

**B. Tech. V Semester (Civil)**  
**CE-301E STRUCTURAL ANALYSIS-III**

L T P/D Total

3 2 - 5

Max.Marks:150

Theory:100 marks

Sessionals:50 marks

Duration:3 hrs.

**UNIT-I**

**Influence lines:**

Introduction, influence lines for three hinged and two hinged arches, load position for Max.S.F. and B.M. at a section in the span.

**Influence Line for statically indeterminate Beams:**

Muller-Breslau Principle, I.L. for B.M. & S.F. for continuous Beams.

**UNIT-II**

**Fixed Arches:**

Expression for H and B.M. at a section, Elastic centre.

**Rolling Loads:**

Introduction, Single concentrated load, uniformly distributed load longer than span, shorter than span, two point loads, several point loads, Max.B.M. and S.F.Absolute, Max.B.M.

**UNIT-III**

**Kani's Method:**

Analysis of continuous beams and simple frames, analysis of frames with different column lengths and end conditions of the bottom storey.

**UNIT-IV**

**Approximate Analysis of frames:**

(i) for vertical loads, (ii) for lateral loads by Portal method & Cantilever method.

**Matrix Methods**

Introduction, Stiffness Coefficients, Flexibility Coefficients, Development of flexibility & stiffness matrices for plane frame, Global axis and local axis, analysis of plane frame, pin jointed and rigid jointed.

**Note for Paper-setter:** EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit.

**Books Recommended:**

1. Indeterminate structures, R.L.Jindal S.Chand & Co.,N.Delhi.
1. Advanced Structural Analysis-A.K.Jain, NemChand & Bros.,Roorkee.
2. Structural Analysis-A Unified Approach, D.S.Prakash Rao,, University Press, Hyderabad.
3. Structural Analysis-A unified classical & Matrix Approach, A.Ghali & A.M.Neville,Chapman & Hall London.
4. Theory of Strucutres,- Vol. I&II,- S.P.Gupta & G.S.Pandit, Tata McGraw Hill, N.Delhi.
5. Basic Structural Analysis – C.S. Reddy, Tata McGraw Hill, New Delhi.

**B. Tech. V Semester (Civil)**  
**CE-303E DESIGN OF CONCRETE STRUCTURES-I**

L T P/D Total  
4 2 - 6

Max.Marks:150  
Theory:100 marks  
Sessional:50 marks  
Duration:4 hrs.

**UNIT-I**

**Elementary treatment of concrete technology:**

Physical requirements of cement, aggregate, admixture and reinforcement, Strength and durability, shrinkage and creep. Design of concrete mixes, Acceptability criterion, I.S.Specifications,

**Design Philosophies in Reinforced Concrete:**

Working stress and limit state methods, Limit state v/s working stress method, Building code, Normal distribution curve, characteristic strength and characteristics loads, design values, Partial safety factors and factored loads, stress -strain relationship for concrete and steel.

**UNIT-II**

**Working Stress Method:**

Basic assumptions, permissible stresses in concrete and steel, design of singly and doubly reinforced rectangular and flanged beams in flexure, steel beam theory, inverted flanged beams, design examples.

**Limit State Method:**

Basic assumptions, Analysis and design of singly and doubly reinforced rectangular flanged beams, minimum and maximum reinforcement requirement, design examples.

**UNIT-III**

**Analysis and Design of Sections in shear bond and torsion:**

Diagonal tension, shear reinforcement, development length, Anchorage and flexural bond, Torsional, stiffness, equivalent shear, Torsional reinforcement, Design examples.

**Columns and Footings:**

Effective length, Minimum eccentricity, short columns under axial compression, Uniaxial and biaxial bending, slender columns, Isolated and wall footings, Design examples.

**Serviceability Limit State:**

Control of deflection, cracking, slenderness and vibrations, deflection and moment relationship for limiting values of span to depth, limit state of crack width, Design examples.

