

I SEMESTER

15CN01 APPLIED STATISTICS AND RELIABILITY Vide Structural Engineering 15CS01

15CN02 REVIEW OF CONCEPTS OF STRUCTURAL and GEOTECHNICAL ENGINEERING Vide Structural Engineering 15CS02

15CN03 PAVEMENT ANALYSIS, DESIGN & EVALUATION

3 0 0 3

PRINCIPLES OF PAVEMENT DESIGN: Components of road – IRC guidelines for each component - Factors influencing pavement stability - vehicle and traffic factors - ESWL and Wheel Load factor – Moisture and climate, Soil – CBR, Hveem stabilometer method, Plate bearing method for modulus of subgrade reaction and North Dakota Cone method – Stress Distribution factor – Boussinesq and Burmister theories. (10)

DESIGN OF FLEXIBLE PAVEMENT: Empirical method based on classification - Group index method - Methods based on arbitrary soil strength tests - CBR method – Provisions of IRC 37 – North Dakota Cone method, Hveem stabilometer method, Plate bearing test method (U S Navy method for air fields), Theoretical and Semi-theoretical methods – Kansas and Texas triaxial methods, Burmister Design method - Design of flexible airport pavement based on recommendations of International Civil Aviation Organization (ICAO). (11)

STRESSES IN RIGID PAVEMENT: Stresses in concrete pavements - stresses due to wheel loads (Westergaard theory and its modifications) - stresses due to changes in temperature, stresses due to subgrade restraint – Critical combinations of stresses. (5)

DESIGN OF RIGID PAVEMENT: Modulus of Rupture of concrete Design for airport pavements - Portland Cement Association (PCA) method - Corps of Engineers (CE) method, Design based on recommendations of ICAO - Design for highway pavements – IRC 58 method and PCA method, – Types of joints, Types of rigid pavement based on reinforcement in longitudinal and transverse direction, Design of tie bars and dowel bars. (8)

PAVEMENT DISTRESS, EVALUATION AND REHABILITATION: Flexible pavement distress - rigid pavement distress - condition surveys - Types of roughness - present serviceability index - skid resistance - structural evaluation - Bituminous and flexible overlays on rigid pavements - Rigid overlays on rigid pavements - Bounded concrete overlay on rigid pavements - Rigid overlays over existing flexible pavements. (6)

STABILISATION OF PAVEMENTS: Stabilisation with special reference to highway pavements, Choice of stabilisers, Testing and field control, Use of Geosynthetics (Geotextiles and geogrids) in roads . (5)

Total L: 45

REFERENCES:

1. Kadiyali L.R., "Principles and Practice of Highway Engineering", Khanna Tech. Publications, New Delhi, 1989.
2. Yoder E. J. and Witezak M. W., "Principles of Pavement Design", John Wiley and Sons Inc., New York, 1975.
3. Sharma S. K., "Principles, Practice and Design of Highway Engineering", S Chand and Company Ltd., New Delhi, 1985.
4. Croney D., "Design and Performance of Road Pavements", HMO Stationary Office, 1979.
5. Wright P.H., "Highway Engineers", John Wiley & Sons, Inc., New York, 1996.

15CN04 REINFORCED COCNRETE DESIGN Vide Structural Engineering 15CS04

15CN05 COMPUTER ANALYSIS OF STRUCTURES Vide Structural Engineering 15CS05

15CN51 CONCRETE TECHNOLOGY AND STRUCTURAL ENGINEERING LABORATORY Vide Structural Engineering 15CS51

15CN61 INDUSTRIAL VISIT AND TECHNICAL SEMINAR Vide Structural Engineering 15CS61

II SEMESTER

15CN06 STRUCTURAL STEEL DESIGN Vide Structural Engineering 15CS06

15CN07 CONSTRUCTION PROJECT MANAGEMENT

3 0 0 3

INTRODUCTION: Management objectives and concepts as a blend of art and science – Functions of management – Opportunities and threats to project managers – Application of management principles and tools to construction projects – Importance of applying management concepts in construction industry. (3)

PLANNING: Importance of planning in the overall project management – Periods of planning – Pretender, Pre contract and contract period planning – Data collection, analysis, design, Activity – time scheduling, charts for labour, material, staff and plant requirements – BOQ and cost estimates – Master Programme Chart. (6)

PROJECT SCHEDULING: Activity break down – Bar chart scheduling – its merits and shortcomings; Inter dependencies of activities – CPM/PERT network diagram – Forward and Backward pass – Critical period and critical path analysis – Float – Three time aspects for PERT activities and their identification based on statistical data – Probability of achieving desired time targets for construction projects. (9)

RESOURCE AGGREGATION AND LEVELING: Optimal use of resources – Aggregation as per early start time of activities and initial histogram – Leveling of resources by manipulating activity start time with respect to float availability and late finish time of activities and final histogram. (5)

TIME COST OPTIMIZATION: Direct cost and Indirect cost, and their influence on project duration – Normal and Crash duration of activities and their corresponding costs – Crashing of network to optimize cost and duration of projects – Simple Operation Research techniques to optimize assignment of tasks to groups of workmen, and transport of materials from quarries to sites. (8)

TECHNICAL PROCEDURES: Tenders – aim, importance and tender documents; tender process – Invitation, submission, opening, scrutiny, negotiation, acceptance and award. Contract – definition, types of contracts, their merit and suitability – contract agreement – Principal clauses and conditions; Payment for works – Measurements, Running Bills, deductions. (7)

COST CONTROL: Aims and scope of cost control – use of estimates, data, unit rate and standard rate as tools for cost monitoring – systems of cost control based on accounting details of spends and periodicity of cost comparison. (4)

EARTHWORK CALCULATION: Mass Haul Diagram – features and characteristics – balancing cut and fill and optimizing haul distances and quantities. (3)

SOFTWARE: Applicable software packages for construction management.

