

J. S. University, Shikohabad



B.Tech

5th Semester & 6th Semester
(Civil Engineering)

Scheme
&
Syllabus

[Effective from the session 2015-16]

**STUDY AND EVALUATION SCHEME FOR
B.Tech (Civil Engineering).**

SEMESTER - Fifth

S.No.	Subject Code	Name of Subject	Periods Per Week				Evaluation Scheme			
			L	T	P	D	Sessional	End Exam	Total	Duration
THEORY SUBJECT										
1	BTCE-51	Geotechnical Engineering	4	1	-	-	50	100	150	3
2	BTCE-52	Transportation Engineering-I	4	1	-	-	50	100	150	3
3	BTCE-53	Environmental Engg.– I	4	1	-	-	50	100	150	3
4	BTCE-54	Structural Analysis-2	4	1	-	-	50	100	150	3
5	BTCE-55	Design Of Concrete Structure-1	4	1	-	-	25	50	75	2
6	BTMB-51	Engg.Economics	4	1	-	-	25	50	75	2

PRACTICA/DRAWING SUBJECTS

8	BTCE-51P	Geotechnical Engineering Lab	-	-	2	-	20	30	50	3
9	BTCE-52P	Transportation Engineering Lab	-	-	2	-	20	30	50	3
10	BTCE-53P	CAD Lab	-	-	2	-	20	30	50	3
11	BTCE-54P	Estimation Costing And Valuation	-	-	2	-	20	30	50	3
12	BTGD-50	Games//Social and Cultural Activities + Discipline (25 + 25)							50	
Grand Total									1000	

NOTE:- (1) Each period will be 50 minutes duration.

(2) Each session will be of 16 weeks.

(3) Effective teaching will be at least 14 weeks.

(4) Remaining periods will be utilized for revision etc.

**STUDY AND EVALUATION SCHEME FOR
B.Tech (Civil Engineering).**

SEMESTER - Sixth

S.No.	Subject Code	Name of Subject	Periods Per Week				Evaluation Scheme			
			L	T	P	D	Sessional	End Exam	Total	Duration
THEORY SUBJECT										
1	BTCE-61	Design of Concrete structure-II	4	1	-	-	50	100	150	3
2	BTCE-62	Environmental Engineering-II	4	1	-	-	50	100	150	3
3	BTCE-63	Construction Technology And Management	4	1	-	-	50	100	150	3
4	BTCE-64	Environmental Management For industries	4	1	-	-	50	100	150	3
5	BTCE-65	Rural Water supply And Sanitation	4	1	-	-	25	50	75	2
6	BTMB-61	Industrial Management	4	1	-	-	25	50	75	2

PRACTICA/DRAWING SUBJECTS

8	BTCE-61P	Structure Detalling Lab	-	-	2	-	20	30	50	3
9	BTCE-62P	Environmental Engineering Lab	-	-	2	-	20	30	50	3
10	BTCE-63P	Cad Lab –II	-	-	2	-	20	30	50	3
11	BTCE-64P	Survey camp	-	-	2	-	50	-	50	3
12	BTGD-40	Games//Social and Cultural Activities + Discipline (25 + 25)							50	
Grand Total									1000	

NOTE:- (1) Each period will be 50 minutes duration.

(2) Each session will be of 16 weeks.

(3) Effective teaching will be at least 14 weeks.

(4) Remaining periods will be utilized for revision etc.

GEOTECHNICAL ENGINEERING

UNIT – 1

Origin and classification: Preview of Geotechnical field problems in Civil Engineering, Soil formation, transport and deposit, Soil composition, Basic definitions, Weight volume relationships, Clay minerals, Soil structure, Index properties, Particle size analysis, Soil classification.

UNIT – 2

Soil Hydraulics: Modes of occurrence of water in soil. Stress conditions in soil- total, effective and neutral stresses and relationships. Permeability - Bernaulli's equation, Darcy's Law, hydraulic conductivity, laboratory determination of hydraulic conductivity, equivalent hydraulic conductivity in stratified soil. Seepage- Laplace equation of continuity, flow nets, seepage calculation from a flow net, flow nets in anisotropic soils, seepage through earth dam, critical hydraulic gradient and quick sand condition. Soil compaction, water content – dry unit weight relationships. Factors controlling compaction. Field compaction equipment; field compaction control; Proctor needle method.