**UNIT-IV**

**Concrete Reinforcement and Detailing:**

Requirements of good detailing cover to reinforcement, spacing of reinforcement, reinforcement splicing, Anchoring reinforcing bars in flexure and shear, curtailment of reinforcement.

**One way and Two Ways Slabs:**

General considerations, Design of one way and two ways slabs for distributed and concentrated loads, Non-rectangular slabs, openings in slabs, Design examples.

**Retaining Walls:**

Classification, Forces on retaining walls, design criteria, stability requirements, Proportioning of cantilever retaining walls, counterfort retaining walls, criteria for design of counteforts, design examples.

**Note for Paper-setter:** EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit.

**Books:**

1. Design of Reinforced Concrete Structures, P. Dayaratnam, Oxford & IBH Pub., N. Delhi.
2. Reinforced Concrete-Limit State Design, A. K. Jain, Nem Chand & Bros., Roorkee.
3. Reinforced Concrete, I. C. Syal & A. K. Goel, A. H. Wheeler & Co. Delhi.
4. Reinforced Concrete Design, S. N. Sinha, TMH Pub., N. Delhi.
5. SP-16(S&T)-1980, 'Design Aids for Reinforced Concrete to IS:456, BIS, N. Delhi.
6. SP-34(S&T)-1987 'Handbook on Concrete Reinforcement and Detailing', BIS, N. Delhi.
7. Reinforced Concrete Design – Pillai and Menon, TMH, New Delhi.

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**B. Tech. V Semester (Civil)**  
**CE- 305E HYDROLOGY**

L T P/D Total  
3 2 - 5

Max Marks: 150  
Theory: 100 Marks  
Sessional: 50 Marks  
Duration: 3 hrs.

**UNIT-I**

**Introduction:**

Hydrologic cycle, scope and application of hydrology to engineering problems, drainage basins and its characteristics, stream geometry, hypsometric curves.

**Precipitation:**

Forms and types of precipitation, characteristics of precipitation in India, measurement of precipitation, recording and non recording raingages, raingage station, raingage network, estimation of missing data, presentation of rainfall data, mean precipitation, depth -area - duration relationship, frequency of point rainfall, intensity -duration- frequency curves, probable max. precipitation.

**UNIT-II**

**Evaporation & Transpiration:**

Process, evaporimeters and empirical relationships, analytical method, reservoir evaporation and methods of its control, transpiration, evapotranspiration and its measurement, Penman's equation and potential evapotranspiration.

**Infiltration:**

Infiltration process, initial loss, infiltration capacity and measurement of infiltration, infiltration indices.

**UNIT-III**

**Runoff:**

Factor affecting run-off, estimation of runoff, rainfall-run off relationships, measurement of stage-staff gauge, wire gauge, automatic stage recorder and stage hydrograph, measurement of velocity-current meters, floats, area velocity method, moving boat and slope area method, electromagnetic, ultra-sonic and dilution methods of stream flow measurement, stage discharge relationship.

**Hydrograph:**

Discharge hydrograph, components and factors affecting shape of hydrograph, effective rainfall, unit hydrograph and its derivation, unit hydrograph of different durations, use and limitations of UH, triangular UH, Snyder's synthetic UH, floods, rational methods, empirical formulae, UH method, flood frequency methods, Gumbel's method, graphical method, design flood.

**UNIT-IV**

**Ground Water:**

Occurrence, types of aquifers, compressibility of aquifers, water table and its effects on fluctuations, wells and springs, movement of ground water, Darcy's law, permeability and its determination, porosity, specific yield and specific retention, storage coefficient, transmissibility.

**Well Hydraulics:**

Steady state flow to wells in unconfined and confined aquifers.

**Note for Paper-setter:** EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit.

**Books:**

- 1 Engineering Hydrology by K.Subramanya, TMH, New Delhi
- 2 Hydrology by H.M.Raghunath.
- 3 Hydrology for Engineers by Linsely, Kohler, Paulhus.
- 4 Elementary Hydrology by V.P.Singh.