Total L: 45

TEXT BOOKS:

1. Shrivastava U. K., "Construction Planning and Management", Galgotia Publications Pvt. Ltd., New Delhi, 2000.
2. Ghattas R. G and Sandra Mckee, "Practical Project Management", Pearson Education (P) Ltd., New Delhi, 2003.

REFERENCES:

1. Punmia B. C. and Khandelval K. K., "Project Planning and Control with PERT and CPM", Laxmi Publications, 1993.
2. Srinath L. S., "PERT/CPM Principles and Applications", Affiliated East West Press (P) Ltd., 2002.
3. Sharma J. C., "Construction Management and Accounts", Satya Prakashan, New Delhi 1986.

15CN08 TRAFFIC ENGINEERING AND TRANSPORT PLANNING

3 0 0 3

INTRODUCTION : Importance of transportation - Employment in transportation - Transportation systems and organization. Characteristics of Driver, the pedestrian, the vehicle and road.(Problems).Traffic and Environment. (5)

TRAFFIC ENGINEERING STUDIES : Statistical studies for traffic engineering, speed studies - volume studies - travel time and delay studies - parking studies - traffic forecasting. Accident studies. (Concepts and problems). (6)

TRAFFIC FLOW : Introduction to traffic flow theory - Macroscopic and microscopic traffic model, shock waves, traffic flow at signal and unsignal intersection. Simulation of traffic. (Concept and problems). (7)

DESIGN FOR TRAFFIC FACILITIES: Intersection design, Design of traffic signal and signal coordination. Intersection design, signalized design - Interchanges - warrant for interchanges, design of interchange - round about, design for parking facilities, capacity analysis and level of service. (Concepts and problems). (8)

TRANSPORTATION PLANNING: Transport planning process - transport survey - forecasting travel demand - trip generation and trip distribution, model spilt, land use transport model. Transport planning strategies. Planning for town centre parking, map approach - TSM, TDM and ITS. (8)

TRANSPORT ECONOMICS : Economic evaluation of transport plans - accident cost - traffic congestion, restraint and road pricing, EIA. (5)

COMPUTER APPLICATION: Computer application in signal design, GIS in urban planning and traffic engineering, SPSS and others. (6)

Total L: 45

REFERENCES:

1. Kadiyali L. R., "Traffic Engineering and Transportation Planning" Khanna Publishers, Delhi, 2005.
2. Khanna K. and Justo C. E. G., "Highway Engineering", Khanna Publishers, Roorkee, 2001.
3. Jason C.yu, "Transportation Engineering: Introduction to Planning", Design and Operations, Elsevier, 1992.
4. Taylor M.A.P and Young W., "Traffic Analysis - New Technology and New Solutions", Hargreen Publishing Company, 1998.
5. Nicholas J. Garben and Lester A. Hoel, "Traffic and Highway Engineering", PWS Publication, 1999.
6. Partha Chakroborty and Animesh Das, "Principle of Traffic Engineering", Prentice Hall of India, New Delhi, 2003.

15CN09 GEOGRAPHIC INFORMATION SYSTEMS

3 0 0 3

GIS TECHNIQUES AND DATA INPUT: Map – Types of map - Map analysis, Digital Cartography and Evolution of GIS, Components of GIS- Software, Hardware and organization- Types of Map Projections and Coordinate concepts- Datums, ellipsoids, geoids, Type of data - spatial and non spatial data, Various Sources of data- Conceptualization of real world in GIS , georeferencing, (7)

DATABASE, DATA STRUCTURES, ERROR ANALYSIS AND OUTPUT: vector and raster data structure, database concepts, E-R Model, Geodatabase, Object Oriented Database- digitizer, scanner, files and data formats, Collection of Data using GPS - Data transfer from other spatial data sources, data compression, GIS flow chart for projects, Edge matching, rubber sheeting. (7)

DATA OUTPUT , ERROR ANALYSIS AND SIMPLE DATA ANALYSIS: Spatial Analysis, data retrieval, query, simple analysis, spatial statistics, Topology, , Measuring distance, area and connectivity, buffering and neighbourhood functions - Raster and Vector overlay method- Reclass, Recode, Types of output data, Map Design, source of errors, types of errors, elimination, accuracies. Data quality and data standards: Concepts – Definition and assessment of data quality, Multimedia GIS, 3D GIS, meta data, Open source GIS and OGC standards. (9)

ADVANCED ANALYSIS: vector data analysis, raster data analysis, Modeling in GIS, digital Elevation Model, DTM, Cost and path analysis, Spatial interpolation - Analysis of surfaces - Network analysis- shortest path problem, traveling salesman problem, location and allocation of resources. Artificial Intelligence and expert system, Multicriteria analysis, Analytical Hierarchy process. (10)

GIS APPLICATION: GIS for water distribution network, sewer network, transportation network, telecom network, power network and other utilities, Site selection for larger projects based on GIS analysis, Remote Sensing data integration, Navigation and tracking using GPS and GIS, GIS database for buildings, Emergency planning, Internet GIS. (12)

Total L: 45

REFERENCES:

1. Chang K. T., "Introduction to Geographical Information Systems", Tata McGraw Hill, 2002.
2. Chrisman N. R., "Exploring Geographic Information Systems", John Wiley & Sons, New York, 2002.
3. Burrough P. A., "Principles of GIS for Land Resources Management", Oxford Publication, 2000.
4. Elangovan K., "GIS: Fundamentals, Applications and Implementation", New India Publishing Agency, New Delhi, 2006.
5. Demers M. N., "Fundamentals of Geographical Information Systems", John Wiley & Sons, New York, 2002.
6. Clarke K. C., "Getting Started with Geographic Information Systems", Prentice Hall, 2001.

