PEOPLE'S UNIVERSITY, BHOPAL

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

Subject Title	Subject Code	Credit			Theory		
Water Resources and Irrigation Engineering	**CET-601**	**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/ Regularity   – Max. Marks: 10

Unit	Contents (Theory)
I	**Hydrology:** Hydrological cycle, precipitation and its measurement, recording and non recording rain gauges, estimating missing rainfall data, rain gauge net works, mean depth of precipitation over a drainage area, mass rainfall curves, intensity-duration curves, depth-area duration curves, infiltration and infiltration indices, run off and its estimation, hydrograph analysis, unit hydrograph , s-curve hydrograph.
II	**Floods and Ground Water**: Types of floods and their estimation by different methods, Probability and frequency analysis, flood routing through reservoirs and channels, flood control measures, economics of flood control, confined and unconfined aquifers, aquifer properties, hydraulics of wells under steady flow conditions, infiltration galleries. Ground water recharge necessity and **methods** of improving ground water storage. Water logging-causes, effects and its prevention. Salt efflorescence-causes and effects, reclamation of water logged and salt affected lands.
III	**Gravity Dams**: Design criteria, forces acting on gravity dams, elementary profile, low and High gravity dams, stability analysis, foundation treatment, construction joints, galleries in gravity dams. **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, pore pressures, sudden draw down, steady seepage and construction pore pressure condition. **Rock fills dams**: Types, merits and demerits, conditions favourable for their adoption. **Spillways:** Ogee spillway and its design, details of syphon.
IV	**Irrigation Water Requirement and Soil-Water-Crop Relationship:** Irrigation, definition, necessity, advantages and disadvantages, types and methods. Irrigation development. Soils - types and their occurrence, suitability for irrigation purposes, wilting coefficient and field capacity, optimum water supply, consumptive use and its determination. Irrigation methods surface and subsurface, sprinkler and drip irrigation. Duty of water, factors affecting duty and Methods to improve duty, suitability of water for irrigation, crops and crop seasons, principal Crops and their water requirement, crop ratio and crop rotation, intensity of irrigation.
V	**Canal Irrigation:** Types of canals, alignment, design of unlined and lined canals, Kennedy's and lacey's silt theories, typical canal sections, canal losses, lininings-objectives, materials used, economics. Canal falls & cross drainage works, - description and design, head and cross Regulators. Escapes and outlets, canal transitions.

References:

1   Engg. Hydrology - J.Nemec - Prentice Hall
2   Hydrology for Engineers Linsley, Kohler, Paulnus - Tata Mc.Graw Hill.
3   Engg. Hydrology By K. Subhramanya - Tata Mc Graw Hills Publ. Co.
4   Hydrology & Flood Control By Santosh Kumar - Khanna Publishers

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

Subject Title	Subject Code	Credit			Theory		
Theory of Structure-I	**CET-602**	**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	**Virtual Work and Energy Principles:** Principles of virtual work applied to deformable bodies, Strain energy and complementary energy, energy theorems, Maxwell's reciprocal theorem, Analysis of pin-jointed frames for static loads.
II	**Indeterminate Structures-I:** Static and kinematics indeterminacy, analysis of fixed and Continuous beams by theorem of three moments, effect of sinking and rotation of supports, Moment distribution method (without sway).
III	**Indeterminate Structures-II:** Analysis of beams and frames by slope deflection method, Column analogy method.
IV	**Arches and Suspension Cables:** Three hinged arches of different shapes, eddy's theorem, Suspension cable, stiffening girders, two hinged and fixed arches - rib shortening and Temperature effects.
V	**Rolling Loads and Influence Lines:** Maximum SF and BM curves for various types of rolling Loads, focal length, EUDL, influence lines for determinate structures- beams, three hinged Arches.

