PEOPLE'S UNIVERSITY, BHOPAL

(Applicable for Admitted from Academic Session 2019-20 onwards)

Programme: **Bachelor of Technology** **Semester –VIII**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total 100			Total
CET-18101	Pavement Design	3	1	-	External (70)	Internal (30)	Min 40 (D Grade)	External Nil	Internal Nil	Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test - Max Marks: 20	Assignment/Quiz/Attendance - Max. Marks: 10
Practical Internal Max Marks: Nil	Lab work & Sessional - Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: Nil

Pre-Requisite	**Knowledge of Transportation Engg.-II & Traffic Engineering subject.**
Course Outcome	1. To give the knowledge of about the equivalent single wheel load (ESWL).
	2. To give the knowledge of flexible pavements.
	3. To give the knowledge of evaluation and strengthening of existing pavements.

Unit	Contents (Theory)	Marks Weightage
I	**Equivalent Single Wheel Load (ESWL):** Definition, Calculation of ESWL, Repetition of loads and their effects on the pavement structures.	**14**
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.	**14**
III	**Rigid Pavements:** Evaluation of sub grade, 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.	**14**
IV	**Rigid Pavement Design:** IRC method, Fatigue analysis, PCA chart method, Joints, Design and construction & types, Aashto method, Reliability analysis.	**14**
V	**Evaluation and Strengthening of Existing Pavements:** Benkleman beam method, Serviceability index method, Rigid and flexible overlays and their design.	**14**

Text Book/References Books/ Websites:

1 E.J.Yoder & M.W. Witczak ; Principles of Pavement Design; Wiley. Publication

2 Aasho;Aasho Interim Guide for Design Of Pavement Structures; Washington, D.C.

3 Portland Cement Association; Guidlines for Design of Rigid Pavements; Washington.

Suggested List of Laboratory Experiments:-Nil

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Programme: **Bachelor of Technology** **Semester –VIII**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total 100			Total
CET-18102	Structural Dynamic and Earthquake Engineering	3	1	-	External (70)	Internal (30)	Min 40 (D Grade)	External Nil	Internal Nil	Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test - Max Marks: 20	Assignment/Quiz/Attendance - Max. Marks: 10
Practical Internal Max Marks: Nil	Lab work & Sessional - Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: Nil

Pre-Requisite	**Nil**
Course Outcome	1. To give the knowledge about the fatigue concept, failure, stress etc.
	2. To give the knowledge about the fatigue testing machines and making of specimen and testing procedures.
	3. Study about the creep of material with their various properties.

Unit	Contents (Theory)	Marks Weightage
I	**Fatigue:** (Normal conditions) concepts of fatigue failure, Statistical methods, Endurance limit, S.N. diagram, Stress cycling, Strain cycling, Goodman and gerber relations, 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.	**14**
II	**Fatigue Testing Machines:** Specimen and test procedures. **Appearance of Fatigue Fractures:** Surface fatigue, Contact stresses, Brief introduction to random load fatigue.	**14**
III	**Creep:** Mechanisms of creep, Transient creep, Viscous creep, Creep fractures, Analysis of creep curves, Stress relaxation, Creep tests.	**14**
IV	**Fracture: H**istorical 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.	**14**
V	Earthquake resistant design of structures, Design of structures for strength & serviceability, Ductility and energy absorption, Provisions of IS: 1893 and IS: 4326 for a seismic design of structures, Code for ductile detailing IS : 13920.	**14**

Text Book/References Books/ Websites:

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.

Suggested List of Laboratory Experiments :- (Expandable): Nil

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Programme: **Bachelor of Technology** **Semester –VIII**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total 100			Total
CET-18103	Construction Planning & Management	3	1	-	External (70)	Internal (30)	Min 40 (D Grade)	External Nil	Internal Nil	Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test - Max Marks: 20	Assignment/Quiz/Attendance - Max. Marks: 10
Practical Internal Max Marks: Nil	Lab work & Sessional - Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: Nil

Pre-Requisite	**Nil**
Course Outcome	1. To give the knowledge about the preliminary and detailed investigation methods for any construction activity.
	2. To give the knowledge about the selection procedure for construction equipments.
	3. Study about the contract procedure, tender invitation, contract documents etc.

