PEOPLE'S UNIVERSITY, BHOPAL

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

Subject Title	Subject Code	Credit			Theory		
		L	T	P	External (70)	Internal (30)	Total (100)
Entrepreneurship & IPR	BT- 501	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/ Regularity – Max. Marks: 10

Unit	Contents (Theory)
I	**Entrepreneurship**: Definition and functions of an entrepreneur, qualities of a good entrepreneur; role of entrepreneur in economic development; theories of entrepreneur, socio, economic, cultural and psychological; entrepreneur traits and behavior, roles in economic growth, employment, social stability, export promotion and indigenization, creating a venture, opportunity analysis competitive and technical factors, sources of fund. Forms of business organizations/ownership - formation of a company - procedures and formalities for setting up of new industry-sources of information to contact for what and where.
II	**Management:** Importance, definition and functions; dimensions of organizations, size/specialization, behavior formalization, authority centralization, departmentalization, spam and line of control, technology and minzberg organization typology, line, staff & matrix organization. **Motivation Theories** - Maslow, Mc Cullen - motivation model - need, want, motive and behavior – attitude towards work - self assessment and goal setting - achievement, motivation and behavior measurement, SWOT analysis and TA analysis - stress and conflict management; with uncertainty; creativity and innovation.
III	**Marketing:** Importance, definition, core concepts of need want and demand, project identification and formulation: sources of information - opportunity guidance - choice of technology and its evaluation; consumer behavior; market survey and research; preliminary project report, detailed project report, assessing viability and feasibility of a report. Exchange &relationships, product value, cost and satisfaction (goods and services) marketing environment; selling, marketing and societal marketing concepts; four p's, product, price, placement, promotion. **Finance:** Nature and scope, forms of business ownerships, balance sheet, profit and loss account, fund flow and cash flow statements, Break Even Point (BEP) and financial ratio analysis, pay-back period, NPV and capital budgeting. Subsidies and concessions for SSI - role of state and central government agencies in promotion of small scale industry
IV	**Concept of Property:** Theories of property, types of intellectual property- origin and development, theories of intellectual property rights, need for protecting intellectual property, commercialization of intellectual property rights by licensing, determining financial value of intellectual property rights, negotiating payments terms in intellectual property transaction
V	**Introduction to Patent Law**, (a) Paris convention , (b) Patent cooperation treaty, (c) Wto- trips , indian patent law, the patents act, 1970, patentable subject matter, patentability criteria, procedure for filing patent applications, patent granting procedure, revocation, patent infringement and remedies, relevant provisions of the biological diversity act, 2002, access and benefit sharing issues

References:

1 Handbook for New Entrepreneurs, EDII, Ahmadabad.
2 Entrepreneurial Development by P.Saravanavel.
3 Environment and Entrepreneur – Tandon B.C. (Asian Publishers, New Delhi)
4 Emerging Trends in Entrepreneurship Development Theories & Practices – Singh P.Narendra Entrepreneurship &
5 Growth of Enterprise in Industrial Estates – Rao Gangadhara N

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Subject Title	Subject Code	Credit			Theory		
		L	T	P	External (70)	Internal (30)	Total (100)
Transportation Engineering - II	CET-502	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	**Highway Planning, Alignment & Geometric Design:** Principles of highway planning, Road planning in India and financing of roads, classification patterns. Requirements, engg. Survey required for highway location. Cross sectional elements- width, camber, super-elevation, sight distances, extra Widening at curves, horizontal and vertical curves, and numerical problems.
II	**Bituminous & Cement Concrete Pavements**: Design of flexible pavements, design of Mixes and stability, WBM, WMM, BM, IBM, surface dressing, interfacial treatment- seal coat, tack coat, prime coat, wearing coats, grouted macadam, bituminous concrete specification, construction and maintenance. Advantages and disadvantages of rigid pavements, general principles of design, types, construction, maintenance and joints, dowel bars, tie bars.
III	**Low Cost Roads, Drainage of Roads, Traffic Engg. & Transportation Planning:** Principles of stabilization, mechanical stabilization, requirements, advantages, disadvantages and uses, quality control, macadam roads-types, specifications, construction, maintenance and causes of failures. **Surface and sub-surface drainage, highway materials:** Properties and testing etc. Channelized and unchannelized intersections, at grade & grade separated intersections, description, rotary-design elements, advantages and disadvantages, marking, signs and signals, street lighting. Principles of planning, inventories, trip generation, trip distribution, model split, traffic assignment, plan preparation.
IV	**Airport Planning, Runway & Taxiway:** Airport site selection. Air craft characteristic and their effects on runway alignments, wind rose diagrams, basic runway length and corrections, classification of airports. **Geometrical Elements: T**axi ways and runways, pattern of runway capacity.
V	**Airport, Obstructions, Lightning & Traffic Control**: Zoning regulations, approach Area, approach surface-imaginary, conical, horizontal. Rotating beacon, boundary lights, approach lights, runway and taxiway lighting etc. Instrumental lending system, precision approach radar, or enroute traffic control.

