FIFTH SEMESTER						CIVIL ENGINEERING
COURSE CONTENTS						
CE-5001	**Theory of Structure – II**	**L**	**T**	**P**	**Max. Marks**	**Min. Marks**
Duration	3 Hours	3	1	2	70	22

UNIT - I

Moment distribution methods in analysis of frames with sway analysis of beams and frames. Analysis of box frames, analysis of portals with inclined members.

UNIT - II

Theory of Plasticity and plastic analysis of simply supported, Cantilever, fixed and continuous beam and frames,

Unsymmetrical bending: Principal moment of inertia, product of inertia, bending of a beam in a plane which is not a plane of symmetry, shear centre.

UNIT - III

Matrix method of structural analysis: Force method and displacement method, Flexibility and stiffness concept, Analysis of beams, Truss and frames by force and displacement method.

UNIT - IV

Influence lines for intermediate structures, Muller Breslau principle, Analysis of Beam-frames. Introduction to space truss by tension coefficient method.

UNIT - V

Kani's method & Curved Beams: Pure bending of curved beams of rectangular, circular and trapezoidal sections, Stress distribution and position of neutral axis, Analysis of beam and frames by Kani's method.

Reference Books:

(i) Wang C.K. Intermediate structural analysis, McGraw Hill, New York.
(ii) Kinney Streling J. Indeterminate structural Analysis, Addison Wesley.
(iii) Reddy C.S. Basic Structural Analysis, Tata McGraw Hill Publishing Company, Newl Dehil.
(iv) Norris C.H., Wilbur J.B. and Utkys. Elementary Structural Analysis, McGraw Hill International, Tokyo.
(v) Weaver W & Gere JM, Matrix Methods of Framed Structures, CBS Publishers & Distributors, Delhi.

FIFTH SEMESTER						CIVIL ENGINEERING
COURSE CONTENTS						
CE-5002	**R.C.C. – I**	**L**	**T**	**P**	**Max. Marks**	**Min. Marks**
Duration	3 Hours	3	1	2	70	22

UNIT - I

Basic Principles of Structural Design : Introduction to working stress method and limit state methods of design, partial safety factor for load and material. Partial load factors and analysis of singing and study of IS-456, IS-875 and SP-16 reinforced beam section by both methods.

UNIT - II

Design of Beams: Analysis Singly and Doubly reinforced sections, Design of rectangular, flanged beams. Design of Lintels, Cantilever, simply supported and continuous beams, Design of beam for shear, bond and torsion.

UNIT - III

Design of Slabs: Slabs spanning in one direction. Cantilever, Simply supported and Continuous slabs, Slabs spanning in two directions with different end conditions.

UNIT - IV

Columns: Effective length of columns, Short and long columns, Square, Rectangular and Circular columns. Design of columns subjected to axial loads and uniaxial and biaxial bending moment with the help of SP-16.

UNIT - V

Footings & Staircases: Isolated footings, rectangle & circular footing. Design of different types of staircases.

Note : *All the designs for strength and serviceability should strictly be as per the latest version of* ***IS:456****. Use of* ***SP-16*** *(Design aids).*

Reference Books:

(i) Plain & Reinforced Concrete Vol. I & II – O.P. Jain & Jay Krishna.
(ii) Limit State Design by P.C. Varghese ; Prentice Hall of India, New Delhi.
(iii) Design of Reinforced Concrete Elements by Purushothman; Tata McGraw Hill, New Delhi.
(iv) Reinforced Cement Concrete by Gupta & Mallick, Oxford and IBH.
(v) Reinforced Cement Concrete by P. Dayaratnam, Oxford and IBH.
(vi) Plain & reinforced concrete – Rammuttham.
(vii) Plain & reinforced concrete – B.C. Punnia.
(viii) Structural Design & Drawing by N.K. Raju.

