: Additional field trip is required **Action 2:** May be C411.1 is wrongly mapped.			
PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.			
PO10	1.97	2.01	Course outcome attainment was low for GS Lab course.
Action 1: Usage of power point presentation is missing.			
PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.			
PO11	1.97	1.95	Course outcome attainment was low for PDC course.
Action 1: May be C224.5 was wrongly mapped.			
PO12. Life-Long learning: Recognize the need for, and have the preparation and able to engage in independent and life-long learning in the broadest context of technological change.			
PO12	1.97	1.99	Course outcome attainment was low for AWP, EMTL, PDC, ET courses.
Action 1: Worksop should be conducted for Antenna Design. **Action2:** Wrong delivery method for the knowledge of Transmission lines practically along with Faraday's Laws. **Action 3:** Appropriate web references are not identified for non-linear wave shaping.			

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Action 4: Tutorial was missing for applications of electric machinery.			
PSO1. Technical Knowledge: An ability to understand the concepts of basic Electronics & Communication Engineering and to apply them to various areas like Signal processing, VLSI, Embedded Systems, Digital & Analog Devices, etc.			
PSO 1	2.12	2.31	Course outcome attainment was low for JAVA course.
Action 1: Tutorial was missing for the C415.5.			
PSO2.Software tools usage: An ability to solve complex Electronics & Communication Engineering problems, using latest hardware and software tools, along with analytical skills to arrive at cost effective and appropriate solutions.			
PSO 2	2.12	2.15	Course outcome attainment was low for WCN, BEFA courses.
Action 1: Identified topic is not correctly mapping. **Action 2:** May be C225.6 was wrongly mapped			
PSO3. Successful Career: Wisdom of social and environmental awareness along with ethical responsibility to have a successful career and to sustain passion and zeal for real-world applications using optimal resources as an Entrepreneur.			
PSO 3	2.12	1.80	Course outcome attainment was low for JAVA, MWE, OS courses.
Action 1: Books were not properly referred for C415.2. **Action 2:** Tutorials were missing.			

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Annexure I (Form1)

Internal Exam-1Marks Evaluation Sheet

KPRIT

KOMMURI PRATAP REDDY INSTITUTE OF TECHNOLOGY

Department of Electronics & Communication Engineering

Course Outcome Attainment (Internal Examination-1)

Name of the faculty : Y. Vishwa Sri — Academic Year: 2018-19

Branch & Section: ECE — Examination: I Internal

Course Name: Digital Signal Processing — Year: III — Semester: II

S.No	HT No.	Question No. Q1	Q2	Q3	Q4									Obj1	A1
Max. Marks ==>		5	5	5	5									10	5
1	16RA1A0401			4	3									5	5
2	16RA1A0403			4	3									2	5
3	16RA1A0404			3.5	3									7	5
4	16RA1A0405	5		5										9.5	5
5	16RA1A0407			5	3									6.5	5
6	16RA1A0408			5	3									9	5
7	16RA1A0409			3	3									3	5
8	16RA1A0412	5		5										8.5	5
9	16RA1A0413	5	4.5											7	5
10	16RA1A0414	4.5		5										9	5
11	16RA1A0416	2.5			3									8.5	5
12	16RA1A0419		2		4									5.5	5
13	16RA1A0420	2		2										6.5	5
14	16RA1A0421	5	2											9	5
15	16RA1A0422	3	2											5	5
16	16RA1A0424	5		5										8.5	5
17	16RA1A0425			5	5									8	5
18	16RA1A0427	2	2											6	5
19	16RA1A0429			2.5	3									5	5
20	16RA1A0430			5	5									5	5
21	16RA1A0431			3	2.5									7	5
22	16RA1A0432	4.5		4										7.5	5
23	17RA5A0401	5	5											7	5
24	16U51A0487				2.5									6.5	5
Performance Target set by the faculty / HoD		50%	50%	50%	50%									50%	50%
Number of students performed above the target		8	2	14	11									18	24
Number of students attempted		12	6	16	13									24	24
Percentage of students scored more than target		67%	33%	88%	85%									75%	100%

CO Mapping with Exam Questions:

C325.1	Y	Y												Y	Y
C325.2		Y	Y	Y										Y	Y
C325.3				Y										Y	Y
C325.4															
C325.5															
C325.6															

CO Attainment based on Exam Questions:

C325.1	67%	33%												75%	100%
C325.2		33%	88%	85%										75%	100%
C325.3				85%										75%	100%
C325.4															
C325.5															
C325.6															

