

PEOPLE'S UNIVERSITY, BHOPAL

Programme: **B. Tech. (Civil Engineering)**

Semester -VII

Subject Title	Subject Code	Credit			Theory		
Design of Steel Structure-I	CET-701	L	T	P	External (70)	Internal (30)	Total (100)
		3	1	-			Min:40 (D Grade)

Duration of Theory (External): 3 Hours

Theory Internal - Max Marks: 30

Best of Two Mid Semester Test

Assignment / Quiz

–Max Marks: 20

– Max. Marks: 10

Unit	Contents (Theory)
I	Various loads and mechanism of the load transfer, partial load factors, and structural properties of steel, design of structural connections -bolted riveted and welded connections.
II	Design of compression members, tension members, roof trusses - angular & tubular, lattice girders.
II	Design of simple beams, built-up beams, plate girders and gantry girders.
IV	Effective length of columns, design of columns-simple and compound, lacings & battens. Design of footings for steel structures, grillage foundation.
V	Design of industrial building frames, multistory frames, bracings for high rise structures, design of transmission towers.

Note: - All the designs for strength and serviceability should strictly be as per the latest version of IS: 800-2007

References:

- 1 Design of Steel Structures By Arya & Azmani Nemchand & Bros, Roorkee
- 2 Design of Steel Structures By P.Dayaratnam
- 3 Design of Steel Structures Vol. I & II By Ramchandra
- 4 Design of Steel Structures By L.S. Negi
- 5 Design of Steel Structures By Ramammutham
- 6 Design of Steel Structures By Punmia

PEOPLE'S UNIVERSITY, BHOPAL

 Programme: **B. Tech. (Civil Engineering)**

Semester -VII

Subject Title	Subject Code	Credit			Theory		
Traffic Engineering	CET- 7101	L	T	P	External (70)	Internal (30)	Total (100)
		3	1	-			Min: 40 (D Grade)

Duration of Theory (External): 3 hours
Theory Internal: Max. Marks: 30

Best of two mid semester test

Assignment / Quiz/ Attendance

–Max. Marks: 20

– Max. Marks: 10

Unit	Contents (Theory)
I	Traffic Characteristics: (i) Road User's Characteristics - general human characteristics, physical, mental and emotional factors, factors affecting reaction time, piev theory. (ii) Vehicular Characteristics: characteristics affecting road design-width, height, length and other dimensions. Weight, power, speed and braking capacity of a vehicle.
II	Traffic Studies: (i) Spot speed studies and volume studies. (ii) Speed and delay studies purpose, Causes of delay, methods of conducting speed and delay studies. (iii) Origin and destination studies (O & D): various methods, collection and interpretation of data, planning and sampling. (iv) Traffic capacity studies: volume, density, basic practical and possible capacities, level of service. (v) Parking studies: methods of parking studies cordon counts, space inventories, parking practices.
III	Traffic Operations and Control: (i) Traffic regulations and various means of control. (ii) One way streets- advantages and limitations. (iii) Traffic signals- isolated signals, coordinated signals, simultaneous, alternate, flexible and progressive signal systems. Types of traffic signals, fixed time signals, traffic actuated signals, speed control signals, pedestrian signals, flashing signals, clearance interval and problems on single isolated traffic signal.
IV	Street Lighting: (i) Methods of light distribution. (ii) Design of street lighting system. (iii) Definitions- luminaire, foot candle, lumen, utilization and maintenance factors. (iv) Different types of light sources used for street lighting. (v) Fundamental factors of night vision.
V	Accident Studies & Mass Transportation: (i) Accident studies: causes of accidents, accident studies and records, condition and collision diagram, preventive measures. (ii) Expressways and freeways, problems on mass transportation and remedial measures, brief study of mass transportation available in the country.

