

**CE701PC: QUANTITY SURVEY & VALUATION****B.Tech. IV Year I Sem.**

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

**Course Objectives:** The subject provide process of estimations required for various work in construction. To have knowledge of using SOR &SSR for analysis of rates on various works and basics of planning tools for a construction projects.

**Course Outcomes:** On completion of the course, the students will be able to:

- Understand the technical specifications for various works to be performed for a project and how they impact the cost of a structure.
- Quantify the worth of a structure by evaluating quantities of constituents, derive their cost rates and build up the overall cost of the structure.
- Understand how competitive bidding works and how to submit a competitive bid proposal.

**UNIT – I**

General items of work in Building - Standard Units Principles of working out quantities for detailed and abstract estimates - Approximate method of Estimating.

**UNIT – II**

Detailed estimation of single and multi storied building.

**UNIT – III**

Reinforcement bar bending and bar requirement schedules Earthwork for roads and canals.

**UNIT – IV**

Rate Analysis - Working out data for various items of work over head and contingent charges.

**UNIT-V**

Contracts - Types of contracts - Contract Documents - Conditions of contract, Valuation -Standard specifications for different items of building construction.

**NOTE:** NUMBER OF EXERCISES PROPOSED:

1. Three in flat Roof & one in Sloped Roof
2. Exercises on Data - three Nos.

**TEXT BOOKS:**

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Estimating and Costing by G.S. Birdie
3. Punmia, B.C., Khandelwal, K.K., Project Planning with PERT and CPM, Laxmi Publications, 2016
4. Chitkara, K. K. Construction Project Management. Tata McGraw-Hill Education, 2014

**REFERENCE BOOKS:**

1. Standard Schedule of rates and standard data book by public works department.
2. S. 1200 (Parts I to XXV - 1974/ method of measurement of building and Civil Engineering works - B.I.S.)
3. Estimation, Costing and Specifications by M. Chakraborti; Laxmi publications.
4. Peurifoy, R.L. Construction Planning, Methods and Equipment, McGraw Hill, 2011
5. Nunnally, S.W. Construction Methods and Management, Prentice Hall, 2006
6. Jha, Kumar Neeraj., Construction Project management, Theory & Practice, Pearson Education India, 2015.

**CE702PC: PROJECT MANAGEMENT****B.Tech. IV Year I Sem.**

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

**Course Objective:** The Objective of this course is to lay on important foundation to student in managing projects with a special focus on every phase such as project planning, execution, monitoring and evaluation.

**Course Outcome:** Students will be able to understand

- Importance of Project Management.
- Project Planning, Execution and implementation.
- Significance of teams in projects.
- Project evaluation techniques.

**UNIT- I:**

**Introduction:** Introduction to Project management - Project Characteristics-Project Life cycle- Project Identification. Formulation and implementation. Project management in different sectors: Construction, Services Sector, Public sector and Government Projects. Systems approach to project management.

**UNIT- II:**

**Project Planning and Appraisal:** Project Planning - Project Appraisal-Feasibility Study-Technical, Commercial, Economic, Financial, Management, Social Cost Benefit Analysis-Project Risk Analysis.

**UNIT- III:**

**Project Finance:** Project Cost Estimation, Project Financing-Investment Criteria. Project Evaluation Techniques - Pay Back Period, Accounting rate of return. Net present value, Internal Rate of return, Profitability Index, Cash Flows Estimation for new and replacement projects-Cost of Capital, Risk Analysis.

**UNIT- IV:**

**Project Planning and Control:** Planning Steps-Scheduling- Network Diagrams. Network Analysis, Critical Path, Quality Management, Project Execution, Monitoring and control, Agile project Management, Scrum, Lean Production and project management.

**UNIT- V: Organizational Behavior and Project Management:** Organizational Structure and Integration, Role of Project manager, Roles in the project team, Project stakeholder engagement. Leadership in project management, participative management, team building approach. Conflict Management in Projects, Stress Management.

**SUGGESTED READING:**

1. Join M. Nicholas and Herman Steyn, Project Management for Engineering. Business and Technology, 5e, Routledge, 2017
2. Prasanna Chandra, Projects. Planning, Analysis. Selection. Financing Implementation and review, 6e, TATA Mc Gaw Hill 2008.
3. K. Nagrajan, Project Management, New Age International publishers, 7e 2015.
4. Jack Gido, Jim Clements Rose Baker. Successful Project Management. Cengage Learning, 7e 2015.
5. R Pancerselvam. P. Senthil Kumar, Project Management. PHI, 2009.

**CE721PE: PRESTRESSED CONCRETE (Professional Elective – II)****B.Tech. IV Year I Sem.**

L	T	P	C
3	0	0	3

**Pre-Requisites:** Reinforced Concrete Design**Course Objectives:** The objectives of the course are to

- Understand the principles & necessity of prestressed concrete structures.
- Know different techniques of prestressing.
- Get the knowledge on various losses of prestress.
- Understand Analysis and design of prestressed concrete members.