CO	Subj	obj	Asgn	Overall	Level
C325.1	50%	75%	100%	75%	3
C325.2	68%	75%	100%	81%	3
C325.3	85%	75%	100%	87%	3
C325.4					
C325.5					
C325.6					

Attainment Level	
1	50%
2	75%
3	>75%

Overall Course attainment level=3.00

Faculty

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Annexure I (Form 2)

Internal Exam-2Marks Evaluation Sheet

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Department of Electronics & Communication Engineering
Course Outcome Attainment (Internal Examination-2)

Name of the faculty : Y. Vishwa Sri — Academic Year: 2018-19
Branch & Section: ECE — Examination: II Internal
Course Name: Digital Signal Processing — Year: III — Semester: II

S.No	HT No.	Question No. Q1	Q2	Q3	Q4								Obj2	A2
Max. Marks ==>		5	5	5	5								10	5
1	16RA1A0401	2.5	2.5										6.5	5
2	16RA1A0403	2.5		2.5									4.5	5
3	16RA1A0404	1.5											7.5	5
4	16RA1A0405	5	5										7.5	5
5	16RA1A0407	2.5		2.5									6	5
6	16RA1A0408	4.5	5										7	5
7	16RA1A0409	2.5		2.5									7	5
8	16RA1A0412	3.5	5										5.5	5
9	16RA1A0413		5	2.5									6.5	5
10	16RA1A0414		5	3.5									7	5
11	16RA1A0416		1	2									5.5	5
12	16RA1A0419	1			2.5								6	5
13	16RA1A0420		1.5	2									5	5
14	16RA1A0421		2.5	2.5									6.5	5
15	16RA1A0422	4.5											6	5
16	16RA1A0424	2			2								6.5	5
17	16RA1A0425	4.5	2.5										6	5
18	16RA1A0427		2										6.5	5
19	16RA1A0429		2	2									6	5
20	16RA1A0430	3		4									6.5	5
21	16RA1A0431			2.5	3								6.5	5
22	16RA1A0432	4	5										6.5	5
23	17RA5A0401	5		4.5									7.5	5
24	16U51A0487	2	2										5	5
Performance Target set by the faculty / HoD		50%	50%	50%	50%								50%	50%
Number of students performed above the target		8	10	3	1	0	0	0	0	0	0	0	21	24
Number of students attempted		16	14	12	3	0	0	0	0	0	0	0	24	24
Percentage of students scored more than target		50%	71%	25%	33%								88%	100%

CO Mapping with Exam Questions:

C325.1														
C325.2														
C325.3													Y	Y
C325.4		Y	Y										Y	Y
C325.5	Y			Y									Y	Y
C325.6	Y	Y	Y											

CO Attainment based on Exam Questions:

C325.1														
C325.2														
C325.3													88%	100%
C325.4		71%	25%										88%	100%
C325.5	50%			33%									88%	100%
C325.6	50%	71%	25%											

CO	Subj	obj	Asgn	Overall	Level
C325.1					
C325.2					
C325.3					
C325.4	48%	88%	100%	79%	3
C325.5	42%	88%	100%	76%	3
C325.6	49%	88%	100%	79%	3

Attainment Level	
1	50%
2	75%
3	>75%

Overall Course Attainment = 3.00

Faculty

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Annexure I (Form 3)

University Marks

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Department of Electronics & Communication Engineering

Course Outcome Attainment (University Examinations)

Name of the faculty : Y. Vishwa Sri | Academic Year: 2018-19

Branch & Section: ECE | Exam: External

Subject: Digital Signal Processing | Year: III

Semester: II

S.No	REG. NO	TOTAL
	Max Marks	10.00
1	16RA1A0401	0
2	16RA1A0403	5
3	16RA1A0404	5
4	16RA1A0405	8
5	16RA1A0407	6
6	16RA1A0408	6
7	16RA1A0409	5
8	16RA1A0412	7
9	16RA1A0413	6
10	16RA1A0414	9
11	16RA1A0416	0
12	16RA1A0419	5
13	16RA1A0420	5
14	16RA1A0421	5
15	16RA1A0422	5
16	16RA1A0424	6
17	16RA1A0425	6
18	16RA1A0427	0
19	16RA1A0429	0
20	16RA1A0430	6
21	16RA1A0431	5
22	16RA1A0432	7
23	17RA5A0401	5
24	16U51A0487	5
Performance Target set by the faculty / HoD		40%
Number of students performed above the target		20
Number of successful students		24
Percentage of students scored more than target		83%
Attainment level		3

