

**B-TECH CIVIL ENGINEERING  
VI SEMESTER**

<b>Code</b>	<b>Subjects</b>
	<b>Theory</b>
<b>CE411</b>	<b>Structural Analysis-II</b>
<b>CE412</b>	<b>Geotechnical Engg.-II</b>
<b>CE413</b>	<b>Environmental Engg.-II</b>
<b>CE414</b>	<b>Structural Design –I</b>
<b>CE415</b>	<b>Transportation Engg.-II</b>
<b>-</b>	<b>ELECTIVE</b>
	<b>Practical</b>
<b>CE417</b>	<b>Environmental Engg. Lab</b>
<b>CE418</b>	<b>Estimation, Costing and Valuation</b>
<b>CE419</b>	<b>Computer Aided Design Lab</b>
<b>CE420</b>	<b>General Proficiency –II</b>

**Elective**

**CE1 Pre-stressed Concrete Structures**

**CE2 Coastal Engineering**

**CE3 Industrial Waste Disposal and Treatment**

**CE4 Irrigation and Drainage Engineering**

**CE5 Architecture and Town Planning**

**CE6 Mass Transportation System**

**CE7 Construction Methods and Equipment**

## **CE 411 STRUCTURAL ANALYSIS-II**

### Unit – I

ILD for shear, moment and reactions for statically determinate beams and pin jointed trusses.

### Unit – II

Moving loads for statically determinate structures –single and several points loads – maximum bending moment and maximum shear force – equivalent u.d.l. - absolute maximum bending moment - determination of equivalent UDL.

### Unit – III

Influence lines – Muller-Breslau Theorem - principle and its application. Influence lines for continuous beams. Muller Breslau Principles qualitative approach for single bay, single storey portals. Analysis of frames for lateral loads by portal and cantilever methods.

### Unit – IV

Theory of arches - Analysis of three hinged, two hinged and fixed arches - influence lines, rib shortening, settlement, and temperature effects. Analysis of forces in cables - Suspension bridges.

### Unit – V

Plastic Theory – Yield stress - Load Factor – Plastic Hinge – Moment redistribution - Shape factor – Upper and lower bound theorems – plastic analysis of beams and frames.

### **Text Books**

1. Bhavikatti. S. S., Structural Analysis, Vols. I & II, Vikas Publishing House (P) Ltd., New Delhi, Second Edition, 2002.
2. Punmia. B. C., Jain, A. K., and Jain, A. K., Strength of Materials and Theory of Structures, Vol. II, Eleventh Edition, Laxmi Publications, New Delhi, 2002.

### **Reference Books**

1. Wang. C. K., Intermediate Structural Analysis, McGraw Hill Publishing Co., Tokyo, Fourth Edition, 1989.
2. Jindal, R. L., Indeterminate Structural Analysis, S.Chand & Co. New Delhi, Third Edition, 1997.

## **CE 412 GEOTECHNICAL ENGINEERING.-II**

### Unit-I

Soil Exploration: Introduction, need, planning, stages - depth and spacing of soil-exploration methods – samplers, sampling method – Insitu tests – SPT,CPT, VST, pressuremeter - exploration reports.

### Unit-II

Stability of slopes: Introduction- slopes failure - stability of infinite slope – land slides. Finite slope analysis - Swedish circle method – stability number. Slope stability – improving slope stability by reinforcement and confinement.

### Unit –III

Lateral earth pressure: Active, passive and earth pressure at rest, Rankine and Coulomb's theory – Rebhann's Method. Earth pressure due to inclined back fill, line load and earth quake load – Cantilever sheet pile wall in granular and clay soil. Design of braced excavations.

### Unit –IV

Shallow foundation: Types and selection criteria. Bearing capacity - Terzaghi's analysis – IS code – methods to determine bearing capacity – field tests - proportioning of foundation – BC of foundation subjected to moments and earthquake loading. Methods to increase BC – compaction – dewatering - pre loading – stone columns – lime stabilisation.

### Unit-V

Pile foundations: Introduction- classification-selection criteria- Individual and group carrying capacity static and dynamic approach-pile load tests under reamed piles-IS Codal provisions. Methods to increase pile carrying capacity – deep compaction methods – grouting.