UNIT – 3

Stresses in soils: Normal and shear Stresses on a plane, Stresses due to applied loads, Boussinesq's solution for a point load, line load, strip load, uniformly loaded circular and rectangular areas, Isobar and pressure bulb concept, stress distribution on horizontal and vertical planes, Newmark's chart and its application, contact pressure. Consolidation: Consolidation and compaction, primary and secondary consolidation, Terzaghi's one dimensional theory of consolidation, Consolidation test, Normal and Over Consolidated soils, Over Consolidation Ratio, determination of coefficient of consolidation, consolidation under construction loading.

UNIT – 4

Shear Strength: Mohr-Coulomb failure criterion, shear strength parameters and determination; direct and tri-axial shear test; unconfined compression test; vane shear test; sensitivity and thixotropy; pore pressure, Skempton's pore pressure coefficients. Earth pressure: Classical theories, Coulomb and Rankine approaches for frictional and c- ϕ soils, Smooth and rough walls, Inclined backfill, graphical methods of earth pressure determination. Types of retaining structures.

UNIT – 5

Characterization of ground, site investigations, groundwater level, methods of drilling, sampling, in situ tests, SPT, CPT, DCPT. Sub-Structures: Introduction to foundations- types and differences; choice; loads; design philosophies. Bearing capacity of shallow foundations; modes of failures; corrections for size, shape, depth and eccentricity; provisions of IS code of practice. Introduction to deep foundations.

Text & References Books

1. V.N.S. Murthy – Soil Mechanics and Foundation Engineering (Fifth Edition)
2. K.R. Arora – Soil Mechanics and Foundation Engineering
3. Narasinga Rao, B.N.D, “Soil Mechanics & Foundation Engineering”, John Wiley & Sons, Wiley India Pvt. Ltd., Daryaganj, New Delhi – 110 002.
4. Alam Singh – Modern Geotechnical Engineering
5. Brij Mohan Das – Geotechnical Engineering , CENGAGE Learning
6. I.H. Khan – Text Book of Geotechnical Engineering
7. C. Venkataramaiah – Geotechnical Engineering

TRANSPORTATION ENGINEERING-I

UNIT-1

Introduction: Role of Transportation, Modes of Transportation History of road development, Road types and pattern, Nagpur road plan, Bombay road plan & 3rd 20 Year Road Plan, NHAI Act (1988), Road Development Plan Vision: 2021 documents, Expressway Master Plan, Features of PMGSY.

UNIT-2

Highway Alignment & Location Survey: Horizontal Profile, Vertical Profile, Factors Controlling the alignment, Survey for route location, Preparation of Detailed Project Report (DPR) Geometric Design: Cross sectional elements, camber, shoulder, sight distance, horizontal curves, super elevation, extra widening, transition curves and gradient, vertical curves, summit and valley curves.

UNIT-3

Traffic Engineering: Traffic Characteristics, traffic volume and speed study, traffic capacity, density, traffic control devices, signs, signals, Island, Intersection at grade and grade separated intersections, design of rotary intersection

UNIT-4

Highway Materials: Road Construction materials : Properties of Subgrade, Aggregates & Binding materials, Various tests and specifications, Design of Highway Pavement : Types of Pavements, Design factors, Design of Flexible Pavement by CBR method (IRC : 37-2012), Design of rigid pavement, Westergaard theory, load and temperature stresses, joints, IRC method of rigid pavement design (IRC:58-2011)

UNIT-5

Highway Construction: Construction of Subgrade, Water Bound Macadam (WBM), Wet mix macadam (WMM), Granular Sub Base (GSB), Tack Coat, Prime Coat, Seal Coat, Surface Dressing, Bituminous Macadam (BM), Semi dense bituminous concrete (SDBC) and Bituminous concrete, Dry lean concrete (DLC), Cement Concrete (CC) road construction, Roller Compacted Concrete Roads.