Attainment Level	Percentage students
1	50%
2	75%
3	>75%

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Annexure I (Form 4)

CO Attainments of Theory Subject

KPRIT

KOMMURI PRATAP REDDY INSTITUTE OF TECHNOLOGY

Department of Electronics & Communication Engineering

Course Outcome Attainment

Name of the faculty : Y. Vishwa Sri — Academic Year: 2018-19

Branch & Section: ECE — Year: III

Subject: Digital Signal Processing — Semester: II

Course Outcomes	1st Internal Exam	2nd Internal Exam	3rd Internal Exam	Internal Exam	University Exam
C325.1	3			3.00	3.00
C325.2	3			3.00	3.00
C325.3	3			3.00	3.00
C325.4		3		3.00	3.00
C325.5		3		3.00	3.00
C325.6		3		3.00	3.00
Internal & University Attainment:				3.00	3.00
Weightage				60%	40%
CO Attainment for the course (Internal, University)				1.80	1.20
CO Attainment for the course (Direct Method)				3.00	

	Course Outcomes	Attainment Level
C325.1	Express time, frequency, and z-transform analysis on signals and systems. [Comprehension]	3.00
C325.2	Identify the fast computation of DFT and appreciate the FFT processing. [Knowledge]	3.00
C325.3	Summarize the significance of various filter structures and their advantages.[Evaluation]	3.00
C325.4	Design IIR digital filters using Step & Impulse Invariant Method & Bilinear Transformation Method. [Synthesis]	3.00
C325.5	Design FIR digital filter for a given specifications. [Synthesis]	3.00
C325.6	Differentiate the trade-offs between normal and multi rate DSP techniques and finite length word effects. [Analysis]	3.00
Overall course attainment level		**3.00**

Faculty

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Annexure I (Form 5)

PO/PSO Attainments of Theory Subject

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Department of Electronics & Communication Engineering

Program Outcome Attainment (from Course)

Name of Faculty: Y. Vishwa Sri — Academic Year: 2018-19
Branch & Section: ECE — Year: III
Course Name: Digital Signal Processing — Semester: II

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C325.1	3	-	3	-	-	-	-	-	-	-	-	-	3	-	-
C325.2	-	3	-	-	-	3	-	-	-	-	-	-	-	3	-
C325.3	3	-	-	-	-	-	-	-	-	-	-	-	3	2	-
C325.4	-	-	3	2	-	-	-	-	-	-	-	-	3	-	-
C325.5	2	-	3	-	-	-	-	-	-	-	-	-	3	-	-
Guest lecture	-	-	-	3	3	-	-	-	-	-	-	3	-	3	-
C325.6	3	2	-	-	-	-	-	-	-	-	-	-	3	2	-
C325	2.75	2.5	3	2.5	3	3	-	-	-	-	-	3	3	2.5	-

	Course Outcome Statement	Level
C325.1	Express time, frequency, and z-transform analysis on signals and systems. [Comprehension]	3.00
C325.2	Identify the fast computation of DFT and appreciate the FFT processing. [Knowledge]	3.00
C325.3	Summarize the significance of various filter structures and their advantages.[Evaluation]	3.00
C325.4	Design IIR digital filters using Step & Impulse Invariant Method & Bilinear Transformation Method. [Synthesis]	3.00
C325.5	Design FIR digital filter for a given specifications. [Synthesis]	3.00
C325.6	Differentiate the trade-offs between normal and multi rate DSP techniques and finite length word effects. [Analysis]	3.00
	Overall course attainment level	**3.00**

PO-ATTAINMENT

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
PO Attainment	2.75	2.50	3.00	2.50	3.00	3.00						3.00	3.00	2.50	

CO contribution to PO - 33%, 67%, 100% (Level 1/2/3)

Faculty

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Annexure I (Form 6)

