



SCHEME FOR Fifth SEMESTER (CIVIL ENGINEERING)

Sr. No.	Subject	Study Scheme			EVALUATION SCHEME						Total Marks
					INTERNAL ASSESSMENT		EXTERNAL ASSESSMENT (EXAMINATION)				
					Theory	Practical	Written Paper		Practical		
					Max. Marks	Max. Marks	Max. Marks	Hrs.	Max. Marks	Hrs.	
Hrs/Week		L	T	P							
5.1	Steel Structure Design-1				5	-	-	50	-	100	3
5.2	Highway Engineering	5	-	2	25	25	100	3	50	3	200
5.3	Survey Camp	-	-	-	-	50	-	-	50	3	100
5.4	Computer Applications in Civil Engineering	-	-	6	-	50	-	-	100	3	150
5.5	Soil and Foundation Engineering	4	-	2	25	25	100	3	50	3	200
5.6	Environmental Education	3	-	-	25	-	100	3	-	-	125
5.7	Structural Drawing	-	-	6	-	50	-	-	100	3	150
5.8	Employability Skills - I	-	-	2	-	25	-	-	50	3	75
# Student Centred Activities		-	-	5	-	25	-	-	-	-	25
Total		17	-	23	125	250	400	-	400	-	1175

* 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



SYLLABUS: Polytechnic (CE)

Department: Civil Engineering – 5th Semester

Subject: Highway Engineering (Theory)

Subject Code: 120752

Detailed Contents

Unit No.1 Introduction

Topic No.1: IMPORTANCE OF HIGHWAY ENGINEERING FUNCTIONS OF IMPORTANT: IRC, CRRI, MOST, NHAI.
Topic No.2: IRC CLASSIFICATION OF ROADS,

Unit No.2 Road Geometries

Topic No.3: Glossary Of Terms Used In Road Geo-Metrics And Their Importance: Formation Width, Road Margin, Road Shoulder, Carriage Way, Side Slopes, Krebs, Formation Levels, Camber Gradient
Topic No.4: 1 Average Running Speed, 2 Stopping And Passing Sight Distance
Topic No.5: 1 Necessity of Curves 2.Horizontal And Vertical Curves Including Transit Curve 3.Super Elevation And Methods of Providing Super Elevation
Topic No.6: Sketch Of Typical Cross-Sections In Cutting And Filling On Straight Alignment And At A Curve

Unit No.3 .Highway Surveys and Plan

Topic No.7: Topographic Map, Reading the Data Given On A Topographic Map.
Topic No.8: Basic Considerations Governing Alignment for A Road In Plain And Hilly Area. Highway Location; Marking of Alignment.

Unit No.4 Road Materials

Topic No.9: Different Types Of Road Materials In Use; Soil, Aggregate, Binders – Bitumen, Cutback, Emulsion And Modified Bitumen (Crumb, Pmb).
Topic No.10: Binders: Common Binders; Bitumen, Properties As Per Bis Specifications, Penetration,, Softening Point Ductility Viscosity Test Of Bitumen, Procedures And Significance, Cut Back And Emulsion And Their Uses, Bitumen Modifiers.

Unit No.5 Road Pavement

Topic No.11: Road Pavement: Flexible And Rigid Pavement, Their Merits And Demerits. Typical Cross-Sections, Functions of Various Components.
Topic No.12: Introduction To California Bearing Ratio, Method Of Finding CBR Value And Its Significance.
Topic No.13: Aggregate: Source And Types, Important Properties, Strength, Durability
Topic No.14: Sub-Grade Preparation:
1. Setting Out Alignment Of Road
2. Setting Out Benchmarks
3. Control Pegs For Embankment And Cutting.
4. Borrow Pits .
5. Making Profiles Of Embankment.
6. Construction Of Embankment
7. Compaction
8. Preparation Of Sub grade.
9. Methods Of Checking Camber .
10. Gradient and Alignment As Per Recommendations Of Irc .
11. Equipment Used for Sub grade Preparation.
12. Stabilization of Sub grade.
13. Types Of Stabilization Mechanical Stabilization Lime Stabilization, Cement Stabilization, Fly Ash Stabilization Etc
Topic No.15: Introduction To Sub Base Course And Base Course: Granular Base Course:
1. Water Bound Macadam (WBM)
2. Wet Mix Macadam (WMM) Bitumen Courses:
1. Bituminous Macadam
2. Dense Bituminous Macadam (DBM) ,Methods Of Construction As Per MORT&H
Topic No.16: Surfacing: Types of surfacing
1. Prime coat and tack coat
2. Surface dressing with seal coat
3. Open graded premix carpet
4. Mix seal surfacing
5. Semi dense bituminous concrete
6. Bituminous Concrete/Asphaltic concrete
7. Mastic Asphalt Methods of constructions as per MOST &H specifications and quality control.
Topic No.17: Construction of concrete roads as per IRC specifications: .1 Form Work Laying 2 Mixing And Placing The Concrete.3 Compacting And Finishing 4 Curing, Joints In Concrete Pavement.5