References:

1   Ghali A & Neville M., Structural Analysis - A Unified Classical and Matrix Approach, Chapman and Hall, New York.
2   Wang C.K. Intermediate Structural Analysis, Mcgraw Hill, New York.
3   Kinney Streling J. Indeterminate Structural Analysis, Addison Wesley.
4   Reddy C.S., Basic Structural Analysis, Tata Mcgraw Hill Publishing Company, New Delhi.
5   Norris C.H., Wilbur J.B. And Utkys. Elementry Structural Analysis, Mcgraw Hill Intern

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

Subject Title	Subject Code	Credit			Theory			Practical		
Design of RCC Structure-II	**CET-603**	**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 (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	**Design of Multistory Buildings:** Sway and non sway buildings, shear walls and other bracing elements.
II	**Earth Retaining Structures:** Cantilever and counter fort types Retaining walls.
III	**Water Tanks:** Tanks on ground and underground tanks: square, rectangular, circular tanks, Overhead tanks: square, rectangular, circular & Intz tanks
IV	**Silos and Bunkers:** Design and Analysis.
V	**T-Beam & Slab Bridges**-For highway loading (IRC loads). Prestressing concepts materials, systems of pre stressing & losses introduction to working & limit State design.

Note: * I S code data book, permitted in the examination hall.

References:

 1   R.C.C. By O.P. Jain Vol. Ii
 2   R.C.C. By B.C. Punmia
 3   Essentials of Bridge Engineering – D.J. Victor
 4   Bridge Engineering - Ponnuswamy
 5   Advanced R.C.C. Design By N.K. Raju

List of experiments

 1   Design and drawing of shear wall
 2   Design and sketch of counter fort retaining wall.
 3   Design and sketch of cantilever wall.
 4   Design and sketch of underground tank.
 5   Design and sketch of Overhead tank.
 6   Design and sketch of Intz tank.
 7   Design and sketch of Silos.
 8   Design and sketch of a Bunker.
 9   Design and sketch of a T-Beam.
 10 Design and sketch of a simply supported slab..

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Subject Title	Subject Code	Credit			Theory			Practical		
		L	**T**	**P**	**External (70)**	**Internal (30)**	**Total (100)** Min:40 (D Grade)	**External (35)**	**Internal (15)**	**Total (50)** Min: 20 (D Grade)
Environmental Engineering - I	**CET-604**	3	1	2						

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	**Estimation of Ground and Surface Water Resources:** Quality of water from different sources, Demand & quantity of water, fire demand, water requirement for various uses, fluctuations in Demand, forecast of population.
II	**Impurities of Water and Their Significance:** Water-borne diseases, physical, chemical and bacteriological analysis of water, water standards for different uses. Intake structure, onveyance of water, pipe materials, pumps - operation & pumping stations.
II	**Water Treatment Methods**: Theory and Design of sedimentation, coagulation, filtration, disinfection, aeration & water softening, modern trends in sedimentation & filtration, miscellaneous methods of treatment.
IV	**Distribution Systems:** Layout and hydraulics of different distribution systems, pipe fittings, valves and appurtenances, analysis of distribution system. Hardy cross method, leak detection, maintenance of distribution systems, service reservoir capacity and height of reservoir.
V	Rural water supply schemes, financing and management of water supply project, water pollution control act, conservation & water carriage system, sanitary appliance and their operation, building drainage system of plumbing.

References:

1 Water Supply Engineering By B.C. Punmia - Laxmi Publications (P) Ltd. New Delhi
2 Water Supply & Sanitary Engg. By G.S. Birdi - Laxmi Publications (P) Ltd. New Delhi
3 Water & Waste Water Technology By Mark J.Hammer - Prentice - Hall Of India, New Delhi
4 Environmental Engineering - H.S. Peavy & D.R.Rowe - Mc Graw Hill Book Company, New Delhi
5 Water Supply & Sanitary Engg. By S.K. Husain
6 Water & Waste Water Technology - G.M. Fair & J.C. Geyer
7 Relevant IS Codes

List of experiments:

1 To study the various standards for water
2 To study of sampling techniques for water
3 Measurement of turbidity
4 To determine the coagulant dose required to treat the given turbid water sample
5 To determine the conc. Of chlorides in a given water samples
6 Determination of hardness of the given sample
7 Determination of residual chlorine by "chloroscope"
8 Determination of alkalinity in a water samples
9 Determination of acidity in a water samples
10 Determination of dissolved oxygen (do) in the water sample.