FIFTH SEMESTER						CIVIL ENGINEERING
COURSE CONTENTS						
CE-5003	**Survey – II**	**L**	**T**	**P**	**Max. Marks**	**Min. Marks**
Duration	3 Hours	3	1	2	70	22

UNIT - I

Curves : Classification and use, Notation and elements of circulars curves, calculations and setting out simple circular curves by chain and tape (offsets from long chord, successive by section of arcs, offsets from the tangents and offsets from chord produced) and by the theodolite (Rankines methods of tangential angles, Two theodolites and Tackeometric methods) and obstacle to the location of curves.

UNIT - II

Compound curves, reverse curves, transition curves and vertical curves. Elements, calculation and setting.

UNIT - III

Triangulation: Geodetic surveying, classification triangulation systems, the strength of figures reconnaissance, selection and marking of stations, Inter-visibility and height of stations, Signals and Towers, baseline measurement and corrections, Satellite Station : Reduction to centre.

UNIT - IV

Survey adjustments and Theory of Errors: Introduction, kinds of errors, definitions, the law of accidental errors, general principles of least square, law of weight, determination of probable error, determination of error of field measurements, normal equations, determination of most probable values and triangulation adjustment.

UNIT - V

Hydrographic Surveying and Photogrammetry: Introduction, application, principles shore line survey, Soundings: requirements, equipments, methods pf locating sounding, reduction of sounding and plotting. ***Photographic surveying***: Introduction, principles Terrestrial and Aerial photogrammetry.

Reference Books :

1. Surveying & Leveling, (Vol. I & II) by Kanetkar T.P.
2. Surveying (Vol I & II) by Duggal S.K., Tata McGraw Hill.
3. Surveying & Leveling by Basak, Tata McGraw Hill.
4. Surveying Theory & Practice by Devis R.E. McGraw Hill, New York.
5. Fundamentals of Surveying by Roy S.K., Prentice Hall of India, New Delhi.
6. Surveying (Vol. I, II, III) by Punmia B.C., Laxmi Publication, New Delhi.
7. Surveying (Vol. I & II) by Arora K.R. Standard Book House, New Delhi.

List of Experiments / Field work (expandable) :

1. Profile leveling and contouring of small area by Tacheometer.
2. Setting of simple circular curve by offsets from long chord offsets from the tangents, offsets from chord produced by chain and tape.
3. Setting of simple circular curve by Rankine's method of tangential angles, two theodolites and tacheometer method.
4. Triangulation survey
5. Setting layout of building & roads.

COURSE CONTENTS

CE-5004	Environmental Engineering – I	L	T	P	Max. Marks	Min. Marks
Duration	3 Hours	3	1	2	70	22

UNIT - I

Quality of water from different sources, demand & quality of water, fire demand, water requirement for various uses, fluctuations in demand, forecast of population.

UNIT - II

Impurities of water and their significance, water-borne diseases, control of water borne diseases, physical, chemical and bacteriological analysis of water, water quality standards for different uses. Intake structures, design of intakes and conveyance of water, pipe materials, pumps-operation and pumping stations.

UNIT - III

Water Treatment methods, Primary & secondary treatment, theory and design of sedimentation, coagulation, filtration, disinfection, aeration & water softening, modern trends in sedimentation & filtration, miscellaneous methods of treatment, detailing & maintenance of treatment limits.

UNIT - IV

Conveyance and distributions systems, Layout and hydraulics of different distribution systems, pipe fittings, valves and appurtenances, analysis of distribution system. Hardy cross method, leak detection & control, maintenance of distribution systems, service reservoir capacity and height of reservoir.

UNIT - V

Rural water supply schemes, financing and management of water supply project, water pollution control act, conservancy & water carriage system, sanitary appliance and their operation, building drainage system of plumbing.

Suggested Books and Reading Materials:-

(i) Water Supply Engineering by B.C. Punmia - Laxmi Publications (P) Ltd. New Delhi.
(ii) Water Supply & Sanitary Engg. by G.S. Birdi - Laxmi Publications (P) Ltd. New Delhi.
(iii) Water & Waste Water Technology by Mark J.Hammer - Prentice - Hall of India, New Delhi.
(iv) Environmental Engineering - H.S. Peavy & D.R.Rowe - Mc Graw Hill Book Company, New Delhi.
(v) Water Supply & Sanitary Engg. by S.K. Husain.
(vi) Water & Wastewater Technology - G.M. Fair & J.C. Geyer.
(vii) Relevant IS Codes.
(viii) Manual of CPHEEO by MEF.