15CN10 ADVANCED ENVIRONMENTAL ENGINEERING SYSTEMS

3 0 0 3

WATER SUPPLY ENGINEERING: Quantity of water -population forecasting- per capita consumption - fluctuation in consumption rate - design period. (5)

WATER TREATMENT SYSTEMS: Purification of water -screening -aeration -plain sedimentation -sedimentation with coagulation- filtration-slow sand filter, rapid sand filter, pressure filter-disinfection of water- optional treatment methods-design aspects. (5)

DISTRIBUTION SYSTEMS: Classification - Storage reservoir design- layout of distribution system - residual pressure - analysis of distribution system- leakage / waste prevention - appurtenances in distribution system. (5)

SEWERAGE SYSTEMS: Water carriage system - types -quantity of sewage - self cleansing velocity - non-scouring velocity-shapes of sewers-sewer materials-design of sewers-construction of sewers testing-plumbing systems-sewer appurtenances -sewage pumping. (6)

WASTE WATER TREATMENT SYSTEMS: Sewage characteristics - BOD- COD- population equivalent - relative stability - designing of waste water treatment units - screens - grit chamber - skimming tank - sedimentation-biological treatment methods - trickling filters- activated sludge process - oxidation pond- rotating biological contactors- design of septic tank and final disposal unit - disposal of sludge. (6)

WASTE WATER DISPOSAL METHODS: Disposal by dilution - oxygen sag curve - standards of dilution -self-purification process- zones of pollution - standards of waste water for irrigation- irrigation methods- percolation test. (5)

SOLID WASTE MANAGEMENT: Solid wastes- composition -generation and factors influencing - collection systems - processing, component separation-volume reduction methods -size reduction - recovery of material -disposal methods, composting, land filling, anaerobic digestion. (6)

AIR POLLUTION CONTROL: Effect of air pollution on human health, plants, animals, properties - air quality and emission standards - particulate removal -removal of gaseous pollutants- stack design -sampling techniques. (7)

Total L : 45

REFERENCES:

1. Peavy H S, Rowe D R and Tchobanoglous G, "Environmental Engineering", Mc Graw Hill Company Ltd., New York, 1985.
2. Punmia B C and Ashok Jain, "Environmental Engineering Volumes I and II", Arihant Publications, Jodhpur, 2006.
3. MetCalf and Eddy, Inc. "Wastewater Engineering Treatment, Disposal, Reuse", Tata Mc Graw Hill Publishing Company Limited, New Delhi, 2003.
4. "Manual on Solid Waste Management", Central Public Health and Environmental Engineering Organisation, Ministry of Urban Development, New Delhi.
5. Rao M N and Rao H V N, "Air Pollution", Tata Mc Graw Hill Publishing Company Limited, New Delhi, 2001.

15CN52 COMPUTER AIDED INFRASTRUCTURE PLANNING AND ANALYSIS LABORATORY

0 0 4 2

1. Scaling Techniques
2. Frequency distributions
3. T-test and chi-square list
4. ANOVA
5. Correlation
6. Regression analysis
7. Cluster analysis
8. Conjoint analysis
9. Factor analysis
10. Multi dimensional scaling
11. Non-parametric list
12. Project planning
13. Scheduling a project
14. Resource and cost analysis
15. Round about planning and analysis
16. Fixed time signal designing
17. Signal Co-ordination

Problems solved using commercially available software.

- 1 Project planning and scheduling
- 2 Statistical requirements
- 3 Signal design
- 4 Round about

Total L:15 + P:45 = 60

III SEMESTER

15CN53 GIS LABORATORY

0 0 4 2

EXERCISES:

1. Classifications of spatial data, layer and symbol concept using a GIS software.
2. Onscreen digitisation for points, lines and polygons for a map. Integration of data from various sources.
3. GPs data collection for utilities.
4. Digitisation using digitiser. Cleaning up the data, error removal and topology building.
5. Satellite image processing to produce landuse / landcover maps.
6. Attribute data query on maps, simple analysis
7. Simple overlay and weighted overlay
8. Network analysis in GIS.
9. DEM, TIN creation and Cost path analysis
10. Site selection of projects using GIS.
11. Output generation and cartographic design of maps.

Total P: 60

**15CN71 PROJECT WORK – PHASE I
Vide Structural Engineering 15CS71**

IV SEMESTER

15CN72 PROJECT WORK – PHASE II Vide Structural Engineering 15CS72

ELECTIVE THEORY COURSES

15CN21 ENVIRONMENTAL IMPACT ASSESSMENT

3 0 0 3

INTRODUCTION: Impact of development projects under Civil Engineering on environment – international scenario of environmental protection – Environmental protection methods – Environmental Impact Assessment (EIA) – Environmental Impact statement (EIS)– EIA capability and limitations – Legal provisions on EIA – Indian legislation to protect environment. (7)

EIA METHODOLOGIES: Methods of EIA – Checklists – Matrices – Networks – Cost-benefit analysis – environmental pricing – Analysis of alternatives - case studies. (7)

PREDICTION AND ASSESSMENT: Assessment of Impact on land, water and air, noise, social, cultural flora and fauna; Mathematical models; public participation – Rapid EIA. (7)

