



SCHEME FOR SIXTH SEMESTER (CIVIL ENGINEERING)

Sr. No.	Subject	Study Scheme			EVALUATION SCHEME						Total Marks
					INTERNAL ASSESSMENT		EXTERNAL ASSESMENT (EXAMINATION)				
					Theory	Practical	Written Paper		Practical		
					Max. Marks	Max. Marks	Max. Marks	Hrs.	Max. Marks	Hrs.	
Hrs/Week		L	T	P							
6.1	Earthquake Resistant Building Construction				3	-	-	50	-	100	3
6.2	Railways, Bridges and Tunnels	5	-	-	50	-	100	3	-	-	150
6.3	Quantity Surveying & Valuation	5	-	-	50	-	100	3	-	-	150
6.4	Construction Management & Accounts	5	-	-	50	-	100	3	-	-	150
6.5	Electives (as given below+)	3	-	-	50	-	100	3	-	-	150
6.6	Employability Skills - II	-	-	2	-	25	-	-	50	3	75
6.7	Major Project Work	-	-	12	-	100	-	-	100	3	200
# Student Centred Activities		-	-	5	-	25	-	-	-	-	25
Total		21	-	19	250	150	500	-	150	-	1050

Common with other diploma programmes

Student Centred Activities will comprise of co-curricular activities like extension lectures, library studies, games, hobby clubs e.g. photography, painting, singing, seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities, Civil Defence/Disaster Management activities etc.

+ **Electives (Any one of the following):**

- 6.5.1 Repair and Maintenance of Buildings
- 6.5.2 Environmental Engineering
- 6.5.3 Pre-stressed Concrete



SYLLABUS: Polytechnic (CE)

Department: Civil Engineering – 6th Semester

Subject: Earthquake Resistant Building Construction (Theory)

Subject Code: 030762

Detailed Contents

Unit No.1 Elements of Engineering Seismology:

Topic No.1: General Features of Tectonic Of Seismic Regions., Causes of Earthquakes.

Topic No.2: Seismic waves, earthquake size (magnitude and intensity), Epicenter, Seismograph, Classification of Earthquakes

Topic No.3: Seismic zoning map of India, Static and Dynamic Loading, Fundamental period.

Unit No.2 Seismic Behavior of Traditionally-Built Constructions of India:

Topic No.4: Performance of building during earthquakes

Topic no.5: Mode of failure (Out-of-plane) failure, in-plane failure, Diaphragm Failure, Connection failure, Non-structural (components failure)

Unit no.3 Special construction method:

Topic No.6: Tips and Precautions to Be Observed While Planning Designing and Construction Of Earthquake Resistant Building

Unit No.4 Introduction to IS: 4326, IS: 13828, IS: 1893(Part 1), 154326 and IS: 13920:

Topic No.7: Introduction to IS: 4326, IS: 13828, IS: 1893(Part 1), 154326 and IS: 13920

Unit No.5 Seismic Provision of Strengthening

Topic No.8: Seismic Provision of Strengthening and Retrofitting Measures for Traditionally-Built Constructions, Brick And RCC Structure

Unit No 6 Provision of reinforcement detailing in masonry and RC constructions:

Unit No 7 Disaster Management:

Topic No.9: Disaster Rescue, Psychology of Rescue, Rescue Workers

Topic No.10: Rescue Plan, Rescue by Steps, Rescue Equipment,

Topic No.11: Safety in Rescue Operations, Debris Clearance and Causality Management

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper			Practical	
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
3	-	-	50	-	100	3	-	-	150

RECOMMENDED BOOKS

- Elements of Earthquake Engineering by Jai Krishana and AR Chandrasekaran; Sarita Parkashan, Meerut.
- Manual Published by Earthquake Engineering department, IIT Roorkee / IITKanpur
- IS 13920, IS: 13827, IS: 13828, IS 1893, IS 4326 (latest edition)
- Singh, Harbhajan " Earthquake Resistant Building Construction" AbhishekPublishers, Chandigarh

INSTRUCTIONAL STRATEGY

The student may be taken for visit to various building construction sites where precautions related to earthquake resistant construction are being taken so that the students may appreciate the importance of the subject

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	8	19
2	07	15
3	08	17
4	05	10
5	08	19
6	06	08
7	06	12
Total	48	100



Detailed Contents

Unit No.1 Introduction

Topic No.1 Introduction to Quantity Surveying And Its Importance. Duties of Quantity Surveyor.