References:

- 1 Traffic Engineering and Transport Planning By L.R. Kadiyali Khanna Publishers, Delhi
- 2 Traffic Engineering By Matson W.S.Smith & F.W. Hurd
- 3 G.J. Pingnataro Principles Of Traffic Engineering
- 4 D.R.Drew Traffic Flow Theory

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 Programme: **B. Tech. (Civil Engineering)**

Semester -VII

Subject Title	Subject Code	Credit			Theory		
Cost Effective and Eco Friendly Construction	CET-7102	L	T	P	External (70)	Internal (30)	Total (100)
		3	1	-			Min: 40 (D Grade)

Duration of Theory (External): 3 hours
Theory Internal - Max Marks: 30

Best of two mid semester test

Assignment / Quiz/ Regularity

–Max Marks: 20

– Max. Marks: 10

Unit	Contents (Theory)
I	Concepts of Energy Efficient & Environment Friendly Materials and Techniques. Cost Effective Materials: - Soil, Fly Ash, Ferrocement, Lime, Fibres, Stone Dust, Red Mud, Gypsum, Alternate Wood, Polymer. Energy Efficient & Environment Friendly Building Material Products: - Walls - Stabilized And Sun Dried, Soil Blocks & Bricks, Solid & Hollow Concrete Blocks, Stone Masonry Blocks, Fibrocement Partitions. Roofs: Precast R.C Plank & Joists Roof, Precast Channel Roof, Precast L-Panel Roof, Precast Funicular Shells, Ferro cement Shells, Filler Slab, Seasal Fibre Roof, Improved Country Tiles, thatch roof, M.C.R. Tile.
II	Cost effective construction techniques and equipments : (A) Techniques: - Rat Trap Bond Construction, Energy Efficient Roofings, Ferrocement Technique, Mud Technology. (B) Equipments :- Brick Moulding Machine, Stabilised Soil Block Making Machine And Plants for The Manufacturing of Concrete Blocks, M.C.R. Tile Making Machine, Ferrocement Wall Panel & Roofing, Channel Making Machine, R.C.C. Chaukhat Making M/C.
III	Cost Effective Sanitation :- (A) Waste Water Disposal System (B) Cost Effective Sanitation for Rural and Urban Areas (C) Ferro cement Drains
IV	Low Cost Road Construction :- Cost Effective Road Materials, Stabilization, Construction Techniques Tests, Equipment Used For Construction, Drainage, and Maintenance.
V	Cost Analysis And Comparison :- (A) All Experimental Materials (B) All Experimental Techniques

References:

- 1 Construction Equipment By Peurify
- 2 CPM By L.S. Srinath
- 3 Construction Management By S. Seetharaman
- 4 CPM & PERT By Weist & Levy
- 5 Construction, Management & Account

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 Programme: **B. Tech. (Civil Engineering)**

Semester -VII

Subject Title	Subject Code	Credit			Theory		
Design of Hydraulic Structures	CET-7103	L	T	P	External (70)	Internal (30)	Total (100)
		3	1	-			Min: 40 (D Grade)

Duration of Theory (External): 3 hours
Theory Internal - Max Marks: 30

Best of two mid semester test

–Max Marks: 20

Assignment / Quiz/ Attendance

– Max. Marks: 10

Unit	Contents (Theory*)
I	Gravity Dams: Design Criteria, Forces Acting on Gravity Dams, Elementary Profile, Low and High Gravity Dams, Stability Analysis, Evaluation of Profile by Method of Zoning, Practical Profile, Foundation Treatment, Construction Joints, Galleries in Gravity Dams.
II	Earth And Rock Fill Dams : Earth Dams: Types, Causes of Failure and Design Criteria, Soils Suitable for Earth Dam Construction, Construction Methods, Foundation Requirements, Typical Earth Dam Sections, Estimation of Seepage Through and Below The Dam, Seepage Control, Stability of Slopes By Slip Circle Method Of Analysis, Pore Pressures, Sudden Draw Down, Steady Seepage and Construction Pore Pressure Condition. Rock Fill Dams: Types, Merits And Demerits, Conditions Favourable for their Adoption.
III	Spillways : Ogee Spillway and its Design, Details of Syphon, Shaft, Chute and Side Channel Spillways, Emergency Spillways
IV	Energy Dissipations and Gates: Principles of Energy Dissipation Energy Dissipators Based on Tail Water Rating Curve and Jump Height Curves Spillway Crest Gates - Vertical Lift and Radial Gates, Their Design Principles and Details. Design of Canal Regulating Structures, Detailed Design of Sarda Falls, Design of Cross Drainage Works, Sphyon Aquaduct.
V	Hydropower Plants: Introduction of Hydropower Development, Assessment of Power Potential, Types of Hydropower Plants, General Features of Hydro-Electric Schemes, Selection of Turbines, Draft Tubes, Surge Tanks, Penstocks, Power House Dimensions, Development of Microhydel Stations, Tidal Plants, Pumped Storage Plants and their Details.