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**B. Tech. V Semester (Civil)**  
**CE-307E GEOTECHNOLOGY-I**

L	T	P/D	Total
3	2	-	5

Max.Marks: 150  
Theory: 100 marks  
Sessionals: 50 marks  
Duration: 3 hrs

**UNIT-I**

**Sub-Surface Exploration**

Purpose, stages in soil exploration, depth and lateral extent of exploration, guidelines for various types of structures, ground water observations, excavation and boring methods, soil sampling and disturbance, major types of samplers, sounding methods-SCPT, DCPT, SPT and interpretation, geophysical methods, pressure-meter test, exploration logs.

**Drainage & Dewatering**

Introduction, ditches and sumps, well point systems, shallow well system, deep well drainage, vacuum method, Electro-osmosis, consolidation by sand piles.

**UNIT-II**

**Shallow Foundations-I**

Design criteria for structural safety of foundation( i ) location of footing,(ii) shear failure criterion, (iii) settlement criterion, ultimate bearing capacity, modes of shear failure, Rankine's analysis Tergazi's theory, Skempton's formula, effect of fluctuation of G.W.T. , effect of eccentricity on bearing capacity, inclined load, I.S Code recommendations, factors affecting bearing capacity, methods of improving bearing capacity.

**Shallow Foundations-II**

Various causes of settlement of foundation, allowable bearing pressure based on settlement, settlement calculation, elastic and consolidation settlement, allowable settlement according to I.S.Code. Plate load test and its interpretation, bearing capacity from penetration tests, design bearing capacity.

**Shallow Foundations-III**

Situation suitable for the shallow foundations, types of shallow foundations and their relative merits, depth of foundation, footing on slopes, uplift of footings, conventional procedure of proportioning of footings, combined footings, raft foundations, bearing capacity of raft in sands and clays, various methods of designing rafts, floating foundations.

**UNIT-III**

**Pile Foundations-I**

Introduction, necessity of pile foundations, classification of piles, load capacity, static analysis, analysis of pile capacity in sands and clays, dynamic analysis, pile load tests, negative skin friction, batter piles, lateral load capacity, uplift capacity of single pile, under-reamed pile.

**Pile Foundations-II**

Group action in piles, pile spacing, pile group capacity, stress on lower strata, settlement analysis, design of pile caps, negative skin friction of pile group, uplift resistance of pile group, lateral resistance, batter pile group.

**UNIT-IV**

**Drilled Piers and Caisson Foundations**

Drilled piers-types, uses, bearing capacity, settlement, construction procedure.  
Caissons-Types, bearing capacity and settlement, construction procedure.

well foundations-shapes, depth of well foundations, components, factors affecting well foundation design lateral stability, construction procedure, sinking of wells, rectification of tilts and shifts, recommended values of tilts & shifts as per I.S.3955.

**Note for Paper-setter:** EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit.

### **Books Recommended**

- 1 Basic And Applied Soil Mechanics by Gopal Ranjan & ASR Rao. New Age Int.(P)Ltd..
- 2 Analysis and Design of Sub-Structures by Swamisaran, IBH & Oxford.
- 3 Principles of Foundation Engineering By B.M.das, PWS Kent, Boston.
- 4 Foundation Analysis & Design by J.E.Bowles, McGraw Hills.
- 5 Design Aids in Soil Mechanics & Foundation Engineering by S.R.Kaniraj, McGraw Hills.
- 6 Foundation Design by Teng, Prentice Hall, India.

**B. Tech. V Semester (Civil)**  
**CE-309E PROJECT PLANNING & MANAGEMENT**

L T P/D Total  
3 1 - 4

Max.Marks:150  
Theory: 100 marks  
Sessionals: 50 marks  
Duration: 3 hrs.

**UNIT-I**

**Construction Management**

Significance, objectives and functions of construction management, types of constructions, resources for construction industry, stages for construction, construction team, engineering drawings.

**Construction Contracts & Specifications**

Introduction, types of contracts, contract document, specifications, important conditions of contract, arbitration.