### **Text Books**

1. Purushothama Raj. P, Soil Mechanics and Foundation Engineering, Pearson Education, 2008
2. Punmia, B.C., Soil Mechanics and Foundation Engineering, Standard Book House, 1997

### **Reference Books**

1. Bowles.J.E., Foundation Analysis and Design, McGraw hill 5th Edition , 1997.
2. Varghese.P.C., Foundation Engineering , Prentice Hall, Indian , 2008
3. Das.B.M, Principles of Foundation Engineering, Brooks/Cole Engineering Division, CA.

## **CE 413 ENVIRONMENTAL ENGINEERING.-II**

### **Unit-I**

Definitions - General considerations- Interdependence of water supply and waste water disposal – source and nature of waste water - Combined and separate system – surface drainage - storm water flow – Investigation and design of sewerage schemes – Data collection - Design flow for separate, storm and combined systems.

### **Unit-II**

Sewage Characteristics- Physical and chemical characteristics - Biology of sewage – chemical tests - D.O. and B.O.D. and its significance. Characteristics and quantification of raw and digested sludge.

### **Unit –III**

Collection and Transport of sewage - Materials for sewers - their strength - Corrosion of sewers – Flow formulae - Self cleansing of sewers - Full and partial flow conditions - Sewer sections. Design of separate sewers - Storm drains and combined sewer systems.- Design principles and procedures, sewer construction: Sewer joints - Jointing materials, specification and tests - Sewer laying under various conditions, Loads on sewers – Tests for sewers.

Flushing equipment for removal of sand, grit - Repair and connections - Clearing catch basins, Gases in sewers - Sewage pumping, types of pumps, capacity, design of centrifugal pumps - Manholes - Inlets - catch basins - Sand, grease and oil traps. Sanitary fixtures and fittings - General layout and street connection - Principles of design of anti syphonage device -Types - Inspection chamber - Fresh air inlet.

### **Unit-IV**

Primary treatment : Basic principles of sewage treatment - Screens, Grit chamber - Principles of sedimentation - Design of settling tanks - Types of settling tanks - Chemical precipitation. Biological Treatment and unit Process : Contact beds - Trickling filter - Description and operation of low rate and high rate filters, intermittent sand filter - Design of the above filters. Activated sludge Process: Theory – Diffuser and Mechanical aeration - Conventional, High rate and extended aeration process - Process modification – Oxidation ditch - Principles and design of waste stabilization lagoon - aerated Lagoon. Principle of Sludge digestion - Optimum conditions - Digestion tanks -Supernatant liquid - Sludge gas - Drying beds. Septic and Imhoff tanks.

## Unit V

Wastewater Disposal and Reuse - Disposal of sewage - Reduction of BOD - Land disposal - Discharge in to rivers, lakes, estuaries and ocean – River pollution - Oxygen sag curve - recycle and reuse of waste effluents. – Disinfection –Chlorination and odour prevention. Introduction to Low cost treatment methods -Special nature of problem of industrial water - Population equivalent – Process modifications and by product recovery

### **Text Books**

1. Duggal, K.N., Elements of Environmental Engineering, S.Chand & Company Ltd., 2008.
2. Birdie G. S and Birdie J.S, Water Supply and Sanitary Engineering, Dhanpat Rai and Sons (1998), New Delhi

### **Reference Books**

1. Peavy, H.S., Rowe, D.R. and Tehobanoglous, G., Environmental Engineering, McGraw Hill Book Company, 1998
2. Hussain ,S.K., Water supply and sanitary engineering , Oxford & IBH, New Delhi,1997
3. Steel, E.W., Water supply and Sewerage , McGraw Hill, 1996
4. Fair, G.M., Gayer, I. and Okun , Water and Waste Water Engineering , John Wiley & Sons, 1981

## **CE 414 STRUCTURAL DESIGN**

### Unit-I

Role of structural engineer in structural design – elements of structures – reinforced concrete – ductility versus brittleness – methods of design – codes of practice - Working Stress Method - Introduction- Permissible stresses-Factor of Safety- Behaviour of R.C.C beams under Flexure, Shear, Bond and Torsion- Design of beams for flexure, shear, bond and torsion.

