

EIGHTH SEMESTER				CIVIL ENGINEERING			
<b>COURSE CONTENTS (Grading)</b>							
CE-8001	R.C.C. – II	L	T	P	Max. Marks	Min. Marks	
Duration	3 Hours	3	2	2	70	22	

#### UNIT – I

Design of Combined footing, deep foundation, raft footing.

#### UNIT – II

**Earth Retaining Structures** : Cantilever and counter fort types retaining walls.

#### UNIT – III

**Water Tanks** : Tanks on ground and underground tanks: square, rectangular, circular tanks, Overhead tanks: square, rectangular, Circular & intze tanks.

#### UNIT – IV

**Silos and Bunkers.**

#### UNIT – V

Introduction to prestress design. Design of RCC and prestress bridge.

#### Reference Books :

- (i) R.C.C. by O.P. Jain, Vol.II.
- (ii) R.C.C. by B.C. Punmia.
- (iii) Essentials of Bridge Engineering – D.J. Victor.
- (iv) Bridge Engineering – Ponnuswamy.
- (v) Advanced R.C.C. Design by N.K. RAJU.
- (vi) N. Krishna Raju, Pre – stressed Concrete, tata McGraw Hill, New Delhi.
- (vii) Pre stresses concrete – T.Y. Lin.

#### List of Practical :

- (i) One Sheet of Drawing on Combined Footing.
- (ii) One Sheet of Drawing on Cantilever Retaining Wall with details.
- (iii) One Sheet of Drawing on Counter Foot Retaining wall with details.
- (iv) One Sheet of Drawing on Rectangular Ground Water Tank.
- (v) One Sheet of Drawing on Elevated Inteze Tank.
- (vi) One Sheet of Bunkers.
- (vii) One sheet of Silo.

EIGHTH SEMESTER			CIVIL ENGINEERING			
COURSE CONTENTS						
CE-8002	Construction Planning & Management	L	T	P	Max. Marks	Min. Marks
Duration	3 Hours	3	1	0	70	22

#### UNIT – I

**Preliminary and detailed investigation methods** : Methods of construction, form work and centering. Schedule of construction, job layout, principles of construction management, modern management techniques like CPM/PERT with network analysis. Introduction to network analysis software like primavera.

#### UNIT – ii

**Construction equipments** : Factors affecting selection, investment and operating cost, output of various equipments, brief study of equipments required for various jobs such as earth work, dredging, conveyance, concreting, hoisting, pile driving, compaction and grouting.

#### UNIT – III

**Contracts** : Different types of controls, notice inviting tenders, contract document, departmental method of construction, rate list, conditions of contract, arbitration, administrative approval, technical sanction.

#### UNIT – IV

**Specifications & Public Works Accounts** : Importance, types of specifications, specifications for various trades of engineering works.

Various forms used in construction works, measurement book, cash book, materials at site account, imprest account, tools and plants, various types of running bills, secured advance, final bill.

#### UNIT – V

**Site Organization & Systems Approach to Planning** : Accommodation of site staff, contractor's staff, various organization charts and manuals, personnel in construction, welfare facilities, labour laws and human relations, safety engineering.

Problem of equipment management, assignment model, transportation model and waiting line models with their applications, shovel truck performance with waiting line method.

#### Reference Books :-

1. Construction Equipment by Peurify
2. CPM by L.S. Srinath
3. Construction Management by S. Seetharaman
4. CPM & PERT by Weist & Levy
5. Construction, Management & Accounts by Harpal Singh
6. Tendering & Contracts by T.A. Talpasai

EIGHTH SEMESTER				CIVIL ENGINEERING		
<b>COURSE CONTENTS</b>						
CE-8003	Solid Waste Management	L	T	P	Max. Marks	Min. Marks
Duration	3 Hours	3	1	2	70	22

#### UNIT – I

**General** : Definition, important terminology, need, objective, principle.

**Classification of Waste** : Residential, Municipal, Commercial, Institutional, Garbage, Rubbish, Ashes, Bulky waste, Street sweeping, construction and demolition, industrial, Hazardous, sewage, Dead animal & Slaughter house Functional elements, Problems in developing countries.