Text Book:

1. Khanna S. K., Justo C.E.G, & Veeraragavan, A. “Highway Engineering”, Nem Chand and Bros., Roorkee- 247 667.
2. Khanna S. K., Justo C.E.G, & Veeraragavan A., “Highway Materials and Pavement Testing”, Nem Chand and Bros., Roorkee- 247 667.

References:

3. Kadiyali L. R., & Lal, N.B. “Principles and Practices of Highway Engineering (including Expressways and Airport Engineering)”, Khanna Publications, Delhi – 110 006
4. Saxena, Subhash C, A Textbook of Highway and Traffic Engineering, CBS Publishers & Distributors, New Delhi

ENVIRONMENTAL ENGINEERING – I

Unit-1

Water supply: Water demands and domestic use, variation in demands; population forecasting by various methods using logistic curve method; basic needs and factors affecting consumption; design period. Sources of water and their characteristics, quality of surface and ground waters; factors governing the selection of a source of water supply; intakes structures and their design, determination of the capacity of impounding reservoir.

Unit-2

Transmission of water: Various types of conduits, capacity and sizes including economical sizes of rising main, structural requirements; laying and testing of water supply pipelines; pipe materials, joints, appurtenances and valves; leakages and control. Storage and distribution of water: Methods of distribution, pressure and gravity distribution systems, Concept of service and balancing reservoirs.

Unit-3

Capacity of distribution reservoirs; general design guidelines for distribution system, Hardy - Cross method, equivalent pipe method of pipe network analysis. Plumbing systems in buildings and houses: water connections, different cocks and pipe fittings. Wastewater collection: Systems of sanitation and wastewater collection, estimation of wastewater flows and variations in wastewater flows. Storm water: Collection and estimation of storm water by different formulae.

Unit-4

Flow in sewers: Flow in full and partially full sewers and design of sewers; types of sewers, materials and construction of sewers, joints and sewer appurtenances, layout and construction of sewer lines, small bore sewer systems, Planning of sewerage systems.

Air Pollution: Definition, Sources, Classification of air Pollutants, National ambient air quality standards, Laplace rate, Inversion, Plume behavior, Acid rain, Vehicular emission and its standards.

Text Books:

1. Peavy, Howard S., Rowe, Donald R and Tchobanoglous, George, "Environmental Engineering" McGraw Hill Education (India) Pvt. Ltd., New Delhi.
2. Metcalf & Eddy "Wastewater Engineering: Treatment & Reuse", Tata Mc-Graw Hill.
3. Garg, S.K.: Water Supply Engineering (Environmental Engineering Vol. – I)
4. Garg, S.K.: Sewage Disposal and Air Pollution Engineering (Environmental Engineering Vol.–II).
5. Seinfeld, J.H. and Pandis, S.N. "Atmospheric Chemistry and Physics: From Air Pollution to Climate Change", John Wiley
6. <http://cpcb.nic.in/>, National ambient air quality standards, Central Pollution Control Board, Ministry of Environment and Forest, Government of India.

References:

1. Manual on Water Supply and Treatment, C. P. H. E. E. O., Ministry of Urban Development, Government of India, New Delhi
2. Manual on Sewerage and Sewage Treatment, C. P. H. E. E. O., Ministry of Urban Development, Government of India, New Delhi

STRUCTURAL ANALYSIS-II

Unit – 1

Analysis of fixed beams, Continuous beams and simple frames with and without translation of joint, method of Consistent Deformation, Slope- Deflection method, Moment Distribution method, Strain Energy method.

Unit – 2

Muller-Breslau's Principle and its applications for drawing influence lines for indeterminate beams, Analysis of two hinged arches, Influence line diagrams for maximum bending moment, Shear force and thrust.

Unit – 3

Suspension Bridges, Analysis of cables with concentrated and continuous loadings, Basics of two and three hinged stiffening girders, Influence line diagrams for maximum bending moment and shear force for stiffening girders.

Unit – 4

Basics of Force and Displacement Matrix methods for beams , frames and trusses.

Unit – 5

Basics of Plastic Analysis, Applications of Static and Kinematic theorem for Plastic Analysis of Beams and Frames.