Unit No.2 Types of estimates

Topic No.2: Preliminary Estimates 1.)Plinth Area Estimate 2.)Cubic Rate Estimate 3.)Estimate Per Unit Base 4. Epicenter, Seismograph, Classification of Earthquakes

Topic No.3: Detailed Estimates, Definition, Stages of Preparation Details of Measurement and Calculation of Quantities and Abstract

Unit no.3 Measurement

Topic No.4: Units of Measurement for Various Items of Work As Per BIS: 1200

Topic No.5: Rules for Measurements, Different Methods of Taking out Quantities – Centre Line Method and Long Wall And Short Wall Method

Unit No.4 Preparation of Detailed and Abstract Estimates from Drawings for

Topic No.6: A Small Residential Building with A Flat Roof And Pitched Roof Building Comprising Of Two Rooms With W.C, Bath, Kitchen and Verandah

Topic No.7: Earthwork For Unlined Channel, WBM Road And Pre-Mix Carpeting, Single Span RCC Slab Culvert, Earthwork For Plain And Hill Roads, RCC Work In Beams, Slab, Column And Lintel, Foundations, Users Septic Tank - 10 Users

Unit No.5 Calculation of quantities of materials

Topic No.8: Cement Mortars of Different Proportion, Cement Concrete of Different Proportion

Topic No.9: Brick/Stone Masonry in Cement Mortar

1. Plastering and Pointing 2. White washing, painting 3. R.C.C. work in slab, beams

Unit No 6 Analysis of Rates

Topic No.10: Steps involved in the analysis of rates. Requirement of Material, labour, sundries, contractor's profit And Overheads,

Topic No.11: Analysis of rates for finished items when data regarding labour, rates of material and labour is given

Topic no.12: Earthwork in excavation in hard/ordinary soil and filling with a concept of lead and lift

1. RCC in roof slab/beam/lintels/columns 2. Brick masonry in cement mortar 3. Cement Plaster 4.

White washing, painting 5. Stone masonry in cement mortar

Topic no 13: Running and maintenance cost of construction equipment

Unit No.7 Contractorship

Topic No.14: Meaning Of Contract, Qualities of A Good Contractor And Their Qualifications

Topic No.15: Essentials of A Contract, Types of Contracts, Their Advantages, Dis-Advantages and Suitability, System Of Payment

Topic No.16: Single and Two Cover-Bids; Tender, Tender Forms and Documents, Tender Notice, Submission of Tender And Deposit of Earnest Money, Security Deposit, Retention Money, Maintenance Period

Topic No.17: Classification and Types of Contracting Firms/Construction Companies

Unit No 8 Preparation of Tender Document based on Common Schedule Rates

Topic No.18: Introduction to CSR and Calculation of Cost Based On Premium on CSR.

Topic No.19: Exercises on Writing Detailed Specifications of Different Types of Building Works from Excavation To Foundations, Superstructure and Finishing Operation

Topic No.20: Exercises On Preparing Tender Documents for The Following

1. Earth Work 2. Construction Of A Small House As Per Given Drawing 3. RCC Works

4. Pointing, Plastering and Flooring 5. White-Washing, Distempering And Painting 6. Wood Work Including

Polishing 7. Sanitary and Water Supply Installations 8. False Ceiling, Aluminum (Glazed) Partitioning 9.