ENVIRONMENTAL MANAGEMENT PLAN: Plan for mitigation of adverse impact on environment – options for mitigation of impact on water, air and land, flora and fauna; Addressing the issues related to the Project Affected people- ISO 14000. (7)

EIA IN INDIA: Procedure for environmental clearance – Environmental guidance for infrastructure projects and river valley projects – Legislations and institutional support – International cooperation –Guidance for industrial licencing. . (6)

CASE STUDIES: EIA for infrastructure projects – Bridges – Stadium – Highways – Dams – Multi-storey Buildings – water supply and drainage projects. (11)

Total L: 45

REFERENCES:

1. Canter, R.L., "Environmental Impact assessment", McGraw Hill Inc., New Delhi, 1996.
2. Shukla, S.K. and Srivasava, P.R., "Concepts in Environmental Impact Analysis", Common Wealth Publishers, New Delhi, 1992.
3. John G. Rau and David C Hooten (Ed)., " Environmental Impact Analysis Handbook", McGraw Hill Book Company, 1990.
4. Shrivastawa A K, "Environmental Impact Assessment", APH Publishers, New Delhi, 2003.
5. Judith Petts, " Handbook of Environmental Impact Assessment Vol. I & II", Blackwell Science, 1999.

15CN22 BRIDGE ENGINEERING Vide Structural Engineering 15CS21

15CN23 FOUNDATION STRUCTURES Vide Structural Engineering 15CS09

15CN24 ADVANCED CONCRETE TECHNOLOGY Vide Structural Engineering 15CS03

15CN25 PRESTRESSED CONCRETE STRUCTURES Vide Structural Engineering 15CS10

15CN26 INFRASTRUCTURE MANAGEMENT

3 0 0 3

INTRODUCTION: What is Infrastructure - Infrastructure management-Importance of infrastructure management. (5)

OVERVIEW OF INDIAN INFRASTRUCTURE ASSETS: Energy - Power, Water resources –Dams – Bridges - canals, Urban Infrastructure, housing, Roads, Railways, Ports, Airports- social Infrastructure - education, health care- Infrastructure deficiencies (7)

ASSET MANAGEMENT: Design service life-Built infrastructure issues. (5)

ENERGY INFRASTRUCTURE: Components of energy - power-generation, transmission, distribution, oil & gas, coal, alternate energy. (8)

INFRASTRUCTURE PERFORMANCE: Report card- Infrastructure Inspection. (3)

INFRASTRUCTURE INTERDEPENDENCIES : Sustainable Infrastructure. (4)

- PRIVATISATION OF INFRASTRUCTURE:** Infrastructure Laws. (4)
- COST ESTIMATION FOR DESIGNING AND MAINTAINING INFRASTRUCTURE:** Financing of Infrastructure projects. (4)
- RURAL INFRASTRUCTURE :** Alternate construction materials, village ponds, village transportation, Sanitation (5)

Total L: 45

REFERENCES:

1. Joshi P, "Law Relating to Infrastructure Projects", Taxmann Publishers, 2001.
2. Murty G R K, "Infrastructure Projects : Current Financing Trends", Icfai University Press, 2006.
3. Alagiri D, "Infrastructure Growth In India and China : A Comparative Study", Icfai University Press, 2006.
4. 3i Network, "India Infrastructure Report 2007 : Rural Infrastructure", Oxford University Press, 2007.
5. 3i Network, "India Infrastructure Report 2006 : Urban Infrastructure", Oxford University Press, 2006.
6. Raghuram G, "Infrastructure Development and Financing : Towards a Public Private Partnership", Macmillan , 2001.
7. Narindar Jethi K, "Infrastructure Development In India", New Century Publications, 2007.
8. Alagiri D, "Infrastructure Development", Icfai University Press, 2007.
9. Krishnamurthy G G, "Infrastructure Financing", Icfai University Press, 2007.
10. 3i Network, "India Infrastructure Report 2008", Oxford University Press, 2008.

WEBSITES:

<http://infrastructure.gov.in/>
<http://www.indiacore.com/>
<http://www.asiatradeshub.com/India/intro.asp>
<http://www.indianinfrastructureobserver.com/>
<http://www.indiahousing.com/infrastructure-in-india.html>
<http://www.iitk.ac.in/3inetwork/html/reports/IIIR2006/iir2006.html>
<http://www.mapsofindia.com/infrastructure/>

**15CN27 OPTIMISATION TECHNIQUES
 Vide Structural Engineering 15CS26**

**15CN28 MAINTENANCE AND REHABILITATION OF STRUCTURES
 Vide Structural Engineering 15CS27**

15CN29 MODERN MATERIALS FOR CONSTRUCTION

3 0 0 3

INTRODUCTION: Introduction to the physics and chemistry of materials, focusing on chemical bonding, crystal structure, mechanical properties, phase transformation, Energy in building materials and building. (5)

SPECIAL CONCRETE: High strength and high-performance concrete-FRP-Fibre reinforced polymer composite-Lightweight concrete-Fly ash concrete-silica fume concrete –ferro cement and ferro concrete– prestressed concrete-precast concrete –concrete for off shore structure: Mineral and chemical admixtures. Non destructive testing methods for concrete. (14)

CERAMICS AND GLASS: Physical and chemical properties – Mechanical behavior – requirements and applications. (4)

FIRE PROOFING MATERIALS: Physical and chemical properties – Mechanical behaviour – requirements and applications - Fire damage assessment of materials. (3)