Text Books & References:

1. Jain, A. K., "Advanced Structural Analysis ", Nem Chand & Bros., Roorkee.
2. Hibbeler, R.C., "Structural Analysis", Pearson Prentice Hall, Sector - 62, Noida-201309
3. C. S. Reddy "Structural Analysis", Tata Mc Graw Hill Publishing Company Limited, New Delhi.
4. Jain, O. P. and B. K. Jain, "Theory and Analysis of Structures", Vol. I & II, Nem

DESIGN OF CONCRETE STRUCTURE-1I

Unit – 1

Concrete Making materials, Properties of concrete and reinforcements, testing of concrete , Introduction to Various Design Philosophies, Design of Rectangular Singly and Doubly Reinforced Sections by Working Stress Method.

Unit – 2

Assumptions in Limit State Design Method, Design of Rectangular Singly and Doubly Reinforced beams, T-beams, L-beams by Limit State Design Method.

Unit – 3

Behaviour of RC beam in Shear, Shear Strength of beams with and without shear reinforcement, Minimum and Maximum shear reinforcement, design of beam in shear, Introduction to development length, Anchorage bond, flexural bond. (Detailed Examples by Limit State Design Method), Failure of beam under shear, Concept of Equivalent Shear and Moments.

Unit – 4

Design of one way and two way solid slabs by Limit State Design Method, Serviceability Limit States, Control of deflection, cracking and vibrations.

Unit – 5

Design of Columns by Limit State Design Method- Effective height of columns, Assumptions, Minimum eccentricity, Short column under axial compression, requirements for reinforcement, Column with helical reinforcement, Short column under axial load and uni-axial bending, Design of columns under bi-axial loading by Design Charts.

Note:

1. All designs shall be conforming to IS: 456 – 2000.

Text Books & References:

1. IS: 456 – 2000, “ Code of Practice for Plain and Reinforced Concrete”, Bureau of Indian Standards, New Delhi.
2. Jain, A.K., “Reinforced Concrete: Limit State Design”, Nem Chand & Bros., Roorkee.
3. Gambhir, M L ,”Fundamentals of Reinforced Concrete”, Prentice Hall of India.

GEOTECHNICAL ENGINEERING LAB

1. Determination of water content of a given moist soil sample by (i) oven drying method, (ii) pycnometer method.
2. Determination of specific gravity of a given soil sample by (i) density bottle, (ii) pycnometer method.
3. Determination of in situ dry density of soil mass by (i) core-cutter method, (ii) sand replacement method.
4. Determination of relative density of a given soil sample.
5. Determination of complete grain size distribution of a given soil sample by sieve analysis and sedimentation (hydrometer) analysis.
6. Determination of consistency limits (liquid, plastic and shrinkage limits) of the soil sample used in experiment no. 5 (grain-size analysis).
7. Classify the soil as per the IS 1498- 1970 based on the results obtained from experiments at serial nos. 5 & 6 (grain size distribution and consistency limits).
8. Determination of compaction characteristics (OMC & MDD) of a given soil sample.
9. Determination of permeability of a remolded soil sample by constant head &/or falling head method.
10. Determination of consolidation characteristics of a remolded soil sample by an oedometer test.
11. Determination of shear strength characteristics of a given soil sample by U/U test from Tri-axial Compression Machine.
12. Retrieving soil samples and conducting SPT tests by advancing boreholes through hand-held auger.

References:

1. Bowles, Joseph E., “Engineering Properties of Soil and Their Measurement” Fourth Edition, Indian Edition, McGraw Hill Education (India) Pvt. Ltd, New Delhi-110032.

TRANSPORTATION ENGINEERING LAB

LIST OF EXPERIMENTS

1. To Determine the Crushing Value of Coarse Aggregates.
2. To Determine the Impact Value of Coarse Aggregates.
3. To determine the Flakiness Index and Elongation Index of Coarse Aggregates.
4. To determine the Los Angeles Abrasion Value of Coarse Aggregates.
5. To determine the Stripping Value of Coarse Aggregates.
6. To determine the penetration Value of Bitumen.