**Course Outcomes:** After the completion of the course student should be able to

- Acquire the knowledge of evolution of process of prestressing.
- Acquire the knowledge of various prestressing techniques.
- Develop skills in analysis design of prestressed structural elements as per the IS codal provisions.

**UNIT - I:**

**Introduction:** Historic development- General principles of prestressing pre-tensioning and post tensioning- Advantages and limitations of Prestressed concrete- General principles of PSC- Classification and types of prestressing- Materials- high strength concrete and high tensile steel their characteristics.

**UNIT - II:**

**Methods and Systems of prestressing:** Pre-tensioning and Posttensioning methods and systems of prestressing like Hoyer system, Magnel Blaton system, Freyssinet system and Gifford- Udall System- Lee McCall system. **Losses of Prestress:** Loss of prestress in pretensioned and posttensioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, relaxation of stress in steel, slip in anchorage, frictional losses.

**UNIT - III:**

**Flexure:** Analysis of sections for flexure- beams prestressed with straight, concentric, eccentric, bent and parabolic tendons- stress diagrams- Elastic design of PSC slabs and beams of rectangular and I sections- Kern line - Cable profile and cable layout.

**Shear:** General Considerations- Principal tension and compression- Improving shear resistance of concrete by horizontal and vertical prestressing and by using inclined or parabolic cables- Analysis of rectangular and I beams for shear - Design of shear reinforcements- IS Code provisions.

**UNIT - IV:**

**Transfer of Prestress in Pretensioned Members:** Transmission of prestressing force by bond - Transmission length - Flexural bond stresses - IS code provisions - Anchorage zone stresses in post tensioned members - stress distribution in End block - Analysis by Guyon, Magnel, Zienlinski and Rowe's methods - Anchorage zone reinforcement- IS Provisions

**UNIT - V:**

**Composite Beams:** Different Types- Propped and Unpropped- stress distribution- Differential shrinkage- Analysis of composite beams- General design considerations.

**Deflections:** Importance of control of deflections- Factors influencing deflections - Short term deflections of uncracked beams- prediction of long time deflections- IS code requirements.

**REFERENCE BOOKS:**

1. Prestressed concrete by Krishna Raju, Tata Mc Graw Hill Book - Co. New Delhi.
2. Design of prestress concrete structures by T.Y. Lin and Burn, John Wiley, New York.
3. Prestressed concrete by S. Ramamrutham Dhanpat Rai & Sons, Delhi.
4. Prestressed Concrete by N. Rajagopalan Narosa Publishing House

**Reference Codes:** IS 1343:2016.

**CE732PE: GROUND IMPROVEMENT TECHNIQUES (PE – III)****B.Tech. IV Year I Sem.**

L	T	P	C
3	0	0	3

**Prerequisites:** Geo-Technical Engineering, Foundation Engineering**Course Objectives:**

- To Identify difficult ground conditions in engineering practice.
- To select suitable ground improvement techniques for problematic soils.
- To assess suitable physical, chemical, mechanical and hydraulic modifications.

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

- Understand the various ground improvement methods.
- Assess different compaction methods for ground modification.
- Design dewatering systems to reduce the settlements.
- Comprehend stabilizations with chemical and grouting techniques.
- Understand the principles of soil reinforcement and confinement in engineering constructions.

**UNIT - I**

**Introduction to Engineering Ground Modification:** Need and objectives, Identification of soil types, In situ and laboratory tests to characterize problematic soils; Mechanical, Hydraulic, Physico-chemical, Electrical, Thermal methods, and their applications.

**UNIT - II**

**Mechanical Modification** - Deep Compaction Techniques- Blasting Vibrocompaction, Dynamic Tamping and Compaction piles.

**UNIT - III**

**Hydraulic Modification** - Objectives and techniques, traditional dewatering methods and their choice, Design of dewatering system, Electro-osmosis, Electro-kinetic dewatering. Filtration, Drainage and Seepage control with Geosynthetics, Preloading and vertical drains.

**UNIT - IV**

**Physical and chemical modification:** Stabilization with admixtures like cement, lime, calcium chloride, fly ash and bitumen; Grouting: Categories of grouting, Art of grouting, Grout materials, Grouting techniques and control.

**UNIT - V**

**Modification by Inclusions and Confinement** - Soil reinforcement, reinforcement with strip, and grid reinforced soil. In-situ ground reinforcement, ground anchors, rock bolting and soil nailing.

**TEXT BOOKS:**

1. Hausmann, M. R. (1990) – Engineering Principles of Ground Modifications, McGraw Hill publications
2. M. P. Moseley and K. Krisch (2006) - Ground Improvement, II Edition, Taylor and Francis
3. Koerner, R. M (1994) - Designing with Geosynthetics - Prentice Hall, New Jersey.

