NETAJI SUBHASH INSTITUTE OF TECHNOLOGY, BIHTA, PATNA
Affilted to Bihar Engineering University

Bachelor of Technology

Department of Civil Engineering

List of Course Outcomes with Program Outcome Mapping

Course Name :Basic Electrical Engineering LAB		Course Code : 100101P

At the end of course student will able to

CO1	To analyze a given network by applying various electrical laws and network theorems.
CO2	To know the response of electrical circuits for different excitations.
CO3	To calculate, Measure and know the relation between basic electrical parametres.
CO4	To analyze the performance characteristics of DC and AC electrical machines.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	2	0	2	0	0	0	1	0	1	1	0
CO2	2	2	1	3	0	2	1	0	0	1	1	1	1	1
CO3	3	3	1	0	0	2	1	0	0	1	1	1	1	0
CO4	3	3	2	3	0	2	1	0	0	1	2	3	2	1
MAPPING AVG	2.75	2.75	1.25	2	0	2	0.75	0	0	1	1	1.5	1.25	0.5

Course Name :Basic Electrical Engineering		Course Code : 100101

At the end of course student will able to

CO1	Students are able to examine and execute the basic concepts of AC and DC electric circuit and its behaviour.
CO2	Students are capable of analysing the fundamental ideas behind magnetic circuits, including their definition, magnetic hysteresis phenomena, B-H curve, and hysteresis loop.
CO3	Students are capable of applying the essential ideas and definitions of AC circuits, including single-phase, three-phase, RC and RLC circuits, and star and delta connections.
CO4	To identify the different kinds of single-phase transformers and to compute efficiency, losses, and regulations
CO5	To analyze the performance characteristics of DC and AC electrical machines.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	2	0	2	2	0	0	1	0	1	1	0

CO2	2	2	1	3	0	2	2	0	0	1	1	1	0	1
CO3	3	3	1	0	0	2	3	0	0	1	1	1	2	2
CO4	3	3	2	3	0	2	3	0	0	1	2	3	1	1
CO5	3	3	1	2	0	2	3	0	0	1	2	3	0	2
MAPPING AVG	2.8	2.8	1.2	2	0	2	2.6	0	0	1	1.2	1.8	0.8	1.2

Course Name : ENGINEERING GRAPHICS & DESIGN	Course Code :100102

At the end of course student will able to

CO1	Apply the concept of drawing in practical applications
CO2	Draw the projection of points, lines and planes
CO3	Classify solids and projection of solids at different positions
CO4	Show sectioned view of solids and development of surfaces
CO5	Discuss about conics and orthographic views , isometric view of engineering components.
CO6	Understand the basic AUTOCAD commands and other emerging designing tools.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	1	0	2	1	0	1	1	0	2	1	1
CO2	1	1	1	1	2	0	0	0	1	1	0	0	2	0
CO3	0	1	1	1	1	0	0	0	0	1	0	0	0	2
CO4	0	1	1	1	0	0	0	0	1	1	0	0	2	2
CO5	0	0	1	1	1	0	1	0	1	1	2	1	1	1
CO6	0	0	0	1	3	0	0	2	0	1	0	1	2	0

CO/PO MAPPING AVG	0.5	0.67	0.83	1	1.17	0.33	0.33	0.33	0.67	1.00	0.33	0.67	1.33	1.00

Course Name : ENGINEERING GRAPHICS & DESIGN	Course Code :100102P

At the end of course student will able to

CO1	Get acquainted with the knowledge of various lines, geometrical constructions and construction of various kinds of scales, and Ellipse.
CO2	Improve their imagination skills by gaining knowledge about points, lines and planes.
CO3	Become proficient in drawing the projections of various solids.

CO4	Gain knowledge about orthographic and isometric projections.	
CO5	Development of surface of different kind of solid.	