**Quantity of Solid Waste** : Waste generation – Street waste, urban, solid waste, Quantity at disposal sites, Quantity forecast.

#### UNIT – II

**Characteristics of Solid Waste** : Need of analysis, Field investigation, collection of samples, physical and chemical characteristics of waste.

**Waste Collection** : House-to-house, community bin system, street, frequency of collection, transfer stations, volume reduction at source and transfer stations, tools & equipment, refuse transportation vehicles planning of vehicle routes.

#### UNIT – III

**Composting** : Definition, use principle, factors affecting composting process, control of the composting process, methods of composting – Indore and Bangalore, mechanical & other methods.

**Incineration** : Self sustained combustion reaction, advantages and disadvantages, types of incinerators, auxiliary fuels, use of refuse as secondary fuel, product of incinerators, air pollution and control.

#### UNIT – IV

**Disposal of Municipal Solid Waste** : History, open land dumping, open combustion, sanitary landfill – Trench method, area method and ramp method, compaction and settlement, mechanical equipment, densities of landfills, selection of sites, maintenance of sites.

**Bioreactor landfill** : Advantages and disadvantages, phases of waste decomposition.

#### UNIT – V

**Environmental menace of landfill** : Leachate & Gases, leachate quantity & quality, factors affecting leachate quantity and quality, landfill leachate treatment, advantages and disadvantages of leachate recirculation, **Lysimeters, Indian scenario of SWM Regulations, Municipal Solid Waste Management (Management & Handling) Rule, 2000.**

#### List of Experiments :

- (i) Determine the total, suspended, dissolved, volatile solids in leachate samples.
- (ii) Determine Biochemical oxygen demand of leachate sample.
- (iii) Determine Chemical oxygen demand of leachate sample.
- (iv) Determine Chloride content in leachate sample.
- (v) Determine Hardness in leachate sample.
- (vi) Determine pH value of leachate sample.
- (vii) Determine conductivity leachate sample.
- (viii) Estimation & Monitoring of S.W. generation, collection of disposal.

#### Reference Books :

- (i) Bhide A.D. – Solid Waste Management.
- (ii) Expert Committee Report (2000) – Solid Waste Manual – Ministry of Environment & Forest.

EIGHTH SEMESTER			CIVIL ENGINEERING			
COURSE CONTENTS						
CE-8021	Remote Sensing & Geographic Information System	L	T	P	Max. Marks	Min. Marks
Duration	3 Hours	3	1	0	70	22

#### UNIT – I

- Remote Sensing – history & development, definition, concept and principles.
- Energy Resources, radiation principles, EM Radiation and EM Spectrum.
- Interaction of EMR with atmosphere and Earth's surface.
- Platforms – Types and their characteristics.
- Satellite and their characteristics, Sensors – Types and their characteristics Optica mechanical scanners – MSS, TM, LISS, WIFS, PAN.

#### UNIT – II

- Concept of Resolution – Spatial, Spectral, Temporal, Radiometric.
- Basic Concept and principles of Thermal, microwave and hyper spectral sensing.
- Basic principles, types, steps and elements of image interpretation, Techniques of visual interpretation an interpretation keys.
- Instruments for visual interpretation, Remote Sensing Data Products and their procurement.
- Digital Image processing.

#### UNIT – III

- Geographic Information System (GIS) – Introduction, GIS overview and GIS applications.
- GIS components.
- The nature of Geographic data, spatial data models, Raster data models, Vector data models.
- Global Positioning System (GPS) – Introduction, Characteristics of GPS satellites, GPS for GIS and mapping.
- Introduction to Remote Sensing and GIS Software's.

#### UNIT – IV

Application of Remote Sensing in Land use/Land cover mapping. Regional and Urban mapping. Geologic, Geomorphic and geomorphic features mapping, digital terrain model.