Equipment Used

Unit No.6 Hill Roads

Topic No.18: Introduction: Typical Cross Sections Showing All Details of A Typical Hill Road Partly In Cutting And Partly In Filling

Topic No.19: Special problems of hill areas Landslides: Causes, prevention and control measures Use Of Geogrids, Geoflexiles, Geo- Synthetics Drainage Soil erosion Snow: Snow clearance, snow Avalanches, frost Land Subsidence.

Unit No.7 Road Drainage

Topic No. 20: Necessity Of Road Drainage Work Cross Drainage Works Surface And Subsurface Drains And Storm Water Drains.

Topic No.21: Location, Spacing And Typical Details Of Side Drains Side Ditches For Surface Drainage. Intercepting Drains, Pipe Drains In Hill Roads Details Of Drains In Cutting Embankment, Typical Cross Sections

Unit No.8 Road Maintenance

Topic No.22: Common Types Of Road Failures Of Flexible Pavements:1 Pot Hole 2 Rutting 3 Alligator Cracking 4 Upheaval - Their Causes And Remedies

Topic No.23: Maintenance Of Bituminous Road Such As Seal-Coat 40.2 Patch-Work And Recarpetng Maintenance Of Concrete Roads-Filling Cracks

Topic No.24: Repairing Joints Maintenance Of Shoulders (Breams)Maintenance Of Traffic Control Devices

Unit No.9 Road Construction Equipment

Topic No.25: Hot Mix Plant Tipper Tractors (Wheel and Crawler) Scraper Bulldozer Dumpers Shovels Grader Roller Dragline Asphalt Mixer and Tar Boilers, Road Pavers

Unit No .10 Airport Engineering

Topic No.26: Necessity of Study Of Airport Engineering Aviation Transport Scenario In India.

Topic No.27: Factors To Be Considered While Selecting A Site For An Airport With Respect To Zoning Laws.

Topic No.28: Introduction to Runways Taxiways And Apron

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		-	25	-	100	3	-	-	125

INSTRUCTIONAL STRATEGY

While imparting instructions, it is recommended that emphasis should be laid on constructional details and quality control aspects. Students should be asked to prepare sketches and drawings, clearly indicating specifications and constructional details for various sub components of a highway. It will be also advantageous to organize field visits to show the actual construction of roads at site.

RECOMMENDED BOOKS

1. Khanna, SK and Justo, CEG, "Highway Engineering", Nem Chand and Bros.,Roorkee
2. Vaswani, NK, "Highway Engineering" , Roorkee Publishing House, Roorkee,
3. Priyani, VB, "Highway and Airport Engineering" Anand, Charotar Book Stall
4. Sehgal, SB; and Bhanot, KL; "A Text Book on Highway Engineering and
5. Airport" S Chand and Co, Delhi
6. Bindra, SP; "A Course on Highway Engineering" , Dhanpat Rai and Sons, NewDelhi
7. Sharma, RC; and Sharma, SK; "Principles and Practice of Highway Engineering",
8. Asia Publishing House, New Delhi

