

Semester – IV

Subject		Contact Hours/Week (L & T) P	Credits
<u>THEORY</u>			
1. CE 2201	Structural Mechanics I	3	3
2. CE 2202	Fluid Mechanics I	4	4
3. CE 2203	Surveying I	4	4
4. CE 2204	Disaster Mitigation and Earthquake Engg.	3	3
5. AM 2203 A	Numerical Methods	3	3
6. EcE 2203 A	Electronics and Instrumentation	3	3
Total of Theory		20	20
<u>PRACTICAL</u>			
7. CE 2401	Surveying Practice I	4	3*
8. EE 2403 A	Electrical Engineering Lab	3	2
Total of Practicals		7	5
Total for the Semester IV		27	25
Total for Part – II			50

* Includes local/outside Surveying Camp.

SEMESTER – VI

CE-3201 : Water Resources Engineering I

Hydrologic-cycle, Meteorological aspects of hydrology. Rain-fall, types, measurement, average depth over a basin, depth duration curves. Water losses; Interception, evaporation, transpiration. Runoff, factors affecting. runoff. Stream flow measurement and hydrograph representation, estimation of runoff from rain fall by empirical formulae, rational & infiltration method, unit hydrograph method and S-curve method. Urban runoff: Hydrological models. Construction and use of mass and flow duration curves, Floods, Hydrologic Routing, reservoir routing, channel routing-analytical and graphical methods. Elements of Sediment transportation. River engineering - Stages of river, meanders, river training. Land erosion and control. Ground water: Aquifers, ground water availability and yield. Groundwater withdrawals, infiltration wells and galleries, artesian, open and tubewells. Remote sensing applications in hydrology.

Suggested Books:

1. R.K. Linsley & J.L.H. Paulhus, 'Water Resource Engineering', McGraw Hill Book Co.
2. K. Subramaniya, 'Engineering Hydrology', Tata McGraw Hill, New Delhi.
3. H.M. Raghunath, 'Ground Water', Wiley Eastern Ltd.
4. Todd, 'Groundwater Hydrology', John Wiley & Sons, New York.

CE-3202 : Structural Design II

Structural Steel & their properties. Rivetted, bolted and welded connections. Tension, compression and flexural members. Roof trusses, plate girders, gantry girders & industrial buildings. Column bases & Grillage foundations. Timber and masonry structures.

Suggested Books:

1. A.S. Arya and J.L. Ajmani, 'Design of Steel Structure', Nemchand & Brothers, Roorkee.
2. S.K. Duggal, 'Design of Steel Structure', Tata McGraw-Hill Publishing Co. Ltd.

CE-3203 : Geotechnical Engineering - I

Introduction to geotechnical problems in civil engineering; Soil types and formation; Simple soil properties, Grain size distribution, Atterberg limits; Soil identification and classification; Total, effective and neutral stresses; Darcy's law; Permeability and capillarity of soil, Seepage, Flow nets, Piping, Design of filters; Stress distribution in soils; Laboratory compaction and field compaction; One-dimensional consolidation and simple settlement analysis; Shear strength; Determination of total

Equipments, Earthmoving, Excavating, Hauling, Compacting, Drilling and Blasting, Grouting, Conveying and Dewatering Equipments. Aggregate Cement Concrete and Asphatt Concrete Plants.

Suggested Books:

1. Jebson, J., 'Cost and Optimisation Engineering', McGraw Hill, New York.
2. Moder, J.J. & Phillips, C.R., 'Project Management with CPM and PERT'.
3. Sengupta, B. and Guha, H., 'Construction Management and Planning', Tata McGraw Hill, New Delhi.
4. Srinath, L.S. PERT and CPM, 'Principles and Applications', East West Press, New Delhi.
5. Pilcher, R., 'Appraisal and Control of Project Cost'.

OPEN ELECTIVES (Humanities)

HU-3201 : History of Science and Technology

An overview of prehistoric legacies and implements. Early science its origin. Magic and science. Views and concept of physical world in ancient civilizations of Egypt, Mesopotamia, Babylonia, Sumaria, China, Greece and India. Theory of element and atom in ancient Indian and Greek literatures and their comparison. Achievement of India in mathematics, astronomy, metallurgy, chemical and pharmaceutical technologies, life sciences, agriculture, medicine and surgery, architecture and transport. Inter-civil with other contemporary civilizations. Development of science and technology in early and the middle ages – A global overview. Impact of technological achievements in development of science. Renaissance and scientific revolution. Survey of major scientific and technological developments from fifteenth century onwards and rise of modern science.