**REFERENCE BOOKS:**

1. Jones C. J. F. P. (1985) - Earth Reinforcement and soil structures - Butterworths, London.
2. Xianthakos, Abreimson and Bruce - Ground Control and Improvement, John Wiley & Sons, 1994.
3. K. Krisch& F. Krisch (2010) - Ground Improvement by Deep Vibratory Methods, Spon Press, Taylor and Francis.
4. Donald P Coduto - Foundation Design Principles and Practices, 2<sup>nd</sup> edition, Pearson, Indian edition, 2012.

**CE743PE: GROUND WATER HYDROLOGY (PE – IV)****B.Tech. IV Year I Sem.**

L	T	P	C
3	0	0	3

**Pre-Requisites:** Hydraulics & Fluid Mechanics**Course objectives: The objectives of the course are:**

- To **explain** the concepts of Groundwater Development and Management.
- To **demonstrate and** derive the basic equations used in Groundwater development and management and the corresponding equations.
- To know the investigations, field studies to conduct basic ground water studies.

**Course Outcomes:** On successful completion of this course, students should be able to:

- **Identify** different fundamental equations and concepts as applied in the Groundwater studies.
- **Discuss** and derive differential equation governing groundwater flow in three dimensions.
- To **solve** groundwater mathematical equations and analyze pumping tests in steady and non-steady flow cases.
- **Distinguish** and understand the saline water intrusion problem in costal aquifers.

**UNIT- I**

**Ground Water Occurrence:** Ground water hydrologic cycle, origin of ground water, rock properties effecting ground water, Vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as aquifers, types of aquifers, porosity, specific yield and specific retention. Ground Water Movement- Permeability, Darcy's law, storage coefficient, Transmissivity, Differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinate system, ground water flow contours and their applications.

**UNIT- II**

**Analysis of Pumping Test Data-I:** Steady flow ground water flow towards a well in confined and unconfined aquifers-Dupit's and Theism's equations, assumptions, formation constants, yield of an open well interface and well tests.

**UNIT- III**

**Analysis of Pumping Test Data-II:** Unsteady flow towards well-Non-Equilibrium equations, Thesis solution, Jacob and Chow's simplifications, Leak aquifers.

**UNIT- IV**

**Surface and sub-surface Investigation:** Surface methods of exploration-Electrical resistivity method and Seismic refraction methods. Subsurface methods geophysical logging and resistivity logging. Concept of artificial recharge of ground water, recharge methods, Applications of GIS and RS in artificial recharge of ground water along with case studies.

**UNIT- V**

**Saline water intrusion in aquifer:** Occurrence of saline water intrusion, Ghyben-Herzberg relation, Shape of interface, control of water intrusion. Ground water basin management-case studies.

**TEXT BOOKS:**

1. Ground water Hydrology by David Keith Todd, John Wiley & Son, New York.
2. Ground water by H. M. Raghunath, Wiley Eastern Ltd.
3. Groundwater System Planning & Management, R. Willes & W.W.G. Yeh, Prentice Hall.

**REFERENCE BOOKS:**

1. Ground water by Bawvwr, John Wiley & Sons.
2. Applied Hydrogeology by C. W. Fetta, CBS Publishers & Distributors.
3. Ground Water Assessment, Development and Management by K R Karanth, McGraw Hill Publications.

**CE703PC: CIVIL ENGINEERING SOFTWARE LAB****B.Tech. IV Year I Sem.****L T P C**  
**0 0 2 1****Course Objectives:**

- Analyze and design structural elements.
- Apply water resources related problems.
- Design various geometric elements using transportation software.
- Analyze slope stability and seepage determination.
- Estimate the quantities of civil engineering structures.

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

- Understand the features and capabilities of the software.
- Apply fundamental principles in problem solving using software tools.
- Apply the software algorithm in the domain area.
- Develop solution for a range of problem of civil engineering using software tools and prepare technical report.

**Student Version Softwares:**

<b>Group 1</b>	<b>Group 2</b>	<b>Group 3</b>	<b>Group 4</b>	<b>Group 5</b>
1. STAAD 2. DESIGN BUILDER 3. MIDAS 4. ETabs	1. CIVIL 3D 2. ISSIM 3. ISSUM 4. MX Road	1. Plaxis 2. Geo Studio	1. eQuest 2. EPA SWMM 3. EPA EPZ Suite 4. EPA NET 5. QGIS 6. HECRAS	1. PRIMAVERA 2. TEKLA 3. RS & GIS

**\*Note:**

- 1.) Open/education/academic version of software is desirable.
- 2.) The student may choose any software one from each of the groups.

**List of experiments:**

1. Estimate, planning and management of any one civil engineering structure.
2. Analyze and design G+3 building.
3. Design various geometric elements and intersections for any Highway.
4. Analyze slope stability and seepage determination.
5. Analyze and design water networks, storm water, channel flow and flood determination.