

**CreditBased (2018-19 Onwards)**  
**SCHEME OF STUDIES/EXAMINATIONS (Semester VIII)**

S. No.	Course No./ Code	Subject	L:T:P	Hours / Week	Credits	Examination Schedule (Marks)				Duration of exam (Hours)
						Major Test	Minor Test	Practical	Total	
1	CE402A	Engineering Economics, Estimation & Costing	2:0:0	2	2	75	25	0	100	3
2	CE404A	Bridge Engineering	2:0:0	2	2	75	25	0	100	3
3	OEIII	Open ElectiveIII	2:0:0	2	2	75	25	0	100	3
4	ELV	ElectiveV	3:0:0	3	3	75	25	0	100	3
5	ELVI	ElectiveVI	3:0:0	3	3	75	25	0	100	3
6	CE412L A	Compressive Viva	0:0:0	0	0			50	50	3
7	CE414L A	Major Project	0:0:10	10	5		40	60	100	3
8	CE LA	SeminarII	0:0:2	2	0		50	0	50	3
		Total	12:0:12	24	19	375	215	110	700	

**Note: The student have to carry out the MAJOR Project either from Structural Engineering, Environmental Engineering and Water ResourceEngineering.**

**OPEN ELECTIVE – III**

Sl. No	Code No.	Subject	Semester	Credits
1.	OE406A	ICT for Development	VIII	3
2.	OE408A	Comparative Study of Literature	VIII	3
3.	OE410A	History of Science & Engineering	VIII	3
4	OE418A	Economic Policies in India	VIII	3

#### ELECTIVEV A

Sl. No	Code No.	Subject	Semester	Credits
1.	EL420A	Prestress Concrete	VIII	3
2.	EL422A	Earthquake Engineering	VIII	3
3.	EL424A	Offshore Engineering	VIII	3
4.	EL426A	Structural Geology	VIII	3

#### ELECTIVEVI A

Sl. No	Code No.	Subject	Semester	Credits
1.	EL428A	Wastewater Treatment	VIII	3
2.	EL430A	Water and Air Quality Modelling	VIII	3
3.	EL432A	Traffic Engineering and Management	VIII	3
4.	EL434A	Infrastructure Planning and Design	VIII	3

**B. Tech. VII Semester (Civil Engineering)**

**SUBJECT: DESIGN OF CONCRETE STRUCTURES II**

B. Tech. VIII Semester (Civil Engineering)					
SUBJECT: Engineering Economics, Estimation & Costing					
L	T	P/ D	Total	Subject Code: CE-402A	Max. Marks: 100
2	0	0	2		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
<b>Course Objective</b>		The aim of study is to get knowledge about estimation of different civil works.			
<b>UNIT</b>		<b>Course Outcomes</b>			
I		Students will study the different methods of estimation			
II		Students will study about different types of specification used in civil works			
III		Students will study about rate analysis of different items			
IV		Students will study the terms used in civil works and public works accounts			

### UNIT I

#### Estimate:

Principles of estimation, units, items of work, different kinds of estimates, different methods of estimation, estimation of materials in single room building, two roomed building with different sections of walls, foundation, floors and roofs, R.B. and R.V.C.C. Works, Plastering, Whitewashing, Distempering and painting, doors and windows, lump sum items, Estimates of canals, roads etc.

### UNIT II

#### Specification of Works:

Necessity of specifications, types of specifications, general specifications, specification for bricks, cement, sand, water, lime, reinforcement; Detailed specifications for Earthwork, Cement, concrete, brick work, floorings, D.P.C., R.C.C., cement plastering, white and colour washing, distempering, painting.

### UNIT III

#### Rate Analysis:

Purpose, importance and requirements of rate analysis, units of measurement, preparation of rate analysis, procedure of rate analysis for items: Earthwork, concrete works, R.C.C. works, reinforced brick work, plastering, painting, finishing (whitewashing, distempering).

### UNIT IV

#### Public Works Account:

Introduction, function of P.W. department, contract, guidelines, types of contracts, their advantages and disadvantages, Tender and acceptance of tender, Earnest money, security money, retention money, measurement book, cash book, preparation, examination and payment of bills, first and final bills, administrative sanction, technical sanction.