HIGHWAY MATERIALS & PAINTS : Requirements – special paints for Road marking. (5)

BUILDING MATERIALS FROM AGRO AND INDUSTRIAL WASTE: Typical agro waste and other biomas resources. (5)

MISCELLANEOUS MATERIALS: PVC,EPOXY, Thermocole , Geotextile , Acoustics ,Thermal and sound insulation materials, Green building material. (5)

SMART AND INTELLIGENT MATERIALS: Brief outline and uses. (4)

Total L: 45

REFERENCES:

1. Shan Somayaji, "Civil Engineering Materials" Second edition, Prentice Hall Inc., 2001.
2. Mamlouk M.S, Zaniewski J.P., "Materials for Civil and Construction Engineers", Prentice Hall Inc.,1999.
3. Derucher K, Korfiatis G. and Ezeldin S., "Materials for Civil and Highway Engineers" Fourth edition, Prentice Hall Inc.,1999.
4. Aitkens, "High Performance Concrete", McGraw Hill,1999.
5. Neveille A.M and Brooks J J "Concrete Technology", Longman,1999.
6. Metha P.K and Montreil P.J.M., "Concrete Microstructure Properties and Materials", Indian Concrete Institute, 1997.
7. Rafat Jeddigue, "Special Structural Concrete", Galgotia Publications, New Delhi,1999.
8. Nawy E G, "Concrete Construction Engineering Handbook", CRC press, New York, 1997.

15CN30 EXPERIMENTAL TECHNIQUES AND INSTRUMENTATION
Vide Structural Engineering 15CS29

15CN31 FINANCIAL MANAGEMENT AND ACCOUNTING

3 0 0 3

INTRODUCTION TO BASIC ACCOUNTING: Meaning of Accounting- Definition and objectives. Need for accounting- Internal and external users of accounting information-Branches of Accounting - Accounting Information system - Accounting Cycle – Accounting Concepts, Conventions and Principles. (3)

INTRODUCTION TO BALANCE SHEET :The Corporate Balance Sheet – Format of Balance sheet – Balance Sheet as per company law and annexure to it – Generally Accepted Accounting Principles . (3)

MANAGEMENT ACCOUNTING: Meaning – Nature and Scope – Functions – Limitations – Need – Financial Accounting vs. Management Accounting. (3)

FINANCIAL STATEMENTS ANALYSIS: Characteristics – limitations - Ratio Analysis (Including Dupont Model): Interpretation. (3)

CASH FLOW STATEMENT: AS 3 Format – Difference between Cash flow and Fund flow - Meaning of a cash flow statement – classification of cash flows – Preparation and Interpretation of Cash Flow Statement. (3)

COST ACCOUNTING: Meaning and objectives – classification -Direct Cost - Overheads – Cost Sheet. (3)

MARGINAL COSTING: Cost- volume profit analysis – Break Even Point - Application of marginal costing techniques to Managerial Decision making. (3)

FINANCIAL MANAGEMENT: An overview – Nature & scope - Finance functions - goals of financial management - Financial manager's role -agency problems ,agency cost. (3)

SOURCES OF FINANCE: Long term finance -ordinary shares, right issue of equity shares, preference shares, debentures, term loan, asset based financing-hire purchase, leasing, venture capital financing. Short term finance - trade credit, bank credit, bill discounting, commercial paper. (3)

TIME VALUE OF MONEY: Concept - future value- present value – single cash flows, annuity, uneven cash flows, multi period and continuous - yield calculation, applications : bonds valuation and yield - valuation of preference shares -valuation of ordinary shares. (3)

COST OF CAPITAL: Concept -determining component cost of capital -weighted average cost of capital - weighted marginal cost of capital. (3)

INVESTMENT DECISION : Capital budgeting decisions - Evaluation of capital budgeting -discounted & non discounted cash flows methods – simple problems. (4)

WORKING CAPITAL MANAGEMENT: Principles and concepts of working capital – operating cycle -determinants of working capital -policies for financing current assets. (4)

RECEIVABLES MANAGEMENT: Inventory management and cash management – basic concepts only. (4)

Total L : 45

REFERENCES:

1. Ambrish Gupta, "Financial Accounting for Management", First edition, Pearson Education, 2005.
2. Ashok Sehgal and Deepak Sehgal "Fundamentals of Financial Accounting", Fifth edition, TaxManns,2006
3. Colin Drury, "Management and Cost Accounting", Sixth Edition, Thomson Learning, 2007.
4. Horngreen, Sundem, Stratton, "Introduction to Management Accounting", Thirteenth Edition, Pearson Publications,2006.
5. Pandey IM, "Financial Management", Ninth Edition, Vikas Publishing House Private Ltd, 2005.
6. Prasanna Chandra, "Financial Management", Sixth Edition, Tata McGraw-Hill, New Delhi, 2004

15CN32 PREFABRICATED STRUCTURES

3 0 0 3

DESIGN PRINCIPLES: Road to industrialization in buildings – history- standardization and components - types of prefabrication – prefabrication systems- disuniting of structures- IS Code Specifications-construction principles – manufacture of prefabricated components – transport and erection of structural components – finishing and fitting –up operations – dimensional deviation and tolerance – principles of structural design of prefabricated components. (9)

ROOF AND FLOOR UNITS: Roofing slabs – large slab type roof components – floor units – structural design of roof and floor units – manufacture of roof and floor units – dimensional variations – structural design problems. (9)

WALL PANELS: General consideration on external wall construction- load bearing walls – wind bracing (shear wall) – curtain walls – window panels – connections and joints for wall panels – external wall panel examples – manufacture, transport and erection of wall panels – structural design- architectural design. (9)