References:

1. Highway Engineering by Gurucharan singh
2. Highway Engineering by S.K. Khanna & C.E.G. Justo
3. Airport Planning & Design by S.K. Khanna & M. G. Arora
4. Sharma & Sharma, Principles and Practice of Highway Engineering.
5. Relevant IRC & IS Codes

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Subject Title	Subject Code	Credit			Theory			Practical		
		L	T	P	External	Internal	Total (100)	External	Internal	Total (50)
Design of R.C.C. Structures – I	CET-503	3	1	2	(70)	(30)	Min: 40 (D Grade)	(35)	(15)	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

Practical internal - Max marks: 15

Lab performance/Lab Record/Viva –Max. Marks: 10

Assignment / Quiz/ Attendance – Max. Marks: 05

Unit	Contents (Theory)
I	**Basic Principles of Structural Design :** Assumptions, mechanism of load transfer, various Properties of concrete and reinforcing steel, introduction to working stress method and limit state methods of design, partial safety factor for load and material. Calculation of various loads for structural design of singly reinforced beam, partial load factors.
II	**Design of Beams:** Doubly reinforced rectangular & flanged beams, lintel, and cantilever, simply Supported and continuous beams, beams with compression reinforcement: deep beams. Design of beam for shear and bond.
III	**Design of Slabs:** Slabs spanning in one direction. Cantilever, simply supported and continuous Slabs, slabs spanning in two directions, circular slabs, waffle slabs, flat slabs.
IV	**Columns & Footings:** Effective length of columns, short and long columns- square, Rectangular and circular columns, isolated and combined footings, strap footing, columns Subjected to axial loads and bending moments (sections with no tension), raft foundation.
V	**Staircases:** Staircases with waist slab having equal and unequal flights with different support Conditions, slab less tread-riser staircase.

Note: - All the designs for strength and serviceability should strictly be as per the latest version of I.S.: 456. Use of SP-16 (design aids)

References:

1. Plain & Reinforced Concrete Vol. I & II – O.P. Jain & Jay Krishna
2. Design of Reinforced Concrete Elements By Purushothman; Tata Mcgraw Hill, New Delhi
3. Plain & Reinforced Concrete - Rammuttham
4. Plain & Reinforced Concrete – B.C. Punnia
5. Structural Design & Drawing By N.K.Raju.

List of Experiments

1. Design and drawing of rectangular and flanged beam.
2. Design and drawing of cantilever beam.
3. Design and drawing of one way slab.
4. Design and drawing of two way slab.
5. Design and drawing of square columns.
6. Design and drawing of rectangular and circular column.
7. Design and drawing of rectangular and combined footing.
8. Design and drawing of isolated and strap footing.
9. Design and drawing of staircase.

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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)
Surveying – II	CET-504	3	1	2			Min: 40 (D Grade)			Min: 20 (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

