

Semester-V

Course Title: Estimating & Costing

Course Code: CE-521

Duration of Exams: 3 hours

Max. Marks: 100

External Examination: 60

Internal Assessment: 40

Objective: The aim of this course is to make the students able enough to determine various quantities and the cost of civil engineering projects.

UNIT-I

Estimate & Types of Estimate: Importance, Items of a work and their Units. Types of estimates, viz. preliminary, Plinth are estimate, Cube rate estimate(for buildings), Approximate quantity method estimate, detailed estimate/Item rate estimate, revised estimate, supplementary estimate, bill of quantities and abstract of cost.

UNIT-II

Analysis of Rates: Preparing analysis of rates, labour schedule, material schedule & rate schedule. Analysis of rates - of lime concrete in foundation; Brickwork in Foundation, super structure, R.C.C. work (Beams, Slabs, Columns), Cement Plastering, white washing, earth work in foundation, D.P.C, Steel work for Reinforcement .

UNIT-III

Specifications: General specifications and detailed specifications, Book of specifications, specifications for earth work in foundation, L.C in foundation, R.C.C. work, Brick work, R.B. Work, Wood work in doors, windows. D.P.C, Centering and Shuttering.

UNIT-IV

Methods of Building Estimates: Estimates of building Estimates of walls, methods of building estimate, Long-wall, short-wall and centre line methods, Estimate of masonry platform, estimate of a masonry tank, estimate of roof trusses (wooden/steel). Estimate of a single room. Building-Estimate of a two roomed building, estimate of an R.C.C beam and R.C.C. Slab.

UNIT-V

Road Estimating & Valuation:

Methods of estimating: earth work, estimate of metallic road, Valuation, Purpose of valuation, Methods of valuation, (1: Rental Method, 2: Direct Comparison with the capital value, 3: Valuation based on profit, 4 : Valuation based on profit, 5: Depreciation method of valuation), Depreciation, Methods of calculating depreciation. Valuation of building-various methods, rent fixation, plinth area requirement.

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

1. Understand the different types of estimation.
2. Determine rates of different items.
3. Know specifications of engineering items.
4. Understand methods of estimation.
5. Estimate the various engineering projects.

Books Recommended:

1. **Datta B. N** : Estimating and Costing, UBS Publication
2. **Mahajan S.P, Satya Srakashan**: Civil Estimating, Costing Evaluation & Specifications.
- 3 **Khanna**: Hand Book of Civil Engineering.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit

Semester-V

Course Title: Structural Analysis-III

Course Code: CE-522

Duration of Exams: 3 hours

Max. Marks: 100

University Examination: 60

Sessional Assessment: 40

Objective: This course aims at honing the skills of students to analyse the indeterminate structures and introducing them to concept of plastic analysis of beams and frames and matrix methods.

UNIT-I

Moment Distribution Method: Analysis of propped cantilevers, continuous beams with fixed and simply supported ends. Analysis of portal frames with and without sway.

UNIT-II

Kani's Method: Analysis of continuous beams and portal frames. Influence lines for indeterminate structure, Muller Breslau's principle.

UNIT-III

Plastic Analysis: Plastic analysis of beams and frames. Redundant pin jointed frames.

UNIT-IV

Matrix Method: Matrix method of structural analysis (Force method). Approximate analysis of multi-story building frames lateral loads for multistory frames. (Portal method)

UNIT-V

Displacement and Cantilever Method: Matrix method structural analysis (Displacement method). Approximate analysis of multi-story. Building frames for lateral loads (cantilever method).

Course Outcome: After the completion of the course the students will be able to:

1. Analyse indeterminate structure by moment distribution methods.
2. Analyse indeterminate structure by Kani's methods.
3. Plastic analysis of beams and frames.
4. Analyse structure by force method and approximate analysis of multi-story building frames by portal method.
5. Analyse structure by stiffness method and approximate analysis of multi-story building frames by cantilever method.

Text Books

1. **Wang C. K.**, Intermediate Structural Analysis, Mc Graw Hill Publication.
2. **Ramamrutham S & Narayan R.**, Theory of Structures, Dhanpat Rai Publishing Company.

Books Recommended:

1. **Gere & Weaver**, Matrix Analysis of Framed Structures, CBS Publishers & Distributors.
2. **Robert D. Cook**, Concepts & Applications of Finite Element Analysis.
3. **Dawe D. J**, Matrix & Finite Element Displacement Analysis of Structures.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Semester-V

Course Title: Design of Structures-I
Course Code: CE-523
Duration of Exams: 3 hours

Max. Marks: 100
University Examination: 60
Sessional Assessment: 40

Objective: The aim of the course is to provide basic knowledge to the students about design of civil engineering structures like beams, columns and slabs.