### Unit-II

Limit State Method: Concepts- Assumptions- Characteristic Strength and Load, Partial Safety Factors- Limit States- Limit State of Collapse in Flexure, Shear, Bond and Torsion- Design of beams for flexure, shear, bond and torsion.

### Unit-III

Limit State Design of One-Way, Two- Way and Continuous Slabs using BIS coefficients - Design of Lintel Beams.

#### Unit-IV

Limit State Design of Short Columns and Long Columns subjected to combined axial load and bending using interaction diagram.

#### Unit-V

Design of Footings (Limit State method)- Isolated footing with axial and eccentric loading  
Combined Rectangular and Trapezoidal footing, Design of Stair Cases.

#### **Text Books**

1. Punmia.B.C and Jain, A.K., Comprehensive RCC Designs, Lakshmi Publications (P) Ltd., New Delhi, Ninth Edition, 2002
2. Ashok K. Jain, 'Reinforced Concrete Limit State Design', 4th Edition Nem Chand & Bros, Roorkee, 1993

#### **Reference Books**

1. Shah V.L and Karve SR, Advanced Reinforced Concrete Design, Structures Publications, Pune, 2002.
2. Unnikrishna Pillai and Devdas Menon, Reinforced Concrete Design, Tata Mc Graw Hill Publishing Company Ltd., New Delhi, 2002.
3. Nilson H., A.H., George Winter,G., 'Design of Concrete Structures', McGraw Hill Book Co., New York, 1972
4. Park R and Pauloy T, Reinforced Concrete Structures, John Wiely & Sons Inc.
5. Mallick S.K., Reinforced Concrete, Oxford & IBH Publishing Company

### **CE 415 TRANSPORTATION ENGINEERING.-II**

#### Unit – I

Traffic engineering: road user and vehicle characteristics; Traffic volume and composition, speed, headway, concentration, delay; flow principles; micro and macroscopic stream characteristics

#### Unit – II

Traffic studies - Volume, Speed, Delay, O-D and Parking surveys; statistical applications in traffic engineering.

#### Unit – III

Traffic regulations and control - Traffic signs, Signals, Markings, Islands, and Rotaries; Traffic signals – Basic concepts and principles, Analysis and design; Types and layout of at-grade and grade separated intersections.

#### Unit – IV

Parking facilities; Capacity analysis and Level of Service (LOS) for uninterrupted flow facilities – performance measures, LOS analysis, Design; Intelligent Transportation Systems (ITS) – Components, Advanced Traffic Management Systems (ATMS), Advanced Traveller Information System (ATIS)

#### Unit – V

Railway engineering: location surveys and alignment; permanent way – gauges, components of permanent way; points and crossings; stations and yards.

#### **Text Books**

1. Kadiyali, L. R., Traffic Engineering and Transport Planning, Khanna Publishers, New Delhi, 2006
2. Saxena, C.S.and. S. Arora. S.A., course in Railway Engineering, Dhanpat Rai & Sons New ,Delhi. 2007.

#### **Reference Books**

1. Antia, K.F, Railway Track, The New Book Company Pvt. Ltd., Bombay, 2006
- 2 .Banks, J. H., Introduction to Transportation Engineering, McGraw-Hill Book Co., 2005.
3. Papacostas, C. S., and Prevedouros, P. D. Transportation Engineering and Planning, Prentice Hall, 3rd edition, 2002.
4. Agarwal, M. M., Indian Railway Track, 14th Edition, Prabha and Co., New Delhi, 2002.
5. Kristi, Lal, Transportation Engineering, PHI, New Delhi, 2008

#### **CE 416 ENVIRONMENTAL ENGG. LAB**

1. Determination of Turbidity, pH, Conductivity and Residual Chlorine.
2. Determination of Alkalinity.
3. Determination of Chlorides.
4. Determination of Hardness.
5. Determination of Iron
6. Determination of Manganese.