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	1	0	2	1	0	1	1	0	2	1	
CO2	1	1	1	1	2	0	0	0	1	1	0	0	2	
CO3	0	1	1	1	1	0	0	0	0	1	0	0		1
CO4	0	1	1	1	0	0	0	0	1	1	0	0		2
CO5	0	0	1	1	1	0	1	0	1	1	2	1		1

CO/PO MAPPING AVG	0.6	0.80	1.00	1	0.80	0.40	0.40	0.00	0.80	1.00	0.40	0.60	1.50	1.33

Course Name : Mathematics - I	Course Code :101102

At the end of course student will able to	
CO1	Learn properties of real line and learn the concept of limit, continuity, differentiability of a real valued function and how to expand a function in powers of independent variable.
CO2	Understand the basics of Gamma and Beta function and Riemann integral for computing area, volume, mass etc.
CO3	Solve a function in powers of independent variable; its properties and Fourier series.
CO4	Apply theory of Matrices and its applications.
CO5	Discuss vector spaces, linear independence, basis, dimension, linear transformation, range and kernel, rank-nullity and inverse of a linear transformation; Gram Scmidt process.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	1	2	1	0	1	0	0	1	2	0	1	1
CO2	3	3	1	3	2	0	0	0	0	1	0	0	2	0
CO3	3	0	0	0	0	0	0	0	0	0	0	0	0	2
CO4	3	3	2	2	2	3	1	0	0	0	2	0	1	2
CO5	2	2	0	2	2	0	2	0	0	0	2	0	1	1

CO/PO MAPPING AVG	2.6	2.20	0.80	1.8	1.40	0.60	0.80	0.00	0.00	0.40	1.20	0.00	1.00	1.20

Course Name : Physics Lab		Course Code :101101P
At the end of course student will able to		
CO1	Understand practical application of mechanical compenents such as flywheel ,pulley and determine related parameters such as moment of inertia of a flywheel.	
CO2	Learn the concept of friction through inclined plain experiment and verify Newton's laws of motion and conservation principles with help of data .	
CO3	Identify an engineering problem and recognize the experiments needed to analyze it, in the light of Engineering Mechanics knowledge.	
CO4	Perform experiments and find out unknowns such as forces, moments, positions and velocities following the instructions and present relations with help of appropiate method such as graphs	
CO5	Perform experiments in laboratory as being part of team , share information with each othet and learn to work as single unit.	

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	0	2	1	1	2	3	1	0	0	1	2	2	2	1
CO2	3	2	1	3	1	0	1	0	0	3	1	2	1	1
CO3	2	3	1	2	2	2	3	2	0	0	2	2	2	0
CO4	2	1	1	3	2	0	0	0	0	3	2	1	0	1
CO5	0	0	0	0	0	0	0	0	2	2	1	1	1	2

CO/PO MAPPING AVG	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	1.4	1.60	0.80	1.8	1.40	1.00	1.00	0.40	0.40	1.80	1.60	1.60	1.20	1.00

Course Name : Physics		Course Code :101101
At the end of course student will able to		
CO1	Identify various relations between Torque,Energy and Force using derived scintific ,mechanical and mathematical laws.	
CO2	Analyze and document various quantities such as velocity, acceleration and force in different coordinate systems	
CO3	Calculate the centre of mass, centroid, centre of gravity and moment of inertia for the simple and composite plane sections using principal of mechanics and basic mathematics	
CO4	Understand and verify various theorem regarding work and energy and momentum methods for particles and rigid bodies and their application in real life engineering problems	
CO5	Apply the knowledge of various theorem in solving the real time problems.	

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	1	2	0	0	0	0	1	1	2	1	0
CO2	2	2	2	1	2	2	2	2	1	3	1	1	0	2
CO3	2	2	2	1	1	0	1	2	1	3	1	2	1	1

CO4	0	2	1	1	2	0	1	0	0	2	0	2	0	0
CO5	2	1	1	2	0	0	1	0	0	1	0	1	1	1

CO/PO MAPPING AVG	1.8	1.80	1.40	1.2	1.40	0.40	1.00	0.80	0.40	2.00	0.60	1.60	0.60	0.80

SEMESTER - II

Course Name :ENGLISH LAB	Course Code : 100206P

At the end of course student will able to	
CO1	Identify common errors in spoken and written communication
CO2	Get familiarized with English vocabulary and language proficiency
CO3	Improve nature and style of sensible writing, acquire employment and workplace communication skills.
CO4	Improve their Technical Communication Skills through Technical Reading and Writing practices.
CO5	Perform well in campus recruitment, engineering and all other general competitive examinations