UNIT-I

Introduction: Characteristic strength, stress-strain relationship for concrete and steel, IS specifications (IS 456, 875 & 1893), characteristic imposed loads, DL, EL & WL. Design philosophies – Working stress method and limit state method. Strength and serviceability requirements, Analysis and design for flexure of singly / doubly rectangular– by working stress method.

UNIT-II

Beams: Analysis and design for flexure of singly / doubly rectangular and flanged beam sections – by limit state method. Serviceability limit states for deflection and cracking, requirements for curtailments and detailing of reinforcement, minimum / maximum tension and compression reinforcement, minimum & maximum spacing of bars.

UNIT-III

Bond stress: flexural & anchorage bond stress, design bond stress, development length, anchorage length; Behavior of beams in shear, design for shear & torsion as per limit state method; Reinforcement detailing..

UNIT-IV

Columns: Design of columns, short and long columns, eccentrically loaded columns.

UNIT-V

One-Way and Two-Slabs: Design of one-way and two-slabs with and without corners held down. Introduction to design by moment confidents. Design of footings (Isolated footings only).

Course Outcomes: After successfully studying this course, students will:

1. Understand the different methods of designing concrete structures.
2. Able to design a beam.
3. Understand the concept of bond stresses in reinforced concrete structures.
4. Able to design a short and long column
5. Able to design a one-way slab and two-way slab.

Text Books:

1. **Jain A.K.**, Design of Reinforced Concrete: Limit State Design.
2. **Sinha**, Design of R.C.C Structures.

Books Recommended:

1. **Kong and Evans**, Design of reinforced Concrete and Pre-stressed Concrete Structures
2. **Karve and Shah**, Design of R.C.C Structures,

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Semester-V

Course Title: Geotechnical Engineering-I

Course Code: CE - 524

Duration of Exams: 3 hours

Max. Marks: 100

University Examination: 60

Sessional Assessment: 40

Objective: This course aims at giving basic knowledge about formation of soil and its properties - hydraulic & compressive. Methods of sub-soil exploration will also be learnt.

UNIT-I

Introduction: Soil and its formation, various processes and agencies for formation. Types of soils. Three phase soil model, Index properties and classification of soils.

UNIT-II

Soil Hydraulics: Flow through soils, Darcy's Law and its validity, Permeability, Factors affecting permeability and determination of permeability in the lab/Field, Steady state flow, Seepage force, Laplace equation for steady state flow, Flow nets, Seepage through earth dam.

UNIT-III

Soil Compressibility: (a) Consolidation: One dimensional consolidation, Terzaghi's equation, Consolidation test e log p curves. Consolidation Settlement, Time required for settlement. (b) Compaction: Laboratory compaction tests, Proctor compaction test, compaction curve and control on field Compaction, Factors affecting compaction.

UNIT-IV

Effective Stress: Total and effective stresses, pore water pressure Stress distribution under concentrated load. Westergard's and Boussineq's method.

UNIT-V

Soil Investigation: Laboratory and Field Investigation. Sub soil exploration, penetration methods, Geo physical methods electromagnetic method, electric resistivity method and Seismic method. Minerals present in clay, dependence of behaviour of clay on type of mineral.

Course Outcomes: After the completion of the course the students will be able to:

1. Understand the formation of soils, types of soils, Characterize and classify soils.
2. Ability to understand, formulate, and solve problems related to soil hydraulics, permeability and seepage.
3. Compute and analyse the consolidation settlements, Understand the principles of compaction and its control.
4. Ability to utilize mathematical, analytical and numerical methods to analyse Geotechnical Engineering problems related to total and effective stresses.
5. Understand soil exploration methods, clay mineralogy.

TEXT BOOKS

1. Soil Mechanics by Alam Singh
2. Soil Mechanics by S.B.Saighal
- 3.

BOOKS RECOMMENDED

1. Principles of soil Mechanics by D.W.Taylor

2. Theoretical Soil Mechanics by Terzaghi
3. Soil Mechanics by Terzaghi & Peck
4. Soil Mechanics by Witman & Lamb
5. Soil Mechanics by Jumikis
6. Geotechnical Engineering by Purushothama Raj
7. Geotechnical Engineering by C.Venkatramaiah

Note For Paper Setter: - The Question paper shall comprises of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Semester V

Course Title: Concrete Technology

Course Code: CE525

Duration of Exams: 3 hours

Max. Marks: 100

University Examination: 60

Sessional Assessment: 40

Objective: Concrete is the most important civil engineering material, often used with steel reinforcement. The course aims to give details about composition of concrete and its characteristics.