7. Determination of Fluorides.
8. Determination of Total Solids.
9. Determination of Suspended solids.
10. Determination of Dissolved Oxygen.
11. Jar test for the determination of optimum coagulant Dose.
12. Determination of B.O.D.
13. Determination of C.O.D.
14. Estimation of E-Coli.
15. Plate count (for bacterial analysis of water)

### **CE 417 ESTIMATION, COSTING AND VALUATION**

Introduction: Types of estimate – Methods of measurement – Units of measurement for various item of work – Factors to be considered in the preparation of detailed estimate –Methods of measurement as per IS,1200. Methods of Estimation: Centerline and crossing methods of estimation – Examples using the above methods. Detailed estimates: Detailed estimates of a simple residential building, Multi- storied building, culverts and bridges, road network inclusive of earth work. Detailed estimates of water tanks and sumps, water supply distribution network, sewer lines man holes, Aqueduct and canal falls and structural steel work. Specifications: Purpose and basic principles of general and detailed specifications of various item of work. Costing, Analysis of rate – Purpose – Quantity of materials per unit rate of work – Estimating labours – Task of out turn work – Quantity of materials for different item of works. Valuation: Valuation – Purpose, Common terms used in valuation – Valuation of building using different methods (with example) – Fixation of rent for a building. Valuation of land.

#### **Reference Books**

1. Dutta, B.N., Estimating and Costing in Civil Engineering Practice, S.Dutta & co,Lucknow, 1999.
2. Rangwala,S.C. , Valuation of Real Estate Properties, Charoter Publishing House,Anand, 1997.



## **CE 418 COMPUTER AIDED DESIGN LAB**

Introduction and Demonstration –analysis and Design Packages in Structural Engineering like STAAD-III, Pro 2007 GTSTRUDL, ETABS etc. Analysis and Design of continuous beams, Multistory Frames, Trusses– Analysis of results. GIS Software Introduction and demonstration – Geographical Information systems –Geomeida Professionals- Thematic – overlays- Applications in Water resources Engineering. Mat Lab Software Introduction to Mat lab 6 software – Roots of an equation –Solution of simultaneous equations – Matrix Inversion –Linear Regression line of given points –Curve fitting using polynomial regression – Eigen value extraction and Eigen vectors.

### **Reference Books**

1. Rajaraman,V. Computer Oriented Numerical Methods Prentice Hall of India, 2002
2. Rudra Pratap, Introduction to Mat Lab 6, Oxford Press, 2002
3. STAAD –III/ STADD RD Manual, 2002
4. ETABS and SAP 2000 Manual , 2007
5. GeoMeida Professional 6 Manual, 2001
6. Mat Lab – 6 Manual, 2001

## **HS 419 GENERAL PROFICIENCY –II**

### **Unit – I : Composition Analysis**

Technical and Non-Technical Passages (GRE Based) – Differences in American and British English – Analyzing Contemporary issues – Expanding Terminology

### **Unit – II : Writing**

Job Application Letter Writing – Resume Writing

### **Unit – III : Oral Skills**

Group Discussion – Introduction and Practice – Team Work – Negotiation Skills – Organizing and Attending Meetings – Facing Interviews

### **Unit – IV : Adapting To Corporate Life**

Corporate Etiquette – Grooming and Dressing

### **Unit – V : Aptitude**

Verbal and numerical aptitude

## **References**

1. Pushplata and Sanjay Kumar. Communicate or Collapse : A Handbook of Effective Public Speaking, Group Discussions and Interviews. Prentice-Hall, Delhi, 2007.
2. Thorpe, Edgar. Course in Mental Ability and Quantitative Aptitude. Tata McGraw-Hill, 2003.
3. Thorpe, Edgar. Test Of Reasoning. Tata McGraw-Hill, 2003.
4. Prasad, H.M. How to prepare for Group Discussion and Interview. Tata McGraw-Hill, 2001.
5. Career Press Editors. 101 Great Resumes. Jaico Publishing House, 2003.
6. Aggarwal, R.S. A Modern Approach to Verbal & Non-Verbal Reasoning. S. Chand & Co., 2004.
7. Mishra Sunita and Muralikrishna, Communication Skills for Engineers, First Edition. Pearson Education, 2004.