Tile Flooring Including Base Course 10. Construction Of W.B.M/Concrete Road

Unit No 9 Exercises on preparation of comparative statements for item rate contract

Unit No 10 Valuation

Topic No.21: Purpose Of Valuation, Principles Of Valuation

Topic no.22: Definition of Various Terms Related to Valuation like Depreciation, Sinking Fund, Salvage And Scrap Value, Market Value, Fair Rent, and Year's Purchase Etc. Methods of Valuation (1) Replacement Cost Method (2) Rental Return Method

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment			External Assessment (Examination)			
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
5		0	50	0	100	3	0	0	150



RECOMMENDED BOOKS

1. Pasrija, HD, Arora, CL and S. Inderjit Singh, "Estimating, Costing and Valuation(Civil)", New Asian Publishers, Delhi,
2. Rangwala, S.C, Estimating and Costing", Anand, Charotar Book Stall
3. Chakraborti, M, "Estimating, Costing and Specification in Civil Engineering", Calcutta
4. Dutta, BN, "Estimating and Costing
5. Mahajan Sanjay, "Estimating and Costing" Satya Parkashan, Delhi

INSTRUCTIONAL STRATEGY

This is an applied engineering subject. Teachers are expected to provide working drawings for various Civil Engineering works and students be asked to calculate the quantities of materials required for execution of such works and use of relevant software for preparing estimates. Teachers should conceptualize making analysis of rates for different items of works. It will be advantageous if students are given valuation reports for reading.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	02	03
2	03	04
3	03	04
4	30	40
5	08	08
6	10	12
7	06	08
8	12	12
9	02	03
10	04	06
Total	80	100



Detailed Contents

Unit No.1 Importance Of Environmental Engineering

Topic No.1: Importance Of Clean Environment, Control Of Environmental Pollution.

Topic No.2: Conservation Of Natural Resources, Environmental Education, Sustainable Development

Unit No.2 Environments And Ecology

Topic No.3: Ecology Ecosystem And Types Of Ecosystems, Food Chain

Topic No.4: Ecological Pyramids Consortium And Ecological Balance

Unit No.3 Water Pollution

Topic No.5: Causes Of Water Pollution Surface And Underground Water, Preventing Measure For Water

Unit No.4 Air Pollution

Topic No.6: Definition, Principal Air Pollutants, Types Of Air Contaminants, Sources Of Air Pollution

Topic No.7: Effects Of Air Pollution On Human Beings, Plants, Animals

Unit No.5 Noise Pollution

Topic No.8: Definition, Unit Of Measurement Of Noise

Topic No.9: Sources and Effects Of Noise Pollution

Topic No.10: Control Of Noise Pollution

Unit No.6 Effects Of Mining, Blasting And Deforestation

Topic No.11: Effects Of Mining

Topic No.12: Effects Of Blasting And Deforestation

Unit No.7 Lands Use:

Topic No.13: Effect Of Land Use On Environmental

Topic No.14: Land Use And Natural Disasters

Topic No.15: Soil Degradation Problems - Erosion, Water Logging, Soil Pollution

Unit No.8 Environmental Impact Assessment

Topic No.16: Definition, Flow Chart Of Environmental Impact Assessment Methodology

Topic No.17: Describe The Need And Importance Of Eia.

Unit No.9 Legislation to Control Environmental Pollution

Topic No.18: Indian Legislative Acts for Water

Topic No.19: Land and Air Pollution Control- Provisions, Scope

Unit No.10 Global Issues Of Environmental Engineering

Topic No.20: Global Warming, Ozone Depletion, Acid Rain, Oil Pollution, Radiation Hazards Their Control, Carbon Credits.

Unit No.11 Renewable Source Of Energy

Topic No.21: Non-Conventional Sources Of Energy (Biogas, Solar, Wind Etc)

Topic No.22: Conservation Of Energy Resources Like Coal, Oil Etc

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
3	-	-	50	-	100	3	-	-	150

RECOMMENDED BOOKS

1. Deswal DS and Deswal SS "Environmental Engineering" Dhanpat Rai and Company (P) Ltd., Delhi
2. Odum EP, "Fundamentals of Ecology", Amarind Publication Co., Delhi
3. Dhamija SK "Environmental Engineering and Management ; SK Kataria and Sons, Delhi
4. De AK, "Engineers Chemistry", New Age Publication, Delhi
5. Kendeigh SC, "Ecology", Prentice Hall of India, Delhi
6. Khitoliya, RK, "Environmental Pollution", S Chand & Co. Ltd., New Delhi
7. Bhatia, HS, "A text book of Environmental Pollution and Control", Galgotia. Publishers, Delhi