Laboratory Assesment Sheet

Kommuri Pratap Reddy Institute of Technology

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

LABORATORY ASSESSMENT

ACADEMIC YEAR 2018-19

Lab Name: DICA LAB **NAME OF FACULTY :** M.SRILEKHA

YEAR: III **Sem.** I

INTERNAL EVALUATION

S.No	H.T.No	Expt 1	Expt 2	Expt 3	Expt 4	Expt 5	Expt 6	Expt 7	Expt 8	Expt 9	Expt 10	Expt 11	Expt 12	Expt 13	Expt 14	Expt 15	Expt 16	Viva	Internal Exam marks	University marks
	Max. Marks	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**5**	**20**	**75**
1	16RA1A0401	8	10	7	8	8	9	8	6	9	7	8	9	8	6	8	9	3	16	70
2	16RA1A0403	10	9	10	10	10	9	10	10	8	10	10	9	9	9	10	8	3	18	71
3	16RA1A0404	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	2	16	72
4	16RA1A0405	10	10	10	10	7	10	10	10	10	10	10	10	10	10	10	9	4	17	74
5	16RA1A0407	9	10	8	10	10	8	8	9	8	10	9	9	9	8	8	8	4	18	73
6	16RA1A0408	10	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	4	17	72
7	16RA1A0409	9	10	9	10	9	10	10	10	10	10	10	10	10	10	10	9	4	19	74
8	16RA1A0412	10	10	10	10	10	7	7	10	10	10	10	10	10	10	10	10	4	19	74
9	16RA1A0413	10	9	10	8	10	10	10	10	9	10	10	10	8	10	10	9	4	17	73
10	16RA1A0414	10	9	9	10	10	8	10	10	10	8	10	10	8	10	10	10	4	19	72
11	16RA1A0416	9	8	10	9	8	10	8	10	9	10	9	10	10	9	10	9	2	16	66
12	16RA1A0419	10	10	10	10	9	10	9	9	10	10	9	8	10	10	9	10	4	18	70
13	16RA1A0420	10	10	10	10	10	9	10	10	10	10	10	10	10	10	10	9	2	16	69
14	16RA1A0421	10	8	9	10	10	9	9	7	8	9	10	8	9	9	8	8	3	18	71
15	16RA1A0422	8	10	10	10	9	10	10	10	10	10	10	10	10	10	10	10	3	17	70
16	16RA1A0424	10	9	9	8	10	7	10	9	10	10	10	10	10	10	10	10	3	18	72
17	16RA1A0425	10	9	10	8	10	7	10	9	10	7	10	10	10	10	9	10	3	18	70
18	16RA1A0427	10	9	10	8	10	7	10	9	10	10	10	10	10	10	10	9	3	19	73
19	16RA1A0429	10	9	9	8	9	7	10	9	10	10	7	10	10	10	10	10	2	13	64
20	16RA1A0430	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	2	18	71
21	16RA1A0431	9	8	7	9	8	9	10	9	8	10	9	9	7	8	8	9	4	19	73
22	16RA1A0432	10	9	8	8	9	9	9	10	8	9	10	9	8	8	9	9	4	18	72
23	16U51A0487	9	9	8	10	8	10	9	10	8	9	9	10	8	8	10	8	3	17	65
24	17RA5A0401	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	4	20	74
No. of Students scored > target Marks		24	24	22	24	23	19	23	22	24	22	23	24	23	23	24	24	11	23	24
Total No. of Students		24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
% Students scored > target Marks		100%	100%	92%	100%	96%	79%	96%	92%	100%	92%	96%	100%	96%	96%	100%	100%	46%	96%	100%

C317.1	100%	100%				79%	96%										100%	46%	96%	100%
C317.2			95%								96%	100%	96%	96%	100%			46%	96%	100%
C317.3				100%														46%	96%	100%
C317.4									100%									46%	96%	100%
C317.5					96%					92%								46%	96%	100%
C317.6								92%										46%	96%	100%

C317.1	3	3				1	3										3	1	3	3
C317.2			3								3	3	3	3	3			1	3	3
C317.3				3														1	3	3
C317.4									3									1	3	3
C317.5					3					2								1	3	3
C317.6								2										1	3	3

OVERALL LABORATORY ATTAINMENT LEVEL: 2.64

Weightage	
Experiments	20%
Internal Exam	30.0%
University exam	75.0%

ASSESSMENT	ATTAINMENT
<=90% students attained	1
90-95% students attained	2
>=95% students attained	3

LABORATORY INCHARGE Assessment Coordinator

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Annexure I (Form 7)