7. To determine the Softening Point of Bituminous material.
8. To determine the Ductility Value of Bituminous material.
9. To determine the Flash and Fire Point of Bituminous material.
10. To determine the Stripping Value of Bituminous material.
11. Classified both directional Traffic Volume Study.
12. Traffic Speed Study. (Using Radar Speedometer or Enoscope).
13. Determination of CBR Value of soil sample in the Lab or in Field.

References:

1. Khanna S. K., Justo C.E.G, & Veeraragavan A., “Highway Materials and Pavement Testing”, Nem Chand and Bros., Roorkee- 247 667.
2. Gambhir, M.L., Jamwal, Neha,” Lab Manual: Building and Construction Materials, Testing and Quality Control” McGraw Hill Education (India), Pvt.Ltd., Noida.

CAD LAB I

1. Working on Latest Version of ANALYSIS SOFTWARE LIKE ANSYS , ADINA , NISA, MATLAB
2. Working on Latest Version of DESIGN SOFTWARE LIKE STAAD PRO / STRUDS / SAP / ETAB / STRAP
3. Working on Latest Version of GEOTECHNICAL SOFTWARES like GEO-5 / PLAXIS 5.10

ESTIMATION COSTING & VALUATION

1. Method of Estimation: General items of works for estimates, units and measurement, method of accounting for the deduction of openings etc.
2. Detailed estimates of a single roomed and a two roomed residential building.
3. Analysis of rates: Definition of analysis of rates, Prime cost, and work charged establishment.
4. Quantity of materials per unit of works for major Civil Engineering items. Resource planning through analysis of rates, market rates.
5. PWD scheduled and cost indices for building material and labour.
6. Valuation: Purpose of Valuation, Market Value, Book Value, Rateable Value, Capital Cost, Capilized Value, Ideal investment, Sinking fund, Depreciation, Straight Line method, sinking fund method, quantity survey method, Valuation of building, rent fixation.

References:

1. Dutta, B.N., “Estimation and Costing in Civil Engineering (Theory and Practice)”, UBS Publishers Distributers Private Ltd., New Delhi.
2. Singh, Gurucharan, Singh Jagadish, “A Text book of Estimation Costing and Valuation” Standard Publishers Distributers, Delhi -110006.
3. Peurifoy, Robert L., Oberlender, Garold D., “Estimating Construction Costs” Tata Mc Graw Hill Education Pvt. Ltd., New Delhi.

DESIGN OF CONCRETE STRUCTURE II

Unit – 1

Nature of Stresses in flat slabs with and without drops, coefficient for design of flat slabs, reinforcement in flat slabs. (IS Code Method).

Unit –2

Analysis and design of beam curved in plan. Structural behaviour of footings, design of footing for a wall and a single column, combined rectangular and trapezoidal footings, Design of strap footing.

Unit – 3

Structural behaviour of retaining wall, stability of retaining wall against overturning and sliding, Design of T-shaped retaining wall, Concept of Counter fort retaining wall. Loads, forces and I.R.C. bridge loadings, Design of R.C. slab culvert.

Unit – 4

Design criteria, material specifications and permissible stresses for tanks, design concept, of circular and rectangular tanks situated on the ground / underground, design of overhead tanks.

Unit – 5

Advantages of prestressing, methods of prestressing, losses in prestress, analysis of simple prestressed rectangular and T-section.

Text Books & References

1. IS : 456 – 2000, “ Code of Practice for Plain and Reinforced Concrete”, Bureau of Indian Standards, New Delhi.
2. Jain, A.K., “Reinforced Concrete : Limit State Design”, Nem Chand & Bros., Roorkee.
3. Dayaratnam, P, “Limit State Design of Reinforced Concrete Structures” Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
4. Gambhir, M L ,”Fundamentals of Reinforced Concrete”, Prentice Hall of India.
5. Unnikrishna Pillai, S. & D. Menon, “ Reinforced Concrete Design”, Tata Mc-Graw Hill Company Limited.
6. Jain, O. P. & Jai Krishna, “ Plain and Reinforced Concrete”, Vol. I & II, Nem Chand & Bros., Roorkee.
7. Park, R. and T. Pauley,” Reinforced Concrete Structures”, John Wiley & Sons.
8. Dayaratnam, P,”Reinforced Concrete Design”, Oxford & IBH.