## **ELECTIVES**

### **ELECTIVE CE1 PRE-STRESSED CONCRETE STRUCTURES**

#### **Unit – I**

Introduction-Principles of pre-stressing-Materials-Losses-Systems of pre-stressing-Simple cable profiles- Load balancing method.

#### **Unit – II**

Pre-tensioned and Post-tensioned beams-Principles of designs-Design for flexure, bond and shear – IS Code provisions-Ultimate Strength of pre-stressed concrete beams in flexure and shear- Design of end anchorage Zones using I S Code method.

#### **Unit – III**

Deflection of pre-stressed concrete members – Methods of pre-stressing-principles of partial pre-stressing –non-pre-stressed reinforcements-Analysis and Design of composite beams.

#### **Unit-IV**

Design of Tension and Compression members-Circular pre-stressing-Pipes- Water Tanks- Analysis and design –IS-Code provisions

#### **Unit- V**

Analysis of continuous beams –Primary moment-secondary moment-cable layout-Linear Transformation – Concordant cable.

### **Text Books**

1. Krishna Raju, N., Prestressed Concrete Structures, Tata McGraw Hill, 1997.
2. Dayaratnam. P. Prestressed Concrete Structures, Oxford & I B H, 1991.

### **Reference Books**

1. Pandit. G.S, Gupta. S.P, Prestressed Concrete, CBS Publishers and Distributors, New Delhi, 1993.
2. Lin. T.Y. Design of Pre-stressed Concrete Structures, Asia Publishing House, Madras, 1987.

## **ELECTIVE CE2 COASTAL ENGINEERING**

### **Unit – I**

Coastal zone: Definition and sub division – Factors influencing coastal topography - Waves: Definitions - Classification – Liner wave theory – Assumptions and derivations of relationships – Pressure within progressive wave – Wave energy – Problems

### **Unit – II**

Wave Transformation: Wave generation – Shoaling – Refraction – Reflection – Diffraction – Breaking of waves – Near shore currents – Tides - Tsunamis - Wave Hindcasting – forecasting - Sea level changes.

### **Unit – III**

Wave forces on Structures: Force due to non breaking, breaking and broken waves on vertical, sloping, curved, stepped barriers and on piles – Problems.

### **Unit – IV**

Sediment Movement : Types – Littoral Drift – Erosion process – Near shore, long shore currents and effects - Beach profile changes – case studies – Beach process - Environmental parameters- Coastal erosion in India - Dredging – Dredgers - Environmental effects of dredging - Remote sensing and GIS application in coastal engineering

### **Unit – V**

Coastal Protection: Methods – Function – Types - Design concepts – Sea walls – Bulkhead – Revetment – Groins – Artificial beach nourishment – Scour – Maintenance of coastal structures.

### **Text Book**

1. Narasimhan & S. kathirolu, Harbour and Coastal Engineering (Indian Scenario) Vol - I & Vol – II, NIOT- Chennai

2. Shore Protection Manual (Vol – I, II, III) U.S. Army Corps of Engg. USA.

### **Reference Books**

1. Ippen, A.T., Estuarine and coastline Hydrodynamics, McGraw Hill Book Co., New York
2. Wiegel. R.L. Oceanographical Engineering., Prentice Hall, Eagle Wood Cliffs, New Jersey
3. Dean .R.G. and Darymple, R.A. Water Mechanics for Engineers and scientists.

## **ELECTIVE CE3 INDUSTRIAL WASTE DISPOSAL AND TREATMENT**

### **Unit-I**

Uses of water by Industry - Sources and types of wastewaters, quality criteria, effluent standards- Individual and common effluent treatment plants - Population equivalent, Effects of industrial wastes on streams, land, air and waste water treatment plants

### **Unit II**

Pretreatment Methods: Process modification – methods and materials changes – Reduce, reuse and recycle methods, house keeping etc. to reduce waste discharge and strength of the waste and established methods for by products recovery within the plant operations

### **Unit-III**

Equalization – Neutralization - Oil separation – Flootation – Precipitation – Adsorption - Aerobic and anaerobic biological treatment - High rate reactors. Chemical oxidation – Ozonation – Ion Exchange – Membrane technologies

### **Unit-IV**

Residuals of Industrial waste treatment —Characteristics of sludge – Thickening, digestion, conditioning, dewatering and disposal of sludge.