TEXT BOOKS

1. MORTH Specifications for Road and Bridge Works (Fifth Revision)
2. MORTH Pocket book for Highway Engineers, 2001



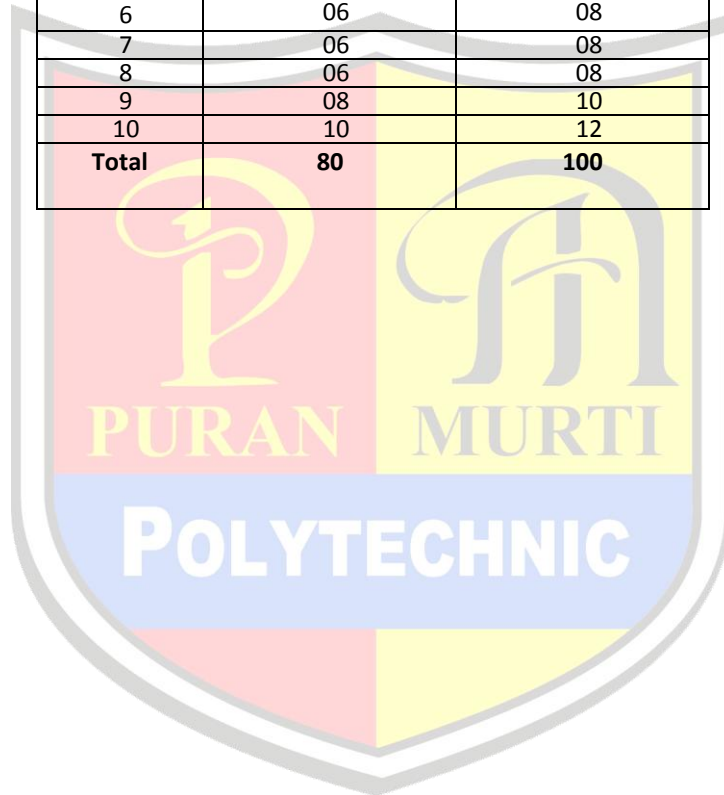
PM

POLYTECHNIC

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SUGGESTED DISTRIBUTION OF MARK

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	02	04
2	10	12
3	10	12
4	10	12
5	12	14
6	06	08
7	06	08
8	06	08
9	08	10
10	10	12
Total	80	100





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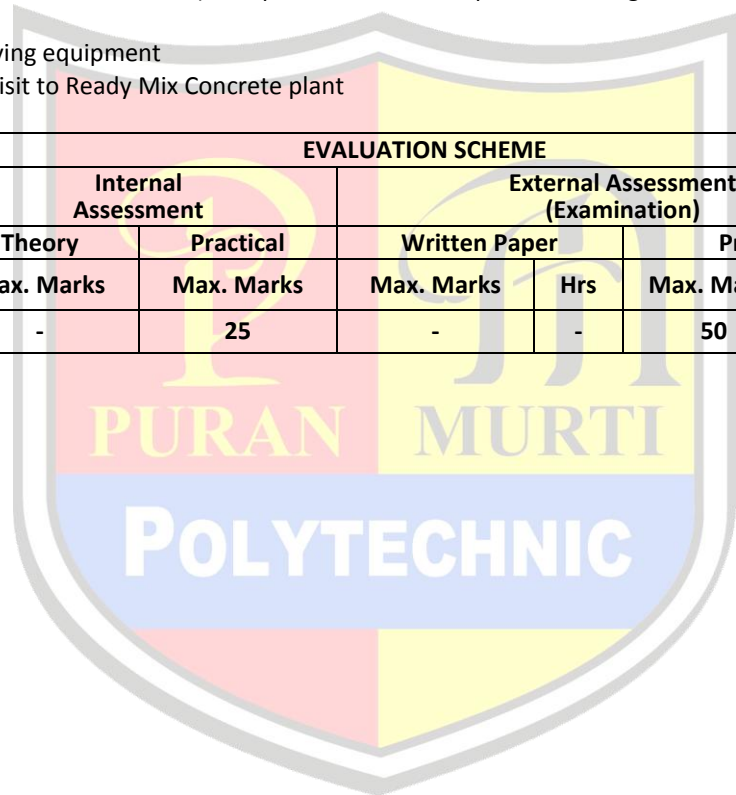
Subject: Highway Engineering (Practical)

Subject Code: 120752(P)