ENVIRONMENTAL ENGINEERING – II

Unit-1

Introduction: Beneficial uses of water and quality requirements, standards. Concepts of water and wastewater quality: physical, chemical and bacteriological examination of water and wastewater, Water borne diseases and their control. Wastewater characteristics: Temperature, pH, colour and odour, solids, nitrogen and phosphorus, chlorides, toxic metals and compounds,

BOD, COD etc. Objectives of treatment: Water and wastewater treatment, unit operations and processes and flow sheets. Disposal of wastewater on land and in water bodies, Recycling and Reuse of wastewater.

Unit-2

Screen, Sedimentation: Determination of settling velocity, efficiency of ideal sedimentation tank, short circuiting; different classes of settling; design of settling tanks; removal efficiency for discrete and flocculent settling.

Coagulation: Mechanisms of coagulation, coagulants and their reactions, coagulant aids; design of flocculators and clariflocculators. Adsorption.

Unit-3

Filtration: Theory of filtration; hydraulics of filtration; Carmen – Kozeny and other equations, slow sand, rapid sand and pressure filters, backwashing; design of slow and rapid sand filters.

Disinfection: Requirements of an ideal disinfectant; kinetics of disinfection, various disinfectants, chlorination and practices of chlorination. Water softening and ion exchange: calculation of dose of chemicals.

Unit-4

Wastewater Treatment: Preliminary, primary, secondary and tertiary treatment processes. Primary Treatment: Screens, grit chamber and their design. Secondary Treatment: Theory of organic matter removal; activated sludge process, design of different units and modifications, extended aeration systems; trickling filters; aerated lagoons, waste stabilization ponds, oxidation ditches, R.B.C. etc. Anaerobic digestion of sludge.

Unit-5

Design of low and high rate anaerobic digesters and septic tank. Basic concepts of anaerobic contact process, anaerobic filter, anaerobic fixed film reactor, fluidized bed and expanded bed reactors and upflow anaerobic sludge blanket (UASB) reactor. Other emerging technologies for wastewater treatment: Duckweed pond, vermiculture, root zone technologies, sequential batch reactor (SBR) etc. Solid waste Management: Definition of solid waste and its classification,

Hazardous waste, Prevailing regulations of solid waste management in India. Noise Pollution: Definition, Sources, Prevailing noise standards in India.

References:

Text books:

1. Peavy, Rowe and Tchobanoglous: Environmental Engineering, Mc-Graw Hill.
2. Metcalf and Eddy Inc.: Wastewater Engineering
3. Garg: Water Supply Engineering (Environmental Engineering Vol. – I)
4. Garg: Sewage Disposal and Air Pollution Engineering (Environmental Engineering Vol. – II).
5. Davis, M.L. & Cornwell, D.A.: Introduction to Environmental Engineering, Mc-Graw Hill.

Reference books:

1. Manual on Water Supply and Treatment, C. P. H. E. E. O., Ministry of Urban
2. Development, Government of India, New Delhi
3. Manual on Sewerage and Sewage Treatment, C. P. H. E. E. O., Ministry of Urban Development, Government of India, New Delhi

CONSTRUCTION TECHNOLOGY & MANAGEMENT

Unit-1

Elements of Management and Network Techniques: Project Cycle, Organisation, Planning, Scheduling, Monitoring, updating and Management System in Construction.

Unit-2

Network Techniques: Bar Chart, Mile stone chart, work break down structure, and preparation of networks. Network techniques like PERT and CPM. In construction Management, Project Monitoring and resource allocations through network techniques.

Unit-3

Project Cost Control: Cost Planning, Direct Cost, Indirect Cost, Total Cost Curve, Cost Slope. Time Value of Money, Present Economy studies, Equivalence Concept, financing of projects, Economic comparisons present worth method, Equivalent annual cost method, discounted cash flow method. Depreciation and break even cost analysis of construction projects.

Unit-4

Contract Management: Legal Aspects of Contracts, laws related to contracts, land acquisition, labour safety and welfare, Different types of contracts, their relative advantages and disadvantages, Elements of Tender Preparation, Process of tendering, pre qualifications of contracts, Evaluation of tenders, contract negotiation and award of work, monitoring of contract, settlement of disputes, arbitration and commissioning of project.