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	1	2	0	1	0	0	2	2	2	1	
CO2	0	2	2	2	2	0	0	0	0	1	1	1		2
CO3	3	1	1	0	2	0	0	0	0	2	1	0	1	
CO4	1	2	2	2	2	3	2	0	0	1	1	1		1
CO5	2	1	1	1	2	2	0	0	0	1	1	2	1	
MAPPING AVG	1.6	1.6	1.6	1.2	2	1	0.6	0	0	1.4	1.2	1.2	1	1.5

Course Name :ENGLISH	Course Code : 100206

At the end of course student will able to	
CO1	Ability to communicate effectively and write and present properly.
CO2	Ability to work individually and in intra disciplinary and multidisciplinary teams
CO3	acknowledgement of the importance of information access, lifelong learning, and advancements in science and technology
CO4	Knowledge of project management, risk management, innovation and change management, entrepreneurship and sustainable development.

CO5	Ability to recognise, describe, formulate, and resolve complicated engineering issues in addition to selecting and utilising suitable modelling and analysis techniques for a variety of.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	1	1	2	1	3	1	1	2	1	1	1	
CO2	2	2	1	2	2	3	3	1	1	2	2	1		1
CO3	3	3	2	2	2	1	2	1	1	2	2	1	1	
CO4	2	2	1	3	1	1	2	1	1	3	2	2	2	
CO5	2	2	2	1	3	3	1	1	1	2	3	1	2	
MAPPING AVG	2	2.2	1.4	1.8	2	1.8	2.2	1	1	2.2	2	1.2	1.5	1

Course Name :Mathematics - II (Differential Equations)	Course Code : 100202

At the end of course student will able to

CO1	Learn the solutions of ODE of higher order that model physical phenomena and engineering problems.
CO2	Demonstrate partial differential equations of first order and their solution.
CO3	Apply operators, finite differences and interpolation to solve first order ODE, Algebraic and Transcendental equations. 1/3rd and 3/8th rule.
CO4	Understand differentiation, integration of functions of complex variables.
CO5	Illustrate real integrals for various complex engineering problems.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2	0	2	0	0	1	2	0	1	
CO2	2	3	2	3	2	2	1	0	0	1	1	0	2	
CO3	3	2	1	0	2	0	0	0	0	1	1	1		1
CO4	3	3	2	2	2	2	2	0	0	1	2	0	1	
CO5	3	2	1	2	2	2	1	0	0	0	2	1	1	
MAPPING AVG	2.8	2.6	1.6	1.8	2	1.2	1.2	0	0	0.8	1.6	0.4	1.25	1

Course Name :PROGRAMMING FOR PROBLEM SOLVING	Course Code : 100204

At the end of course student will able to

CO1	TO FORMULATE SIMPLE ALGORITHMS FOR ARITHMETIC AND LOGICAL PROBLEMS.	
CO2	TO TRANSLATE THE ALGORITHMS TO PROGRAMS (IN C LANGUAGE).	
CO3	TO TEST AND EXECUTE THE PROGRAMS AND CORRECT SYNTAX AND LOGICAL ERRORS.	
CO4	TO IMPLEMENT CONDITIONAL BRANCHING, ITERATION AND RECURSION.	
CO5	TO DECOMPOSE A PROBLEM INTO FUNCTIONS AND SYNTHESIZE A COMPLETE PROGRAM USING DIVIDE AND CONQUER APPROACH.	