Mapping of Laboratory Experiments with COs

KOMMURI PRATAP REDDY INSTITUTE OF TECHNOLOGY

Department of Electronics & Communication Engineering

Experiment CO Mapping

Name of Faculty: M.Srilekha

Branch & Section: ECE

Lab Name: DICA

A.Y-2018-19, Year:III, Semester: I

Expt No	Title of the Experiment	CO mapped
1	Design of 16X4 priority encoder using two 8X3 priority encoder.	C317.1
2	Design a 16 bit comparator using 4 bit comparator	C317.1
3	Design a mod -53 counter using two decade counters	C317.2
4	Design a 450 khz clock using NAND/NOR gates	C317.3
5	Design a 4-bit pseudo random sequence generator	C317.5
6	Design 16X1 Mux using two 8X1 Mux	C317.1
7	Design a 16 bit Adder/Subtractor	C317.1
8	plot the Transform Charecterstics of 74H,74LS,HS IC's	C317.6
9	Design a 4-bit Gray to Binary & Binary to Gray	C317.4
10	Design a two digit 7 segment display	C317.5
11	Design a 8-bit parallel load Serial out shift register using 4 bit	C317.2
12	Design a 8 bit serial in serial out shift register using 4 bit	C317.2
13	Design a ring counter &Twisted Ring Counter	C317.2
14	Design a4 digit Hex counter using synhronous 1 digit hex counter	C317.2
15	Design a4 digit Hex counter using Asynhronous 1 digit hex	C317.2
	Additional Experment	
16	Design 8X1 Mux using two 4X1 Mux	C317.1

Associated Theory Course Outcomes:

CO1	student can able to design various combinational circuits like Encoder/Decoder,Mux/Demux,Adder/Subtractor.
CO2	student can able to design various Sequential circuits like Counters in synchronous and Asynchronous modes.
CO3	student can able to Realize various circuits by using NAND/NOR Gates.
CO4	Student can understand various conversions by using binary digits.
CO5	student can generate various binary sequences randomly.
CO6	can plot charecterstics by using different IC's

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Annexure I (Form 8)

CO Attainments of Laboratory Experiments

KOMMURI PRATAP REDDY INSTITUTE OF TECHNOLOGY

Department of Electronics & Communication Engineering

Course Outcome Attainment (from Lab)

Name of Faculty: M.Srilekha
Branch & Section: ECE
Lab Name: DICA

Academic Year: 2018-19
Year: III
Semester: I

Course Outcomes	Day to day evaluation	Internal Exam	External Exam
C317.1	2.60	2.00	3.00
C317.2	3.00	2.00	3.00
C317.3	3.00	2.00	3.00
C317.4	3.00	2.00	3.00
C317.5	2.50	2.00	3.00
C317.6	2.00	2.00	3.00
Internal & University Attainment:	2.68	2.00	3.00
Weightage	20%	30%	50%
O Attainment for the course (Internal, Universi	0.54	0.60	1.50
CO Attainment for the course (Direct Method)	2.64		

faculty

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Medchal-Malkajgiri Dist.-501301 T.S.

Annexure I (Form 9)

PO/PSO Attainments of Laboratory Experiments

KOMMURI PRATAP REDDY INSTITUTE OF TECHNOLOGY

Department of Electronics & Communication Engineering

Program Outcome Attainment (from Lab)

Name of Faculty: M.Srilekha
Academic Year: 2018-19
Branch & Section: ECE
Year: III
Lab Name: DICA
Semester: I

CO-PO mapping

	PO1	PO 2	PO3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
C317.1	2	1	3	-	2	-	-	-	1	-	-	-	3	2	1
C317.2	2	1	3		-	2	-	-	1	-	-	-	3	2	1
C317.3	-	-	-	1	3	-	-	-	1	-	-	-	2	2	-
C317.4	1	3	-	-	-	-	-	-	1	-	-	-	3	-	-
C317.5	1	-	3	-	-	-	-	-	1	-	-	-	3	-	-
C317.6	3		2		1				1					2	3
C317	1.8	1.67	2.75	1	2	2			1				2.8	2	1.67

Overall Lab CO attainement level	2.64

PO-ATTAINMENT

	PO1	PO 2	PO3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
PO Attainment	1.58	1.47	2.42	0.88	1.76	1.76			0.88				2.46	1.76	1.47

CO contribution to PO - 33%, 67%, 100% (Level 1/2/3)

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Annexure I (Form10)

CO Attainments of Projects

KOMMURI PRATAP REDDY INSTITUTE OF TECHNOLGY

KPRIT

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

PROJECT ATTAINMENTS

AY: 2018-19 Name of the Guide: B. Krishnaveni

NAME OF PROJECT : Automatic Vehicle monitoring system using ARDUINO and GPS

Batch Number 9

S.NO.	Regd. No.	REVIEW 1	REVIEW 2	REVIEW 3	DAY TO DAY EVALUATION	UNIVERSITY EXAMINATION
1	15RA1A0403	43	44	42	10	140
2	15RA1A0413	43	40	45	8	138
3	15RA1A0415	39	41	38	8	122
	AVERAGE	41.6666667	41.67	41.67	8.67	133.3333333
	% MARK	83%	83%	83%	87%	89%
	CO 1	√			√	√
	CO 2	√			√	√
	CO 3		√		√	√
	CO 4		√		√	√
	CO 5			√	√	√
	CO 6			√	√	√