Unit	Contents (Theory)	Marks Weightage
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.	**14**
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.	**14**
III	**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.	**14**
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, Impress account, Tools and plants, Various types of running bills, Secured advance, Final bill.	**14**
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.	**14**

Text Book/References Books/ Websites:

1 Peurify : Construction Equipment ; TMH.
2 L.S. Srinath ; CPM.; Affiliated East-West Press (Pvt.) Ltd.
3 S. Seetharaman; Construction Management; Umesh Publications.
4 Weist & Levy; CPM & PERT; Prentice Hall India Learning Private Limited.
5 H Singh,Construction; Management & Account; TMH.

Suggested List of Laboratory Experiments: - Nil

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Programme: **Bachelor of Technology** **Semester –VIII**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total 100			Total
CET-1802	Design of Steel Structure-II	3	1	-	External (70)	Internal (30)	Min 40 (D Grade)	External Nil	Internal Nil	Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test - Max Marks: 20	Assignment/Quiz/Attendance - Max. Marks: 10
Practical Internal Max Marks: Nil	Lab work & Sessional - Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: Nil

Pre-Requisite	**Nil**
Course Outcome	1. To give the knowledge of about the plate girder bridges.
	2. To give the knowledge of trussed girder bridges for railways and highways.
	3. To give the knowledge of water tanks, pressed steel tanks.

Unit	Contents (Theory)	Marks Weightage
I	Plate girder bridges (riveted and welded).	**14**
II	Trussed girder bridges for railways and highways (IRC & IRS holding), Bearings for bridges.	**14**
III	Water tanks, Pressed steel tanks, Tanks with ordinary plates, Square, Rectangular, Circular with hemispherical bottom and conical bottom.	**14**
IV	Chimneys, Guyed and self supporting steel stacks.	**14**
V	Bunkers, Silos & towers.	**14**

Text Book/References Books/ Websites:

1 Ramammutham; Design of steel structures; Dhanpat Rai, Publishing,Co (P) Ltd.
2 B.C. Punmia; Design of steel structures; Laxmi, publication.
3 Ramchandra; Steel structures. Vol II; Standard Publisher, Distributors.
4 Arya & Ajmani.; Steel structures; Nem Chand.
5 L.S. Negi; Design of steel structures, TMH.

Suggested List of Laboratory Experiments :- Nil

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Programme: **Bachelor of Technology** **Semester –VIII**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total 100			Total (50)
CET-1803	Geotechnical Engg.-II	3	1	1	External (70)	Internal (30)	Min 40 (D Grade)	External (35)	Internal (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	Assignment/Quiz/Attendance - Max. Marks: 10
Practical Internal Max Marks: 15	Lab work & Sessional - Max Marks: 10	Assignment/Quiz/Attendance - Max. Marks: 05

Pre-Requisite	**Nil**
Course Outcome	1. To give the knowledge about the foundations and bearing capacity of foundation.
	2. To give the knowledge about the deep foundation and pile foundation.
	3. Study about the soil improvement techniques compaction. various equipment for field compaction and their suitability.

Unit	Contents (Theory)	Marks Weightage
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.	**14**
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, Equilibrium of wells, Analysis for stability tilts and shifts, Remedial measures.	**14**
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.	**14**
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.	**14**
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.	**14**

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Programme: **Bachelor of Technology** **Semester –VIII**

Text Book/References Books/ Websites:

1 Dr. K.R. Arora ; Soil Mech. & Found. Engg.; Std. Publishers Delhi.
2 Dr. B.C.Punmia ; Soil Mech. & Found.; Laxmi Publications, Delhi.
3 Dr.L Aram Singh ; Modern Geotech Engg.; IBT Publishers, Delhi.
4 C. Venkatramaiah ; Geotech Engg.; New Age International Publishers, Delhi
5 S.K. Garg ; Soil Mech. & Found. Engg.; Khanna Publishers, Delhi.

Suggested List of Laboratory Experiments:-

1 Determine the bearing capacity of soil by Plate Load Test.
2 Determine the bearing capacity of soil by Cyclic Plate Load Test.
3 To find out California bearing ratio of soil by CBR.
4 Determine c & ϕ by Standard Penetration Test.
5 Determine c & ϕ by Triaxial Test.

