# PEOPLE'S UNIVERSITY, BHOPAL

Programme: **B. Tech. (Civil Engineering)** **Semester -VIII**

| Subject Title | Subject Code | Credit | | | Theory | | |
|---|---|---|---|---|---|---|---|
| | | L | T | P | External (70) | Internal (30) | Total (100) |
| **Design of Steel Structures - II** | **CET - 801** | 3 | 1 | - | | | Min: 40 (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

| Unit | Contents (Theory) |
|---|---|
| **I** | Plate Girder Bridges (Riveted and Welded). |
| **II** | Trussed Girder Bridges for Railways and Highways (IRC & IRS Holding). Bearings for Bridges. |
| **III** | Water Tanks: Pressed Steel Tanks, Tanks With Ordinary Plates, Square, Rectangular, Circular With Hemispherical Bottom and Conical Bottom. |
| **IV** | Chimneys: Guyed and Self Supporting Steel Stacks. |
| **V** | Bunkers, Silos & Towers. |

**References:**


**1** Design of steel structures – ramammutham.
**2** Design of steel structures – punia.
**3** Steel str. By ramchandra vol ii.
**4** Steel str. By arya & ajmani.
**5** Design of steel structures – l.s. Negi.

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Programme: **B. Tech. (Civil Engineering)** **Semester -VIII**

| Subject Title | Subject Code | Credit | | | Theory | | |
|---|---|---|---|---|---|---|---|
| | | L | T | P | External (70) | Internal (30) | Total (100) |
| Pavement Design | CET- 8101 | 3 | 1 | - | | | Min:40 (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

| Unit | Contents (Theory) |
|---|---|
| I | **Equivalent Single Wheel Load (ESWL):** Definition, Calculation of ESWL, Repetition of Loads and their Effects on the Pavement Structures. |
| II | **Flexible Pavements:** Component Parts of the Pavement Structures and Their Functions, Stresses in Flexible **Pavements**, Stress Distribution Through Various Layers, Boussinesque's Theory , Burmister's Two Layered Theory, Methods of Design, Group Index Method, CBR Method, Burmister's Method and North Dakota Cone Method. |
| III | **Rigid Pavements:** Evaluation of Subgrade, Modulus-K by Plate Bearing Test and The Test Details, Westergaard's Stress Theory Stresses in Rigid Pavements, Temperature Stresses, Warping Stresses, Frictional Stresses, Critical Combination of Stresses, Critical Loading Positions. |
| IV | **Rigid Pavement Design:** IRC Method, Fatigue Analysis, PCA Chart Method, Joints, Design and Construction & Types, Aashto Method, Reliability Analysis. |
| V | **Evaluation And Strengthening of Existing Pavements:** Benkleman Beam Method, Serviceability Index Method. Rigid and Flexible Overlays and their Design. |

**References:**


1 Principles of Pavement Design By E.J.Yoder & M.W. Witczak.
2 Aasho, "Aasho Interim Guide for Design Of Pavement Structures", Washington, D.C.
3 Portland Cement Association, Guidlines for Design of Rigid Pavements, Washington.
4 Dsir, Conc. Roads Design & Construction.
5 Srinivasan M. "Modern Permanent Way".

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| Subject Title | Subject Code | Credit | | | Theory | | |
|---|---|---|---|---|---|---|---|
| | | L | T | P | External (70) | Internal (30) | Total (100) |
| Structural Dynamic & Earthquake Engineering | CET- 8102 | 3 | 1 | - | | | Min:40 (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