#### Books

1. Estimating and Costing for Building & Civil Engg. Works by P.L.Bhasin, S.Chand & Co., N.Delhi.
2. Estimating, Costing & Specification in Civil Engg. By M.Chakraborty, Calcutta.
3. Estimating & Costing in Civil Engg.: Theory & Practice by B.N.Dutta, S.Dutta & Co., Lucknow.
4. Building Construction Estimating by George H.Cooper, McGraw Hill Book Co., New York.

<b>B. Tech. VIII Semester (Civil Engineering)</b>					
<b>SUBJECT: BRIDGE ENGINEERING</b>					
L	T	P/D	Total	Subject Code: CE-404A	Max. Marks: 100
2	0	0	2		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		Students will acquire the knowledge about the design of Railway, R.C.C and Steel Bridge and its foundation			
<b>UNIT</b>		<b>Course Outcomes</b>			
I		Students will be able to study Specifications for Roads and Railways Bridges			
II		Students will be able to design consideration for R. C. C. Bridges			
III		Students will be able to design consideration for Steel Bridges			
IV		Students will be able to Hydraulic & Structural design of Bridge			

### UNIT I

#### **Introduction:**

Definition, components of bridge, classification of bridges, selection of site , economical span, aesthetics consideration, necessary investigations and essential design data.

#### **Standard Specifications for Roads and Railways Bridges:**

General, Indian Road Congress Bridge Code, width of carriage way, clearance, various loads to be considered for the design of roads and railway bridges, detailed explanation of IRC standard live loads.

### UNIT II

#### **Design Consideration for R. C. C. Bridges:**

Various types of R.C.C. bridges, design of R.C.C. culvert and Tbeam bridges.

### UNIT III

#### **Design Consideration for Steel Bridges:**

Various types of steel bridges (brief description of each), design of truss and plate girder bridges.

### UNIT IV

#### **Hydraulic & Structural Design:**

Piers, abutments, wingwall and approaches. Bearings, joints, articulation and other details.

#### **Bridge Foundation:**

Various types, necessary investigations and design criteria of well foundation.

#### **Books:**

1. Essentials of Bridge Engineering, D.J.Victor, Oxford & IBH Pub.N.Delhi.
2. Design of Bridges, N.Krishna Raju, Oxford & IBH, N.Delhi.
3. Bridge Deck Analysis, R.P.Pama&A.R.Cusens, John Wiley & Sons.
4. Design of Bridge Structures, T.R.Jagadish&M.A.Jairam, Prentice Hall of India, N.Delhi.

<b>B. Tech. VIII Semester (Civil Engineering)</b>					
<b>SUBJECT: ICT for Development</b>					
L	T	P/D	Total	<b>Subject Code: OE-406A</b>	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
<b>Course Objective</b>		To apply basics of Information technology in Civil Engineering problems.			
<b>UNIT</b>		<b>Course Outcomes</b>			
I	To study various optimization techniques in real world problems related to civil engineering				
II	To study the inventory models				
III	To study about assigning jobs to people in an efficient way				
IV	To study about sequencing techniques				

#### **UNIT I**

Introduction to ICT: New media and ICT, Different types of ICT. Use of ICT for development; e-learning; Web commerce; Mobile telephony and Development: telecom industry in India. ICT Projects implemented in India and Northeast – Problems and Prospects

#### **UNIT II**

Digital Revolution and Digital Communication: Basics of New media theories - Information Society; Surveillance society; Digital Divide, Knowledge society; Network society. Works of Machlup, Bell, Negroponte and Castells

#### **UNIT III**

Technology and Development: ICT for Development its societal implications; Evolution of ICT in Development Endeavour; ICT and Millennium Development Goals. Democratic and decentralized processes in development. Technology and culture: community and identity; participatory culture and ICT, community informatics

#### **UNIT IV**

Computer Mediated Communication and development: Different types of CMC; Important theoretical framework of CMC, cyber platform and communities, Social Networking Site; Convergent media, Multimedia platforms, Scope of convergent journalism for Development; Characteristics of convergent journalism; Different types of convergent journalism: precision journalism; annotative and open-source journalism; wiki journalism; open source journalism; citizen journalism; back-pack journalism,

#### **Books**

1. Heeks, R. (2017). Information and communication technology for development (ICT4D). Routledge.
2. Gairola, C. M., Chandra, M., Mall, P., Chacko, J. G., Phet, S., & Loh, H. (2004). Information and Communications Technology for development.