List of practical experiments

1. Determination of penetration value of bitumen
2. Determination of softening point of bitumen
3. Determination of ductility of bitumen
4. Determination of impact value of the road aggregate
5. Determination of abrasion value (Los Angeles') of road aggregate
6. Determination of the California bearing ratio (CBR) for the sub-grade soil
7. Visit to Hot mix plant
8. Visit to highway construction site for demonstration of operation of:
Tipper, tractors (wheel and crawler), scraper, bulldozer, dumpers, shovels, grader, roller, dragline, road pavers, JCB etc.
9. Mixing and spraying equipment
10. A compulsory visit to Ready Mix Concrete plant

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	
-	-	2	-	25	-	-	50	3	75





Detailed Contents

Unit No.1 Introduction

- Topic No.1: Importance Of Soil Studies In Civil Engineering, Geological Origin Of Soils, Residual And Transported Soil
- Topic No.2: Types Of Soil, Black Cotton Soils, Names Of Organizations Dealing With Soil Engineering Work In India

Unit No.2 Physical Properties of Soils

- Topic No.3: Constituents Of Soil And Representation By A Phase Diagram
- Topic No.4: Definitions of Void Ratio, Porosity, Water Content, Degree of Saturation, Specific Gravity, Bulk Density Dry Unit Weight, Unit Weight Of Soil Grain.
- Topic No.5: Simple Numerical Problems With The Help Of Phase Diagrams

Unit no.3 Classification And Identification Of Soils

- Topic No.6: Particle Size, Shape And Their Effect On Engineering Properties Of Soil. Particle Size Classification Of Soils
- Topic No.8: Gradation and Its Influence On Engineering Properties Relative Density and Its Use In Describing Cohesionless Soils
- Topic No.9: Behaviour of Cohesive Soils With Change In Water Content Field Identification Tests For Soils Soil Classification System As Per BIS 1498;
- Topic no.10: Major Divisions And Sub Divisions, Groups, Plasticity Chart; Procedure For Classification Of Given Soil

Unit No. 4 Permeability

- Topic No.11: Concept Of Permeability And Its Importance
- Topic No.12: Darcy's Law, Coefficient Of Permeability, Seepage Velocity And Factors Affecting Permeability
- Topic No.13: Comparison Of Permeability Of Different Soils Measurement Of Permeability In The Laboratory

Unit No 5 Effective Stress

- Topic No.14: Stresses In Subsoil Definition And Meaning Of Total Stress, Effective Stress And Neutral Stress Principle of Effective Stress Importance Of Effective Stress In Engineering Problems

Unit No 6 Deformation of Soils

- Topic No.15: Meaning, Conditions/Situations Of Occurrence With Emphasis On Practical Significance Of: Consolidation And Settlement B) Creep C) Plastic Flow D) Heaving E) Lateral Movement) Freeze And Thaw Of Soil
- Topic No.16: Definition and Practical Significance Of Compression Index, Coefficient Of Consolidation, Degree Of Consolidation.
- Topic No.17: Meaning Of Total Settlement, Uniform Settlement And Differential Settlement; Rate Of Settlement And Their Effects
- Topic No.18: Settlement Due To Construction Operations And Lowering Of Water Table
- Topic No.19: Tolerable Settlement For Different Structures As Per BIS

Unit No 7 Shear Strength Characteristics Of Soils

- Topic No.20: Concept And Significance Of Shear Strength
- Topic No.21: Factors Contributing To Shear Strength Of Cohesive And Cohesion Less Soils, Coulomb's Law Examples Of Shear Failure In Soils

Unit No.8 Compaction

- Topic No.22: Definition And Necessity Of Compaction
- Topic No.23: Laboratory Compaction Test Definition And Importance Of Optimum Water Content, Maximum Dry Density; Moisture Dry Density Relationship for Typical Soils With Different Compactive Efforts
- Topic No.24: Compaction Control; Density Control, Measurement Of Field Density By Core Cutter Method And Sand Replacement Method, Moisture Control, Proctor's Needle And Its Use, Thickness Control, Jobs Of An Embankment Supervisor In Relation To Compaction

Unit No 9 Soil Exploration

- Topic No.25: Purpose And Necessity Of Soil Exploration Reconnaissance, Methods Of Soil Exploration, Trial Pits, Borings
- Topic No.26: Sampling; Undisturbed, Disturbed And Representative Selection Of Type Of Sample;
- Topic No.27: Presentation Of Soil Investigation Results