**UNIT-II**

**Construction Planning**

Introduction, work breakdown structure, stages in planning-pre-tender stages, contract stage, scheduling, scheduling by bar charts, preparation of material, equipment, labour and finance schedule, limitation of bar charts, milestone charts.

**Construction Organization**

Principles of Organization, communication, leadership and human relations, types of Organizations, Organization for construction firm, site organization, temporary services, job layout.

**UNIT-III**

**Network Techniques in Construction Management-I:CPM**

Introduction, network techniques, work break down, classification of activities, rules for developing networks, network development-logic of network, allocation of time to various activities, Fulkerson's rule for numbering events, network analysis, determination of project schedules, critical path, ladder construction, float in activities, shared float, updating, resources allocation, resources smoothing and resources leveling.

**Network Techniques in Construction Management-II-PERT**

Probability concept in network, optimistic time, pessimistic time, most likely time, lapsed time, deviation, variance, standard deviation, slack critical path, probability of achieving completion time, central limit theorem.

**UNIT-IV**

**Cost-Time Analysis**

Cost versus time, direct cost, indirect cost, total project cost and optimum duration, contracting the network for cost optimisation, steps in time cost optimisation, illustrative examples.

**Inspection & Quality Control**

Introduction, principles of inspection, enforcement of specifications, stages in inspection and quality control, testing of structures, statistical analysis.

**Note for Paper-setter:** EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit.

**Books Recommended**

- 1 Construction Planning & Management by P.S.Gehlot & B.M.Dhir, Wiley Eastern Ltd.
- 2 PERT & CPM -Principles & Applications by L.S.Srinath. Affiliated East-west Press(P)Ltd.



- 3 Project Planning & Control with PERT & CPM by B.C.Punmia & K.K.Khandelwal, Lakshmi Pub. Delhi
- 4 Construction Management & Planning by B.sengupta & H.Guha, Tata McGraw-Hills.

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**B.TECH 5<sup>TH</sup> SEMESTER**  
**FUNDAMENTALS OF MANAGEMENT**  
**HUT-302E**

L	T	Total
3	1	4

Theory	: 100 Marks
Sessionals	: 50 Marks
Total	: 150 Marks
Time	: 3 hours

**UNIT-I Financial Management**

Introduction of Financial Management, Objectives of Financial Decisions, Status and duties of Financial Executives. Financial Planning – Tools of financial planning. Management of working capital, Factors affecting requirements of working capital. Capital structure decisions. Features of appropriate capital structure. Sources of finance.

**UNIT-II Personnel Management**

Personnel Management – Meaning, Nature and Importance; Functions of Personnel Management – (a) Managerial Functions and (b) Operative functions. Job Analysis: Meaning and Importance; Process of Job Analysis; Job Description and Job specification. Human Resource Development-Meaning and concept.

**UNIT-III Production Management**

Production Management : Definition and Objectives  
Plant location: Ideal plant location. Factors affecting plant location.  
Plant Layout : Ideal plant layout, factors affecting plant layout.  
Work Measurement : Meaning, Objectives and Essentials of work measurement.  
Production Control : Meaning and importance of production control and steps involved in production control.

**UNIT-IV Marketing Management**

Nature, scope and importance of marketing management. Modern Marketing concepts. Role of marketing in economic development. Marketing Mix. Marketing Information System. Meaning, nature and scope of International Marketing.

