

SEMESTER VII

CE401 MATRIX METHODS OF STRUCTURAL ANALYSIS

Generalised measurements - Degrees of freedom - Constrained Measurements - Behaviour of structures - Principle of superposition. Stiffness and flexibility matrices - Constrained measurements - Stiffness and flexibility coefficients from virtual work.

Strain energy - Stiffness and flexibility matrices from strain energy - Symmetry and other properties of stiffness and flexibility matrices - Betti's law and its applications - Strain energy in systems and in elements.

Determinate and indeterminate structures - Transformation of element matrices to system matrices - Transformation of system vectors to element vectors - Normal coordinates and orthogonal transformations.

Flexibility method applied to statically determinate and indeterminate structures - Choice of redundants - Transformation of redundants - Internal forces due to thermal expansion and lack of fit.

Development of the method - Internal forces due to thermal expansion and lack of fit - Application to symmetrical structures - Comparison between stiffness and flexibility methods.

References

1. Moshe, F., Rubenstein, Matrix Computer Analysis of Structures, Prentice Hall, New York, 1986.
2. Rajasekaran S, Computational Structural Mechanics, Prentice Hall of India, New Delhi, 2001
3. Manickaselvam V.K., Elements of Matrix and Stability Analysis of Structures, Khanna Publishers, New Delhi, 1998.

CE403 TRANSPORTATION ENGINEERING - II

Railway Engineering - Location surveys and alignment - Permanent way - Gauges - Components - Functions and requirements - Geometric design

Track Junctions-Points and crossings - types and functions - design and layout - simple problems - Railway stations and yards. Signaling and interlocking - control systems of train movements.

Airport Engineering-Aircraft characteristics - Airport obstructions and zoning - Runway - taxiways and aprons- Terminal area planning

Docks and Harbours - Types - Layout and planning principles- breakwaters - docks- wharves and quays - Transit sheds- warehouses- navigation aids.

Urban transportation systems - Bus transit - Mass Rapid Transit System - Light Rail Transit. Transport economics and Financing - Intelligent Transportation Systems (ITS)

References

1. M.M. Agarwal, Railway Engineering, Prabha & Co. 2007.
2. Khanna, S.K. and Arora, M.G. Airport Planning and Design, Nemchand and Bros. 1999.
3. Oza and Oza, Elements of Dock and Harbour Engineering, Charotar Publishing House, 1996.

CE405 IRRIGATION AND HYDRAULIC STRUCTURES

Irrigation - necessity - Types of irrigation - Methods of supplying water - Assessment of irrigation water - Consumptive use and its determination - water requirement of various crops - Duty - Delta - Base period and crop period.

Functions and components of a diversion head work - Function - selection of site - type of weirs on pervious foundations - cause of failure - Bligh's creep theory and Khosla's theory - complete design of a vertical drop weir.

Gravity dams - Non overflow section - forces acting - stability rules - elementary profile - Low and High dams - drainage gallery - Construction joints - Earthen dams - stability of slopes by slip circle method - seepage analysis and its control

Types of canals - canal alignment - Kennedy's silt theory - Lacey's silt theory - Design of canals using the above theories - economical depth of cutting - canal losses - canal maintenance - lined canals and their design - silt control measures.

Canal falls - Necessity and location - Design of sand type fall - design of a cross regulator - cross drainage works - selection of suitable type of cross drainage work - canal outlets.

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

References

1. Punmia, B.C., Irrigation and Water Power Engineering, Standard Publishers, 2001.
2. Garg, S.K., Irrigation and Hydraulics Structures, Khanna Publishers, 1992.
3. Sharma, S.K., Principles and Practice of Irrigation Engg, S.Chand & Co, 1984.

MD4901 INDUSTRIAL ECONOMICS

Demand and Supply - Forecasting techniques

Cost and Revenues -Competitive nature of the firms - Keynesian economics - National Income

Trade cycle - Inflation - Index numbers Capital budgeting - Impact of Liberalization, Privatization and Globalization - Locating the firm in a global economy

Fiscal Policy - Taxation - Principles. Monetary policy - Functions of banks - Credit creation by commercial banks.

References

1. Manb, Adhikari, Business Economics, Excel books.
2. Mishra S.K and Purin V.K, Economic Environment of business, HPH.

CE407 COMPUTER AIDED DESIGN – II

R.C.C: Slabs - Beams- Columns - Retaining walls.

Steel: Trusses - Beams - Columns - Column Bases - Plate girders - Gantry girders - Connections.

Transportation planning process- Trip generation and distribution- Network analysis - Shortest path algorithms.

Water resources - Pipe networks - Canal design - Backwater profile - Synthetic derivation of stream flows using random numbers - Dam stability

Analysis and design packages in Structural Engineering, Transportation Engineering, Water Resources Engineering and Geotechnical Engineering

References

1. Krishnamoorthy, C.S. and Rajeev, S., Computer Aided Design and Analytical Tools, Narosa, 1993.
2. Papacostas, C.S., Fundamentals of Transportation Engineering Prentice-Hall of India, 2001.
3. Loucks, D.P., Stedinger, J.R. and Haith, D.A., Water Resource Systems Planning and Analysis, Prentice-Hall INC, 1981.