References:

- 1 Engineering for Dams (Volumes I, II & III) by Creager, Justin & Hinds
- 2 Hydroelectric Hand Book By Creager
- 3 Hydraulic Structures by Varshney
- 4 Irrigation & Water Power Engg. By Punmia & Pandey

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Subject Title	Subject Code	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (35)	Internal (15)	Total (50)
Theory of Structure - II	CET-703	3	1	2			Min: 40 (D Grade)			Min:20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal - Max Marks: 30

Best of Two Mid Semester Test

–Max Marks: 20

Assignment / Quiz

– Max. Marks: 10

Practical Internal - Max Marks: 15

Lab performance/Lab Record/Viva

– Max. Marks: 10

Assignment / Quiz/ Attendance

– Max. Marks: 05

Unit	Contents (theory)
I	Moment distribution method in analysis of frames with sway, analysis of box frames, analysis of Portals with inclined members, analysis of beams and frames by kani's method.
II	Plastic analysis of beams and frames.
II	Analysis of tall frames, wind and earthquake loads, codal provisions for lateral loads. Approximate analysis of multistorey frames for vertical and lateral loads.
IV	Matrix method of structural analysis: force method and displacement method..
V	Influence lines for intermediate structures, muller breslau principle, and analysis of beam-columns.

References:

1. Wang C.K. Intermediate Structural Analysis, Mcgraw Hill, New York.
2. Reddy C.S., Basic Stgructural Analysis, Tata Mcgraw Hill Publishing Company, New Delhi.
3. Norris C.H., Wilbur J.B. And Utkys. Elementary Structural Analysis, Mcgraw Hill International,Tokyo.
4. Weaver W & Gere Jm, Matrix Methods of Framed Structures, CBS Publishers & Distributors, Delhi

List of Experiments

- 1 Analysis of frame with sway by moment distribution method.
- 2 Analysis of portals with inclined members.
- 3 Plastic analysis of beams and frames.
- 4 Analysis of multistorey frame for vertical and lateral loads.
- 5 Analysis of beam and columns.

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Subject Title	Subject Code	Credit			Theory			Practical		
Environmental Engineering - II	CET-704	L	T	P	External (70)	Internal (30)	Total (100)	External (35)	Internal (15)	Total (50)
		3	1	2			Min: 40 (D Grade)			Min:20 (D Grade)

Duration of Theory (Externals): 3 Hours
Theory Internal - Max Marks: 30

Best of Two Mid Semester Test

–Max Marks: 20

Assignment / Quiz

– Max. Marks: 10

Practical Internal - Max Marks: 15

Lab performance/Lab Record/Viva

–Max. Marks: 10

Assignment / Quiz/ Attendance

– Max. Marks: 05

Unit	Contents (Theory)
I	Sewerage schemes and their importance, collection & conveyance of sewage, storm water quantity, fluctuation in sewage flow, flow through sewer, design of sewer, construction & maintenance of sewer, sewer appurtenances, pumps & pumping stations.
II	Characteristics and analysis of waste water, cycles of decomposition, physical, chemical & biological parameters. Oxygen demand i.e. Bod & cod, toc, tod, od, relative stability, population equivalent, instrumentation involved in analysis, natural methods of waste water disposal i.e. By land treatment & by dilution, self purification capacity of stream, oxygen sag analysis.
III	Unit operations for waste water treatment, preliminary treatment such as screens, grit chamber, floatation tank, sedimentation and chemical clarification, role of micro-organism in biological treatment, sewage filtration- theory & design.
IV	Methods of biological treatment (theory & design) - activated sludge process, oxidation ditch, stabilization ponds, aerated lagoon, anaerobic lagoons, septic tank & imhoff tank, sources & treatment of sludge, sludge thickening and digestion sludge drying beds, sludge disposal.
V	Advanced waste water treatment - diatomaceous earth filters, ultrafiltration, adsorption by activated carbon, phosphorus removal, nitrogen removal, physico chemical waste water treatment, solid waste disposal - classification, composition, collection, & disposal methods. Rural sanitation - collection & disposal of refuse, sullage & night soil.