Unit No 10 Bearing Capacity Of Soil

- Topic No.28: Concept Of Bearing Capacity
- Topic No.29: Definition And Significance Of Ultimate Bearing Capacity, Net Safe Bearing Capacity And Allowable Bearing Pressure
- Topic No.30: Guidelines of Bis (Is 6403) For Estimation Of Bearing Capacity Of Soil
- Topic No 31: Factors Affecting Bearing Capacity
- Topic No.32: Concept of Vertical Stress Distribution In Soils Due To Foundation Loads, Pressure Bulb
- Topic No.33: Applications of Spt, Unconfined Compression Test And Direct Shear Test In Estimation Of Bearing



Capacity

Topic No.34: Plate Load Test (No Procedure Details) And Its Limitations

Topic No.35: Improvement Of Bearing Capacity By Sand Drain Method, Compaction, use of geo-synthetics.

Unit No.11 Foundation Engineering

Topic no.36: Types of Shallow Foundations: Isolated, Combined, Strip, Mat, And Their Suitability.

Topic no.37: Factors Affecting the Depth of Shallow Foundations, Deep Foundations, Type of Piles and Their Suitability;

Topic no38: Pile Classification On The Basis Of Material, Pile Group And Pile Cap.

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	
4	-	-	25	-	100	3	-	-	125

INSTRUCTIONAL STRATEGY

The teacher while imparting instructions are expected to lay greater emphasis on the practical aspects rather than theory and mathematical treatment. To bring clarity regarding concepts and principles involved, teachers should organize demonstrations in the laboratories and fields. It is necessary to create understanding that soils fail either under shear or settlement due to heavy loads. This can be shown by making use of photographs on working models of such failures. Efforts should be made in the practical classes that students perform practical exercises individually. Conduct of viva examination at the end of each practical work will develop clear understanding about the concepts and principles related to this subject.

RECOMMENDED BOOKS

1. Punmia, BC, "Soil Mechanics and Foundations"; Standard Publishers, Delhi
2. Bharat Singh and Shamsher Prakash; "Soil Mechanics and Foundations
3. Engineering", Nem Chand and Bros, Roorkee,
4. Sehgal, SB, "A Text Book of Soil Mechanics"; CBS Publishers and Distributors, Delhi,
5. Gulati, SK and Manoj Dutta, "Geotechnical Engineering ", Tata McGraw Hill, Delhi,
6. Ranjan Gopal and Rao ASR "Basic and Applied Soil Mechanics", New Age Publication (P) Ltd., New Delhi
7. Singh Harbhajan "Soil and Foundation Engineering", Abhishek Publishers,
8. S Mittal and JP Shukla, "Soil Testing for Engineers", Khanna Publishers Ltd., Delhi
9. BIS Codes IS 6403 (latest edition) and IS 1498 (latest edition)
10. Jagroop Singh, "Soil and Foundation Engineering", Eagle Parkashan, Jalandhar

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	03	05
2	04	06
3	04	06
4	04	06
5	04	06
6	04	06
7	09	14
8	04	06
9	08	16
10	10	12
11	10	17
Total	64	100



Subject: Soil And Foundation Engg (practical)

Subject Code: 120754(P)