Unit-I

Concrete and its Ingredients: Concrete, Types of concrete, Ingredients of Concrete: Cement; Types of cement, Aggregates; Classification of aggregates, Characteristics of aggregate. Grading of aggregates, fineness modulus, Gap grading, bulking of sand, Water Quality requirements

Unit-II

Properties of Concrete: Properties of concrete in plastic state/ hardened state. Factors affecting the properties of concrete, water-cement ratio, Abram's law, Limitations of Abram's law, Gel/Space ratio.

Unit- III

Admixtures and Special Concretes : Admixtures: Chemical admixtures, Mineral admixtures (Fly ash, Silica fumes, Rice husk ash, Meta Kaolin). Effect of admixtures on properties of concrete in fresh /hardened stage. Special Concrete: Cold weather concreting, hot weather concreting, under water concreting, ready mix concrete, Fiber reinforced concrete, Fly ash concrete, Self compacting concrete, light weight concrete, pre-stressed concrete.

Unit-IV

Concrete Mix Design: Principles of concrete mix design, basic considerations in mix design, factors effecting mix design, mix design procedure of (ACI method, USBR method, British mix design method, IS method), numerical on mix design as per IS guideline.

Unit-V

Concreting Operations: Storing of Cement. Batching of Cement, Batching of aggregate. Mixing of concrete (Hand mixing, Machine mixing), Quality control, Compaction of concrete (Hand compaction, Machine compaction), Curing of concrete, Curing-Methods, nominal and controlled concrete, Defects in concrete.

Course Outcomes: The students will be able to

1. Know about the constituent materials use for making the concrete
2. Know the properties and tests as per IS specification for fresh and hardened concrete
3. To design a concrete Mix
4. Know about the properties and effect of chemical and mineral admixtures in concrete.
5. Know about the quality control, compaction of concrete and batching, mixing curing of concrete.

Text Books:

1. Neville. A M, *Properties of Concrete*,
2. M.S. Shetty, *Concrete Technology*,

Reference Books:

1. Kulkarni P. D, Ghosh R. K and Phull Y. R, *Text Book of Concrete Technology*, New

Delhi Oxford and IBH Publishing Co.

2. Gupta B.L and Gupta Amit, *Text Book of Concrete Technology*, Standard Publishers and Distributors, Delhi.
3. Varshney R.S, *Concrete Technology*, New Delhi, Oxford and IBH Publishing

Note for Paper setter: The question paper shall comprise of 10 questions and two questions shall be set from each Unit. The student has to attempt five questions, selecting one from each Unit.

Semester-V

Course Title: Environmental Engg. I
Course Code: CE-526
Duration of Exams: 3 hours

Max. Marks: 100
External Examination: 60
Internal Assessment: 40

Objective: It is the important subject of Civil Engg by which the students become aware about the water quality and its purification processes.

UNIT-I

Water supply: Water demands and domestic use, variation in demands; population forecasting by various methods using logistic curve method; per capita supply, basic needs and factors affecting consumption; design period.

UNIT-II

Sources of water: Kinds of water sources and their characteristics, collection of surface and ground water; quality of surface and ground waters; factors governing the selection of a source of water supply; intakes and their design for lakes, streams and rivers, impounding reservoir and canal; determination of the capacity of impounding reservoir.

UNIT-III

Transmission of water: Various types of conduits, capacity and sizes including economical sizes of rising main, structural requirements; laying and testing of water supply pipelines; pipe materials, joints, appurtenances and valves; leakages and control; water hammer and its control measures.

UNIT-IV

Storage and distribution of water: Methods of distribution, pressure and gravity distribution systems, concept of service and balancing reservoirs, capacity of distribution reservoirs; general design guidelines for distribution system, Hardy - Cross method and equivalent pipe method of pipe network analysis; rural water supply distribution system. Water supply, plumbing systems in buildings and houses: water connections.

UNIT-V

Solid waste management: Solid wastes, physical and chemical characteristics of solid waste, generation, collection and disposal of solid waste, land filling operations.