CO 1	83%			87%	89%	87%	2
CO 2	83%			87%	89%	87%	2
CO 3		83%		87%	89%	87%	2
CO 4		83%		87%	89%	87%	2
CO 5			83%	87%	89%	87%	2
CO 6			83%	87%	89%	87%	2
						87%	2

CO Statement

C426 .1: To *acquire* practical knowledge in spite of theoretical concepts he/she acquired *(Application)*.

C426.2: To *Recognise* uncertainty of open ended investigations like technical problems and difficulties in collecting the required data *(knowledge)* .

C426.3: To *differentiate* open ended projects and set of practicals(Comparasion) .

C426.4: To *develop* their communication and team work skills*(synthesys)*.

C426.5: To *Asses* different tools /soft ware's and protocols which he used in the project(Evaluation).

C426.6: To Simulate their Software results and dump into hardware for testing (Analysis).

ASSESSMENT	ATTAINMENT
<=85% Students	1
85 TO 90% Students	2
>=90% Students	3

Project attainment level 3

Guide

ASSESSMENT COORDINATOR

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KOMMURI PRATAP REDDY INSTITUTE OF TECHNOLGY
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
PROJECT CO ATTAINMENTS
AY: 2018-19

Overall

	Batch 1	Batch 2	Batch	Batch 4	Batch 5	Batch 6	Batch 7	Batch 8	Batch 9	Avg
C426.1	90%	89%	89%	91%	92%	97%	96%	92%	87%	91%
C426.2	90%	89%	89%	91%	92%	97%	96%	92%	87%	91%
C426.3	91%	89%	90%	91%	93%	97%	96%	93%	87%	92%
C426.4	91%	89%	90%	91%	93%	97%	96%	93%	87%	92%
C426.5	91%	88%	89%	91%	93%	97%	97%	91%	87%	91%
C426.6	91%	88%	89%	91%	93%	97%	97%	91%	87%	91%

	Batch 1	Batch 2	Batch	Batch 4	Batch 5	Batch 6	Batch 7	Batch 8	Batch 9	Avg
C426.1	3	2	2	3	3	3	3	3	2	2.67
C426.2	3	2	2	3	3	3	3	3	2	2.67
C426.3	3	2	3	3	3	3	3	3	2	2.78
C426.4	3	2	3	3	3	3	3	3	2	2.78
C426.5	3	2	2	3	3	3	3	3	2	2.67
C426.6	3	2	2	3	3	3	3	3	2	2.67

Reviews

	Batch 1	Batch 2	Batch	Batch 4	Batch 5	Batch 6	Batch 7	Batch 8	Batch 9	Avg
C426.1	80%	87%	89%	85%	88%	95%	93%	89%	83%	88%
C426.2	80%	87%	89%	85%	88%	95%	93%	89%	83%	88%
C426.3	83%	90%	92%	87%	90%	95%	93%	93%	83%	90%
C426.4	83%	90%	92%	87%	90%	95%	93%	93%	83%	90%
C426.5	83%	84%	86%	85%	89%	95%	96%	88%	83%	88%
C426.6	83%	84%	86%	85%	89%	95%	96%	88%	83%	88%

	Batch 1	Batch 2	Batch	Batch 4	Batch 5	Batch 6	Batch 7	Batch 8	Batch 9	Avg
C426.1	1	2	2	1	2	3	3	2	1	1.89
C426.2	1	2	2	1	2	3	3	2	1	1.89
C426.3	1	3	3	2	3	3	3	3	1	2.44
C426.4	1	3	3	2	3	3	3	3	1	2.44
C426.5	1	1	2	1	2	3	3	2	1	1.78
C426.6	1	1	2	1	2	3	3	2	1	1.78

Day to day evaluation

	Batch 1	Batch 2	Batch	Batch 4	Batch 5	Batch 6	Batch 7	Batch 8	Batch 9	Avg
C426.1	90%	90%	90%	90%	90%	90%	90%	90%	87%	90%
C426.2	90%	90%	90%	90%	90%	90%	90%	90%	87%	90%
C426.3	90%	90%	90%	90%	90%	90%	90%	90%	87%	90%
C426.4	90%	90%	90%	90%	90%	90%	90%	90%	87%	90%
C426.5	90%	90%	90%	90%	90%	90%	90%	90%	87%	90%
C426.6	90%	90%	90%	90%	90%	90%	90%	90%	87%	90%