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

Subject Title	Subject Code	Credit			Theory			Practical		
Geotechnical Engineering - I	**CET-605**	**L**	**T**	**P**	**External (70)**	**Internal (30)**	**Total (100)**	**External (30)**	**Internal (20)**	**Total (50)**
		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	**Basic Definitions & Index Properties:** Definition and scope of soil mechanics, historical development.formation of soils. Soil composition. Minerals, influence of clay minerals on engineering behaviour. Soilstructure. Three phase system. Index properties and their determination. Consistency limits. Classification systems based on particle size and nsistency limits.
II	**Soil Water and Consolidation:** Soil water, permeability determination of permeability in laboratory and in field. Seepage and seepage pressure. Flow nets, uses of a flow net, effective, neutral and total stresses. Compressibility and consolidation, relationship between pressure and void ratio, theory of one dimensional consolidation. Consolidation test, fitting time curves. Normally and over consolidated clays. Determination of pre consolidation pressure, settlement analysis. Calculation of total settlement.
III	**Stress Distribution in Soils and Shear Strength of Soils:** Stress distribution beneath loaded areas by boussinesq and wester-gard's analysis. New mark's influence chart. Contact pressure distribution. mohr - coulomb's theory of shear failure of soils, mohr's stress circle measurement of shear strength, shear box test, tri axial compression test, unconfined compression test, value shear test, measurement of pore pressure, pore pressure parameters, critical void ratio, liquefaction.
IV	**Stability of Slopes:** Infinite and finite slopes. Types of slope failures, rotational slips. Stability number. Effect of ground water. Selection of shear strength parameters in slope stability analysis. Analytical and graphical methods of stability analysis. Stability of earth dams.
V	**Lateral Earth Pressure:** Active, Passive and Earth pressure at rest. Rankine, coulomb, terzaghi and culmann's theories. Analytical and graphical methods of determination of earth pressures on cohesion-less and cohesive soils. Effect of surcharge, water table and wall friction. Arching in soils. Reinforced earth retaining walls.

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

List of experiments:

1 Determination of hygroscopic water content.
2 Particle - size analysis.
3 Determination of specific gravity of soil particles.
4 Determination of plastic limit.
5 Determination of liquid limit.
6 Determination of shrinkage limit.
7 Permeability tests.
8 Direct shear test.
9 Consolidation test.

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Subject Title	Subject Code	Credits			Practical		
		L	**T**	**P**	**External (Nil)**	**Internal (50)**	**Total (50)**
Professional Skills –III	**BT- 606**	-	-	2			Min: 20 (D Grade)

Practical Internal - Max Marks: 50

Lab work & Sessional   – Max Marks: 45
Assignment / Quiz   – Max. Marks: 05

Contents
Group discussion   Introduction to group discussion, structure and dynamics; Techniques of effective participation in group discussion; Preparing for group discussion; Ways to carry out group discussion,   Parameters— Contact, body language, analytical and logical thinking, decision making   **Interview Technique**   Necessity, How to prepare for interviews; Language and style to be used in interview; Types of interview questions and how to answer them; Tips for handling common questions.