List of Practical Experiments

1. To determine the moisture content of a given sample of soil
2. Auger Boring and Standard Penetration Test
 - a) Identifying the equipment and accessories
 - b) Conducting boring and SPT at a given location
 - c) Collecting soil samples and their identification
 - d) Preparation of boring log and SPT graphs
 - e) Interpretation of test results
3. Extraction of Disturbed and Undisturbed Samples
 - a) Extracting a block sample
 - b) Extracting a tube sample
 - c) Extracting a disturbed samples for mechanical analysis.
 - d) Field identification of samples
4. Field Density Measurement (Sand Replacement and Core Cutter Method)
 - a) Calibration of sand
 - b) Conducting field density test at a given location
 - c) Determination of water content
 - d) Computation and interpretation of results
5. Liquid Limit and Plastic Limit Determination:
 - a) Identifying various grooving tools
 - b) Preparation of sample
 - c) Conducting the test
 - d) Observing soil behaviour during tests
 - e) Computation, plotting and interpretation of results
6. Mechanical Analysis
 - a) Preparation of sample
 - b) Conducting sieve analysis
 - c) Computation of results
 - d) Plotting the grain size distribution curve
 - e) Interpretation of the curve
7. Laboratory Compaction Tests (Standard Proctor Test)
 - a) Preparation of sample
 - b) Conducting the test
 - c) Observing soil behaviour during test
 - d) Computation of results and plotting
 - e) Determination of optimum moisture content and maximum dry density
8. Demonstration of Unconfined Compression Test
 - a) Specimen preparation
 - b) Conducting the test
 - c) Plotting the graph
 - d) Interpretation of results and finding/bearing capacity
9. Demonstration of:
 - a) Direct Shear and Vane Shear Test on sandy soil samples
 - b) Permeability test apparatus

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	
-	-	2	-	25	-	-	50	3	75



Detailed Contents

Unit No.1 Structural Steel and Sections

Topic No.1: Properties of Structural Steel as Per Is Code

Topic No.2: Designation of Structural Steel Sections As Per Is Handbook and Is: 800 – 2007

Unit No.2 Riveted Connections

Topic No.3: Types of Rivets, Permissible Stresses In Rivets

Topic No.4: Types of Riveted Joints, Specifications for Riveted Joints As Per IS 800. Failure Of A Riveted Joint

Topic No.5: Assumptions In The Theory Of Riveted Joints. Strength and Efficiency Of A Riveted Joint.

Topic No.6: Design Of Riveted Joints for Axially Loaded Members

Unit No.3 Bolted and Welded connections

Topic No.7: Types Of Bolts and Bolted Joints, Specifications For Bolted Joints As Per IS: 800 – 2007

Topic No.8: Types Of Welds and Welded Joints, Advantages And Disadvantage of Welded Joints and Bolted Joints

Topic No.9: Design Of Fillet And Butt Weld. Plug and Slot Welds

Unit No. 4 Tension Members

Topic No.10: Analysis and Design Of Single And Double Angle Section Tension Members and Their Riveted And Welded Connections with Gusset Plate As Per IS: 800

Unit No.5 Compression Member

Topic No.11: Analysis and design of single and double angle sections Compression members (struts) and their welded Connections with gusset plate as per IS: 800

Unit No 6 Roof Trusses

Topic No.12: Form of Trusses, Pitch of Roof Truss

Topic No.13: Spacing Of Trusses, Spacing Of Purlins

Topic No.14: Connection between Purlins and Roof Covering. Connection between Purlins and Principal Rafter

Unit No 7 Columns

Topic No.15: Concept of Buckling Of Columns, Effective Length And Slenderness Ratio

Topic No.16: Permissible Stresses In Compression as Per IS: 800 For Different End Conditions.

Topic No.17: Analysis and Design of Axially Loaded Single Section Steel Column Types of Column Bases

Topic No.18: Beam and Column, Frame and Seated Connections

Unit No.8 Beams

Topic No.19: Analysis and design of single section simply supported laterally restrained steel beams.

Topic No.20: Introduction to Plate Girder and Functions of Various Elements of Plate Girders

Unit No.9 Fabrication and Erection

Topic No.21: Fabrication and Erection of Steel Structures Like Trusses, Columns and Girders

Unit No.10 Masonry structures

Topic No.22: Design of Brick Column and Wall Foundations

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

INSTRUCTIONAL STRATEGY

Teachers are expected to give simple problems for designing various steel structural members. For creating comprehension of the subject, teachers may prepare tutorial sheets, which may be given to the students for solving. It would be advantageous if students' are taken at construction site to show fabrication and erection of steel structures. IS: 800 may be referred along with code for relevant clauses

RECOMMENDED BOOKS

1. Duggal SK, "Design of Steel Structures" by Standard Publishers, Delhi
2. Birinder Singh, "Steel Structures Design and Drawing", Kaption Publishing House, Ludhiana
3. Ram Chandra, "Design of Steel Structures", Standard Publishers, Delhi
4. LS Negi, "Design of Steel Structure" Tata McGraw Hill, New Delhi
5. S Ramamurthan, "Design of Steel Structures",
6. Harbhajan Singh, "Design of Steel Structures", Abhishek Publishing, Chandigarh
7. IS Code : 800-2007