**NOTE :**

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

**Suggested Books:**

1. Business Environment – Francis Charurilam (Himalaya Publishing House).
2. Management – Harold, Koontz and Cyrilo’ Donell (Mc Graw Hill)
3. Principles of Personnel Management – Edwin B. Flippo (Mc Graw Hill )
4. Personnel Management and Industrial Relations – D.C. Sharma and R.C. Sharma)  
( SJ Publications, Meerut)
5. Basic Marketing – Cundiff and Still ( PHI, India )

6. Marketing Management – S.A. Sherlekar (Himalaya Publishing House Bombay)
7. Principles and Practice of Management – L.M. Prasad
8. Financial Management – I.M. Pandey (Vikas Publishing House, New Delhi)
9. International Marketing – Vorn terpestre and Ravi Sasathy.
10. Production Management – E.S. Buffa & W. H. Tausart, Richard D. Irwin, Homewood, Illionis.
11. Personnel Management – C.B. Mamoria, (Himalaya Publishing House)

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**B. Tech V Semester (Civil)**  
**CE-311E STRUCTURAL MECHANICS -II( P )**

L T P/D Total  
- - 2 2

Max. Marks-75  
Viva-Voce-50  
Sessional- 25  
Duration: 3 hrs.

1. Experiment on a two hinged arch for horizontal thrust & influence line for Horizontal thrust
2. Experimental and analytical study of a 3-bar pin-jointed Truss.
3. Experimental and analytical study of deflections for unsymmetrical bending of a Cantilever beam.
4. Begg's deformeter- verification of Muller Breslau principle.
5. Experimental and analytical study of an elastically coupled beam.
6. Sway in portal frames - demonstration.
7. To study the cable geometry and statics for different loading conditions.
8. To plot stress-strain curve for concrete.

**B. Tech. V Semester (Civil)**  
**CE-313E CONCRETE LAB(P)**

L T P/D Total  
- - 2 2

Max. Marks: 75  
Sessionals: 50 marks  
Viva-voce: 25 marks  
Duration : 3 hrs.

**Tests on Cement**

- 1 Standard consistency of cement using Vicat's apparatus.
- 2 Fineness of cement by Sieve analysis and Blaine's air permeability method.
- 3 Soundness of cement by Le-Chatelier's apparatus.
- 4 Setting time of cement, initial and final.
- 5 Compressive strength of cement.
- 6 Measurement of specific gravity of cement.
- 7 Measurement of Heat of Hydration of cement.

**Tests on Aggregate**

- 1 Moisture content and bulking of fine aggregate.
- 2 Fineness modulus of coarse and fine aggregates.

**Tests on Concrete**

- 1 Workability of cement concrete by (a) Slump test, (b) Compaction factor test, (c) Flow table test,.
- 2 Compressive strength of concrete by (a) Cube test, (b) Cylinder test
- 3 Indirect tensile strength of concrete-split cylinder test.
- 4 Modulus of rupture of Concrete by flexure test
- 5 Bond strength between steel bar and concrete by pull-out test
- 6 Non-destructive testing of concrete

**Books Recommended:**

- 1 Concrete Manual-M.L.Gambhir, Dhanpat Rai & Sons, N.Delhi.
- 2 Concrete Technology-M.L.Gambhir, Tata McGeraw Hill, N.Delhi.
- 3 Concrete Technology – Nevellie, Pearson Education.

**B. Tech. V Semester (Civil)**  
**CE-315E GEOTECHNOLOGY (P)**

L T P/D Total  
- - 2 2

Max.Marks: 75  
Pract/Viva-Voce: 50 marks  
Sessional: 25 marks  
Duration: 3 hrs.

1. Grain Size Analysis-Hydrometer method.
2. Shrinkage Limit Determination.
3. Relative Density of Granular Soils.
4. Consolidated Drained (CD) Triaxial Test.
5. Consolidated Undrained (CU) Triaxial Test with Pore Water Pressure measurement.
6. Consolidation Test.
7. Undisturbed Sampling.
8. Standard Penetration Test.
9. Dynamic Cone Penetration Test.
10. Model Plate Load Test.

**Books:**

1. Soil Testing for Engineers by S.Prakash & P.K.Jain, Nem Chand & Bros., Roorkee.
2. Engineering Soil Testing by Lambi, Wiley-Eastern.
3. Engineering Properties of Soils & Their Measurement by JE Bowles, McGraw-Hill.
4. Soil Engineering in Theory & Practice by Alam Singh, Vol.II, Geotechnical Testing & Instrumentation, CBS Pub.