INSTRUCTIONAL STRATEGY

Students should be encouraged to undertake project work related to environmental problems. They should visit industrial effluent treatment plant, water treatment plant and environmental engineering laboratory and study the impact of utilization of reclaimed byproducts

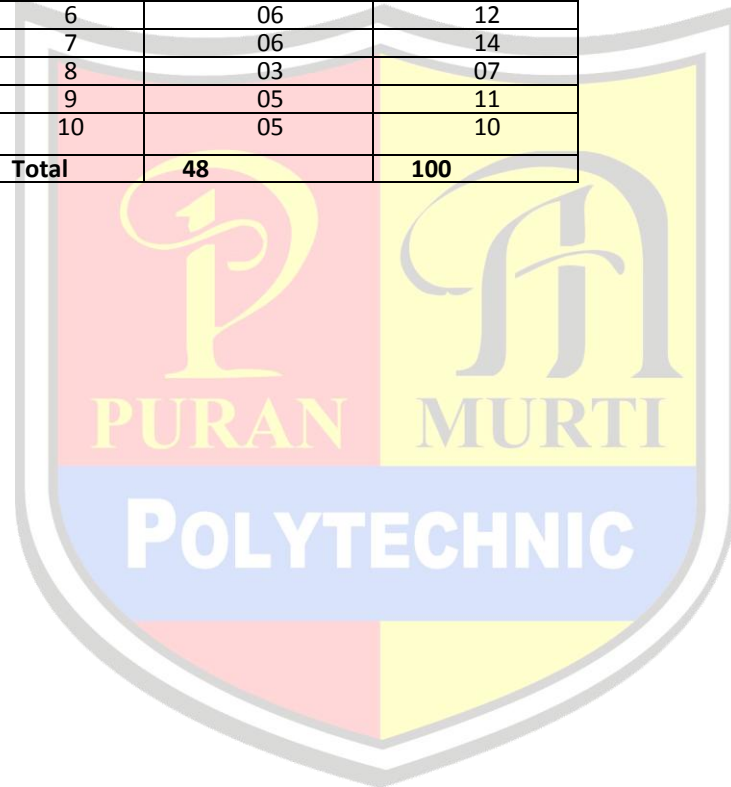


PM
POLYTECHNIC

A Unit of Puran Murti Educational Society
Approved by AICTE, Ministry of HRD, Govt. of India,
Affiliated to State Board of Technical Education, Panchkula, Haryana

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	02	04
2	05	04
3	04	08
4	07	14
5	03	06
6	06	12
7	06	14
8	03	07
9	05	11
10	05	10
Total	48	100





Detailed Contents

Unit No.1 Introduction

- Topic No.1: Significance of Construction Management, Main Objectives of Construction Management
- Topic No.2: Functions of Construction Management, Planning, Organizing, Staffing, Directing, Controlling And Coordinating
- Topic No.3: Classification of Construction into Light, Heavy and Industrial Construction
- Topic No.4: Stages in Construction from Conception to Completion
- Topic No.5: The Construction Team: Owner, Engineer, and Contractors, Their Functions and Inter-Relationship

Unit No.2 Construction Planning

- Topic No.6: Importance of Construction Planning, Stages Of Construction Planning
1 Pre-Tender Stage 2. Contract Stage
- Topic No.7: Scheduling Construction Works By Bar Charts Definition of Activity, Identification of Activities, Preparation Of Bar Charts for Simple Construction Work Preparation of Schedules for Labor, Materials, Machinery And Finances for Small Works, Limitations of Bar Charts
- Topic No.8: Scheduling By Network Techniques Introduction to Network Techniques; Pert and Cpm. Differences Between Pert and Cpm Terminology

Unit No.3 Organization

- Topic No.9: Types of organizations Line, line and staff, functional and their Characteristics

Unit No.4 Site Organization:

- Topic No.10: Principle of Storing and Stacking Materials at Site Location of Equipment Preparation of Actual Job Layout for a Building Organizing labour at Site