Unit-5

Equipment Management: Productivity, operational cost, owning and hiring cost. Construction equipment: Earth moving, Hauling equipments, Hoisting equipments, Conveying Equipments, Concrete Production equipments, Tunneling equipments.

References:

1. Robert L. Peurifoy, Clifford J., Schexnayder, Aviad Shapira “ Construction Planning Equipment and Methods” McGraw Hills Education (India), Private Ltd., New Delhi.
2. Srinath, L.S., “PERT and CPM Principals and applications” Affiliated East-West Press Pvt. Ltd., New Delhi.
3. Patil, B.S., “Civil Engineering Contracts and Estimates” University Press India, Pvt. Ltd. Hyderabad – 500 004
4. Construction Management by Ojha
5. Srivastava, U.K., “Construction Planning and Management”, Galgotia Publications Pvt. Ltd., New Delhi.
6. Construction Technology By Sarkar, Oxford.

ENVIRONMENTAL MANAGEMENT FOR INDUSTRIES

Unit-1

Environmental legislations for setting up and for operation of an industrial activity, Compliance procedure of these legislations, Need of Environmental Impact Assessment (EIA) study, Other Pollution control legislations.

Unit-2

Defining the industrial activity: Location, approach, manufacturing processes, raw materials and other inputs of natural resources; Defining the local environment format: Physical environment, biological, environment and socio-economic environment.

Unit-3

Detailing of the local environment: Physical environment- water, air, land resources & solid wastes, noise emissions, radiation emissions etc.; biological environment- all flora & fauna including microbial activities in the local vicinity; Socio-economic environment- history of the area, customs & rituals, demography, infrastructural activities, education, health, and developmental profile of the area, specific local environmental issues.

Unit-4

Environmental Pollution in Industries: various industrial processes, sources and types of pollutions - solid, liquid, gaseous, noise & radiation emissions. Case studies of various industries, e.g., dairy, fertilizer, distillery, sugar, pulp and paper, iron and steel, metal plating, thermal power plants, etc.

Unit-5

Environmental Impact Assessment (EIA): definitions, methodologies, environmental toxicology; Environmental management Plan, Risk Assessment & risk management plan, pollutant exposure assessment, Environmental Management Cell (EMC): Environmental monitoring schedules, Environmental Statement, Application for consent, Authorization for hazardous wastes, ISO and ISO 14000 etc.

References:

1. EIA Manuals of MOEF (Available on [http://envfor.nic.in/essential-links/eiaspecific-](http://envfor.nic.in/essential-links/eiaspecific-manuals) manuals and <http://envfor.nic.in/division/introduction-8>)
2. Environment (protection) Act 1986. Any authorized & recent publication on Government Acts. Also available on CPCB/MoEF Website
3. Environmental Impact Assessment □ Training resource manual, UNEP 2001
4. Wastewater Reuse and Recycling Technology □ Pollution Technology Review 72, Culp, Gordan,
5. George Wasner, Robert Williams and Mark , V. Hughes Jr., Noyes Data Corporation, New Jersey.
6. Industrial Pollution Control –Issues and Techniques. Nancy, J. Sell, Van Nostrand Reinhold Co, NY.
7. Industrial Pollution Prevention Handbook. Shen, T.T., Springer □ Verlag, Berlin.
8. Environmental Engineering. Pandey, G.N. and Corney, G.C., Tata McGraw Hill, New Delhi

RURAL WATER SUPPLY AND SANITATION

Unit-1

Rural Water Supply: Issues of rural water supply –Various techniques for rural water supply- merits- National rural drinking water program- rural water quality monitoring and surveillance- operation and maintenance of rural water supplies. Low Cost water Treatment: Introduction – Epidemiological aspects of water quality methods for low cost water treatment - Specific contaminant removal systems

Unit-2

Rural Sanitation: Introduction to rural sanitation- Community and sanitary latrines - Planning of wastewater collection system in rural areas- Treatment and Disposal of wastewater - Compact and simple wastewater treatment units and systems in rural areas stabilization ponds - septic tanks - Imhoff tank- soak pits- low cost excreta disposal systems Effluent disposal. Identify problems pertaining to rural water supply and sanitation. Design water supply and sanitation system for rural community.

