SEMESTER VI

CE302 STRUCTURAL ANALYSIS – II

Influence lines - Maxwell Betti's theorem - Muller Breslau's principle and its application. Influence lines for continuous beams and single bay, single storey portals with prismatic members.
Analysis of plane truss with one or two redundants - trusses with lack of fit - Thermal stresses - Settlement of supports - Trussed beams.
Theory of arches - Analysis of three hinged, two hinged and fixed arches - influence lines, rib shortening, settlement and temperature effects.
Analysis of cables - Suspension bridges with three and two hinged stiffening girders - influence lines.
Analysis of multistorey frames for gravity and lateral loads by approximate methods - Substitute frame - Portal and Cantilever methods.

References

1. Punmia, B.C, Theory of Structures, Laxmi Publications, 2000.
2. Timoshenko, S.P.,Young, D.H., Theory of Structures, Tata McGraw Hill, 1983.
3. Wang. C.K., Intermediate Structural Analysis, International Text Book Co, 1983.
4. Hibbeler. R.C., Structural Analysis, Pearson Education (Singapore) Ptc. Ltd., Indian Branch, 2002.

CE304 TRANSPORTATION ENGINEERING - I

Introduction to transportation systems - Characteristics of traffic elements - Road user, vehicle and highway - Concept of capacity - Highway development and planning - Highway alignment
Geometric standards for different types of roads – Terrain- Design speed - Sight distance - Horizontal and vertical curves
Pavement materials - specifications and tests - Pavement Design - Design elements and loads - Design of Flexible and Rigid Pavements
Traffic studies - volume - Manual and automatic methods of data collection - Speed studies - Travel time and delay studies - Parking studies - Road accidents.
Traffic regulation and control - Road markings - Traffic signs - Design of at grade intersections - Rotaries - Traffic signals - Grade separated interchanges.

References

1. Khanna and Justo, Highway Engineering, Nemchand and Bros 2003.
2. Sharma, S.K. Principle, Practice and Design of Highway Engineering, S. Chand and Co., 1985.
3. Kadiyali, Principles of Highway Engineering, Khanna Publishers 2000.

CE306 CONCRETE STRUCTURES – II

Earth Retaining structures - Retaining walls- types - cantilever and counterfort - design - drainage and other construction details. Liquid Retaining structure - Water tanks - types - square, rectangular, circular - Design of underground and elevated tanks - design of staging -

spherical & conical roof for circular tanks. Material storage structures - Determination of lateral pressure on side walls of bunker - Rankine's theory - design of bunker - design of circular silo using Jansen's theory. Environmental Structures - Chimneys - Principles and Design - Design of long columns. Transportation structures - Bridges - Slab bridge - Design of single span slab bridge - Tee beam bridge - Design of Tee beam bridge with stiffness - Tee beam bridge with cross girders

Note: Assignments include the design and drawings of various R.C.C structures.

References

1. Vazirani, V.N., and Ratwani, Concrete Structures, Vol. IV, Khanna Publishers, New Delhi, 1995.
2. Dayaratnam, P., Design of Reinforced Concrete Structures, Oxford & IBH Publishers & Co., New Delhi, 2005.
3. Victor, D.J., Essentials of Bridge Engineering, Oxford & IBH Publishers Co., Newdelhi, 1991.
4. IS456-2006 Code of practice for Plain and reinforced concrete code of practice.

CE308 STEEL STRUCTURES-II

Welded Plate girders - Economical depth - flange design - curtailment of flange plates - web stiffeners - flange and web splices - connection - Gantry Girder Eccentrically loaded simple and compound columns - lacing - battens - column bases - design and detailing of beam column, moment and shear connections. Chimney - Functional and structural requirements - Self supporting and Guyed - Base plate and Anchor bolt.
Light gauge steel sections - types of cross section - Local and post buckling - Effective width concept - Compression and Flexural members. Limitations and size of structural elements - fabrication and erection equipments - sequence of erection - safety - fabrication and erection tolerances.

