PEOPLE'S UNIVERSITY, BHOPAL

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

Subject Title	Subject Code	Credit			Theory		
		L	T	P	External (70)	Internal (30)	Total (100)
Engineering Mathematics-III	BT- 401	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	Content (Theory)
I	**Functions of Complex Variables:** Analytic functions, Harmonic Conjugate, Cauchy – Riemann equations, line integral, Cauchy's theorem, Cauchy's integral formula, singular points, poles and residues, residue theorem and evaluation of real integral
II	**Numerical Analysis:** Difference operators, errors and approximations, interpolation, inverse interpolation, numerical differentiation, numerical integration by using Simpson's method, Weddle's rule and Trapezoidal rule.
III	**Solution of Algebraic & Simultaneous Equations:** Solutions of algebraic and transcendental equations(Regular false, Newton-Raphson, iterative, Graff's root squaring methods) and solutions of simultaneous algebraic equations (Gauss elimination, Gauss Jordan, Gauss iterative, Jacobi, Gauss Seidel and Crout's Traingularization).
IV	**Solution to Differential Equations:** Solutions of ordinary differential equations (Taylor's series, Picard's method, Euler method, modified Euler's method, Runge method and runge kutta method).
V	**Optimization by Linear Programming:** Introduction, two variable problems, solution by graphical and simplex methods, concept of degeneracy and duality, simple three variable transport and assignment problems and modeling into lpp.

References:

1. Higher Engineering Mathematics B.S. Grewal,Khanna Publications.
2. Engineering Mathematics II , D.C. Aggarwal.
3. Mathematical Methods Kv Suryanarayan Rao, Scitech Publication.
4. Numerical Methods Using Matlab J.H.Mathews And K.D.Fink, P.H.I.
5. Numerical Methods For Scientific And Engg. Computation Mk Jain, Iyengar And Rk Jain, New Age
6. Numerical Methods Using Matlab Matlab, Yang,Wiley India.
7. Probability And Statistics Ravichandran ,Wiley India.
8. Mathematical Statistics George R., Springer.

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Subject Title	Subject Code	Credit			Theory		
		L	T	P	External (70)	Internal (30)	Total (100)
Concrete Technology	CET- 402	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	Content (theory)
I	Introduction Classification, properties, grades, advantage & disadvantages of concrete, Ingredients of concrete, types of cement, aggregates, water, admixtures, inspection & testing of Materials as per Indian standard specifications.
II	**Properties of Fresh and Hardened Concrete :** Introduction, workability, testing of concrete, Factors affecting, compressive & tensile strength, stress and strain characteristics, shrinkage and temperature effects. Creep of concrete, permeability, durability, thermal properties & micro-cracking of concrete.
III	**Design of Concrete mix:** Various classical methods of concrete mix design, i.s. Code method, Basic considerations and factors influencing the choice of mix design, acceptance criteria for Concrete, concrete mixes with surkhi and other pozzolonic materials, design of plastic concrete Mix, computer aided design of concrete mix.
IV	**Production and Quality Control of Concrete :** Production of crushed stone aggregate, batching Equipments for production and concreting, curing at different temperatures, concreting Underwater, hot & cold weather condition, statistical quality control, field control, non-destructive Testing, inspection & testing of concrete.
V	**Special Concretes :** Light weight concrete, ready mix concrete, vacuum concrete, Ferro cement, fiber reinforced concrete, polymer concrete composites, prestressed concrete, mass concrete,

References:

1. Varshney R S; Concrete Technology; Oxford & Ibh Publishing Co.
2. Gambhir M L; Concrete Technology – Tmh
3. Sinha S N; Reinforced Concrete Technology; Tmh
4. New Building Materials Published By B.M.T.P.C., New Delhi
5. Hand Books On Materials & Technology - Published By Bmtpc & Hudco
6. Mohan Rai & M.P. Jai Singh; Advances In Building Materials & Construction
7. Jackson N; Civil Engineering Materials.
8. Properties Of Concrete - A.M. Neville - Pearson Education