INDUSTRIAL BUILDINGS: Structural Systems-Single bay-multi-bay buildings-low rise buildings-Applications-Design and detailing-Crane track beams- Columns-Frames- Structural Connections- execution of construction work – structural design and stability problems. (9)

SPECIAL STRUCTURES: Design and detailing, construction, stability conditions and design problems of plates and shells – lattice structures – arches – pipe bridges and conveyor bridges- - concrete poles – silos- Inelastic behaviour of externally prestressed continuous composite box-girder bridge with prefabricated slabs- Cyclic behavior of prefabricated circular composite columns with low steel ratio- Seismic performance of prefabricated steel beam-to-column connections. (9)

Total L: 45

REFERENCES:

1. Koncz T, "Manual of Precast Concrete Construction, Vol I,II & III, Bauverlag, GMBH, 1971.
2. Makk L, "Prefabricated Concrete for Industrial and Public Structures, Akademiai Kiado, Budapest 1964.
3. Sebestyen G, "Large Panel Buildings", Akademiai Kiado, Publishing house of the Hungarian Academy of Sciences, Budapest, 1965.
4. PCI Manual on Design of Connections for Precast Prestressed Concrete, 1973.
5. Prefabricated Building – A survey of some European systems, published by European productivity Agency, 1958.
6. Chang-Su Shim, Young-Soo Chung, Jae-Young Yoon, Cyclic behavior of prefabricated circular composite columns with low steel ratio. Engineering Structures. 33(2011): 2525–2534.
7. Fangxin Hu , Gang Shi, Yu Bai , Yongjiu Shi , Seismic performance of prefabricated steel beam-to-column connections. Journal of Construction steel research. 102(2014): 204–216.
8. Hyung-Keun Ryu , Chang-Su Shim , Sung-Pil Chang ,Chul-Hun Chung, Inelastic behaviour of externally prestressed continuous composite box-girder bridge with prefabricated slabs. Journal of Construction steel research. 60(2004): 989–1005.

15CN33 CITY PLANNING AND URBAN DESIGN

3 0 0 3

CITY PLANNING: Evolution of cities; principle of city planning; type of cities & new towns; Indian cities and metropolises constraints and prospects, Polarization of economic socio cultural and administrative activities: Distribution of urbanization process; National settlement polices; eco city concept; sustainable development. (8)

METROPOLITAN PLANNING: Metropolitan plan making processes, metropolitan plans in India, Metropolitan planning strategies. (8)

TECHNIQUES OF PLANNING: Planning survey techniques ; Conducting survey; statistical methods of data analysis; report presentation ; application of GIS and remote sensing techniques in urban and regional planning ; decision making models. (10)

DEVELOPMENT ADMINISTRATION AND MANAGEMENT: Scope and content of master plan and structure plan, integrated urban development plans and IDSMT and urban development projects; Planning laws ; development control and zoning regulations; law relating to land acquisition; development enforcements, urban land ceiling, scope and content of zonal development plans, detailed town planning schemes, area development plans, action plans and subject plans. Land management techniques; planning and municipal administration; disaster mitigation management; 73rd and 74th constitutional amendments; public participation and role of NGO & CBO. (10)

URBAN DESIGN: Definition of urban design , scope of urban design under Indian context and its integration with urban planning; Historical development and approach to urban design; urban form; Urban structure and design rational inter-relationship between economic activities, public organization , communication system, urban conservation and land-use structure .Organization of space. Review and designing of urban renewal and redevelopment projects for old and new towns. (9)

Total L: 45

REFERENCES:

1. Moser C.A., Kaltono G, "Survey Methods in Social Investigation" ELBS, London, 1972.
2. Faludi A, "A Reader in Planning theory", Pergamon Press, Oxford, 1981.
3. Peter Hall, "Urban and Regional Planning", Taylor and Francis, 2003.
4. Simon Eisner, Arthur B Gallion, "Urban Pattern City Planning and Design, CBS Publisher, 2004.
5. Urban Raw M, "Urban Planning and Practice", CBS Publisher, 2005.
6. Cliff Moughlin, Rafael Cuesta, "Urban Design Method and Techniques", Butterworth, 1999.
7. Harold Maclean Lewis, Wrigley J S, "Planning the Modern City Vol.I and Vol. II, John-Wiley, 1998.
8. Sundaram K.V, " Urban and Regional Planning in India " Vikas publishing House Pvt. Ltd., New Delhi, 2000.

15CN34 ORGANISATION BEHAVIOUR

3 0 0 3

INTRODUCTION TO OB: Definition, Meaning and Importance of OB, Historic developments of OB, Hawthorne experiment, Basic OB Model, Different approaches to OB, Contributing disciplines to OB, Scope of OB, Significance of OB. (5)

PERSONALITY: Definition, Origin of the word Personality, Determinants of Personality, Theories of Personality (Psychoanalytic theory, Self theory, Holland's personality theory, Myers Briggs Type Indicators and Big 5 personality theory), Attributes of personality. (5)

EMOTIONAL INTELLIGENCE: Definition and Meaning, Categories of intelligence, EI Dimensions, Physiology of EI, OB applications of emotions. (5)

MOTIVATION: Definition, Meaning, Characteristics of Motivation, Process of Motivation, Theories of Motivation (Maslow's need theory, ERG theory, Herzberg theory, Expectancy theory, Theory X & Y, McClelland's theory of needs, Goal setting theory, Equity theory), Incentives for Motivation. (5)