Practical internal - Max marks: 15

Lab performance/Lab Record/Viva –Max. Marks: 10

Assignment / Quiz/ Attendance – Max. Marks: 05

Unit	Contents (Theory*)
I	**Modern Equipments for Surveying :** Digital levels and theodolites, Electronic Distance Measurement (EDM), total station and Global Positioning Systems (GPS), Digital Planimeter
II	**Surveying Astronomy:** Definitions of astronomical terms, coordinate systems for locating heavenly bodies, geographic, geodetic, geocentric, cartesian, local and projected coordinates for earth resources mapping, convergence of meridian, parallel of latitude, shortest distance between two points on the earth, determination of latitude and longitude.
II	**GPS Surveying:** Introduction & components of GPS, space segment, control segment and user segment, elements of satellite based surveys-map datum's, GPS receivers, GPS observation methods and their advantages over conventional methods. Digital Terrain Model (DTM) : topographic representation of the terrain and generation of DTM on computers using spot heights and contour maps.
IV	**Photogrammetry** : Principle, definitions and classifications of terrestrial and aerial photogrammetry, flight planning for aerial photography, scale and relief displacements of vertical aerial photographs, stereoscopic vision on vertical photographs, computation of position, length and elevations of objects using photographs and photo mosaic.
V	**Remote Sensing:** Principle, components, classification, remote sensing data acquisition process, different types of remote sensing satellite imagery with special relevance to Indian Remote Sensing Satellites (IRSS) and applications. Geographic Information Systems (GIS) : definition, components and advantages.

***Note: - Surveying Project - Student will go for one week surveying camp to carry out project Work.**

References:

1. Surveying and Leveling-Part-I & II By T.P. Kanetkar and S.V. Kulkarini, Pune Vidyarthi Griha Prakashan, Pune
2. Engineering Surveying: Theory and Examination Problems for Students By W. Schofield, Butterworth, Heinemann,Oxford.
3. Surveying: Problems Solving with Theory and Objective type Questions By A.M. Chandra, New Age International Publishers N. Delhi.
4. Advance Surveying By A.M. Chandra, New Age International Publishers N. Delhi.
5. Surveying Vol. II By S.K. Duggal, Tata Mcgraw Hill Publishing Company Ltd. New Delhi.

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List of Experiment

1. To find the R.L. of given stations with the help of Auto Level.
2. Study of electronic total station and to find the horizontal distance and vertical height with the help of Total Station.
3. To set out a transition curve in the field.
4. To set out the simple curve by two theodolite method.
5. To set out the simple curve by single theodolite method.
6. To measure included angle by theodolite traversing.
7. To measure the exterior angle by theodolite traversing.
8. Determination of elevation of point trigonometric leveling.
9. To make a contour plan of given area (on full size drawing sheet).
10. Determination of horizontal distance between two inaccessible points with theodolite.

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Subject Title	Subject Code	Credit			Theory			Practical		
		L	T	P	External	Internal	Total (100)	External	Internal	Total (50)
Fluid Mechanics-II	CET-505	3	1	2	(70)	(30)	Min: 40 (D Grade)	(35)	(15)	Min:20 (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

Practical internal - Max marks: 15

Lab performance/Lab Record/Viva –Max. Marks: 10

Assignment / Quiz/ Attendance – Max. Marks: 05

Unit	Contents (Theory)
I	**Turbulent Flow:** Laminar and turbulent boundary layers and laminar sub layer, hydrodynamic ally smooth and rough boundaries, velocity distribution in turbulent flow, resistance of smooth and artificially roughened pipes, commercial pipes, aging of pipes. **Pipe Flow Problems:** Losses due to sudden expansion and contraction, losses in pipe fittings and valves, concepts of equivalent length, hydraulic and energy gradient lines, siphon, pipes in series, pipes in parallel, branching of pipes. **Pipe Network: *water hammer (only quick closure case). Transmission of power.** Hardy cross method
II	**Uniform Flow in Open Channels :** Channel geometry and elements of channel section, velocity Distribution, energy in open channel flow, specific energy, types of flow, critical flow and its Computations, uniform flow and its computations, chezy's and manning's formulae, determination of normal depth and velocity, normal and critical slopes, economical sections, saint vegnet equation.
III	**Non uniform flow in Open Channels :** Basic assumptions and dynamic equations of gradually Varied flow, characteristics analysis and computations of flow profiles, rapidly varied flow hydraulic jump in rectangular channels and its basic characteristics, surges in open channels & channel flow routing, venturi flume.
IV	**Forces on Immersed Bodies**: Types of drag, drag on a sphere, a flat plate, a cylinder and an aerofoil development of lift, lifting vanes, magnus effect.
V	**Fluid Machines:** **Turbines:** Classifications, definitions, similarity laws, specific speed and unit quantities, pelton turbine-their construction and settings, speed regulation, dimensions of various elements, action of jet, torque, power and efficiency for ideal case, characteristic curves. Reaction turbines: construction & settings, draft tube theory, runaway speed, simple theory of design and characteristic curves, cavitations. **Pumps:** **Centrifugal Pumps :** Various types and their important components, manometric head, total Head, net positive suction head, specific speed, shut off head, energy losses, cavitations, principle of working and characteristic curves. **Reciprocating Pumps**: Principle of working, coefficient of discharge, slip, single acting and Double acting pump, manometric head, acceleration head.