Note: Assignments include the design and drawings of various steel structures.

References

1. Subramanian N, Design of Steel Structures, Oxford University Press, New Delhi 2008.
2. Dayaratnam P, Design of Steel Structures, S.Chand & Co., New Delhi, 2003.
3. Punmia, B.C., Ashok Kumar Jain and Arun Kumar Jain. Comprehensive Design of Steel Structures, Laxmi Publications Pvt. Ltd., New Delhi, 2000.
4. Arya, A.S. and Ajmani, A.L., Design of Steel Structures, Nemchand and Brothers, Roorkee, 1992.
5. IS800-1984, Code of practice for general construction in steel.
6. SP6 (1)-1964, IS hand book for structural Engineers.

CE310 WATER RESOURCES ENGINEERING

Hydrologic cycle - rainfall and its measurement - computation of mean rainfall over a catchment area using arithmetic mean, Theissen polygon and Isohyetal methods - Runoff - infiltration indices - Storm Hydrograph and unit hydrograph

River regions and their characteristics - classification of rivers on alluvial plains - meandering of rivers - river training
Reservoir planning - Investigations - zones of storage in a reservoir - single purpose and multi purpose reservoir - determination of storage capacity and yield - reservoir sedimentation - Reservoir life - Sediment prevention - Flood estimation- Flood forecasting - Flood routing
Ground water - types of aquifers - storage coefficient - coefficient of transmissibility - steady radial flow into a well located in an unconfined and confined aquifers - Tube wells and Open wells - yield from an open well.
Water logging - causes and effects of water logging - remedial measures - land reclamation - land drainage - benefits - classification of drains - surface drains - subsurface drains - design principles and maintenance of drainage systems.

References

1. Punmia, B.C., Irrigation and Water Power Engineering, Standard Publishers, 2001.
2. Ragunath. H.M., Hydrology, Willey Eastern Limited, New Delhi, 2000.
3. Subramanya, Engineering Hydrology, Tata-McGraw Hill, 2004.

CE312 COMPUTER AIDED DESIGN – I

Application Programs

a. Roots of an equation using Newton - Raphson method.
b. Solution of linear simultaneous equations using Gauss elimination.
c. Matrix inversion using Gauss Jordan method
d. Linear regression line of given points
e. Curve fitting using Polynomial Regression
f. Eigen value extraction using Power method

Standard packages to solve the above problems-Solution of Linear Programming problems using standard software-Basic 2D objects - line, polyline, circle, ellipse - editing objects - trim, break, change, stretch - dimensioning - preparation of plan, elevation and section drawings of simple structural objects - printing and plotting drawings - script files - introduction to 3D
DBMS concepts - Civil Engineering Databases - Manipulation - Spreadsheet concepts - Worksheet calculations in Civil Engineering - Regression, Matrix Inversion, etc.

References

1. Chapra, S.C., and Canale R.P., Numerical Methods for Engineers, McGraw-Hill, 2004
2. Rajasekaran, S., Numerical Methods in Science and Engineering A Practical Approach, A.H.Wheeler and Co, 2005.
3. Ronald W., Leigh, AutoCAD: A Concise Guide to Commands and Features, Galgotia Publications, 2004.

CE314 ESTIMATION, COSTING AND VALUATION

Preparation of detailed estimates - Preparation of specifications report accompanying the estimate Approximate methods of Costing - types of estimate - costing for various structures - rate analysis - rate for material and labour - schedule of rates -data sheets -

abstract estimate. Values and its kinds - Valuation - purpose- scope - methods - land and building method - Factors affecting the value of plot and building - depreciation - Valuation of residential building with case study.

References

1. Dutta, Estimating and Costing in Civil Engineering, S. Datta & Co, 2002.
2. Bhasin, P.L., Quantity Surveying, 2nd Edition, S.Chand & Co., 2000.