<b>SUBJECT: Comparative Study of Literature</b>					
L	T	P/D	Total	<b>Subject Code: OE-408A</b>	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
<b>Course Objective</b>		The course aims to give the basic knowledge of methods and models of Comparative Literature.			
<b>UNIT</b>		<b>Course Outcomes</b>			
I		The course is expected to introduce the students about Conceptual Framework of Comparative Literature			
II		It will give the idea to students about the History of Comparative Literature.			
III		It will orient students towards History and Politics of Translation			
IV		It will give closer look at Indian Poetics and Literary Theory			

### Unit I

**Conceptual Framework of Comparative Literature:** The Emergence of Comparative Literature. Difference/ Alterity and the Ethics of Plurality. Limitations of the Idea of National Literature. Theories of Interpretation

### Unit II

**History of Comparative Literature:** French, German, Russian and Tel Aviv Schools  
Comparative Literature in India: From Tagore to the Present. World Literature: From Goethe to the Present, "The State of the Discipline" Reports

### Unit III

**History and Politics of Translation:** Translation as Reception, Problems and Promises of Translation in Multilingual Situations, Untranslatability and Silence

### Unit IV

**Poetics and Literary Theory:** Indian Poetics: Sanskrit and Tamil, Perso-Arabic Traditions, Western Classical Literary Theory

### Books:

1. Bassnett, S. (1993). Comparative Literature: A Critical Introduction. Oxford: Blackwell.
2. Claudio Guillen. (1993). The Challenge of Comparative Literature. (Cola Franzen, Trans.). London: Harvard University Press.
3. Dev, A. (1984). The Idea of Comparative Literature in India. Kolkata: Papyrus.
4. Bernheimer, C. (1995). Ed. Comparative Literature in the Age of Multiculturalism. Baltimore: The Johns Hopkins University Press.

<b>B. Tech. VIII Semester (Civil Engineering)</b>					
<b>SUBJECT: History of Science &amp; Engineering</b>					
L	T	P/D	Total	<b>Subject Code: OE-410A</b>	Max. Marks: 100

3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective	To provide the insight about the history of Science and Technology				
<b>UNIT</b>	<b>Course Outcomes</b>				
I	The course is expected to introduce the history of development of science and technology				
II	Students will able to learn statistical profile of science & engineering				
III	Students will able to learn about keys of effective learning.				
IV	Students will able to gain problem solving skill.				

#### Unit I

**History of science & technology:** introduction, beginning of science, technology & engineering, traveling through the ages. Science, Engineering & technology Major: Introduction, function, emerging field.

#### Unit II

**Profile of Engineers, scientist & technologist:** Statistical profile of science & engineering profession: Statistical, overview, college enrolment trends of science and engineering students, college majors of recent science & engineering students. Job placement trends, diversity of profession distribution of scientist and engineers by type of employer.

#### Unit III

**Succeeding in the classroom:** Introduction, attitude, goal, key to effectiveness, test taking, learning style, accountability and overcoming challenges. Biography of Isaac Newton, Einstein, Thomas Edison, Alfred Nobel, M. Visvesvaraya .

#### Unit IV

**Problem solving:** Introduction, analytical and creative problem solving, analytical problem solving, personal problem solving styles, brainstorming strategies, critical thinking. Failure of science & technology.