References:

1. Fluid Mechanics - Modi & Seth - Standard Book House, Delhi
2. Open Channel Flow By Rangaraju - Tata Mc Graw - Hill Publishing Comp. Ltd., New Delhi
3. Fluid Mechanics - A.K. Jain - Khanna Publishers, Delhi
4. Fluid Mechanics, Hydraulics & Hydraulic Machanics - K.R. Arora - Standard Publishers Distributors 1705- B, Nai Sarak, Delhi-6
5. Fluid Mechanics – R K Bansal – Laxmi publication

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List of experiments:

1. Study the performances characteristics of Pelton wheel turbine.
2. Study the performances characteristics of Francis turbine.
3. Study the performances characteristics of Kaplan turbine.
4. Calibration of multistage (two) pumps & study of characteristic of variable speed pump.
5. To study the performance & details of operation of Hydraulic Ram.
6. Determination of minor losses in pipe flow.
7. Study of the characteristic of the Reciprocating Pump.
8. Determination of chezy and mannings constant.
9. Determination of pipe friction factor.

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Subject Title	Subject Code	Credit			Practical		
		L	T	P	External (35)	Internal (15)	Total (50)
Highway Material Testing Lab	CET-506	-	-	2			Min: 20 (D Grade)

Practical internal - Max marks: 15

Lab work & sessional – Max. Marks: 10

Assignment / Quiz/ Regularity – Max. Marks: 05

List of experiments:

1. Aggregate Crushing Value Test.
2. Determination of Aggregate Impact Value.
3. Determination of Los Angeles Abrasion Value.
4. Determination of California Bearing Ratio values.
5. Determination of Penetration value of bitumen.
6. Determination of Viscosity of bituminous material.
7. Determination of Softening Point of bituminous material.
8. Determination of Flash point and Fire point of bituminous material.
9. Determination of bitumen content by Centrifuge Extractor.
10. Determination of Stripping Value of road aggregate.

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Subject Title	Subject Code	Credit			Practical		
		L	T	P	External	Internal (50)	Total (50)
Software Lab	CET-507	-	-	2	Nil		Min: 20 (D Grade)

Practical Internal - Max Marks: 50

Lab work & Sessional – Max. Marks: 25

Assignment / Quiz – Max. Marks: 25

Contents (Practical)
MATLAB
Introduction: Introduction to MATLAB, Study of MATLAB programming environment, Modeling, Design and development of Program. The following contents beginning with a broad overview of MATLAB.
Basic MATLAB: The MATLAB Workspace, Working with Vectors, Working with Matrices, Solving Systems of Linear Equations, Working with Loops, Working with Plots.
Statics and Structures: Computing reaction forces acting on a truss, Computing reaction internal shear force and bending moment. **Fluid Mechanics**: Solving for the friction coefficient, Computing the head loss for flow through a pipe. **Heat Transfer:** Analyzing the ice build-up on a body of fluid. **Dynamics:** Modeling a damped spring-mass system using Simulink, The logistic equation.

References:

1 http://www.colorado.edu/MCEN/programs/undergraduate/matlab_tutorials/

List of Experiments/ Programs:

Programs to be performed based on the topics contained in the syllabus.

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Subject Title	Subject Code	Credit			Practical		
		L	T	P	External	Internal (50)	Total (50)
Industrial Training-I	CET-508	-	-	2	Nil		Min: 20 (D Grade)

Practical internal - Max marks: 50

Assignment /quiz – Max Marks: 50

Duration: 2 weeks after the IVsemester in the summer break. Assessment in V semester.

Contents
Marks of various components in industry should be awarded to the student, in consultation with the Training and Placement Officer (TPO)/ faculty of the institute, who must establish contact with the supervisor/ authorities of the organization where, students have taken training, to award the marks for term work. During training, students will prepare a first draft of the training report in consultation with the section in charge. After training they will prepare final draft with the help of the TPO / faculty of the institute. Then, they will present a seminar on their training and will face viva-voce on training in the institute.