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	1	0	0	0	0	1	1	0	1	1	
CO2	0	1	1	1	0	0	0	0	1	1	0	1		1
CO3	0	1	1	1	0	0	1	0	1	1	0	1	1	
CO4	1	1	1	1	0	0	1	0	1	1	0	1	1	
CO5	1	1	1	1	0	0	1	0	1	1	0	1		
MAPPING AVG	0.8	1	1	1	0	0	0.6	0	1	1	0	1	1	1

Course Name :PROGRAMMING FOR PROBLEM SOLVING	Course Code : 100204P

At the end of course student will able to	
CO1	Students will be able to develop C programs for simple applications making use of basic constructs
CO2	Students will be able to develop C programs for simple applications using Arrays and Strings
CO3	Students will be able to develop C programs involving Functions, Recursion, and Pointers.
CO4	Students will be able to develop C programs involving Structures
CO5	Students will be able to design applications using sequential and random access file processing.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	0	1	1	0	2	0	0	0	0	2	0	1	
CO2	0	0	1	1	0	2	0	0	0	0	2	0		1
CO3	0	0	1	1	0	2	1	0	0	1	2	0	2	
CO4	0	0	1	1	0	2	1	0	0	1	2	0	1	
CO5	0	0	1	1	0	2	1	0	0	1	2	0	1	
MAPPING AVG	0.4	0	1	1	0	2	0.6	0	0	0.6	2	0	1.25	1

Course Name :Workshop Manufacturing Practices	Course Code : 100205

At the end of course student will able to

CO1	Undersatnd different types of manufacturing techniques, their advantagas with their economic,socail and susatainable aspects.
CO2	Apply principalof fundamental and advanced mathematics, basic science and engineering, statistical techniques to calculate process parameters and design parameters to craete a product satisfying national and international standards used in any manufacturing process.
CO3	Compare, analyze,document and present various traditional workshop manufacturing processes as well as modern manufacturing tools.
CO4	Analyze alternative design as well as economic aspects of a given manufacturing process
CO5	Identify emerging technologies and make students aware of them for their continuous professional growth by bridging knowledge about emerging industry oriented technology

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	0	1	2	2	2	0	1	1	2	3	1	
CO2	3	3	2	2	3	3	1	3	0	1	0	0	2	
CO3	2	2	2	2	2	0	0	0	0	3	1	2		1
CO4	0	1	2	2	1	0	0	0	0	1	3	0		2
CO5	0	2	1	1	1	0	0	0	0	1	1	2		1
MAPPING AVG	1.4	1.8	1.4	1.6	1.8	1	0.6	0.6	0.2	1.4	1.4	1.4	1.5	1.333333

Course Name :Workshop Manufacturing Practices LAB	Course Code : 100205P

At the end of course student will able to

CO1	Understand the appropriate conventional and modern tools, materials, instruments required for specific operations with their limitations in workshop.
CO2	Identify , develop and improve practical skills in various machining operations and safety consciousness and show team work.
CO3	Design ,anlayze ,create and inspect an object in workshop using various machine and hand tool available in different shops such as fitting , carpentary weleding and machine shop.
CO4	Apply different conventional and advanced manufacturing techniques and measuring instruments for making a job with help of laws of basic science under economic constraints.
CO5	Discriminate and develop various sustainable,ethical and cost-effective solutions for real engineering problems using machine and equipments in workshop .

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1	1	2	0	0	0	0	1	0	1	1	
CO2	1	2	1	2	2	2	0	2	3	1	1	2	2	
CO3	2	1	1	2	2	0	1	0	1	3	1	0		1

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO4	3	1	2	2	1	0	0	0	0	1	2	2		2
CO5	2	2	1	1	1	0	3	3	0	0	2	1		1
MAPPING AVG	1.8	1.4	1.2	1.6	1.6	0.4	0.8	1	0.8	1.2	1.2	1.2	1.5	1.333333

Course Name :CHEMISTRY LAB	Course Code : 100203P

At the end of course student will able to

CO1	Determine the choride content of water
CO2	Learnand apply basic techniques used in chemistry laboratoryfor volumetric analysis redox titration with different indicators, EDTA titration .
CO3	Expose to different methodsof chemicals analysis anduse of some commonly employed.
CO4	Synthesis a small drugs molecule and analysea salt samples .
CO5	Estimate rate constant of reaction from concentration of reatant such as surface tension aand viscosity .