| Unit | Contents (Theory) |
|---|---|
| I | **Fatigue:** (Normal Conditions) Concepts of Fatigue Failure, Statistical Methods. Endurance Limit, S.N.Diagram, Stress Cycling, Strain Cycling, Goodman and Gerber Relations, and their Application to Design Problems. Review of Stress Concentration.(Controlling Factors)- Effect of Frequency of the Cyclic Stress, Effect of Temperature, Size, Form, Surface Condition, Surface Protection, Residual Stresses Environment(Corrosion Fatigue), Fretting of Surfaces in Contact and Effect of Under Stresses and Overstress. |
| II | **Fatigue Testing Machines:** Specimen and test Procedures.<br>**Appearance of Fatigue Fractures:** Surface Fatigue, Contact Stresses. Brief Introduction to Random Load Fatigue. |
| III | **Creep:** Mechanisms of Creep, Transient Creep, Viscous Creep. Creep Fractures, Analysis of Creep Curves, Stress Relaxation, Creep Tests. |
| IV | **Fracture:** Historical Background, Modes of Crack Displacement, Opening Mode, Sliding Mode, Tearing Node; Stress Intensity Factor of A Crack, Stress Intensity Factor in Finite Bodies; Fracture Criterion-Griffith's Fracture Stress, Fatigue Toughness (Critical Stress Intensity Factor). Fracture Crack Propagation, Plastic Deformation Around Crack Tip, Crack Opening is Placement. Application to Design of Steam Turbine Rotor Discs. Thin Walled Pressure Vessels and Thin and Parallel Pressure Piping's. |
| V | Earthquake Resistant Design of Structures, Design of Structures for Strength & Servicability, Ductility and Energy Absorption, Provisions of IS: 1893 And IS: 4326 For Aseismic Design of Structures, Code for Ductile Detailing IS : 13920. |

*** Note: Structural Design Data Books Permitted in the Examination Hall.**

**References:**


1 Chopra A.K., Dynamics Of Structures - Theory And Applications To Earthquake Enginering,Prentice Hall Of India, New Delhi.

2 Berg G.V. Elements Of Structural Dynamics, Prentice Hall Of India, Englewood Cliffs, Nj.

3 Paz Mario, Structural Dynamics, Cbs Publishers, Delhi.

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Programme: **B. Tech. (Civil Engineering)** **Semester -VIII**

| Subject Title | Subject Code | Credit | | | Theory | | |
|---|---|---|---|---|---|---|---|
| | | L | T | P | External (70) | Internal (30) | Total (100) |
| Construction Planning and Management | CET- 8103 | 3 | 1 | - | | | Min:40 (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

| Unit | Contents (Theory) |
|---|---|
| I | **Preliminary and Detailed Investigation Methods:** Methods of Construction, Form Work And Centering.Schedule of Construction, Job Layout, Principles of Construction Management, Modern Management Techniques Like Cpm/Pert With Network Analysis. |
| II | **Construction Equipments:** Factors Affecting Selection, Investment and Operating Cost, Output of Various Equipments, Brief Study of Equipments Required for Various Jobs Such as Earth Work, Dredging, Conveyance, Concreting, Hoisting, Pile Driving, Compaction and Grouting. |
| II | **Contracts:** Different Types of Controls, Notice Inviting Tenders, Contract Document, Departmental Method of Construction, Rate List, Security Deposit and Earnest Money, Conditions of Contract, Arbitration, Administrative Approval, Technical Sanction. |
| IV | **Specifications & Public Works Accounts:** Importance, Types of Specifications, Specifications For Various Trades of Engineering Works.Various Forms Used in Construction Works, Measurement Book, Cash Book, Materials at Site Account, Imprest Account, Tools and Plants, Various Types of Running Bills, Secured Advance, Final Bill. |
| V | **Site Organization & Systems Approach to Planning:** Accommodation of Site Staff, Contractor's Staff, Various Organization Charts and Manuals, Personnel in Construction, Welfare Facilities, Labour Laws and Human Relations, Safety Engineering.Problem of Equipment Management, Assignment Model, Transportation Model and Waiting line Modals with their Applications, Shovel Truck Performance with waiting line Method. |

**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 -VIII**

| Subject Title | Subject Code | Credits | | | Theory | | | Practical | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | External | Internal | Total (100) | External | Internal | Total (50) |
| Geotechnical Engineering-II | CET- 803 | 3 | 1 | 2 | (70) | (30) | Min: 40 (D Grade) | (35) | (15) | Min: 20 (D Grade) |

