

**SCHEME OF EXAMINATION FOR B.TECH DEGREE COURSE**  
**Eighth Semester Examination**  
**(Civil Engineering)**

S No.	Course No.	Subject	Teaching Schedule				Examination Schedule				Duration of Exam (Hours)
			L	T	P/D	Total	Theor y	Sessional	Practical Viva	Total Marks	
1	-----	Departmental Elective- III	3	1	-	4	75	50	-	125	3
2	-----	Departmental Elective- IV	3	2	-	5	75	50	-	125	3
3	CE-402E	Bridge Engineering	3	1	-	4	100	50	-	150	3
4	CE-404E	Railway And Airport Engineering	3	1	-	4	100	50	-	150	3
5	CE-406E	Industrial Waste Water Treatment	3	1	-	4	100	50	-	150	3
6	CE-408E	Estimation And Accounts	-	-	3	3	-	25	50	75	3
7	CE-426E	Transportation Engineering – II (P)	-	-	2	2	-	25	25	50	3
8	CE-428E	Environmental Engineering- II(P)	-	-	2	2	-	25	25	50	3
9	CE-430-E/ CE-432-E	Structural Engineering /OR/ Water Resource Engineering	-	-	6	6	-	100	50	150	3
10	CE-434-E	Seminar	-	1	-	1	-	25	-	25	3
11	CE-436-E	Comprehensive Viva-Voce	-	-	-	-	-	-	75	75	3
12	CE-438-E	General Fitness & Professional Compulsory	-	-	-	-	-	-	75	75	3
		Total	15	7	13	28	450	450	300	1200	

Departmental Elective-III

CE-410-E Introduction To Finite Element Method

CE-412-E Structure Optimization

CE-414-E Geosynthetic Engineering

CE-416-E Machine Foundations

Departmental Elective-IV

CE-418-E Ground Water Hydrology

CE-420-E Design of Hydraulic Structures

CE-422-E Environment Impact Assessment

CE-424-E Remote Sensing & GIS

B.TECH VIII<sup>th</sup> SEMESTER  
Bridge Engineering  
(CE-402E)

L T P  
3 1 -

Theory : 100  
Sessional : 50  
Total:150

Time : 3Hrs

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(brief description of each type) , design of R.C.C. culvert and T-beam 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, wing-wall and approaches.

Brief Description: Bearings, joints, articulation and other details.

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

Note for Paper-setter: EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit.

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.TECH. VIII<sup>th</sup> SEMESTER  
Railway and Airport Engineering  
(CE-404-E)

L T P  
3 1 -

Theory : 100  
Sessional : 50  
Total:150

Time : 3Hrs

UNIT-I

Introduction, Permanent Way And Rails: Rail transportation and its importance in India. Permanent way: requirements and components. Gauges in India and abroad. Selection of gauge. Coning of wheels. Adzing of sleepers. Rails: functions, composition of rail steel, types of rail sections, requirements of an ideal rail section, length of rails. Defects in rails. Creep of rails. Long welded rails and continuously welded rails.

Sleepers, Fastenings And Ballast: Sleepers: functions, requirements of an ideal sleeper. Types of sleepers: wooden, cast iron, steel and concrete sleepers, advantages, disadvantages and suitability of each type. Sleeper density. Fastenings for various types of sleepers: fish plates, spikes, bolts, bearing plates, keys, chairs, jaws, tie bars. Elastic fastenings. Ballast: functions, requirements, types of ballast and their suitability.

UNIT-II

Points And Crossings: Necessity. Turnout: various components, working principle. Switch: components, types. Crossing: components and types. Design elements of a turnout, design of a simple turnout. Layout plan of track junctions: crossovers, diamond crossing, single-ouble slips, throw switch, turn table, triangle.

Signaling, Interlocking And Train Control: Signals: objects, types and classification. Semaphore signal: components, working principle. Requirements/principles of a good interlocking system. Brief introduction to devices used in interlocking. Methods of control of train movements: absolute block system, automatic block system, centralized train control and automatic train control systems.

UNIT-III

Geometric Design Of The Track: Gradients, grade compensation. Super elevation, cant deficiency, negative super elevation. Maximum permissible speed on curves. Tractive resistances, types. Hauling capacity of a locomotive.