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	0	1	0	0	0	0	0	0	0	0	1	
CO2	1	1	0	1	0	3	3	0	1	0	2	1		
CO3	1	2	1	2	2	2	2	0	0	1	2	0		1
CO4	1	1	2	3	2	3	3	0	2	2	3	2	2	
CO5	2	1	2	2	2	0	0	0	1	2	0	1	2	
MAPPING AVG	1.4	1.2	1	1.8	1.2	1.6	1.6	0	0.8	1	1.4	0.8	1.66667	1

Course Name :CHEMISTRY	Course Code : 100203

At the end of course student will able to

CO1	Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces .
CO2	Rationlise bulk properties and processes using thermodynamic considerations.
CO3	Analyze hardness of water for industrial and domestic applications .

CO4	Distinguish the ranges of the electromagnetic spectrum used exciting different molecular energy levels in various spectroscopic techniques .
CO5	learn periodic properties such as ionisation potential, electronegativity, oxidation state, electron affinities.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	2	1	0	0	3	0	2	0	2	2	2
CO2	1	1	1	2	2	0	0	0	0	1	1	2	1	
CO3	1	1	2	2	3	3	2	0	1	2	3	2	1	1
CO4	2	2	2	3	2	2	2	0	1	2	2	3	1	2
CO5	0	0	0	0	1	0	0	3	0	1	0	2	1	
MAPPING AVG	2	2	2	3	3	3	2	0	1	2	3	3	1	1

SEMESTER - III

Course Name :Computer aided Civil Engineering Drawing	Course Code : 101303

At the end of course student will able to

CO1	Computer Aided civil Engineering drawing
CO2	Students are able to apply the feautures and function of typical CAD system for producing CAD drawing,
CO3	Students are able to communicate through CAD drawings,
CO4	Students are able describe Auto-CAD commands
CO5	Students are able draw 2D Auto-CAD drawing of residential buildings

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3	2	2	2	1	3	1	2	2	1	1	
CO2	3	2	2	2	1	2	2	2	2	2	2	3		2
CO3	2	2	1	2	2	2	2	2	2	2	1	2	1	
CO4	2	3	2	3	2	2	2	3	2	3	3	3		1
CO5	2	2	2	2	2	2	1	2	0	2	2	3	2	
MAPPING AVG	2.2	2.4	2	2.2	1.8	2	1.6	2.4	1.4	2.2	2	2.4	1.33333	1.5

Course Name :Computer aided Civil Engineering Drawing	Course Code : 101303P
At the end of course student will able to	

CO1	Students are able to Explain the principle and convetional representation of engineering drawing accroding to engineering stands,
CO2	Students are able to apply the feautures and function of typical CAD system for producing CAD drawing,
CO3	Students are able to communicate through CAD drawings,
CO4	Students are able describe Auto-CAD commands

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3	2	3	2	1	3	1	2	2	1	1	
CO2	3	2	2	2	1	2	3	2	2	2	2	3	1	
CO3	2	2	1	2	2	2	2	2	2	2	1	2		2
CO4	2	3	2	3	2	2	2	3	2	3	3	3	2	

MAPPING AVG	2.25	2.5	2	2.25	2	2	2	2.5	1.75	2.25	2	2.25	1.33333	2

Course Name : Basic Electronics	Course Code : 101302
At the end of course student will able to	

CO1	Have a thorough understanding of the fundamental concepts of electronics and its characteristics
CO2	To design the basic circuits using op-amp and perform operations and their troubleshooting.
CO3	To Understand to design different type of amplifier
CO4	To understand the basic about power transistor circuits.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	2	2	3	3	0	3	1	3	3	1	0
CO2	2	2	1	2	3	3	3	0	3	1	2	2	0	1
CO3	2	2	1	1	3	3	3	0	3	1	2	2	1	0
CO4	2	2	0	2	1	3	3	0	3	1	2	2	1	0