**Duration of Theory (Externals): 3 Hours**

**Theory Internal - Max Marks: 30**

Best of Two Mid Semester Test –Max Marks: 20

Quiz/Assignment / Attendance – Max. Marks: 10

**Practical Internal - Max Marks: 15**

Lab Performance, Lab Record & Viva –Max Marks: 10

Assignment / Quiz – Max. Marks: 05

| Unit | Contents (Theory) |
|---|---|
| I | **Shallow Foundations:** Type of Foundations Shallow And Deep. Bearing Capacity of Foundation on Cohesion Less and Cohesive Soils. General and Local Shear Failures. Factors Effecting B.C. Theories of Bearing Capacity - Prandle, Terzaghi, Balla, Skempton, Meyerh of And Hansan. I.S. Code on B.C. Determination of Bearing Capacity. Limits of Total and Differential Settlements. Plate Load Test. |
| II | **Deep Foundation:** Pile Foundation, Types of Piles, Estimation of Individual and Group Capacity of Piles in Cohesion Less and Cohesive Soils. Static and Dynamic Formulae.. Pile Load Test, Settlement of Pile Group, Negative Skin Friction, Under- Reamed Piles and Their Design. Piles Under Tension, Inclined and Lateral Load Caissons. Well Foundation. Equilibrium of Wells. Analysis for Stability Tilts and Shifts, Remedial Measures. |
| III | **Soil Improvement Techniques:** Compaction. Field and Laboratory Methods, Proctor Compaction Tests, Factors Affecting Compaction. Properties of Soil Affected by Compaction. Various Equipment for Field Compaction and their Suitability. Field Compaction Control. Lift Thickness. Soil Stabilization: Mechanical, Lime, Cement, Bitumen, Chemical, Thermal, Electrical-Stabilization and Stabilization by Grouting. Geo-Synthetics, Types, Functions, Materials and Uses. |
| IV | **Soil Exploration and Foundations on Expansive and Collapsible Soils:** Methods of Soil Exploration. Planning Of Exploration Programmed for Buildings, Highways and Earth Dams. Disturbed And Undisturbed Samples and Samplers for Collecting them. Characteristics of Expansive and Collapsible Soils, Their Treatment, Construction Techniques On Expansive And Collapsible Soils. Cns Layer. |
| V | **Sheet Piles/Bulkheads and Machine Foundation:** Classification of Sheet Piles/Bulkheads. Cantilever and Anchored Sheet Piles, Cofferdams, Materials, Types and Applications. Modes of Vibration. Mass-Spring Analogy, Natural Frequency. Effect of Vibration on Soils. Vibration Isolation. Criteria for Design. Design of Block Foundation for Impact Type of Machine. |

**Laboratory Work**: Laboratory Work will be Based on The Course of Geotech. Engg. I & II as Required for Soil Investigations of Engineering Projects and not Covered in the Lab. Work of Geotech. Engg. I

**References:**


1 Soil Mech. & Found. Engg. By Dr. K.R. Arora - Std. Publishers Delhi.

2 Soil Mech. & Found. By Dr. B.C.Punmia- Laxmi Publications, Delhi.

3 Modern Geotech Engg. By Dr.L Aram Singh - Ibt Publishers, Delhi.

4 Geotech Engg. By C. Venkatramaiah - New Age International Publishers, Delhi

5 Soil Mech. & Found. Engg. By S.K. Garg- Khanna Publishers, Delhi.

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| Subject Title | Subject Code | Credits | | | Theory | | | Practical | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | External | Internal | Total (100) | External | Internal | Total (50) |
| Estimation & Costing | CET- 804 | 3 | 1 | 2 | (70) | (30) | Min: 40 (D Grade) | (35) | (15) | Min: 20 (D Grade) |

**Duration of Theory (Externals): 3 Hours**

**Theory Internal - Max Marks: 30**

Best of Two Mid Semester Test –Max Marks: 20

Quiz/Assignment / Attendance – Max. Marks: 10

**Practical Internal - Max Marks: 15**

Lab Performance, Lab Record & Viva –Max Marks: 10

Assignment / Quiz – Max. Marks: 05

| Unit | Contents (theory) |
|---|---|
| I | **Introduction:** Purpose And Importance of Estimates, Principles of Estimating. Methods of Taking out Quantities of items of work. Mode of Measurement, Measurement Sheet and Abstract Sheet; Bill of Quantities. Types of Estimate, Plinth Area Rate, Cubical Content Rate, Preliminary, Original, Revised and Supplementary Estimates for Different Projects. |
| II | **Rate Analysis:** Task for Average Artisan, Various Factors Involved in the Rate of an Item, Material and Labor Requirement for Various Trades; Preparation for Rates of Important Items of Work. Current Schedule of Rates. (C.S.R.). |
| II | **Detailed Estimates:** Preparing Detailed Estimates of Various Types of Buildings, R.C.C. Works, Earth Work Calculations for Roads and Estimating of Culverts Services for Building Such as Water Supply, Drainage and Electrification. |
| IV | **Cost Of Works:** Factors Affecting Cost of Work, Overhead Charges, Contingencies and Work Charge Establishment, Various Percentages for Different Services in Building. Preparation of DPR. |
| V | **Valuation:** Purposes, Depreciation, Sinking Fund, Scrap Value, Year's Purchase, Gross and Net Income, Dual Rate Interest, Methods of Valuation, Rent Fixation of Buildings. |