#### Textbooks;

1. Engineering your future by William C. Oaks, Oxford university press.

<b>B. Tech. VIII Semester (Civil Engineering)</b>					
<b>SUBJECT: Economic Policies in India</b>					
L	T	P/D	Total	<b>Subject Code: OE-418A</b>	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks

					Duration: 3 hrs.
Course Objective	Students will acquire the knowledge about Economic policies practiced in India				
<b>UNIT</b>	<b>Course Outcomes</b>				
I	Students will be able to understand concept of economy				
II	Students will be able to calculate National Income for India				
III	Students will be able to get introduction to five year plans.				
IV	Students will be able to understand role of agriculture in economy				

### Unit I

**Underdevelopment** – Basic Features of Indian Economy: Growth and Structural Changes in Indian Economy – Demographic Features – Population: Size, Growth, Composition and their Implications on Indian Economy – Concept of Demographic Dividend –Occupational Distribution of Population in India – Population Policy of India.

### Unit II

**Estimation of National Income** – Trends and Composition of National Income in India – Income Inequalities in India: Magnitude, Causes, Consequences and Remedial Measures – Poverty in India: Concept, Types, Causes and Consequences – Unemployment in India: Concept, Types, Trends, Causes and Consequences – Poverty Alleviation and Employment Generation Programmes in India.

### Unit III

**Five Year Plans: Concept and Objectives** – Review of Five Year Plans – NITI Aayog – Economic Reforms: Liberalization, Privatization and Globalization – Impact of WTO on Indian Economy.

### Unit IV

**Importance and Role of Agriculture in Indian Economy** – Trends in Agricultural Production and Productivity – Land Reforms – Green Revolution – Agricultural Finance – Agricultural Marketing – Agricultural Pricing – Food Security in India. Structure, Growth, Importance and Problems of Indian Industry – Large, Medium and Small Scale Industries: Role and Problems – Industrial Policies of 1948, 1956 and 1991– FEMA and Competition Commission of India –Disinvestment Policy – Foreign Direct Investment

#### Books:

- 1) SK Misra and Puri : Indian Economy, Himalaya Publishing House
- 2) Ishwar C Dhigra : The Indian Economy: Environment and Policy, SC Chand & Sons, New Delhi Dutt and Sundaram : Indian Economy

B. Tech. VIII Semester (Civil Engineering)					
SUBJECT: Prestress Concrete					
L	T	P/ D	Total	Subject Code: EL-420A	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks



					Duration: 3 hrs.
<b>Course Objective</b>	To understand the concept of pre stress Concrete				
<b>UNIT</b>	<b>Course Outcomes</b>				
I	To learn the principles, materials, methods and systems of prestressing				
II	To know the different types of losses and deflection of prestressed members				
III	To learn the design of prestressed concrete beams for flexural, shear and tension				
IV	To learn the design the flexural members in pre stress				

### UNIT I

**Introduction:** Basic concepts of Prestressing, terminology, advantages and applications of prestressed concrete. Materials for Prestressed Concrete: High strength Concrete, permissible stresses in concrete, high strength steel, permissible stresses in steel. Prestressing Systems: Prestensioning and post tensioning systems, various types of tensioning devices, LecMacall systems, MagnelBlaton post tensioning, Freyssinet systems, Gifford Udal system.

### UNIT II

**Losses of Prestress:** Types of losses of Prestress, loss due to elastic deformation of concrete, loss due to shrinkage of concrete, loss due to creep of concrete, loss due to relaxation of stress in steel, loss due to friction, loss due to anchorage slip, total loss in pretension and post tensioned members. Analysis of Prestress and bending stresses: Basic assumptions, resultant stresses at a section, concept of load balancing, cracking moment.

### UNIT III

**Deflections:** Factors influencing deflections, short term deflections of uncracked members, deflections of cracked members, prediction of long term deflections. Shear and Torsional Resistance: Ultimate shear resistance of prestressed concrete members, prestressed concrete members in torsion, design of reinforcements for torsion, shear and bending.

### UNIT IV

**Design of Flexural Members :** Dimensioning of flexural members, design of pretensioned and post tensioned beams, design of partially prestressed members, design of one way and two way slabs, continuous beams. Design for axial tension, compression and bending, bond and bearing.