LEADERSHIP: Definition and Meaning, Styles of leadership, Theories of leadership (Trait theory, Ohio state theory, Managerial grid, Contingency theory, Path goal theory, Leader Member Exchange(LMX), Transactional & transformational leadership theory, Charismatic and Visionary leadership theory). (5)

GROUP DYNAMICS: Definition and Meaning, Difference between Group and Team, Groups in Organisation, Team Effectiveness model, Troubles with team, Social loafing. (5)

ORGANISATIONAL CULTURE: Meaning and Definition, Characteristics of Organisational culture, Elements of Organisational culture, Organisational sub culture, Artifacts for Organisational culture, Bicultural audit, Strategies to merger different organisational culture. (5)

ORGANISATIONAL CHANGE: Meaning, Why to change, Factors of Organisational change, Lewin's forced field model, Human reactions to change, Resistance to change, Strategies for reducing change, Ethical issues in Organisational change. (5)

CASES (5)

Total L: 45

REFERENCES:

1. McShane.L. Steven., Von Glinow Mary Ann., Sharma .R.Radha., "Organisational Behaviour", New Delhi, Tata McGraw-Hill Edition., 2006.
2. Robbins P.Stephen., "Organizational Behavior", New Delhi, Prentice-Hall of India, 1999.
3. Luthans Fred., "Organisational Behaviour", India, McGraw-Hill International Edition, 2001.
4. Kreitner Robert., Kinicki Angelo., "Organisational Behaviour", Illinois, Irwin Inc., 1997.

15CN35 MODERN SURVEYING

3 0 0 3

ASTRONOMY: Spherical Trigonometry - Astronomical Terms - Coordinate Systems – astronomical triangle – determination of azimuth of a line, latitude of the place of observation and error in the chronometer by taking extrameridian observations of the sun. (7)

TYPES OF SURVEYING AND CONTOURING

Geodetic surveying-triangulation and its classification-reconnaissance-station marks-intervisibility and heights of stations-signals-sounding party-methods and reduction of soundings-plotting-use of sextant-three point problem and use station pointer, CONTOURING: Definition-Contour interval and horizontal equivalent-characteristics-interpolation-contouring by grid and radial methods-drawing contour lines-use of contour maps-drawing of contours through computers. (12)

ADVANCED TOTAL STATION AND GPS: EDM measurements, Electronic theodolite - Principles of working of Advanced Total Station, linear measurements and angular measurements, co-ordinate measurement programme, vertical plane method - data transfer to computer- Introduction to GPS-functions and applications (9)

SETTING OUT WORKS: Procedures for setting out a building-pipelines-sewers-setting out curves-simple curve-compound curve-transition curves-vertical summit curves (8)

PHOTOGRAPHIC SURVEYING: Photo theodolite - principles of terrestrial photogrammetry - stereo photogrammetry - examples - aerial surveying - terminology - scale - simple problems on vertical photographs, soft copy photogrammetry. (9)

Total L: 45

REFERENCES:

1. Purnia.B.C., "Surveying", Vol.II and III, Laxmi Publications (P) Ltd., New Delhi, 2004.
2. Chandra.A.M., "Higher Surveying", New Age International Publishers, 2002.
3. Kanetkar T P, "Surveying and Levelling" Part 1 and 2, Pune Vidyarthi Griha Prakashan, 1998.

15CN36 GEOSYNTHETICS

3 0 0 3

OVERVIEW OF GEOSYNTHETICS AND DESIGN PRINCIPLES: Introduction, basic descriptions of geosynthetics, types, their current applications for various functions, materials, manufacturing processes, properties and testing, Mechanism of reinforced soil, Factors influencing behaviour and performance. (7)

IMPROVEMENT OF BEARING CAPACITY: Modes of failure in reinforced earth, Determination of force induced in reinforcement, Guidelines on the use of geogrids, bearing capacity improvement in soft soils. (7)

DESIGN OF REINFORCED SOIL RETAINING WALLS: Components of reinforced soil walls, Principles of design – Internal and

external stability - Design. (7)

EMBANKMENTS IN SOFT SOILS: Analysis, Influence of reinforcement extensibility, deformation in foundation, Overall stability with respect to bearing. (6)

USE OF GEOSYNTHETICS FOR FILTRATION AND DRAINAGE: Applications, Geotextile filter requirements, boundary conditions, drain and filter properties, design criteria. (6)

USE OF GEOSYNTHETICS IN ROADS: Applications, Role of subgrade conditions, Design – The Giroud and Noiray approach, Geotextile serviceability, Application in pavement overlays. (6)

GEOSYNTHETICS IN ENVIRONMENTAL CONTROL: Liners for ponds and canals, covers and liners for landfills, material aspects and stability considerations. (6)

Total L: 45

REFERENCES:

1. Robert M Koerner, "Designing with Geosynthetics", Prentice Hall, New Jersey, 2005.
2. Mandal J N, "Geosynthetics World", New Age International (P) Ltd., New Delhi, 2007.
3. Braja M Das, "Shallow Foundations: Bearing Capacity and Settlement", CRC Press, New York, 1999.
4. Sivakumar Babu, G.L., "Introduction to Soil Reinforcement and Geosynthetics", Universities Press, Hyderabad, 2009.