MAPPING AVG	2.25	2	0.75	1.75	2.25	3	3	0	3	1	2.25	2.25	0.75	0.25

Course Name : Surveying & Geomatics LAB	Course Code : 101308P

At the end of course student will able to

CO1	Measure Bearing of lines with a Prismatic Compass for Open and Closed Traverse
CO2	Compute level differences between different stations by dumpy level and prepare contour maps
CO3	Operate Theodolite to find heights and distances as well as conducting trigonometric surveying.
CO4	Understand setting out curves.
CO5	Get knowledge on Total Station and its operation.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	0	2	0	0	0	0	1	0	1	1	1
CO2	0	0	1	3	0	2	2	0	0	1	1	1	1	0
CO3	1	1	1	0	0	2	3	0	0	1	1	1	1	1
CO4	0	1	0	2	0	2	3	0	0	1	2	3	2	0
CO5	0	0	1	1	0	2	3	0	0	1	2	3	0	1

MAPPING AVG	0.6	0.8	0.8	1.2	0.4	1.6	2.2	0	0	1	1.2	1.8	1	0.6

Course Name : Basic Electronics LAB	Course Code : 101302P

At the end of course student will able to

CO1	Have a thorough understanding of the fundamental concepts of electronics and its characteristics
CO2	To design the basic circuits using op-amp and perform operations and their troubleshooting.
CO3	To Understand to design different type of amplifier
CO4	To understand the basic about power transistor circuits.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	0	1	1	3	3	0	1	2	0	3	1	1
CO2	1	1	1	2	3	3	3	0	1	2	1	2	1	1
CO3	2	2	1	1	2	2	3	0	1	2	1	2	0	2
CO4	1	1	1	3	2	3	3	0	1	2	2	2	1	0

MAPPING AVG	1.5	1.25	0.75	1.75	2	2.75	3	0	1	2	1	2.25	0.75	1

Course Name : BIOLOGY FOR ENGINEERS	Course Code :100301

At the end of course student will able to

CO1	Describe how biological observations of 18th Century that lead discoveries.
CO2	Conveythat classification per seis not biology is all about highlight the underlaying criteria such as mophplogical, biochemical, and ecological
CO3	Highlight the concepts of recessiveness and dominance during the passage of genetic material from parents to offsprings.
CO4	Convey that all forms of life have the same building blocks and yet the manifestations are as diverse as one can imagine .
CO5	Classify enzymes and distinguish between different mechanisms of enzymes action .
CO6	Identify DNA as a genetic material in the molecular basis of information trasfer.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	0	1	1	1	0	0	3	0	1	0	1	1	
CO2	2	1	1	1	1	0	1	2	1	2	0	1		1
CO3	1	1	0	1	0	0	0	0	0	0	1	0	1	
CO4	2	1	1	1	0	2	0	2	0	1	1	0		1
CO5	0	1	0	1	2	0	0	0	0	1	0	0	2	
CO6	0	1	2	1	3	0	1	0	1	1	0	0		

MAPPING AVG	1	0.83333	0.83333	1	1.16667	0.33333	0.33333	1.16667	0.33333	1	0.33333	0.33333	1.33333	1

Course Name : Engineering Mechanics	Course Code :101304

At the end of course student will able to

CO1	Understand the concepts of engineering mechanics.
CO2	Knowledge regarding center of gravity and moment of inertia and apply them for practical problems.
CO3	Knowledge regarding various types of forces and reactions and tom draw free body diagram to quicker solutions for complicated problems
CO4	Knowledge in solving problems involving work and energy.
CO5	Knowledge on friction on equilibrium and its application.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2

CO1	2	1	1	1	0	0	0	0	0	1	2	2	1	
CO2	2	2	1	2	2	3	3	3	1	2	3	2		2
CO3	2	2	3	2	2	2	3	3	2	3	2	3	1	
CO4	3	3	2	3	1	2	3	0	0	1	2	1		1
CO5	1	2	2	1	2	3	3	3	2	2	3	3	2	
MAPPING AVG	2	2	1.8	1.8	1.4	2	2.4	1.8	1	1.8	2.4	2.2	1.33333	1.5