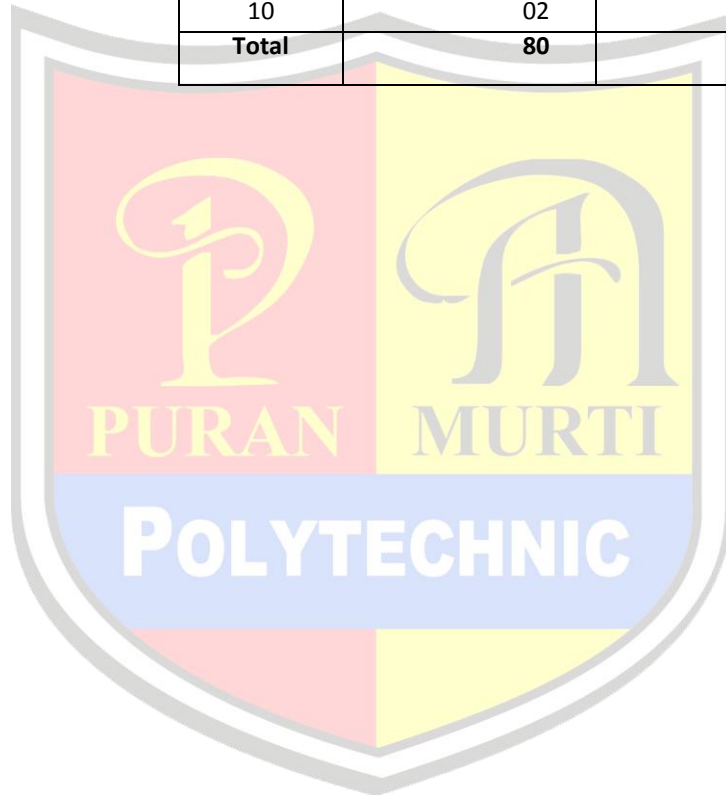


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SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	02	03
2	10	12
3	06	08
4	16	19
5	16	19
6	06	08
7	10	12
8	10	13
9	02	03
10	02	03
Total	80	100





Detailed Contents

Unit no.1

Topic no.1: Definition, Scope and Importance of Environmental Education.

Unit no.2

Topic no.2: Basics of ecology, biodiversity, eco system and sustainable development 3. Sources of Pollution - natural and manmade, causes, effects and control measures of pollution (air, water, noise, soil, radioactive and nuclear) and their units of measurement

Unit no.3

Topic no.3: Solid waste management – Causes, effects and control measures of urban and industrial Waste.

Unit no.4

Topic no.4: Mining and deforestation – Causes, effects and control measures

Topic no.5: Environmental Legislation - Water (prevention and control of pollution) Act 1974, Air (Prevention and Control of Pollution) Act 1981 and Environmental Protection Act 1986, Role and Function of State Pollution Control Board, Environmental. Impact Assessment (EIA)

Unit no.5

Topic no.6: Role of Non-conventional Energy Resources (Solar Energy, Wind Energy, Bio Energy, Hydro Energy)

Unit no.6

Topic no.7: Current Issues in Environmental Pollution – Global Warming, Green House Effect, and Depletion Of Ozone Layer, Recycling of Material, Environmental Ethics, Rain Water Harvesting, Maintenance of Groundwater, Acid Rain, Carbon Credits.

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	-	-	25	-	100	3	-	-	125

INSTRUCTIONAL STRATEGY

The contents will be covered through lecture cum discussion sessions. In addition, in order to have more appreciation of need for protection of environment, it is suggested that different activities pertaining to Environmental Education like video films, seminars, environmental awareness camps and expert lectures may also be organized.