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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)
Construction Material and Techniques	CET-403	3	1	2			Min: 40 (D Grade)	Min: 14 (D Grade)	Min: Nil	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	**Stones:** Occurrence, varieties, characteristics and their testing, uses, quarrying and Dressing of stones. **Timber** : Important timbers, their engineering properties and uses, defects in Timber, seasoning and treatment, need for wood substitutes, alternate materials for shuttering Doors/windows, partitions and structural members etc. **Brick and Tile**: Manufacturing, characteristics, classification and uses, improved brick from inferior soils, hand molding brick table, clay-fly ash brick table, flooring tiles and other tiles and their characteristics.
II	**Advance Construction Materials :** Use of fly ash in mortars, concrete, fly ash bricks, Stabilized mud blocks, non-erodible mud plinth, d.p.c. Materials, building materials made by Industrial & agricultural waste, clay products p.v.c. Materials, advance materials for flooring, Doors & windows, facia material, interiors materials for plumbing, sanitation & electrification.
III	**Foundation: T**ype of soils, bearing capacity, soil stabilization and improvement of Bearing capacity, settlement and safe limits. Spread foundations, wall footings, grillage, Foundations well foundation, causes of failure and remedial measures; under reamed piles, Foundation on shrinkable soils, black cotton soil, timbering for trenches, dewatering of Foundations. Simple methods of foundation design, damp proof courses, repairs techniques for foundations.
IV	**Masonry and Walls**: **B**rick masonry, bonds, jointing, stone masonry, casting and Laying, masonry construction, brick cavity walls, code provisions regarding load bearing and non Load bearing walls. Common defects in construction and their effect on strength and Performance of walls, designed brick masonry, precast stone masonry block, hollow concrete Block, plastering and pointing, white and color washing, distempering, dampness and its Protection.
V	**Floors and Roofs : T**ypes, minimum thickness, construction, floor finishes, flat roofs, RCC jack arch, reinforced brick concrete, solid slab and timber roofs, pitched roofs, fall ceiling, Roof coverings, fibrocement roofing units, water proofing .services : water supply & drainage, electrification, fire protection, thermal insulation, air conditioning, acoustics & sound insulation.

References:

1. Mohan Rai & M.P. Jai Singh; Advance In Building Materials & Construction,.
2. S.C. Rangwala; Engineering Materials
3. Sushil Kumar; Building Construction,

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4. B.C. Punmia; Building Construction,.
5. Building Construction, Metchell
6. Construction Technology, Chudley R.
7. Civil Engineering Materials, N. Jackson.
8. Engineering Materials, Surendra Singh.

List of Experiments (Expandable/Suggested):

1. Tests on bricks.
2. Los angles abrasion test.
3. Aggregate impact test.
4. Initial and Final setting time of cement by Vicat's apparatus.
5. Determination of uncombined lime by Le-chateliers apparatus.
6. Determination of compressive strength of concrete with different cement grades.
7. Determination of workability of concrete by slump test
8. Determination of workability by compacting factor apparatus.
9. Determination of workability of concrete by Vee-Bee apparatus.
10. Nondestructive testing of concrete by rebound hammer test

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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 -I	CET-404	3	1	2			Min: 40 (D Grade)	Min: 14 (D Grade)	Min: Nil	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	Traversing by theodolite, traverse computations, latitude and departures, adjustments, computations of co-ordinates, plotting & adjusting or traverse, omitted measurements, measurement edm, trigonometrically leveling.
II	**Tachometry:** Tachometric systems and principles, stadia system, uses of anallatic lens, Tangential system, sublense system, instrument constant, direct-reading tacheometers, use of tacheometry for traversing and contouring.
II	**Curves**: Classification and use; elements of circular curves, calculations, setting out Curves by offsets and by theodolite, compound curves, reverse curves, transition curves, cubic Spiral and lemniscates, vertical curves, setting out.
IV	**Control surveys:** Providing frame work of control points, triangulation principle, co-naissance, selection and marking of stations, angle measurements and corrections, baseline measurement and corrections, computation of sides.
V	**Hydrographic surveying:** Soundings, methods of observations, computations and Plotting. Principles of photographic surveying: aerial photography, tilt and height distortions, Remote sensing, simple equipments, elements of image interpretation, image-processing Systems.