#### Books:

1. Prestressed Concrete by N. Krishna Raju, TMH Publishing Company, New Delhi,
2. Prestressed Concrete by P. Dayartnam, Oxford and IBH Publication, New Delhi.
3. Design of Prestressed Concrete Structures by T Y Lin & Ned H. Burns

B. Tech. VIII Semester (Civil Engineering)					
SUBJECT: Earthquake Engineering					
L	T	P/ D	Total	Subject Code: EL-422A	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25

					Marks
					Duration: 3 hrs.
<b>Course Objective</b>	To understand basics of Earthquake Engineering				
<b>UNIT</b>	<b>Course Outcomes</b>				
I	To introduce the basics of Seismology				
II	To introduce the seismic analysis and design				
III	To learn to assess the seismic performance of the structure				
IV	To learn about vibration control measures				

### UNIT I

**Seismology:** Introduction, plate tectonics, earthquake distribution & mechanism, seismicity, seismic wave, earthquake magnitude & intensity, seismic zoning & seismometer.

### UNIT II

**Seismic Analysis and Design:** General principles, assumptions, Seismic coefficient method, response spectrum method, strength and deflection, design criterion for structures, significance of ductility, codal provisions, and design examples.

### UNIT III

**Seismic performance, Repair and strengthening:** Methods for assessing seismic performance influence of design ductility and masonry infills, criterion for repair and strengthening techniques and their applications, addition of new structural elements.

### UNIT IV

**Vibrational control:** General features of structural control, base isolation, active and passive, Control system, earthquake resistance design as per IS: 1893, IS: 4326 and: 13920.

#### Books:

1. Elements Of Earthquake of Engineering, Jai Krishna, A. R. Chandershekar and Brajesh Chandra, South Asian Pub New Delhi.
2. Dynamics of Structures, Clough & Penzion, McGraw Hill.
3. Earthquake Engineering, YX Hu, SC. Liu and W. Dong, E and FN Sons., Madras.
4. Earthquake Resistant Concrete Structures, George G. Penelis and J. Kapoor, E and FN Sons., Madras. Structural Dynamic, Mario Paz, CBB Pub. N.Delhi.

<b>B. Tech. VIII Semester (Civil Engineering)</b>					
<b>SUBJECT: Offshore Engineering</b>					
L	T	P/D	Total	<b>Subject Code: EL-424A</b>	Max. Marks: 100
3	0	0	3		Theory: 75 marks

					Sessional: 25 Marks
					Duration: 3 hrs.
<b>Course Objective</b>	To impart the basic knowledge of off shore engineering				
<b>UNIT</b>	<b>Course Outcomes</b>				
I	To introduce the basics of offshore structures				
II	To introduces different loads on offshore structure				
III	To introduce the concept of general layout and consideration given				
IV	To introduce the concept of installation of offshore structur				

### UNIT I

#### Historical Development of Offshore Structures

Introduction, Definition of Offshore Structure, Historical Developments Deepwater challenges, Functions of Offshore Structures, selection of Offshore Structure and its Configurations, Bottom Supported Fixed Structures, Complaint Structures, Floating Structures, Novel offshore design, Field development concepts

### UNIT II

#### Load and Responses

Introduction, Gravity Load, Hydrostatic Loads, Resistance Loads, Current loads on Structures, Current Drag and Lift Force, Steady and Dynamic Wind Loads on Structures, Wave Loads on Structures, Varying Wind Load, Impulse loads and Introduction to design

### UNIT III

#### Topside Facilities and Layout

Introduction General layout Considerations Areas and Equipment Deck Impact Loads Deck Placement and Configuration Float over Deck Installation Helipad Platform Crane Living quarters Oil and gas treatment Oil and gas storage, offloading and export Utility and process support systems Drilling facilities

### UNIT IV

#### Offshore Installation

Introduction , Installation of Fixed Platform Substructures Floating Structures, Foundations Subsea Templates , loadouts transportation Platform Installation Methods and installation criteria, Installation of Pipelines and Risers

#### Books:

1. Dawson, T.H., "Offshore Structural Engineering", Prentice Hall, 1983
2. B.C Gerwick, Jr. "Construction of Marine and Offshore Structures", CRC Press, Florida, 2000.
3. Subrata K Ckkrabarti, "Handbook of Offshore Engineering", Vol 1, Vol 2, Elsevier Publishers, 1st edition, 2005.