List of Experiments:

(i) Study of the various standards for water.
(ii) Study of sampling techniques for water.
(iii) Measurement of turbidity.
(iv) To determine the coagulant dose required to treat the given turbid water sample.
(v) To determine the conc. of chlorides in a given water samples.
(vi) Determination of hardness of the given sample.
(vii) Determination of residual chlorine by “Chloroscope” or any other method.
(viii) Determination of Alkalinity in a water samples.
(ix) Determination of Acidity in a water samples.
(x) Determination of Dissolved Oxygen (DO) in the water sample.

FIFTH SEMESTER						CIVIL ENGINEERING
COURSE CONTENTS						
CE-5005	**Transportation – II**	**L**	**T**	**P**	**Max. Marks**	**Min. Marks**
Duration	3 Hours	3	1	2	70	22

UNIT – I :

Highway planning, Alignment & Geometric Design: Principles of highway planning, road planning in India and financing of roads, classification patterns. Requirements, Engineering surveys for highway location.

Cross Sectional Elements: Width, camber, super-elevation, sight distances, extra widening at curves, horizontal and vertical curves, numerical problems.

UNIT - II

Bituminous Payments : Design of flexible pavements, design of mixes and stability, WBM, WMM, BM, IBM, surface dressing, interfacial treatment - seal coat, tack coat, prime coat, wearing coats, grouted macadam, bituminous concrete specification, construction and maintenance.

UNIT - III

Advantages and disadvantages of rigid pavements, general principles of design, types, construction, maintenance and joints, dowel bars, tie bars. Brief study of recent developments in cement concrete pavement design, fatigue and reliability.

UNIT – IV

Traffic Engineering: Traffic characteristics, theory of traffic flow, intersection design, traffic signs ad signal design, highway capacity.

Unit – V

Low Cost Roads, Drainage of Roads, Traffic Engg. & Transportation Planning: Principles of stabilization, mechanical stabilization, requirements, advantages, disadvantages and uses, quality control, macadam roads-types, specifications, construction, maintenance and causes of failures.

Surface and sub-surface drainage, highway materials: Properties and testing etc. Channelised and unchannelised intersections, at grade & grade separated intersections, description, rotary-design elements, advantages and disadvantages, marking, signs and signals, street lighting. Principles of planning, inventories, trip generation, trip distribution, model split, traffic assignment, plan preparation.

List of Experiments:

(i) Aggregate Crushing Value Test.
(ii) Determination of aggregate impact value.
(iii) Determination of Los Angeles Abrasion value.
(iv) Determination of California Bearing Ratio values.
(v) Determination of penetration value of Bitumen.
(vi) Determination of Viscosity of Bituminous Material.
(vii) Determination of softening point of bituminous material.
(viii) Determination of ductility of the bitumen.
(ix) Determination of flash point and fire point of bituminous material.
(x) Determination of Bitumen content by centrifuge extractor.
(xi) Determination of stripping value of road aggregate.
(xii) Determination of Marshall stability value for Bituminous mix.
(xiii) Determination of shape tests on aggregate

Reference Books & Study Materials:

(i) Highway Engineering by Gurucharan Singh.
(ii) Principles of Pavement Design by E.J. Yoder & M.W. Witzech.
(iii) Highway Engineering by O'Fleherty.
(iv) Highway Engineering by S.K. Khanna & C.E.G. Justo.
(v) Airport Planning & Design by S.K. Khanna & M. G. arora.
(vi) Foresch, Charles "Airport Planning".
(vii) Horonjeff Robert "The Planning & Design of Airports".
(viii) Sharma & Sharma, Principles and Practice of Highway Engg.
(ix) Haung, Analysis and Design of Pavements.
(x) Relevant IRC & IS codes.
(xi) Laboratory Mannual by Dr. S.K. Khanna .
(xii) Highway Engg. By Hews & Oglesby.
(xiii) Highway Material by Walker.