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Programme: **Bachelor of Technology** **Semester –VIII**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total 100	External	Internal	Total (50)
CET-1804	Estimation & Costing	3	1	1	(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	Assignment/Quiz/Attendance - Max. Marks: 10
Practical Internal Max Marks: 15	Lab work & Sessional - Max Marks: 10	Assignment/Quiz/Attendance - Max. Marks: 05

Pre-Requisite	**Nil**
Course Outcome	1. Study about the cost of works: factors affecting cost of work, overhead charges.
	2. To give the knowledge about the valuation depreciation, sinking fund, scrap value.
	3. To give the knowledge about the principles of estimating and mode of measurement

Unit	Contents (Theory)	Marks Weightage
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.	**14**
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.).	**14**
III	**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.	**14**
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.	**14**
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.	**14**

Text Book/References Books/ Websites:

1 B.N. Datta; Quantity Surveying & Costing; UBS, Publisher Distributor, Pvt Ltd.
2 G.S. Birdi; Estimating & Costing For Civil Engg.; Dhanpat Rai, Publishing Company Pvt Ltd, New Delhi.
3 Chakraborty; Quantity Surveying & Costing; Satya Prakashan, New Delhi.
4 S.C. Rangawala; Estimating & Costing; Charotor Books, Distric-Anand.

Suggested List of Laboratory 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: **Bachelor of Technology** **Semester –VIII**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (Nil)	Internal (Nil)	Total Nil	External (Nil)	Internal (50)	Total (50)
CET-1805	Steel Structure Lab-II	-	-	1			Nil			Min: 20 (D Grade)

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test - Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: Nil
Practical Internal Max Marks: 15	Lab work & Sessional - Max Marks: 10	Assignment/Quiz/Attendance - Max. Marks: 05

Pre-Requisite	Knowledge of design of steel structure subject.
Course Outcome	1. Designing of plate girder bridges, guyed and self supporting steel stacks, pressed steel tanks, tanks with ordinary plates, square, rectangular

Unit	Contents (Theory)	Marks Weightage
1	**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.	**50**

Text Book/References Books/ Websites: Nil

Suggested List of Laboratory Experiments:-

Students should prepare a Design and Drawing sheet of any five members as assigned by the subject faculty.

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Programme: **Bachelor of Technology** **Semester –VIII**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total			Total (200)
CET-1806	Major Project	-	-	4	External (Nil)	Internal (Nil)	Nil	External (140)	Internal (60)	Min: 80 (D Grade)

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test - Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: Nil
Practical Internal Max Marks: 60	Lab work & Sessional - Max Marks: 55	Assignment/Quiz/Attendance - Max. Marks: 05

Pre-Requisite	**Knowledge of all previously studied subjects**
Course Outcome	The student will be able to-Utilize technical resources:
	1. Identify, analyze & define the problem.
	2. Generate alternative solutions to the problem identified.
	3. Compare & select feasible solutions from alternatives generated.
	4. Design, develop, manufacture & operate equipment/program.
	5. Acquire higher-level technical knowledge by studying recent development in Engineering field.
	6. Compare machines/devices/apparatus for performance practices.
	7. Work effectively in a team.

Unit	Contents (Theory)	Marks Weightage
I	Students shall be encouraged to form groups (Maximum 5) to do a minor project on technical topic of concern branch, The student should prepare a working system or some design or understanding of a complex system that he has selected for his project work 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 group of students 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. Evaluation will be based on his performance in technical work pertaining to the solution of a small size problem, Project report and presentation of work and defending it in a viva-voce.	**200**

Text Book/References Books/ Websites: Nil

Suggested List of Laboratory Experiments :- Nil

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Programme: **Bachelor of Technology** **Semester –VIII**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total			Total (50)
BT-1807	Professional Ethics and Proficiency	-	-	1	External (Nil)	Internal (Nil)	Nil	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test - Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: Nil
Practical Internal Max Marks: 15	Lab work & Sessional - Max Marks: 10	Assignment/Quiz/Attendance - Max. Marks: 05

Pre-Requisite	**Nil**
Course Outcome	1. To give the knowledge of business ethics, etiquettes in social and office settings, email etiquettes, telephone etiquettes.
	2. To give the knowledge about the career oriental communication covering, resume and bio-data.
	3. To give the knowledge about the communication and personality development.

Unit	Contents (Theory)	Marks Weightage
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.	**50**
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.	

Text Book/References Books/ Websites: Nil

Suggested List of Laboratory Experiments :-

Students should prepare a hand written report on Professional Ethics and Proficiency as assigned by faculty.