<b>B. Tech. VIII Semester (Civil Engineering)</b>					
<b>SUBJECT: STRUCTURAL GEOLOGY</b>					
L	T	P/D	Total	<b>Subject Code: EL-426A</b>	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25

					Marks
					Duration: 3 hrs.
<b>Course Objective</b>	To introduce the concept of structural geology				
<b>UNIT</b>	<b>Course Outcomes</b>				
I	To introduce the concept of topography and its impact on structure.				
II	To introduce the concept of rock deformation.				
III	To understand geometric and genetic classification of folds				
IV	To learn origin and classification of fractures and fault.				

#### UNIT I

**Structure and Topography** Effects of topography on structural features, Topographic and structural maps; Importance representative factors of the map

#### UNIT II

**Stress and strain in rocks** Concept of rock deformation: Stress and Strain in rocks, Strain ellipses of different types and their geological significance. Planar and linear structures; Concept of dip and strike; Outcrop patterns of different structures.

#### UNIT III

**Folds and Fold morphology;** Geometric and genetic classification of folds; Introduction to the mechanics of folding: Buckling, Bending, Flexural slip and flow folding

#### UNIT IV

**Foliation and lineation** Description and origin of foliations: axial plane cleavage and its tectonic significance Description and origin of lineation and relationship with the major structures

**Fractures and faults Geometric and genetic** classification of fractures and faults Effects of faulting on the outcrops Geologic/geomorphic criteria for recognition of faults and fault plane solutions

#### **Books:**

1. Davis, G. R. (1984) Structural Geology of Rocks and Region. John Wiley
2. Billings, M. P. (1987) Structural Geology, 4th edition, PrenticeHall.
3. Park, R. G. (2004) Foundations of Structural Geology. Chapman & Hall
4. Pollard, D. D. (2005) Fundamental of Structural Geology. Cambridge University Press.
5. Ragan, D. M. (2009) Structural Geology: an introduction to geometrical techniques (4th Ed). Cambridge University Press (For Practical)
6. Lahee F. H. (1962) Field Geology. McGraw Hill

<b>B. Tech. VIII Semester (Civil Engineering)</b>					
<b>SUBJECT: Waste Water Treatment</b>					
L	T	P/D	Total	<b>Subject Code: EL-428A</b>	Max. Marks: 100
3	0	0	3		Theory: 75 marks

					Sessional: 25 Marks
					Duration: 3 hrs.
<b>Course Objective</b>	The aim of study is to understand the effect of waste water on environment and its treatment				
<b>UNIT</b>	<b>Course Outcomes</b>				
I	Students will study the effect of waste water on streams				
II	Students will study the working process of treatment plant				
III	Students will study about the standard for disposal				
IV	Students will study the types of industry responsible for waste generation				

### Unit I

**Sewer appurtenances:** Man holes, Catch basin, flushing devices, inverted siphon. Ventilation of sewers. Sewage, Sewerage, Systems of sewerage, Sewage characteristics Physical, chemical and biological parameters, Biological oxygen demand, first stage BOD, Chemical Oxygen demand, Relative stability, Population equivalent.

### Unit II

**Waste water disposal systems** Selfpurification of streams, DilutionOxygen sag curve, Streeter Phelp's Equation, land treatment, Treatment of sewage, Preliminary and Primary treatment –Theory and design of Screen, Grit chamber, Detritus chamber, Flow Equalization tank and Sedimentation tank.

### Unit III

**Secondary treatment methods**Contact bed, Intermittent sand filter, Theory and design of Trickling filter, Activated sludge process, Trickling filterHigh rate, standard. Rotating biological contactor Design of Septic tank and Imhoff tank, Principle and working of Oxidation ditch and oxidation ponds.