	Batch 1	Batch 2	Batch	Batch 4	Batch 5	Batch 6	Batch 7	Batch 8	Batch 9	Avg
C426.1	3	3	3	3	3	3	3	3	2	2.89
C426.2	3	3	3	3	3	3	3	3	2	2.89
C426.3	3	3	3	3	3	3	3	3	2	2.89
C426.4	3	3	3	3	3	3	3	3	2	2.89
C426.5	3	3	3	3	3	3	3	3	2	2.89
C426.6	3	3	3	3	3	3	3	3	2	2.89

External

	Batch 1	Batch 2	Batch	Batch 4	Batch 5	Batch 6	Batch 7	Batch 8	Batch 9	
C426.1	94%	89%	89%	93%	94%	98%	98%	93%	89%	93%
C426.2	94%	89%	89%	93%	94%	98%	98%	93%	89%	93%
C426.3	94%	89%	89%	93%	94%	98%	98%	93%	89%	93%
C426.4	94%	89%	89%	93%	94%	98%	98%	93%	89%	93%
C426.5	94%	89%	89%	93%	94%	98%	98%	93%	89%	93%
C426.6	94%	89%	89%	93%	94%	98%	98%	93%	89%	93%

	Batch 1	Batch 2	Batch	Batch 4	Batch 5	Batch 6	Batch 7	Batch 8	Batch 9	
C426.1	3	2	2	3	3	3	3	3	2	2.67
C426.2	3	2	2	3	3	3	3	3	2	2.67
C426.3	3	2	2	3	3	3	3	3	2	2.67
C426.4	3	2	2	3	3	3	3	3	2	2.67
C426.5	3	2	2	3	3	3	3	3	2	2.67
C426.6	3	2	2	3	3	3	3	3	2	2.67

CO Code	Internal Assessment Rating (25 %)	Day to day evaluation rating (5%)	University Assessment Rating (70 %)	Overall CO Attainment (100%)	Remarks
C426.1	1.89	2.89	2.67	2.48	Level 2
C426.2	1.89	2.89	2.67	2.48	Level 2
C426.3	2.44	2.89	2.67	2.62	Level 3
C426.4	2.44	2.89	2.67	2.62	Level 3
C426.5	1.78	2.89	2.67	2.46	Level 2
C426.6	1.78	2.89	2.67	2.46	Level 2
Average	2.04	2.89	2.67	2.61	Level 2

Faculty

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Annexure I (Form 11)

PO/PSO Attainments of Projects

KPRIT

KOMMURI PRATAP REDDY INSTITUTE OF TECHNOLGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

PROJECT PO ATTAINMENTS

AY: 2018-19

s. No.	Batch No.	Assessment	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
1	Batch 1	91%	3	3	3	3	3	3	3		3	3	3	3	3	3	3
2	Batch 2	89%	2		2	2	2	2	2			2	2	2	2	2	2
3	Batch 3	89%	2.33		2.33	2.33	2.33	2.33		2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33
4	Batch 4	91%	3		3	3	3	3	3			3	3	3	3	3	3
5	Batch 5	93%	3		3		3	3	3			3		3	3	3	3
6	Batch 6	97%	3		3	3	3	3	3			3	3	3	3	3	3
7	Batch 7	96%	3	3	3	3	3	3		3	3	3	3	3	3	3	3
8	Batch 8	92%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
9	Batch 9	87%	2		2	2	2	2	2			2	2	2	2	2	2
Attainment Level		92%	2.70	3.00	2.70	2.67	2.70	2.70	2.71	2.78	2.83	2.70	2.67	2.70	2.70	2.70	2.70

Faculty

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Annexure II (Form 12)

AlumniFeedback Form

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ALUMNI FEEDBACK FORM

Dear Alumni

We are glad that you have spent valuable years for pursuing B.Tech course in our college. You will be pleased to know that your college has, in a short period of time, grown to be one of the leading and sought-after colleges. We would like to place on record that your co-operation and support has contributed in no small measure for this achievement.

We shall very much appreciate and be thankful if you can spare some of your valuable time to fill up this feedback form and give us your valuable suggestions for improvement of the college. Your valuable inputs will be of great use to improve the quality of our academic programs and enhance the credibility of our college.