Course Name :Introduction to Civil Engineering	Course Code :101306

At the end of course student will able to	
CO1	To give an understanding to the students of the vast breadth and numerous areas of engagement available in the overall field of Civil Engineering.
CO2	To motivate the student to pursue a career in one of the many areas of Civil Engineering with deep interest and keenness.
CO3	To expose the students to the various avenues available for doing creative and innovative work in this field by showcasing the many monuments and inspiring projects of public utility.
CO4	After completion of this subject students will able to understand basic principles of building design and planning.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	1	1	2	3	0	0	1	0	2	1	
CO2	2	2	1	1	1	3	3	0	0	1	0	1		1
CO3	2	2	1	1	1	3	3	0	0	1	0	1	1	
CO4	2	2	2	2	0	3	3	0	0	1	0	2	2	
MAPPING AVG	2	2	1.25	1.25	0.75	2.75	3	0	0	1	0	1.5	1.33333	1

Course Name : Summer Internship-I	Course Code :101399P

At the end of course student will able to	
CO1	It aims to cultivate entrepreneurial skills within the context of civil engineering construction
CO2	It could involve fostering an understanding of business models, market analysis, and feasibility studies specifically within the tech industry.
CO3	The goals might include developing skills in ideation, prototyping, and business planning, and understanding the essentials of technology commercialization.
CO4	Furthermore, students might learn about intellectual property rights, pitching, and the process of bringing structural innovations to the market.
CO5	Creative strategies for pursuing, exploiting and further developing new opportunities.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	2	1	0	2	1	0	3	2	2	2	1	
CO2	1	2	2	1	1	2	3	0	3	3	2	3		2
CO3	1	2	3	2	2	2	3	2	3	3	3	3	1	
CO4	1	2	3	2	2	2	3	2	2	3	1	2		2
CO5	1	1	2	1	0	2	2	0	3	2	3	3	1	
MAPPING AVG	1	1.6	2.4	1.4	1	2	2.4	0.8	2.8	2.6	2.2	2.6	1	2

Course Name : Mathematics - IIII (Ordinary Differential Equation and Special Function)	Course Code :101312

At the end of course student will able to

CO1	Demonstrate the applications of Bessel and Legendre functions.
CO2	Solution of ordinary differential equations of first order and their solutions.
CO3	Apply the effective mathematical tools for solutions of partial differential equations of higher order.
CO4	Describe measure of Central tendency: Moments, Skewness, kurtosis, Correlation and regression.
CO5	Discuss curve fitting by the method of least squares; Fitting of straight lines, Parabolas and general curves; test for single mean, difference of means, correlation coefficients,Chi squares test for goodness of Fit

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	1	2	1	0	1	0	0	1	2	0	1	
CO2	3	3	1	2	2	0	0	0	0	1	0	0		1
CO3	3	0	0	0	0	0	0	0	0	0	0	0	2	
CO4	3	3	2	2	2	3	2	0	0	0	2	2	2	
CO5	2	2	0	1	2	0	1	0	0	0	3	0		1
MAPPING AVG	2.6	2.2	0.8	1.4	1.4	0.6	0.8	0	0	0.4	1.4	0.4	1.66667	1

Course Name :Surveying & Geomatatic	Course Code :101308

At the end of course student will able to

CO1	Apply the Knowledge Apply the knowledge, techniques, skills ,and applicable tools of the discipline to Engineering and surveying activities.
CO2	To be able to calculate, design and layout of horizontal and vertical curves, Understand, interpret, and prepare plan, profile, and cross-section drawings
CO3	Understand the advantages of electronic surveying over conventional surveying methods

CO4	Acquire knowledge about photogrammetry principles, methods and. Product generation strength in both Analytical and digital photogrammetry system.	
CO5	Acquire knowledge about the principles and physics of Remote sensing and data acquisition and getting familiarized with various data analysis techniques.	