Aerated lagoons, Design of up flow anaerobic sludge blanket reactors, Sludge treatment and disposalMethods of thickening, Sludge digestion Anaerobic digestion, Design of sludge digestion tanks and Sludge drying beds, methods of sludge disposal

### Unit IV

**Effects of industrial wastes on streams,** sewerage systems and wastewater treatment plants. Minimizing the effects of industrial effluents on waste water treatment plants and receiving streamsconservation of water, process change, reuse of waste water, volume reduction, strength reduction, neutralization, equalization and proportioning.

#### Books:

1. Industrial and Hazardous Waste Treatment by N.L.Nemerow&A.Dasgupta.
2. Industrial Effluents by N.Manivasakam.
3. Waste Water Treatment by M.N.Rao&A.K.Dutta.

<b>B. Tech. VIII Semester (Civil Engineering)</b>					
<b>SUBJECT: Water and Air Quality Modelling</b>					
L	T	P/	Total	<b>Subject Code: EL-430A</b>	Max. Marks: 100

		D			
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
<b>Course Objective</b>	This course aims at developing mathematical models for air and water quality check				
<b>UNIT</b>	<b>Course Outcomes</b>				
I	Students will learn the Mathematical Models for water quality				
II	Students will learn the Mathematical Models for dissolved oxygen.				
III	Students will learn the Mathematical Models for Estuary and Lakes				
IV	Students will learn about micrometeorological process.				

### UNIT I

**Introduction to Mathematical Models:** water quality model development, calibration and verification cost: benefit analysis using models, Model requirements and limitations.

### UNIT II

**D.O. Models for Streams:** Dissolved oxygen model for streams sources and sinks of dissolved oxygen estimation of system parameters Streeter Phelps model oxygen 'sag' curvedetermination of Deoxygenation and reaeration coefficients

### UNIT III

**Benthic oxygen demand mass transport mechanisms** Models for Estuary and Lakes: Physical chemical and biological processes in estuaries; Air quality models:

### UNIT IV

**Micrometeorological processes,** wind rose, dispersion, coefficients and stability classes, Gaussian and dispersion model, Stack height computation, Regional air quality models, Source inventories and significance

### Books

1. Deaton, M.L and Winebrake, J.J., Dynamic Modelling of Environmental Systems, Verlag, 2000.
2. Chapra, S.C. Surface Water-Quality Modelling, McGraw-Hill, 2008.
3. Arthur C.Stern., Air Pollution (Third Ed.) Volume I – Air Pollutants, their transformation and Transport, (Ed.), Academic Press, 2006.
4. Wainwright, J and Mulligan, M., Environmental Modelling Finding simplicity in complexity, John Wiley and Sons Inc., New York, 2013

<b>B. Tech. VIII Semester (Civil Engineering)</b>
<b>SUBJECT: TRAFFIC ENGINEERING AND MANAGEMENT</b>

L	T	P/D	Total	<b>Subject Code: EL-432A</b>	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		To understand and explain the various modes of Transport viz. Surface, Air, Rail and Water.			
<b>UNIT</b>		<b>Course Outcomes</b>			
I		To introduce the significance and scope of traffic engineering.			
II		Describe the different methods of conducting Traffic volume studies.			
III		Mention the various driver characteristics affecting traffic behavior onroads.			
IV		State the objectives in providing road markings and describe its effectiveness in traffic regulation.			

### UNIT I

**Introduction:** Importance of Transportation Employment in Transportation Transportation Systems and Organization Characteristics of Driver, the Pedestrian, the Vehicle and Road, Traffic and Environment, Introduction to MRTS, LRTS and Underground railways.

### UNIT II

**Traffic Engineering Studies:** Statistical studies for Traffic Engineering, Speed studies Volume Studies Travel time and Delay Studies Parking Studies Traffic Forecasting Accident Studies, Traffic Flow Theory, Macroscopic and Microscopic Traffic model, Shock Waves Traffic Flow at signal and un signal intersection Simulation of Traffic.

### UNIT III

**Airport Planning:** Airport -Accessibility ,Transport Connections, Forecasting Future Traffic – Airfield Capacity and Delay Aircraft characteristics , Airport Site Selection, Airport Classification, Planning of Airfield Components, Runway, Taxiway, Apron, Hanger, Passenger Terminals.