References:

1 T.P. Kanetkar, Surveying & Levelling, Vol. I & II.
2 Duggal; Surveying . I & II.; Tmh
3 Basak; Surveying And Leveling; Tmh
4 R.E.Devis, Surveying Theory & Practice, Mc.Graw Hill, New York
5 David Clark & J Clendinning, Plane & Geodetic Surveying Vol. . I & II. Constable & Co. London.
6 S.K. Roy, Fundamentals Of Surveying, Prentice - Hall Of India New Delhi
7 B.C. Punmia, Surveying Vol. I, II, III, Laxmi Publications New Delhi
8 K.R. Arora, Surveyhing Vol. I & II. , Standard Book House, New Delhi

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List of Experiments/ field work (expandable):

1 Theodolite traversing
2 Profile leveling, contouring & cross sectioning
3 Determination of tachometric constants & uses of tachometer in various field works
4 Curve setting by different methods.
5 To find the R.L. of given stations with the help of auto level.
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).

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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)
Fluid Mechanics -I	CET-405	3	1	2			Min: 40 (D Grade)	Min: 14 (D Grade)	Min: Nil	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	**Review of Fluid Properties:** Engineering units of measurement, mass, density, specific Weight, specific volume, specific gravity, surface tension, capillarity, viscosity, bulk modulus of Elasticity, pressure and vapor pressure. Pressure at a point, pressure variation in Static fluid, absolute and gauge pressure, manometers, forces on plane and curved surfaces buoyant force, stability of floating and submerged bodies, relative equilibrium.
II	**Kinematics of Flow :** Types of flow-ideal & real , steady & unsteady, uniform & nonuniform, One, two and three dimensional flow, path lines, streaklines, streamlines and stream Tubes; continuity equation for one and three dimensional flow, rotational & irrotational flow, Circulation, stagnation point, separation of flow, sources & sinks, velocity potential, stream Function, flow nets- their utility
II	**Dynamics of Flow:** Euler's equation of motion along a streamline and derivation of Bernoulli's equation, application of bernoulli's equation, energy correction factor, linear Momentum equation for steady flow; momentum correction factor. The moment of momentum Equation, forces on fixed and moving vanes and other applications. Fluid measurements: Velocity measurement etc.
IV	**Dimensional Analysis and Dynamic Similitude**: Dimensional analysis, dimensional Homogeneity, use of buckingham-pi theorem, calculation of dimensionless numbers, similarity Laws, specific model investigations (submerged bodies, partially submerged bodies, weirs, Spillways, Rotodynamic machines etc.)
V	**Laminar Flow:** introduction to laminar & turbulent flow, reynolds experiment & Reynolds Number, relation between shear & pressure gradient, laminar flow through circular pipes, Laminar flow between parallel plates, laminar flow through porous media, stokes law, lubrication Principles.

References:

1. Modi & Seth; Fluid Mechanics; Standard Book House, Delhi
2. Som and Biswas; Fluid Mechanics And Machinery; TMH
3. Cengal; Fluid Mechanics; TMH
4. White ; Fluid Mechanics ; TMH
5. Essential of Engg Hyd. By Jnik Dake; Afrikan Network & Sc Instt. (Ansti)
6. A Text Book of Fluid Mech. for Engg. Student By Franiss Jrd

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7. R Mohanty; Fluid Mechanics by; PHI
8. Fluid Mechanics; Gupta Pearson.

List of Experiments (Expandable/Suggested):

1. To determine the local point pressure with the help of pitot tube.
2. To find out the terminal velocity of a spherical body in water.
3. Calibration of orifice meter and venturimeter.
4. Determination of C_c, C_v, C_d of orifices.
5. To verify Bernoullis theorem.
6. Reynolds experiment for demonstration of stream lines & turbulent flow.
7. Determination of meta-centric height.
8. Determination of friction factor of a pipe.
9. To study the characteristics of a centrifugal pump.
10. Verification of impulse momentum principle.

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Subject Title	Subject Code	Credit			Practical		
		L	T	P	External	Internal (50)	Total (50)
Professional Skills – II	BT- 406	-	-	2	Nil	Min: 20 (D Grade)	Min: 20 (D Grade)

Practical internal - Max marks: 50

Assignment / Quiz/ Attendance – Max. Marks: 50

Contents

Elements of Effective Presentation:

Body language and use of voice during presentation; dress, posture, gestures, eye contact and facial expression, connecting with the audience during presentation; projecting a positive image while speaking; planning and preparing a model presentation; organizing the presentation to suit the audience and context; basics of public speaking; preparing for a speech.