Unit No.5 Construction Labour

- Topic No.11: Conditions Of Construction Workers in India, Wages Paid To Workers
- Topic No.12: Important Provisions of the Following Acts:
Labour Welfare Fund Act 1936, Payment of Wages Act 1936, Minimum Wages Act 1948

Unit No.6 Control Of Progress

- Topic No.13 Methods of Recording Progress, Analysis of Progress Taking Corrective Actions Keeping Head Office Informed
- Topic No. 21 Cost Time Optimization for Simple Jobs Direct and Indirect Cost, Variation with Time, Cost Optimization, Need for Inspection and Quality Control, Principles of Inspection
- Topic No. 24 Stages Of Inspection and Quality Control For
1. Earth Work 2. Masonry, 3. RCC 4. Sanitary and Water Supply Services

Unit No.8 Accidents and Safety In Construction

- Topic No. 25 Accidents – Causes and Remedies, Safety Measures For
1 Excavation Work, 2 Drilling and Blasting, 3 Hot Bituminous Works, 4 Scaffolding, Ladders, Form Work, 5 Demolitions, Safety Campaign and Safety Devices

Unit No 9 Public Work Accounts

- Topic No.28: Introduction, technical sanction, administrative Approval, allotment of funds, reappropriation of Funds bill, Contractor ledger, measurement book running and final account bill complete
- Topic No.29 Preparation of Bill Of Quantities, Completion Certificate & Report, Hand Receipt, Quittances Roll. Muster Roll Labour, Casual Labour Roll- Duties and Responsibility Of Different Cadres, Budget-Stores, Returns, Account Of Stock, Misc.
- Topic No.30: Definition of Cash, Precaution in Custody Of Cashbook, Imprest Account, Temporary Advance, Treasury Challan, Preparation of Final Bills. Students Must Learn To Prepare Accounts Register, Stock Register.

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
5	-	-	50	-	100	3	-	-	150



PM

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RECOMMENDED BOOKS

1. Harpal Singh, "Construction Management and Accounts", Tata McGraw Hill Publishing Company., New Delhi
2. Peurifoy, RL, "Construction Planning, Equipment and Methods", McGraw Hill, Tokyo
3. Singh, Harbhajan " Construction Project Management" Abhishek Publishers, Chandigarh
4. Verma, Mahesh; "Construction Equipment and its Planning and Application
5. Dharwadker, PP; "Management in Construction Industry", , Oxford and IBH Publishing Company, New Delhi
6. Gahlot PS; Dhir, BM; "Construction Planning and Management", Wiley Eastern Limited, New Delhi
7. Softwares :
(a) MS Project – Microsoft USA
(b) Primavera

INSTRUCTIONAL STRATEGY

This is highly practice-based course and efforts should be made to relate process of teaching with direct experiences at work sites. Participation of students should be encouraged in imparting knowledge about this subject. To achieve this objective the students should be taken to different work sites for clear conception of particular topic such as site organization, inspection of works at various stages of construction and working of earth moving equipment

SUGGESTED DISTRIBUTION OF MARKS

Topic No.) Marks	Time (Hrs)	Allotted	Marks Allotted (%)
1	06		09
2	12		14
3	06		09
4	06		08
5	08		12
6	04		06
7	08		09
8	10		11
9	20		22
Total	80		100



Detailed Contents

Unit No.1 Introduction

Topic No.1: Introduction To Indian Railways

Unit No.2 Railway Surveys

Topic No.2: Factors Influencing The Railways Route, Brief Description Of Various Types Of Railway Survey

Unit No.3 Classification Of Permanent Way Describing Its Component Parts

Topic No.3: Classification Of Permanent Way Describing Its Component Parts

Unit No.4 Rail Gauge

Topic No.4: Definition Of Rail Gauge, Types Of Rail Gauge & Practice In India.