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

Subject Title	Subject Code	Credits			Practical		
Research Methodology	**BT- 607**	**L**	**T**	**P**	**External (Nil)**	**Internal (50)**	**Total (50)**
		0	0	2			Min: 20 (D Grade)

Practical Internal - Max Marks: 50

Lab Performance, Lab Record & Viva   –Max Marks: 45
Assignment / Quiz   – Max. Marks: 05

Unit	Contents *(Practical)*
I	**Objectives and types of research:** Motivation and objectives – Research methods *vs* Methodology. Types of research – Descriptive *vs*. Analytical, Applied *vs*. Fundamental, Quantitative *vs*. Qualitative, Conceptual *vs*. Empirical.
II	**Research Formulation** – Defining and formulating the research problem - Selecting the problem Necessity of defining the problem - Importance of literature review in defining a problem.
III	**Research design and methods** – Research design – Basic Principles- Need of research design Features of good design – Important concepts relating to research design – Observation and Facts. Developing a research plan - Exploration, Description, Diagnosis, and Experimentation.
IV	**Data Collection and analysis:** Execution of the research - Observation and Collection of data Methods of data collection – Sampling Methods- Data Processing and Analysis strategies - Data Analysis with Statistical Packages - Hypothesis-testing - Generalization and Interpretation.
V	**Reporting and thesis writing** – Structure and components of scientific reports - Types of report – Technical reports and thesis – Significance – Different steps in the preparation – Layout, structure and Language of typical reports – Illustrations and tables - Bibliography, referencing and footnotes.

References:

1   Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. *An introduction to Research Methodology*, RBSA Publishers.
2   Kothari, C.R., 1990. *Research Methodology: Methods and Techniques*. New Age International. 418p.
3   Sinha, S.C. and Dhiman, A.K., 2002. *Research Methodology*, Ess Ess Publications. 2 volumes.
4   Trochim, W.M.K., 2005. *Research Methods: the concise knowledge base*, Atomic Dog Publishing. 270p.

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Subject Title	Subject Code	Credits			Practical		
		L	**T**	**P**	**External** **(35)**	**Internal** **(15)**	**Total (50)**
RDBMS	**BT-638**	-	-	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	DBMS an overview, Advantages of DBMS Network, Hierarchical and Relational Model, Levels of abstraction, Data Independence, Data Models, Instances and schemes, Data independence, Structures of a DBMS, Application Programmers & Data Base administrators – their function, Transaction Management ,Entity Relationship Model- Entities, Attributes and Entity Sets, Relation and Relationships sets, Features of E-R Model
II	Relational Model Introduction, Integrity constraints over relations, Enforcing Data Integrity, Integrity Constraints, Relational Data, Logical Data Base Design, E-R to relational, Introduction to views, Querying, Relational Algebra and Relational Calculus, Operations on Relational Algebra, Operations on Relational Calculus, Tuple Relational Calculus, Domain Relational Calculus
III	Meaning of integrity constraints, various types of integrity constraints in relational approach like domain constraints, referential integrity constraints, functional dependency constraints, assertions, triggers etc. Normalization in relational approach, conversion of a relational to higher normal forms, normalization using functional dependencies, multi-valued dependencies, join dependencies etc., domain key normal form.
IV	Methods of storing relational database record in files, various types of files like sequential files, indexed files, indexed sequential files etc. for storing of relational data, buffer management, data dictionary, physical storage media etc. needed for these file. Introduction to indexing and hashing, various types of indexing techniques using B -Trees, B+ -Trees etc., various types of hashing techniques like static hashing function, dynamic hashing function etc, overview of query processing and cost estimation.
V	Overview of object oriented databases and related concepts, object relational model, distributed databases, parallel databases, temporal databases, spatial databases, web & multimedia databases.

References:

1. Fundamentals of Database Systems by Elmasri & Navathe
2. Database System Concepts by Silberschatz , Korth & Sudershan .
3. An introduction to Database Systems by C.J.Date

List of Experiments (Expandable/Suggested):

1. Study and Implementation of Create table Command
2. Study and Implementation of Insert Command
3. Study and Implementation of Delete Command
4. Study and Implementation of Drop Table Command
5. Study and Implementation of Alter Table Command
6. Study and Implementation of Update Command
7. Study and Implementation of Select Clause
8. Study and Implementation of From Clause
9. Study and Implementation of Where Clause
10. Delete Duplicate Rows from the Table

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