Hall Ticket No.: 13 RA1A0 4 50 **Year of Graduation:** 19

Tick the number that best describes your level of satisfaction at each question: 1 - Satisfied, 2 – Moderately Satisfied, 3 – Highly Satisfied.

S.NO	Attributes	1	2	3
1	Knowledge of mathematics, science and engineering helped you in your area of expertise.		✓	
2	Able to identify and analyze complex engineering problems using principles of mathematical engineering sciences for job specification		✓	
3	Engineering knowledge helped you to take up projects in your present field.			✓
4	Received performance awards after completion of research based tasks.		✓	
5	Able to apply recent software tools to justify the impacts in problem solutions.		✓	
6	Able to correlate overall impact of engineering and technology on the issues like economy, society and human health.			✓
7	Able to cater to the requirements of clients and of society as a whole, working to optimize social, environmental and economic outcomes.			✓
8	Able to shoulder the professional and ethical responsibilities for social development.			✓
9	Learning at KPRIT helped you take up tasks/ projects as team leader or member.			✓
10	Communications skills helped you building the membership/ relation to execute any project in your profession.		✓	
11	Program encouraged you to develop a system involved in R&D or allied fields using engineering knowledge.		✓	
12	Program encouraged you to continue professional development or pursue higher education in electronics or allied fields.		✓	
13	Program encouraged you to understand the concepts of basic Electronics & Communication Engineering and to apply them to various areas like Signal processing, VLSI, Embedded Systems, Digital & Analog Devices.		✓	
14	Able to solve complex Electronics & Communication Engineering problems, using latest hardware and software tools, along with analytical skills to arrive at cost effective and appropriate solutions.			✓
15	Program encouraged you to develop Wisdom of social and environmental awareness along with ethical responsibility to have a successful career and to sustain passion and zeal for real-world applications using optimal resources as an Entrepreneur.		✓	

SIGNATURE

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Annexure II (Form 13)

Employer FeedBackForm

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FEEDBACK FORM EMPLOYERS

Name of the Company/Institutions: Stealth Techno Crats.

Name of the evaluating person with Designation: Vishaka Thakur / HR.

Tick the number that best describes your level of satisfaction at each question: 1 - Satisfied, 2 – Moderately Satisfied, 3 – Highly Satisfied.

S. No	Description	1	2	3
1	Ability to contribute to the goal of the organization.			✓
2	Technical knowledge/skill Ability to manage/leadership Innovativeness.		✓	
3	Creativity.		✓	
4	Relationship with senior/peers/subordinates.			✓
5	Ability and motivation for social activity.			✓
6	Obligation to work beyond schedule if required.		✓	
7	Overall impression about their performance.			✓
8	Common Computer Center / Internet facilities			✓
9	Software facilities			✓
10	T & P Facilities			✓
11	Self- Learning Facility such as NPTEL, e- Journals,		✓	
12	Overall impression about infrastructure			✓

Signature (Optional)

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Annexure II (Form 14)

Exit Student FeedBackForm

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GRADUATE EXIT SURVEY

Dear Student

This questionnaire requests information to assist KPRIT in understanding your experiences as a graduate student and to determine how services and programs can be improved. The information you supply on this questionnaire will be kept completely confidential. Combined student responses will be shared with the Principal of the College, Department Heads, and other college officials. It is important that you respond carefully to each question.

Hall Ticket No.: 15RA1A0415 Year of Graduation: 18-19.

Tick the number that best describes your level of satisfaction at each question: 1 - Satisfied, 2 – Moderately Satisfied, 3 – Highly Satisfied.

-S. NO	At the end of B.Tech ECE Program I am able to	1	2	3
1	Apply the knowledge of mathematics, science and engineering fundamentals to the solution of complex engineering problems.		✓	
2	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.		✓	
3	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.		✓	
4	Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.		✓	
5	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.			✓
6	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.			✓
7	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	✓		
8	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	✓		
9	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.			✓
10	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.			✓

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11	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.		✓	
12	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.			✓
13	Ability to understand the concepts of basic Electronics & Communication Engineering and to apply them to various areas like Signal processing, VLSI, Embedded Systems, Digital & Analog Devices.		✓	
14	Ability to solve complex Electronics & Communication Engineering problems, using latest hardware and software tools, along with analytical skills to arrive at cost effective and appropriate solutions.		✓	
15	Wisdom of social and environmental awareness along with ethical responsibility to have a successful career and to sustain passion and zeal for real-world applications using optimal resources as an Entrepreneur.			✓

Signature (Optional)

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