Unit No.5 Rails

Topic No.5: Types Of Rails

Unit No.6 Rail Fastenings

Topic No.6: Rail Joints, Types Of Rail Joints, Fastenings For Rails, Fish Plates, Bearing Plates

Unit No.7 Sleepers

Topic No.7: Functions Of Sleepers, Types Of Sleepers, Requirements Of An Ideal Material For Sleepers

Unit No.8 Ballast

Topic No.8: Function of Ballast, Requirements Of An Ideal Material For Ballast

Unit No.9 Crossings and Signaling

Topic No.9: Brief Description Regarding Different Types Of Crossings/Signaling

Unit No.10 Maintenance Of Track

Topic No.10: Necessity, Maintenance Of Track, Inspection Of Soil, Track And Fixtures; Maintenance And Boxing Of Ballast Maintenance Gauges, Tools

Unit No.11 Earth Work An Drainage

Topic No.11: Features of Rail Road, Bed Level, Width Of Formation, Side Slopes, Drains, Methods Of Construction, Requirement Of Drainage System

Unit No.12 Part-2 Bridges

Topic No.12: Introductions of Bridge Its Function And Component Parts, Difference Between A Bridge And A Culvert

Unit No.13 Classification Of Bridges

Topic No.13: According To Life-Permanent And Temporary According To Deck Level – Deck, Through And Semi-Through According To Material – Timber, Masonry, Steel, Rcc, Pre-Stressed According To Structural Form.

Topic No.14: Grade Separators-Railway Over Bridges (Rob), Railwayunder Bridge (Rub) Beam Type –Rcc, T-Beam, Steel Girder Bridges, Plate Girder And Box Girder, Balanced Cantilever, Trussed Bridges.

Topic No.15: Arch Type – Open Spandrel And Filled Spandrel Barrel And Rib Type Suspension Type Unstiffened And Stiffened And Tables

Topic No.16: According To The Position Of Highest Flood Level Submersible And Non Submersible Irc Classification

Unit No.14 Bridge Foundations

Topic No.17: Introduction To Open Foundation, Pile Foundation, Well Foundation

Unit No.15 Piers, Abutments And Wing Walls

Topic No.18: Piers-Definition, Parts; Types –Solid (Masonry And Rcc), Open

Topic No.19: Abutments And Wing Walls – Definition, Types Of Abutments Abutment With Wing Walls, Launching Of Equipment Bridges

Unit No.16 Bridge Bearings

Topic No.20: Purpose Of Bearings; Types Of Bearings – Fixed Plate, Rocker And Roller

Unit No.17 Maintenance Of Bridges

Topic No.21: Inspection Of Steel And Equipment Bridges, Routine Maintenance

Unit No.18 Tunnels

Topic No.22: Definition And Necessity Of Tunnels

Unit No.19 Typical Section Of Tunnels

Topic No.23: Typical Section Of Tunnels For A National Highway And Single And Double Broad Gauge Railway Track

Unit No.20 Ventilation

Topic No.24: Necessity And Methods Of Ventilation, By Blowing, Exhaust And Combination Of Blowing And Exhaust

Unit No.21 Drainage Method Of Draining Water In Tunnels

Unit No.22 Lighting Of Tunnels

Topic No.25: Drainage Method Of Draining Water In Tunnel & Lighting Of Tunnels



STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
5	-	-	50	-	100	3	-	-	150

RECOMMENDED BOOKS

1. Vaswani, NK, "Railway Engineering", Publishing House, Roorkee
2. Rangwala, SC, "Railway Engineering", Anand, Charotar Book Stall
3. Deshpande, R, "A Text Book of Railway Engineering", Poonam United Book Corporation
4. Algia, JS "Bridge Engineering", Anand, Charotar Book Stall
5. Victor Johnson, "Essentials of Bridge Engineering" Oxford and IBH, Delhi
6. Rangwala S.C., "Bridge Engineering", Anand, Charotar Book Stall
7. IRC Bridge Codes
8. MORTH drawings for various types of bridges
9. MORTH pocket books for bridge Engineers, 2000 (First Revision)
10. Subhash C Saxena, "Tunnel Engineering", Dhanpat Rai and Sons, Delhi

INSTRUCTIONAL STRATEGY

This subject is of practical nature. While imparting instructions, teachers are expected to organize demonstrations and field visits to show various components and construction of railway track, bridges and tunnel

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Allotted (Hrs) Marks
1	35	43
2	35	43
3	10	14
Total	80	100