### **Unit –V**

Industry and power plants - manufacturing process description - wastewater characteristics and waste treatment flow sheet for typical industries – Textiles – Tanneries – Pulp and Paper –Metal finishing – Petroleum refining – Chemical industries -Sugar and distilleries –Dairy –Iron and Steel- Fertilizers –Nuclear power plants.

### **Text Books**

1. Eckenfelder. W.W., Industrial Water Pollution Control, McGraw Hill, 2000.
2. Arceivala.S.J. Wastewater Treatment for Pollution Control, Tata Mc.Graw Hill. 2008.

### **Reference Books**

1. Nemerow, N.L., Theories and Practices of Industrial Wastes Treatment, Addison and Wesley, 1963.
2. Gurnham, C.F., Principles of Industrial Waste Treatment, John Wiley, New York, 1948.

## **ELECTIVE CE4 IRRIGATION AND DRAINAGE ENGINEERING**

### Unit-I

Introduction: Need, advantages and disadvantages of Irrigation - Environmental effects - Types of Irrigation systems - Gravity irrigation, canals, Tanks, Wells and Irrigation galleries - Water lifts. Soil - water - plant relationship: Soil and its function - Physical properties of soil and their importance in relation to irrigation - Classes and availability of soil water - Movement of water in soils - Measurement of soil moisture - Crop growth and moisture relationship - Salt problems in soil and effect of salts on plant growth.

### Unit - II

Irrigation Requirement: Evaporation, Evapo transpiration, Consumptive use and its estimation – Crop factor - Lysimeters - Effective rain fall and irrigation requirements - Water requirements of various crops - Duty of water - Quality of irrigation water.

### Unit –III

Methods of Irrigation: Surface, subsurface and overhead methods - Check basin, border & furrow, Drip and sprinkler irrigation - Irrigation efficiency, Depth, Rate and frequency of irrigation - Irrigation schedule.

### Unit – IV

Design of channels: Design of unlined and lined channels for irrigation - Location and design of canal regulation structures - Cross drainage structures - Measuring devices.

### Unit – V

Land Development: Reclamation and management of saline & alkaline soils, water logging, Causes and remedial measures - Design, construction and maintenance of drainage systems.

Irrigation Management: Management of irrigation system - water charge assessment and water use management.

### **Text Books**

1. Punmia, B.C., and Lal ,B.B., Irrigation and Water Power Engineering, Standard Publishers & Distributors, New Delhi, 2006.

2. Sharma.R.K., and Sharma. T.K., Irrigation Engineering , S.Chand & Company Ltd, New Delhi, 2007.

### **Reference Books**

1. Hansen, V.E., et.al., Irrigation Principles and Practices, John Wiley & Sons, 2001.
2. Sharma, R.K., Text Book of Irrigation Engineering and Hydraulic Structures, Oxford & IBH Publishing Co., 2007.
3. Michael, A.M., Irrigation Theory and Practice, Vikas Publishing House, New Delhi, 1996.
4. Das, M.M, Saikia, M.S Irrigation and water power Engineering, PHI, Learning, (P) Ltd, New Delhi, 2009.

## **ELECTIVE CE5 ARCHITECTURE AND TOWN PLANNING**

### Unit-I

Introduction to Architecture: Origin and definition – Influence of nature – Climate – Topography – material – Social condition – Economic condition on architecture. Architectural science - factors influencing architecture, aesthetic responses: Colour and aesthetic responses- formal and informal organization of solids and voids.

### Unit-II

Basic Principles: Concepts of beauty, unity, balance, composition, rhythm, harmony, style, character, integration, scale, proposition, contrast, shape and structure.

### Unit-III

Urbanization: Urbanization trends in India- Classification of towns - humans settlements development policy - National approach. Urban growth: planning of towns in ancient India - Greek and Roman towns - Garden city concept - New towns & satellite towns –Urban Renewal- Planning standards for neighborhood

### Unit-IV

Evolution of planning legislation in India – Organisation and administration of planning agencies at national, state, regional level and metropolitan level – building bye law – Function of local Authority – Provision of Building regulations.