Suggested Books:

1. Ronan, Colin A., (i) 'Science : Its History and Its Development Among the World's Culture'. (ii) The Cambridge Illustrated History of World's Science', Cambridge University Press, Newnes Books, 1983.
2. D.M. Bose, S.N.Sen & B.V. Subrayappa, 'A Concise History of Science in India' Indian National Science Academy, New Delhi.
3. Ray Spangenburg and Daine K. Moser, (i) The History of Science From the Ancient Greeks to the Scientific Revolution, (ii) The History of Science in the Eighteenth Century, (iii) The History of Science in the Nineteenth Century (iv) The History of Science from 1895 to 1945 & (v) The History of Science from 1946 to 1990s. University Press (India) Limited, 1999.
4. J.G.Landels, University Press (India) Limited, 1999.
5. R.J.Forbes, 'History of Technology', O.U.P., 1956.

Water turbines : Selection of water turbines, scroll castings and draft tubes, Speed regulation and governing of turbines. Power house : Types of power house, substructure and superstructure. General arrangement and space requirements for standard power house facilities.

Suggested Books:

1. W.P. Creager and J.D. Justin, 'Hydro-electric Hand Book', John Wiley.
2. M.M. Dandekar and K.N. Sharma, 'Water Power Engineering', Vikas Publishing House, New Delhi.
3. P.N. Modi, 'Irrigation, Water Resources and Water Power Engg.', Standard Book House, New Delhi.

CE-4107 : Analysis and Design of Pavements

Analysis of Pavements : Pavement Types, Design Factors, Equivalent Single Wheel and Axle Loads, Stresses in Flexible and Rigid Pavements. Design of Pavements : Design of Flexible Pavements – Group Index Method, CBR Method, California Resistance Value Method, Triaxial Method, Burmisters Method, Miedel's Method, IRC Method, Analytical Methods, Design of Rigid Pavements – PCA Method, IRC Methods, Design of Dowel and Tie Bars. Overlay Design : Structural and Functional Distress in Pavements, Flexible and Rigid Pavement Overlay Design, IRC, TRRL, Asphatt Institute Method and Analytical Methods.

Suggested Books:

1. Yoder, E.J. and Wicary, M.W., 'Principles of Pavement Design', John Wiley & Sons.
2. Yang, H. Huang, 'Pavement Analysis and Design', Prentice-Hall, New Jersey.
3. Teng, 'Functional Designing of Pavements', McGraw Hill.
4. E.J. Yoder, 'Principles of Pavement Design', John Wiley & Sons, Inc., New York.
5. Chakraborty and Das, 'Principles of Highway Engineering', Prentice Hall of India, New Delhi.

CE-4109 : Environmental Pollution and Control

Different sources of pollution: Important cases for atmospheric, hydrospheric and land pollution and related control strategies. Water-borne, air-borne and vector-borne common diseases – Transmission modes and control measures. Excreta disposal in unsewered areas- various options and their selection. Noise pollution and engineering approaches for its abatement. Environmental Impact Assessment and Auditing: Few case studies.

Suggested Books:

1. Salvato, 'Environmental Sanitation'.
2. Canter, 'Environmental Impact Assessment'.

3. Peavy, H.S., Rowe D.R. and Techobanoglous, G. 'Environmental Engg'.
4. Sincero and Sincero. 'Environmental Engg. – A Design Approach.' Masters G.M. Environmental Science and Engg.

(B) List of Subjects for Elective – II, V and VI

(Opt any one for each elective II, V and VI)

CE – 5118 : Soil Structure Interaction

Contact pressure distribution; Foundation models; Model parameters and their evaluation; Analysis of beams and plates resting on foundation soils, Soil Structure interaction studies pertaining to buried structures; Analysis and design of deep foundation; Modern trends in design of earth retaining structures

CE – 5123 : Elasticity and Experimental Stress Analysis

Theory of Stress : Stress components, Equilibrium equations, Stress transformation, principal stresses, Boundary conditions. Theory of Strain : Strain components, Strain transformation, Principal Strain, Compatibility. Stress-strain relationship, Generalized Hookes law, Strain-energy, Uniqueness theorem, St. Venant's principle. Plane problems in cartesian and polar coordinates, Stress function, Axisymmetric problems, stress concentration. Stress and strain measurements, different types of strain gauges, rosettes, Wheat Stone bridge, circuit for simple and multiple strain gauges.

CE – 5124 : Stability of Structures

Buckling of beams, columns and frames. Lateral buckling of beams, Torsional buckling. Post-buckling analysis. Buckling of plates and shells. Ritz and Galerkin method for conservative and non-conservative systems.

CE - 5125 : Metal and Cable Structures

Design of light gauge, tubular and aluminium structures. Analysis and design of cables, cable trusses and cable roofs, Design of tower structures. Suspension bridges: Classical and deflection theories, design considerations. Cable-Stayed bridges : Analysis and design, Aero-dynamic consideration in cable structures.

CE - 5126 : Structural Dynamics

Vibration of Discrete Systems: Free and forced vibrations of single and multi-degree freedom systems, Damping and Forcing functions, Determination of frequencies and mode shapes, Orthogonal relationship of principal modes, Duhamel's integral, Step-by-step response. Calculation and Response spectra. Vibration of Continuum Systems. Earthquake resistant design of structures and IS recommendations.