Stage Fright, Voice and Language:

Volume, pitch, inflection, speed, pause pronunciation, articulation, language, practice of speech.

Use of Aids –OHP, LCD, projector, white board.

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Subject Title	Subject Code	Credit			Practical		
		L	T	P	External (35)	Internal (15)	Total (50)
Java Programming	BT-407	-	-	2	Min: 14 (D Grade)	Min: Nil	Min: 20 (D Grade)

Practical Internal - Max Marks: 15

Lab Performance/Lab Record/Viva – Max marks: 10
Assignment / Quiz/ Attendance – Max. Marks: 05

Unit	Contents (practical)
I	**Introduction to java programming:** Introduction to java, fundamentals of object oriented programming object and classes, data abstraction and encapsulation, inheritance, polymorphism, dynamic binding, java features compiled and interpreted, platform independent and portable, object oriented distributed, multithreaded and interactive, high performance, constant, variables and data types, scope of variable, operators and expressions, statements, loops, jumps in loops (break , continue).
II	**Object-oriented programming with java classes and objects:** Classes, object and methods defining a class, creating object, accessing class members, visibility control, constructor, methods overloading, static member, inheritance, overriding methods, final variable and methods, final classes, abstract method and classes, array, interfaces and packages: interface: multiple inheritance defining interfaces, extending interfaces, implementing interfaces, accessing interface variable ,packages: putting classes together system package, using system package, naming convention, creating package, accessing a package, using a package, adding a class to a package.
III	**Advance java features:** Multithreading: thread states, priorities and thread scheduling, life cycle of a thread, thread synchronization, creating and executing threads, multithreading with gui, monitors and monitor locks. Networking: manipulating urls, reading a file on a web server, socket programming, security and the network, rmi, networking, accessing databases with jdbc: relational database, sql, mysql, oracle
IV	**Advance JAVA technologies:** Servlets: overview and architecture, setting up the apache tomcat server, handling http get requests, deploying a web application, multitier applications, using jdbc from a servlet, java server pages (jsp): overview, first jsp example, implicit objects, scripting, standard actions, directives, multimedia: applets and application: loading, displaying and scaling images, animating a series of images, loading and playing audio clips
V	**Advance web/internet programming (overview)**: J2ME, J2EE, EJB, and XML.

References:

1. Naughton & schildt "the complete reference java 2", tata mcgraw hill
2. Deitel "java- how to program:" pearson education, asia
3. Horstmann & cornell "core java 2" (vol I & II) , sun microsystems
4. Lvan bayross "java 2.0" : bpb publications

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List of Experiments (Expandable/Suggested):

1. Installation of j2sdk.
2. Write a program to show scope of variables
3. Write a program to show concept of class in java
4. Write a program to show type casting in java
5. Write a program to show how exception handling is in java
6. Write a program to show inheritance
7. Write a program to show polymorphism
8. Write a program to show access specifies (public, private, protected) in java
9. Write a program to show use and advantages of contractor
10. Write a program to show interfacing between two classes
11. Write a program to add a class to a package
12. Write a program to show life cycle of a thread
13. Write a program to demonstrate awt.
14. Write a program to hide a class.
15. Write a program to show data base connectivity using java
16. Write a program to show "hello java" in explorer using applet
17. Write a program to show connectivity using jdbc
18. Write a program to demonstrate multithreading using java.
19. Write a program to demonstrate applet life cycle.
20. Write a program to demonstrate concept of servlet.

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Subject Title	Subject Code	Credit			Practical		
		L	T	P	External (35)	Internal (15)	Total (50)
Computer Aided Engineering Drawing - II	**CET-408**	-	-	2	Min: 14 (D Grade)	Min: Nil	Min: 20 (D Grade)

Practical Internal - Max Marks: 15

Lab Performance/Lab Record/Viva – Max marks: 10
Assignment / Quiz/ Attendance – Max. Marks: 05

Contents (practical)
Students have to understand the working of AutoCAD
• Practicing plan, section and elevation of residential buildings. • Practicing plan, section and elevation of commercial buildings. • Practicing plan, elevation and side view of institutional buildings.

List of experiments/ programs:

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