#### UNIT – V

Application of Remote Sensing in Soil mapping and characteristics, Water resources engineering and ground water targeting, Environmental pollution monitoring, Urban sprawl monitoring, waste disposal sites.

#### Reference Books :

1. Remote Sensing in Civil Engineering - Kennie, J.J. M., Matthews, M.C.
2. Remote Sensing principles and interpretation – Floyd F. Sabims, Jr. W.H. Freeman & Co.
3. Remote Sensing and image interpretation – Lillesand, Kidfer, John Wiley & Sons.
4. Introduction to Remote Sensing and concepts – Gibson.
5. Principles of Geographical information systems for land resource assessment – P.A. Burrough (Clarendon Press, Oxford).
6. Geographic Information systems a management perspective – Stan Aronoff (WDL publications, Ottawa).

EIGHTH SEMESTER				CIVIL ENGINEERING		
<b>COURSE CONTENTS</b>						
CE-8022	Pavement Design	L	T	P	Max. Marks	Min. Marks
Duration	3 Hours	3	1	0	70	22

#### UNIT – I

**Equivalent Single Wheel Load (ESWL) :** Definition, calculation of ESWL, repetition of loads and their effects on the pavement structures.

#### UNIT – II

**Flexible Pavements :** Component parts of the pavement structures and their functions, stresses in flexible pavements, Stress distribution through various layers, Boussinesque's theory , Burmister's two layered theory, methods of design, group index method, CBR method, Burmister's method and North Dakota cone method.

#### UNIT – III

**Rigid Pavements :** Evaluation of subgrade, Modulus-K by plate bearing test and the test details, Westergaard's stress theory stresses in rigid pavements, Temperature stresses, warping stresses, frictional stresses, critical combination of stresses, critical loading positions.

#### UNIT – IV

**Rigid pavement design :** IRC method, Fatigue analysis, PCA chart method, joints, design and construction & types, AASHTO Method, Reliability analysis.

#### UNIT – V

**Evaluation and Strengthening of Existing Pavements :** Benkleman beam method, Serviceability Index Method. Rigid and flexible overlays and their design procedures.

#### Reference Books :--

1. Principles of pavement design by E.J.Yoder & M.W. Witczak
2. AASHO, "AASHO Interim Guide for Design of Pavement Structures", Washington, D.C.
3. Portland Cement Association, Guidelines for Design of Rigid Pavements, Washington
4. DSIR, Conc. Roads Design & Construction
5. Srinivasan M. "Modern Permanent Way".

EIGHTH SEMESTER			CIVIL ENGINEERING			
COURSE CONTENTS						
CE-8023	Industrial Waste Treatment	L	T	P	Max. Marks	Min. Marks
Duration	3 Hours	3	1	0	70	22

### UNIT – I

Problem of Water Pollution: Effects of wastes on streams and sewage treatment plant. natural purification of streams. Oxygen sag curve. allowable organic load on streams classification of stream, stream standards and effluent standards. requirement of water for different purposes.

### UNIT – II

Measurement of Waste Water Volume: Sampling of waste waters, grab and composite samples. Analysis of waste water. biochemical oxygen demand. chemical oxygen demand and pH value of waste, toxicity of waste by bioassay method.

Pretreatment of Wastes: Volume and strength reduction, salvage of materials, recovery of by products, reuse of waste water.

### UNIT - III

Conventional Methods of Treatment of Waste Water: Removal of suspended solids, removal of inorganic and organic dissolved solids, sludge disposal, advance methods of treatment, such as reverse osmosis, ion exchange, electro dialysis, algal harvesting etc. low cost treatment plants. common effluent treatment plant, design and operation.

### UNIT – IV

Combined Treatment of Waste Water Sewage: Energy requirement optimization and bedget, municipal regulation, sewer rental charge, instrumentation in waste water treatment plants, collection of data, operation and maintenance of plants, water pollution control board.

### UNIT – V

Brief study of industrial processes and treatment methods of waste water from common industries, such as textile, dairy, paper and pulp, tannery, distillery.  
Hazardeous wastes- Impact handing and disposal.