Unit-3

Industrial Hygiene and Sanitation: Occupational Hazards- Schools- Public Buildings-Hospitals- Eating establishments- Swimming pools – Cleanliness and maintenance and comfort- Industrial plant sanitation.

Unit-4

Solid Waste Management: Disposal of Solid Wastes- Composting- land filling incineration- Biogas plants - Rural health - Other specific issues and problems encountered in rural sanitation.

References:

1. 'Water Treatment and Sanitation – Simple Method for Rural Area' by Mann H.T. and Williamson D.
2. Operation and maintenance of rural water supply and sanitation systems by Brikké F
3. 'Water Supply for Rural Areas & Small Communities' by Wanger E.G. and Lanoix J.N.,
4. WHO 'Water Supply and Sewerage', by E.W. Steel & T.J. McGhee, McGraw Hill.
5. 'Manual on Water Supply and Treatment', CPHEEO, Ministry of Urban Development, Govt. of India.
6. 'Manual on Sewerage and Sewage Treatment', CPHEEO, Ministry of Urban Development, Govt. of India

7. 'Environmental Engineering' by D. Srinivasan, PHI Learning Pvt. Ltd. 2009.
8. Metcalf & Eddy, "Wastewater Engineering: Treatment and Reuse", McGraw Hill Education Pvt. Ltd. (India) Noida.

STRUCTURAL DETAILING LAB

1. Preparation of working drawings for the following using any drafting software
2. RC Beams- Simply supported, Continuous, Cantilever
3. T – beam / L-beam floor
4. Slabs – Simply supported, Continuous, One way and two way slabs.
5. Columns – Tied Columns and Spirally reinforced columns.
6. Isolated footings for RC Columns.
7. Combined rectangular and trapezoidal footings.
8. Detailing of Buildings with respect to Earthquake Resistant Design

References:

1. Krishna Raju N., "Structural Design and Drawing" University Press (India), Pvt. Ltd., Hyderabad.

ENVIRONMENTAL ENGINEERING LAB

1. Determination of turbidity and conductivity.
2. Determination of pH, alkalinity and acidity.
3. Determination of hardness and chlorides.
4. Determination of residual chlorine.
5. Determination of MPN (most probable number) of coliforms.
6. Measurement of SPM and PM10 with high volume sampler.
7. Measurement of sound level with sound level meter.
8. Determination of total, suspended and dissolved solids.
9. Determination of BOD.
10. Determination of COD.
11. Determination of kjeldahl nitrogen.
12. Determination of fluoride.
13. Determination of optimum dose of coagulants by Jar Test Apparatus.
14. Field Visit of Water/ Sewage Treatment Plant of A Nearby area.

References:

1. A.P.H.A. "Standard Methods for the Examination of Water and Wastewater", American Public Health Association.
2. Sawyer, C.N., McCarty, P.L. & Parkin, G.F. "Chemistry for Environmental Engineering", Mc-Graw Hill.
3. Mathur, R.P. "Water & Wastewater Testing", Lab Manual, Roorkee.

CAD LAB II

1. Working on Latest Version of Environmental Engineering software for Analysis and Design of water & wastewater treatment and distribution systems (WATER CAD / SEWER CAD / WATER GEM / SEWER GEM / LOOP)
2. Working on Latest Version of Transportation Engineering software like MAX ROAD/ Surveying Software.
3. Working on Latest Version of GIS software (ARC GIS / ENVI / GEPSY)
4. Working on Latest Version of Project Management software (PRIMAVEERA / MS PROJECT)

SURVEY CAMP

The purpose of the camp is to train students in using modern surveying techniques and equipment such as GPS, total stations, automatic and digital levels, electronic theodolites, etc. to prepare a detailed digital map. The course will be run in the form of a camp for 7 working days and will involve the following components:

1. Reconnaissance of the area to be mapped.
2. Control establishment: Observations and Adjustment using GPS and/or Total station traverse to yield adjusted coordinates of control points.
3. Detail digital mapping using Total station/GPS.
4. Preparing a digital map using open source mapping software and report writing.