**Reference book:**


1. Quantity Surveying & Costing – B.N. Datta.
2. Estimating & Costing For Civil Engg. – G.S. Birdi.
3. 3. Quantity Surveying & Costing – Chakraborty 4. Estimating & Costing – S.C. Rangawala.


**List of Experiments**

1. Prepare an estimate of various types of buildings by centre line method.
2. Prepare an estimate of various types of buildings by long wall, short wall method.
3. Prepare detailed estimate of earth work calculation for road.
4. Prepare detailed estimate of a culvert.
5. Prepare detailed project report of road.

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Programme: **B. Tech. (Civil Engineering)** **Semester -VIII**

| Subject Title | Subject Code | Credit | | | Practical | | |
|---|---|---|---|---|---|---|---|
| | | L | T | P | External | Internal | Total (50) |
| Steel Structure Lab-II | CET-805 | - | - | 2 | (Nil) | (50) | Min: 20 (D Grade) |

**Practical Internal - Max Marks: 50**

Lab Performance, Lab Record & Viva –Max Marks: 50
Assignment / Quiz

| Contents (Practical) |
|---|
| **Designing:** Plate Girder Bridges, Guyed and Self Supporting Steel Stacks, Pressed Steel Tanks, Tanks With Ordinary Plates, Square, Rectangular, Circular With Hemispherical Bottom and Conical Bottom, Trussed Girder Bridges for Railways and Highways, Bunkers, Silos & Towers. |

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| Subject Title | Subject Code | Credits | | | Practical | | |
|---|---|---|---|---|---|---|---|
| | | L | T | P | External (140) | Internal (60) | Total (200) |
| Major Project-II | CET-806 | - | - | 8 | | | Min: 80 (D Grade) |

**Practical Internal - Max Marks: 60**

Lab work & Sessional –Max Marks: 55

Assignment / Quiz – Max. Marks: 05

| Contents (Practical) |
|---|
| The student should prepare a working system or some design or understanding of a complex system that he has selected in the seventh semester using system analysis tools and submit the same in the form of a write-up i.e. detail project report. The student should maintain proper documentation of different stages of project such as need analysis, market analysis, concept evaluation, requirement specification, objectives, work plan, analysis, design, implementation and test plan wherever applicable. Each student is required to prepare a project report based on the above points and present the same at the final examination with a demonstration of the working system. |

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| Subject Title | Subject Code | Credit | | | Practical | | |
|---|---|---|---|---|---|---|---|
| | | L | T | P | External (35) | Internal (15) | Total (50) |
| Professional Ethics and Proficiency | BT-807 | - | - | 2 | | | Min: 20 (D Grade) |

**Practical Internal - Max Marks: 15**

Lab work & Sessional –Max Marks: 10

Assignment / Quiz – Max. Marks: 05

| Unit | Contents (Practical) |
|---|---|
| I | **Ethics**: Business ethics, Etiquettes in social and office settings, Email etiquettes, Telephone Etiquettes, Engineering ethics, Managing time, Role and responsibility of engineer, Work culture in jobs, Personal memory, Rapid reading, Taking notes, Complex problem solving, Creativity. |
| II | Communication and personality development covering, Psychological aspects of communication, cognition as a part of communication; Emotional Intelligence; Politeness and Etiquette in communication; Cultural factors that influence communication; Mannerisms to be avoided in communication; Language and persuasion; Language and conflict resolution. |
| III | Career Oriental Communication covering, Resume and Biodata: Design & style; Applying for a job: Language and format of job application. Job Interviews: purpose and process. |
| IV | Advanced Techniques in Technical Communication covering, Interview through telephone/video-conferencing. |
| V | Power-point presentation: structure and format; Using e-mail for business communication; Standard e-mail practices; Language in e-mail; Using internet for collecting information; Referencing while using internet materials for project reports. |