References:

- 1 Water Supply & Sanitary Engg. - G.S. Birdie - Dhanpat Rai Publishing Company, (P) Ltd. New Delhi
- 2 Waste Water Engg. By B.C. Punmia - Laxmi Publication (P) Ltd. New Delhi
- 3 Environmental Engg. - M.L. Davis & D.A. Cornwell - Mc Graw Hill Company
- 4 Chemistry for Environmental Engg. - Sawyer & Mc Carty - Mc Graw Hill Book Company New Delhi
- 5 Water & Waste Water Technology - Mark J Hammer - Prentice - Hall Of India, New Delhi
- 6 Waste Water Engineering - Metcalf & Eddy - Mc Graw Hill Book Company New Delhi

List of Experiments:

- 1 To study the various standards for waste water
- 2 To study the sampling techniques for waste water
- 3 To determine the alkalinity in water sample
- 4 To determine the acidity in water sample
- 5 Determination of dissolved oxygen in the water and waste water sample
- 6 Determination of biological oxygen demand of a waste water sample
- 7 Determination of chemical oxygen demand of a waste water sample
- 8 Determination of various types of solids in the waste water sample
- 9 Determination of bacterial number by membrane filter technique
- 10 Determination of bacterial colonies by standard plat count method

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Subject Title	Subject Code	Credits			Practical		
Steel Structure Lab - I	CET-705	L	T	P	External (Nil)	Internal (50)	Total (50)
		-	-	2			Min: 20 (D Grade)

Practical Internal - Max Marks: 50

Lab Performance, Lab Record & Viva
Assignment / Quiz

–Max Marks: 50

Contents (Practical)
Designing: Design of industrial building frames, multistory frames, bracings for high rise structures, design of transmission towers. Design of compression members, tension members, and roof trusses. Design of simple beams, built-up beams, plate girders and gantry girders. Design of columns-simple and compound, lacings & battens. Design of footings for steel structures, grillage foundation.

List of Experiments (Expandable/Suggested):

List of experiments covered by contained from the syllabus.

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Subject Title	Subject Code	Credit			Practical		
Major Project – I	CET-706	L	T	P	External (105)	Internal (45)	Total (150)
		-	-	6			Min: 60 (D Grade)

Practical Internal - Max Marks: 45

Lab Performance, Lab Record & Viva
Assignment / Quiz

–Max Marks: 40

– Max. Marks: 05

Contents (Practical)

The Major Project Work provides students an opportunity to do something on their own and under the supervision of a guide. Each student shall work on an approved project, which should be selected from some real life problem as far as possible, which may involve fabrication, design or investigation of a technical problem. The project work involves sufficient work so that students get acquainted with different aspects of manufacturing, design or analysis. The student also have to keep in mind that in final semester they would be required to implement whatever has been planned in the major project in this semester. It is possible that a work, which involves greater efforts and time, may be taken up at this stage and finally completed in final semester, but partial completion report should be submitted in this semester and also evaluated internally. At the end of semester, all students are required to submit a synopsis.

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Subject Title	Subject Code	Credits			Practical		
Industrial Training II	CET- 707	L	T	P	External (70)	Internal (30)	Total (100)
		-	-	4			Min: 40 (D Grade)

Practical Internal - Max Marks: 30

Lab work & Sessional

Assignment / Quiz

– Max Marks: 25

– Max. Marks: 05

Contents (Practical)
<p style="text-align: center;">OBJECTIVE OF INDUSTRIAL TRAINING</p> <p>The objective of undertaking industrial training is to provide work experience so that student's engineering knowledge is enhanced and employment prospects are improved. The student should take this course as a window to the real World of Work and should try to learn as much as possible from real life experiences by involving and interacting with industry staff. Industrial training also provides an opportunity to students to select an engineering problem and possibly an industry guide for their Major Project in final Year.</p> <p>Industrial training of the students is essential to bridge the wide gap between the classroom and industrial environment. This will enrich their practical learning and they will be better equipped to integrate the practical experiences with the classroom learning process.</p>