RECOMMENDED BOOKS

1. Environmental Engineering and Management by Suresh K Dhameja; SK Kataria and Sons, New Delhi.
2. Environmental Science by Dr. Suresh K Dhameja; SK Kataria and Sons, New Delhi.
3. Environmental and Pollution Awareness by Sharma BR; Satya Prakashan, New Delhi.
4. Environmental Protection Law and Policy in India by Thakur Kailash; Deep and Deep Publications, New Delhi.
5. Environmental Science by Deswal and Deswal; Dhanpat Rai and Co. (P) Ltd. Delhi.
6. Engineering Chemistry by Jain and Jain; Dhanpat Rai and Co. (P) Ltd. Delhi.
7. Environmental Studies by Erach Bharucha; UGC University Press.

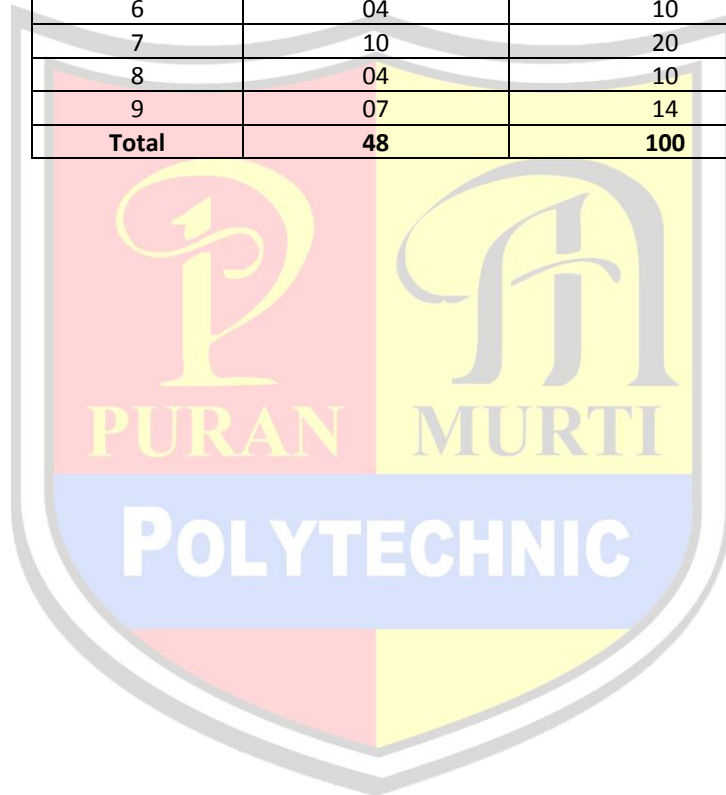


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SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted for Lectures (Periods)	Marks Allotted (%)
1	02	04
2	03	06
3	12	24
5	06	12
6	04	10
7	10	20
8	04	10
9	07	14
Total	48	100





Detailed Contents

Drawing Exercises

Unit no.1 RC Structures

Reinforcement details from the given data for the following structural elements with bar bending schedules

Topic No.1: RC Slabs - One way slab, Two way slab and Cantilever Slab.

Topic No.2: Beams - Singly and doubly reinforced rectangular beams and Cantilever beam (All beams with vertical stirrups)

Topic No.3: Columns and Footings – Square, Rectangular and Circular

Unit no.2 Columns with lateral ties and their isolated sloped column footings.

Topic No.4: Portal Frame – Three bay two storey RC portal frame with blow up of column beam junctions.

Topic No.5: Dog legged stairs for single storey building

Topic No.6: Draw at least one sheet using CAD software

Unit no 3 Steel Structures

Topic.No.7: Roof Truss – Drawing of Fink Roof Truss with details of joints, fixing details of purlins and roof sheets.

Topic.No.8: Column and Column Bases - Drawing of splicing of

Topic No.9: steel columns. Drawings of slab base, gusseted base and grillage base for single section steel columns.

Unit no 4. Drawing No.3 Column Beam Connections

Topic no.10: Sealed and Framed Beam to Beam Connections Sealed and Framed beam o Column Connections

Topic no.11: Plate Girder Plan and Elevation of Plate Girder with details at supports and connection of stiffness, Flange angles and cover plate with web highlighting curtailment of plates. Draw at least one sheet Using CAD software.

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	
-	-	6	-	50	-	-	100	3	150

RECOMMENDED BOOKS

1. Loyal JS "Civil Engineering Drawing", Satya Parkashan, New Delhi
2. Chandel RP " Civil Engineering Drawings"
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