Course Outcomes: After the completion of the course the students will be able to:

1. Analyze physical chemical and biological characteristics of water.
2. Estimate future population and quantity of drinking water and domestic water requirements.
3. know sources of water and their characteristic
4. Design components of water supply scheme.
5. Acquainted with physical and chemical characteristics of solid waste and suitable remedies for its safe disposal

Text books:

1. Peavy, Rowe and Tchobanoglous: Environmental Engineering
2. Metcalf and Eddy Inc.: Wastewater Engineering
3. Garg: Water Supply Engineering (Environmental Engineering Vol.-I)
4. Garg: Sewage Disposal and Air Pollution Engineering (Environmental Engineering Vol. – II).

Recommended Books:

1. Modi, P. N; Water supply Engineering. Volume-I

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Semester-V

Course Title: Geotechnical Engg-I Lab.

Course Code: CE-531

Duration of Exams: 2 hours

Max. Marks: 50

University Examination: 25

Internal Assessment: 25

List of practical's

1. Detennination of water content; bulk density and specific gravity
2. Soil gradation by sieve analysis and hydrometer analysis.
3. Consistency limits; Detennination of plastic, liquid and shrinkage limits.
4. Detennination of penne ability by falling head and constant head method
5. Conduct of I-dimensional consolidation.
6. Conduct of standard proctor compaction test.
7. Rapid control Compaction test as per USBR

Course Outcomes: After the completion of the course the students will be able to:

1. Determine index properties of soils
2. Classify soils
3. Determine engineering properties of soils
4. Determine compaction, permeability and consolidation characteristics of soils

Semester-V

Course Title: Concrete Technology Lab.
Course Code: CE-532
Duration of Exams: 2 hours

Max. Marks: 50
University Examination: 25
Internal Assessment: 25

List of practical's

1. To determine
 - (a) Standard consistency of cement.
 - (b) Initial setting time of cement.
 - (c) Final setting time of cement.In conformity with IS code.
2. To determine the tensile strength and compressive strength of Cement in accordance with IS code.
3. To determine the particle size distribution and fineness modulus of coarse and fine aggregates in conformity with IS code.
4. To determine the workability of fresh concrete by slump test.
5. To determine the workability of freshly mixed concrete by the compaction factor test.
6. To determine the cube strength of concrete for different mixes and different W/C ratios.
7. To determine the flexural strength (Modulus of Rupture) of concrete (Nominal Mix).
8. To determine the flexural ultimate strength of under reinforced beam and over reinforced beam.
9. To determine the ultimate load carrying capacity of a reinforced concrete column.
10. To determine the bond strength between:
 - (a) Mild steel plain bars & concrete
 - (b) (Tor Steel) cold twisted bars and concrete

Course Outcomes: After the completion of the course the students will be able to:

1. Determine Standard consistency of cement, Initial setting time of cement and Final setting time of cement in conformity with IS code.
2. Determine the tensile strength and compressive strength of Cement in accordance with IS code.
3. Determine the workability of fresh concrete by slump test.
4. Determine the cube strength of concrete for different mixes and different W/C ratios.
5. Determine the flexural ultimate strength of under reinforced beam and over reinforced beam.

Semester-V

Course Title: Environmental Engg. Lab.

Course Code: CE-533

Duration of Exams: 2 hours

Max. Marks: 50

University Examination: 25

Sessional Assessment: 25

List of Practicals:

- 1) To determine the total solids, suspended solids and dissolved solids for a given sample of water.
- 2) To determine the alkalinity of a given sample of water.
- 3) To determine the total hardness and carbonate hardness for a given sample of water.
- 4) To determine the turbidity of a given sample of water.
- 5) To find out the colour and odour of a given sample of water.
- 6) To determine the percentage of Magnesium, Cadmium, Iron, silica and Aluminium in a given sample of water.
- 7) To determine the percentage of sulphates, chlorides, Iodide, Fluoride.
- 8) To determine the percentage of Sodium and Potassium in a given sample of water.
- 9) To determine the concentration of dissolved oxygen in a given sample of water and find out the oxygen.
- 10) To determine the percentage of Ammonia and Nitrogen present in a given sample of water.

Course Outcomes: After the completion of the course the students will be able to:

1. Determine the total solids, suspended solids and dissolved solids for a given sample of water.
2. Determine the total hardness and carbonate hardness for a given sample of water.
3. Determine the turbidity of a given sample of water and able to find out the colour and odour of a given sample of water.
4. Determine the percentage of Magnesium, Cadmium, Iron, silica and Aluminium in a given sample of water.
5. Determine the concentration of dissolved oxygen in a given sample of water and find out the oxygen.