15CN37 CORROSION ENGINEERING

3 0 0 3

INTRODUCTION: Cost of Corrosion – Corrosion-Definition of Corrosion – Environments – Corrosion Damage – Classification of Corrosion. Corrosion Principles: Introduction-Corrosion Rate Expression. Electrochemical Aspects : Electrochemical Reactions-Polarisation-passivity. Environmental Effects: Effect of oxygen and oxidizers-Effect of Velocity-Effect of temperature-Effects of Corrosive concentration-Effect of Galvanic Coupling-Metallurgical Aspects. (9)

FORMS OF CORROSION: Galvanic Corrosion: EMF and Galvanic Series-Environmental Effects-Distance Effect-Area Effect-Prevention. Creative Corrosion: Environmental Factors-Mechanism-Combating Crevice Corrosion-File form Corrosion, Pitting – Solution composition-velocity-Metallurgical Variables-Evaluation & Prevention of pitting damager Intergranular corrosion. Austenitic Stainless Steels-Weld Decay-Knife Line Attack.

Selective Leaching: Dezincification Characteristics, Mechanism, prevention – Graphitization-Other Alloy systems. Erosion Corrosion: Surface Films-Velocity-Turbulence-Impingement-Galvanic Effect-Combating Erosion corrosion. Stress corrosion: crack morphology-Stress effects-time to cracking-Environmental & Metallurgical factors-Mechanism-methods of prevention-corrosion factors-Hydrogen Blistering-Hydrogen Embrittlement - Prevention. (9)

CORROSIVE ENVIROMENTS: Mineral Acids: Sulfuric Acid-Nitric Acid-Hydrochloric Acid-Hydrofluoric Acid-Phosphoric Acid. Organic Acids-Alkalies-Atmosphere Corrosion-Sea water-Fresh water-High purity water-soils-Aerospace-Biological corrosion-Human body-Corrosion of metal by halogens-Liquid metals and fused salts-sewage and plant-waste treatment-Dew point corrosion-liquid metal embrittlement of cracking-Hydrogen peroxide-Rebar corrosion. (9)

CORROSION TESTING: Introduction-Classification-Purpose-Materials and specimens-surface preparation-Measuring & Weighing-Exposure Techniques-Duration-Planned Interval Tests Aeration-Cleaning specimens after exposure-temperature-Standard expressions for corrosion rate-Galvanic corrosion high temperature and pressure-Erosion-Intergranular corrosion-pitting & stress corrosion-NACE Test methods-Linear polarization-paint Tests-Sea water tests-Miscellaneous tests of metals. (9)

CORROSION PREVENTION: Materials Selection: Metals & Alloys-Metal purification, Alteration of Environment changing mediums-inhibitors. Design: Wall Thickness-Design Rules. Cathodic & Anodic protection - comparison. Coatings: metallic & other Inorganic coatings-Organic coatings-corrosion control standards-Failure Analysis. (9)

Total L: 45

REFERENCES:

1. Mars G. Fontana, "Corrosion Engineering", Third Edition, Mc Graw-Hill Book Company, New York 1988.
2. Mandal J N, "Geosynthetics World", New Age International (P) Ltd., New Delhi, 2007.
3. Braja M Das, "Shallow Foundations: Bearing Capacity and Settlement", CRC Press, New York, 1999.
4. Sivakumar Babu, G.L., "Introduction to Soil Reinforcement and Geosynthetics", Universities Press, Hyderabad, 2009.

15CN38 REMOTE SENSING

3 0 0 3

REMOTE SENSING SYSTEM: Elements of EMR - wavelength regions – energy interaction in atmosphere – Absorption – scattering - atmospheric windows – terrestrial interaction – spectral reflectance curves – active and passive remote sensing.-platforms and sensors-types of resolutions (7)

RADAR AND THERMAL REMOTE SENSING: Plank's blackbody law – displacement law and emissivity effects - heat capacity, thermal ,thermal property of objects – thermal sensors – thermography – thermal image interpretation - Radar interaction with Earth surface and vegetation, Surface scattering theory. RADAR equation, Fading concept, Measurement and discrimination , SAR Interferometry – Basics- - Differential SAR Interferometry- Polarimetry- Radargrammetry- applications - Altimeters – SRTM – Applications. (10)

SATELLITE DATA PRODUCT AND INTERPRETATION OF SATELLITE IMAGERIES: Types of data product- software and hardware requirement for data processing- Elements of visual image interpretation- Digital Image processing techniques, Landuse/landcover classification. (8)

CHARACTERISTICS OF SATELLITES AND THEIR APPLICATIONS: GOES, NOAA, METEOSAT, INSAT - Land observation satellites: LANDSAT, SPOT, IRS, IKONOS, GEOEYE, QUICKBIRD, WORLDVIEW – SEASAT, SIRA, SIRB, ERS , JERS, RADARSAT and other currently available satellites. (11)

REMOTE SENSING APPLICATIONS: Urban land use planning - site selection for various infrastructure projects- resource management- mapping of infrastructure facilities and planning - integration of satellite imageries in GIS (9)

Total L: 45

REFERENCES:

1. American Society of Photogrammetry, (1983). Manual of Remote Sensing, 2nd Edition, American Society of Photogrammetry, Falls Church, Virginia.
2. James B. Campbell (1996); Introduction to Remote Sensing; Taylor & Francis, London.
3. Jensen, John R., (2007). Remote Sensing of the Environment: An Earth Resource Perspective, 2nd Ed., Prentice Hall, New Jersey.
4. Lillisand, T. M., and Kiefer, P. W., (1998). Remote Sensing and Image Interpretation, John Wiley & Sons, New York.
5. Sabins F F, "Remote Sensing - Principles and Interpretation", W H Freeman & Company, 1987.

ONE CREDIT COURSES

For the detailed syllabi of the electives and one credit courses offered by other departments refer to the syllabi of M.E- Automotive Engineering offered by Automobile Engineering Department.