### Unit-V

Planning of Land uses: Residential area planning - Site & service programmes - Commercial areas - Industrial sites - rectangular areas, Principles of planning for traffic and transportation facilities – transport terminals pedestrian path and bikeways.

### **Text Books**

1. Gallion,D., et.al, The Urban pattern city planning & design, Affiliated East West Press Pvt. Ltd., New Delhi.
2. Lewis Keeble, Town Planning Made Plain & Town & Country Planning Association, London, 1983.

### **Reference Books**

1. Rangwala, K.S., Town Planning, Charotar Publishing House, Anand, India.
3. Hiraqskar, G.K., Fundamentals of Town Planning, Dhanpat Rai & Sons., Delhi 2001.
4. Pickering,E., Architectural Design, John Wiley and Sons , London.

## **ELECTIVE CE6 MASS TRANSPORTATION SYSTEMS**

### **Unit-I**

Role of Transportation: History of transit, Recent Trends in transit, Mass transportation characteristics, Demand Characteristics: Spatial, temporal and behavioral characteristics.

Mass Transportation Planning: Transportation demand surveys, Mass transportation demand estimation, Demand projection, Trip generation, Trip distribution, Model split and route assignment.

### **Unit-II**

Transport system Performance: Performance evaluation and analysis, Structure of decision making, Evaluation and selection methods, selection procedure Generation of alternative schemes, Economic evaluation methods. Terminals: Functions of terminals, Design, Typical Terminal characteristics.

### **Unit-III**

Scheduling and Routes: Service analysis, Vehicle dispatch policy, Vehicle Requirements, Spacing of bus stops, Route spacing and performance.

### **Unit-IV**

Management: Operational and management issues in transport planning, Reserved buslanes and signals, Vehicle monitoring and control system,, Nodal coordination.

Unit-V

Special Systems: People mover systems, Underground transportation, para transit, Railtransit system, case studies.

### **Text Books**

1. Kristhi, Lal, Transportation Engineering, PHI, Delhi, 2008 Hay, W.W., An Introduction to Transportation Engineering, 2nd Ed., John Wiley & Sons, 2001
2. Kadiyali, L. R, “Traffic Engineering and Transport Planning”, Khanna Publishers New Delhi – 110006, 2006

### **Reference Books**

1. Hutchinson, Urban Transport Planning, John Wiley, 2006
2. Dickey, J.W., et. al., Metropolitan Transportation Planning, TMH edition, 2002.
3. Paguette, R.J., et.al, Transportation Engineering - Planning and design, 2nd edn., John Wiley & Sons, 2002.
4. Railis, V.R, Inter city Transport, Engineering and Planning, The Macmillan Press, 2003.

## **ELECTIVE CE7 CONSTRUCTION METHODS AND EQUIPMENT**

Unit - 1

Modern Construction Methods - Open excavation, shafts and tunnels, pier and caisson foundation . Basement construction - construction Methods – supporting the excavations- control of ground watershoring and underpinning- basement waterproofing.

Unit –II

Construction Methods for Bridges, roads railways, dams, harbours , river works and pipelines

Unit –III

Construction equipment and techniques for Earth moving, excavating , drilling, blasting, tunneling and hoisting and erection

Unit –IV

Equipment for: Dredging, tunneling, dewatering- Equipment for Flooring – dewatering and floors finishing

Unit –V



Equipment for production of aggregate and concrete – Crushers- feeders- screening equipment – batching and mixing equipment – hauling, pouring and pumping equipment – transporters

### **Reference Books**

1. Antil J.M., Civil Engineering Construction, McGraw Hill Book Co., 1982
2. Peurifoy, R.L., Ledbette. W.B Construction Planning , Equipment and Methods McGraw Hill Co, 2000
3. Ratay., R.T Hand Book of Temporary Structures in Construction, McGraw Hill,1984
4. Koerner., R.M, Construction & Geotechnical Methods in Foundations Engineering, McGraw Hill, 1984
5. Varma., M., Construction Equipment and its Planning & Application, Metropolitan Book Co., 1979
6. Smith, R.C, Andres, C.K Principles and Prentice of Heavy Construction, Prentice Hall, 1986