### Reference Books :

- (i) "Liquid Waste of Industries - Theories, Practice & Treatment" - N.L. Nemerow, WEsley Publishing Co.
- (ii) Treatment of Industrial Waste - E.B. Besselievre & Max Schwartz - McGraw Hill Book Company.
- (iii) "Waste Water Engineering – Treatment Disposal & Reuse" - Metcalf & Eddy - Tata Mc Graw Will, New Delhi.
- (iv) Waste Water Treatment - Arceivala - Tata McGraw Will, New Delhi.
- (v) Industrial Pollution Control, hand book - Lund H.F. Tata McGraw Will, New Delhi

EIGHTH SEMESTER				CIVIL ENGINEERING		
COURSE CONTENTS						
CE-8024	Advance Water Resources Engineering	L	T	P	Max. Marks	Min. Marks
Duration	3 Hours	3	1	0	70	22

#### UNIT – I

**Hydrology** : Hydrological cycle, precipitation and its measurement, recording and non recording rain gauges, estimating missing rainfall data, rain gauge net works, mean depth of precipitation over a drainage area, mass rainfall curves, intensity-duration curves, depth-area duration curves,

#### UNIT – II

**Hydrology** : Infiltration and infiltration indices, evaporation stream gauging, run off and its estimation, hydrograph analysis, unit hydrograph and its derivation from isolated and complex storms, S-curve hydrograph, synthetic unit hydrograph.

#### UNIT – III

**Floods** : Types of floods and their estimation by different methods, probability and frequency analysis, flood routing through reservoirs and channels, flood control measures, economics of flood control.

#### UNIT – IV

**Ground water** : Occurrence, confined and unconfined aquifers, aquifer properties, hydraulics of wells under steady flow conditions, infiltration galleries. Ground water recharge-necessity and methods of improving ground water storage.

**Water logging and salt efflorescence** : Water logging-causes, effects and its prevention. Salt efflorescence causes and effects. reclamation of water logged and salt affected lands.

#### UNIT – V

**Water resources planning and management** : Planning of water resources projects, data requirements, economic analysis of water resources projects appraisal of multipurpose projects, optimal operation of projects introduction to linear programming and its application to water resources projects. Role of water in the environment, rain water harvesting, impact assessment of water resources development and managerial measures.

#### Suggested Books :-

1. Engg. Hydrology - J.NEMEC - Prentice Hall
2. Hydrology for Engineers Linsley, Kohler, Paulnus - Tata Mc.Graw Hill.
3. Engg. Hydrology by K. Subramanya - Tata Mc Graw Hills Publ. Co.
4. Hydrology & Flood Control by Santosh Kumar - Khanna Publishers
5. Engg. Hydrology by H.M. Raghunath

EIGHTH SEMESTER				CIVIL ENGINEERING		
<b>COURSE CONTENTS</b>						
CE-8007	Bridge Engineering	L	T	P	Max. Marks	Min. Marks
Duration	3 Hours	3	1	2	70	22

#### UNIT – I

Bridge site investigation, Planning Loading Standard & component parts, Selection of site, alignment, essential survey hydraulic design, scour, Economics span types of road and railway bridges, Design load and forces impact factor, Indian loading standard for Railway and Highway bridges. Prndge super structure and sub structure, abutment piers, wing walls, return walls approaches.

#### UNIT – II

Design of culverts (IRC loading), Design of T-beam bridges, Bearings for bridges.

#### UNIT – III

Design of Plate girder bridge (Reverted & welded)

#### UNIT – IV

Design of Truss girder bridges for railway & highway

#### UNIT – V

Design of prestress bridges

#### Reference Books :

- (i) Bridge Engineering by D.S. Viehs
- (ii) Bridge Engineering by Pannuswamy
- (iii) Relevant IS & IRC Codes
- (iv) R.C.C. by B.C. Punmia
- (v) Advanced R.C.C. by N.K. Raju
- (vi) Design of Structure by Ramchandra
- (vii) Design of Structure by Punmia