### UNIT IV

**Waterways Transport Systems:** Fresh Water and Salt Water Navigation –Ocean, Currents and Tide, Canals and Waterways, Ports, Types of Ships Inland Water Transport-Planning, limitations and advantages Case Studies-Pipelines, Ropeways, Beltways and other means of transport.

#### Books:

1. Kadiyali L.R, “Traffic Engineering and Transportation Planning” Khanna Publishers, Delhi, 2005.
2. Khanna SK and Justo CEG, “Highway Engineering”, Nem Chand & Bros, Roorkee, 2010.
3. Brase/Brase “Understandable Statistics 3rd edition”,D C Health and Company, Lexington, Massachusetts,Toronto,1987.
4. Jason C.yu, Transportation Engineering: Introduction to Planning, Design and Operations, Elsevier,1992.
5. Taylor M.A.P and Young W,Traffic AnalysisNew Technology and New solution.

B. Tech. VIII Semester (Civil Engineering)					
SUBJECT: Infrastructure Planning and Design					
L	T	P/ D	Total	Subject Code: EL-434A	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
<b>Course Objective</b>		To understand various concepts of infrastructure planning and management.			
<b>UNIT</b>		<b>Course Outcomes</b>			
I		To understand the basic concepts related to Infrastructure Projects			
II		To understand the role of private sector infrastructure growth.			
III		To impart the strategies for successful Infrastructure Project implementation.			
IV		To develop Infrastructure modeling and Life Cycle Analysis Techniques.			

### Unit I

**An Overview Of Basic Concepts Related To Infrastructure:** Introduction to Infrastructure, an overview of the Power Sector in India., an Overview of the Water Supply and Sanitation Sector in India., an overview of the Road, Rail, Air and Port Transportation Sectors in India. An overview of the Telecommunications Sector in India. An overview of the Urban Infrastructure in India, an overview of the Rural Infrastructure in India, an Introduction to Special Economic Zones, Organizations and layers in the field of Infrastructure, The Stages of an Infrastructure Project Lifecycle., an overview of Infrastructure Project Finance.

### Unit II

**Private Involvement In Infrastructure:** A Historical Overview of Infrastructure Privatization. The Benefits of Infrastructure Privatization, Problems with Infrastructure Privatization, Challenges in Privatization of Water Supply: A Case Study, Challenges in Privatization of Power: Case Study, Privatization of Infrastructure in India: Case Study, Privatization of Road Transportation Infrastructure in India.

### Unit III

**Challenges To Successful Infrastructure Planning And Implementation:** Mapping and Facing the Landscape of Risks in Infrastructure Projects, Economic and Demand Risks: The Case study for Political Risks, SocioEnvironmental Risks, Cultural Risks in International Infrastructure Projects, Legal and Contractual Issues in Infrastructure, Challenges in Construction and Maintenance of Infrastructure.

### Unit IV

**Sustainable Development Of Infrastructure:** Information Technology and Systems for Successful Infrastructure Management, Innovative Design and Maintenance of Infrastructure Facilities, Infrastructure Modeling and Life Cycle Analysis Techniques, Capacity Building and Improving the Governments Role in Infrastructure Implementation, An Integrated Framework for Successful Infrastructure Planning and Management Infrastructure Management Systems and Future Directions.

### Books:

1. Grigg, Neil, Infrastructure engineering and management, Wiley, (1988).
2. Haas, Hudson, Zaniewski, Modern Pavement Management, Krieger, Malabar, (1994).



3. Hudson, Haas, Uddin, Infrastructure management: integrating design, construction, maintenance, rehabilitation, and renovation, McGraw Hill, (1997).
4. Munnell, Alicia, Editor, Is There a Shortfall in Public Capital Investment? Proceedings of a Conference Held in June (1990).
5. World Development Report 1994: Infrastructure for Development (1994).
6. Zimmerman, K. and F. Botelho, "Pavement Management Trends in the United States," 1st European Pavement Management Systems Conference, Budapest, September (2000).