Stations, Yards And Track Maintenance: Stations: functions and classification. Junction, non-junction and terminal stations. Yards: functions, types. Marshalling yard: functions, types. Maintenance of railway track: necessity, types of maintenance. Brief introduction to mechanized maintenance, M.S.P and D.T.M.

UNIT-IV

Introduction And Airport Planning: Air transportation, its importance and characteristics, status in India. Layout plan of an airport and its basic elements: terminal area, apron, taxiway, runway, hanger. Aircraft characteristics, their effect on elements of an airport. Site selection of an airport. Classification of airports.

Runway Layout And Pavement Design: Runway orientation, Wind Rose diagram. Basic runway length. Corrections to basic runway length. Runway patterns. Difference between highway and runway

pavement. Types of runway pavements. Design factors for runway pavement. Brief introduction to design of thickness of a runway pavement.

Note for Paper-setter: EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit.

**Books:**

1. A text book of Railway Engineering by S.C.Saxena and S.P.Arora, Dhanpat Rai Publicatios, Delhi.
2. Railway Track Engg. by J.S.Mundray, Tata McGraw-Hill Publishing Co. Ltd. N.Delhi.
3. Airport Planning and Design by S.K.Khanna, M.G.Arora, Nem Chand Bros., Roorkee.
4. The Planning and Design of Airports by Robort Hornjeff, McGraw Hill Book Co.
5. Air Transportation Planning and Design by Virender Kumar & Satish Chandra, Galgotia Publications, N.Delhi

B.TECH VIII<sup>th</sup> SEMESTER  
Industrial Waste Water Treatment  
(CE-406E)

L T P  
3 1 -

Theory : 100  
Sessional : 50  
Total:150

Time : 3 Hrs

UNIT – I

Effects of industrial wastes on streams, sewerage systems and wastewater treatment plants.

UNIT-II

Minimizing the effects of industrial effluents on waste water treatment plants and receiving streams- conservation of water, process change, reuse of waste water, volume reduction, strength reduction, neutralization, equalization and proportioning.

UNIT-III

Population equivalent. Industrial effluent standards for disposal into inland surface water sources and on land for irrigation.

UNIT-IV

Study of the following Industries from waste generation, quality and its treatment including brief overview of manufacturing process:Textile, tannery, sugar mill, distillery, dairy, pulp & paper, metal plating, oil refinery, nitrogenous fertilizers, thermal power plants and radio active wastes.

Note for Paper-setter: EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit.

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.TECH VIII<sup>th</sup> SEMESTER  
Estimation and Accounts  
(CE-408E)

L T P  
- - 3

Viva/Pract: 25  
Sessional : 50  
Total:75

Time : 3 Hrs

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, White-washing, 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(white-washing, 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.Chakarborty, 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.

Note for Paper-setter: EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit

B.TECH. VIII<sup>th</sup> SEMESTER

TRANSPORTATION ENGINEERING – II (P)  
(CE-426E)

L T P

- - 2

Time : 3 Hrs

Sessional : 50

Viva : 25

Total: 75

LIST OF EXPERIMENTS

1. Flakiness and Elongation Index of aggregates.
2. Specific gravity and water absorption test on aggregates.
3. Specific gravity of bitumen.
4. Proportioning of aggregates.
5. Marshall's stability test.
6. Stripping test on aggregates.
7. Determination of bitumen content.
8. CBR lab test on soil.
9. Traffic volume study using videography technique.
10. Traffic speed study using videography technique.

B.TECH VIII<sup>th</sup> SEMESTER  
ENVIRONMENTAL ENGINEERING-II(P)  
(CE-428E)

L T P

-- 2

Sessional : 50

Viva : 25

Total: 75

Time : 3 Hrs

LIST OF EXPERIMENTS

1. To determine the acidity of a sewage sample.
2. To determine the alkalinity of a sewage sample.
3. To determine total, suspended, dissolved and settable solids in a sewage sample.
4. To determine volatile and fixed solids in a sewage sample.
5. To determine oil and grease in a sewage sample.
6. To determine the chloride concentration in a sewage sample.
7. To determine the sulphate concentration in a sewage sample.
8. To determine the B.O.D. of a given sewage sample.
9. To determine the C.O.D. of a given sewage sample.
10. To determine the T.O.C. of a given sewage sample.
11. To determine the fecal count of a given sewage sample.
12. Microscopic studies of a sewage