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	1	3	3	3	0	3	2	2	2	2	
CO2	3	3	3	3	3	3	3	0	3	3	2	3		1
CO3	3	3	2	2	3	3	3	0	3	2	2	3	1	2
CO4	3	3	1	2	3	2	3	3	3	2	2	2		
CO5	3	3	1	3	3	3	2	3	3	2	2	3	1	

| MAPPING AVG | 3 | 3 | 1.6 | 2.2 | 3 | 2.8 | 2.8 | 1.2 | 3 | 2.2 | 2 | 2.6 | 1.33333 | 1.5 |

Course Name :Humanities	Course Code :101305

At the end of course student will able to	
CO1	Discuss the applications of mean value theorems to the mathematical problem, evaluation of improper integrals using Beta and Gamma functions.
CO2	Basic concept of convergence and Divergence, and Discuss the applications of convergence of sequence and series .,half range sine and cosine series
CO3	Examine the extrema of functions of two variables with / without constraints.
CO4	Discuss the double and triple integrals and its applications
CO5	Classifies the differential equation, ODE and PDE and Discuss the different types of problems. ODE and PDE and understand that physical system ,practical importance and boundary value problem.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	0	1	1	1	2	2	2	3	3	2	1	3	1	2
CO2	0	1	1	1	2	3	3	3	2	2	2	3	0	1
CO3	0	1	1	1	1	2	2	3	3	2	2	3	1	0
CO4	0	1	1	1	2	2	1	2	2	3	2	2	0	0
CO5	0	1	1	2	2	2	3	3	3	2	2	2	1	2

| MAPPING AVG | 0 | 1 | 1 | 1.2 | 1.8 | 2.2 | 2.2 | 2.8 | 2.6 | 2.2 | 1.8 | 2.6 | 0.6 | 1 |

SEMESTER - IV

Course Name : Disaster Preparedness and Planning	Course Code :101402

At the end of course student will able to

CO1	Understand basic concept in Disaster Management.
CO2	Understand Definitions and Terminologies using in Disaster
CO3	Understand types and Categories of Disasters.
CO4	Understand the Challenges posed by Disasters.
CO5	To understand impacts of Disasters keySkills.
CO6	Understanding the Disaster risk Reduction .

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	1	1	2	0	3	0	0	3	2	3	1	
CO2	2	2	2	2	3	2	3	0	0	2	2	2		2
CO3	2	3	2	1	2	2	2	0	0	2	2	1	1	
CO4	2	2	1	2	1	2	2	0	0	3	2	3	1	
CO5	2	2	2	1	2	3	1	3	0	3	3	2		
CO6	2	3	2	1	2	0	0	0	0	2	0	3		2

MAPPING AVG	1.83333	2.33333	1.66667	1.33333	2	1.5	1.83333	0.5	0	2.5	1.83333	2.33333	1	2

Course Name :Engineering Geology	Course Code 101403

At the end of course student will able to

CO1	Recognize the fundamentals of the Earth as a planet, earth's dynamic actions and their importance for civil engineering structures
CO2	Appreciate the usefulness and utilization of natural materials in civil engineering works;
CO3	Broadly assess the dynamic actions of natural forces on civil engineering structures and recommend remedial measures
CO4	Analyze and interpret geological reports and information and the latest geological exploration methods for suitable site selection;
CO5	Ascertain safe, stable and economical civil structures.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	1	1	2	1	3	1	1	2	1	1	1	
CO2	2	2	1	2	2	3	3	1	1	2	2	1		1

CO														
CO3	3	3	2	2	2	1	2	1	1	2	2	1	1	
CO4	2	2	1	3	1	1	2	1	1	3	2	2		1
CO5	2	2	2	1	3	3	1	1	1	2	3	1		1

MAPPING AVG	2	2.2	1.4	1.8	2	1.8	2.2	1	1	2.2	2	1.2	1	1

Course Name :Engineering Geology	Course Code 101403P

At the end of course student will able to

CO1	Identify the minerals based on their physical properties by simple tests.
CO2	Solve various geological problems.
CO3	Classify rocks using basic geologic classification systems
CO4	Interpret the geological structures in the geological maps and models.
CO5	Understanding of geological structures and out crops patterns of different types of rocks and land forms

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	2	2	1	3	1	2	2	1	1	1
CO2	3	2	2	2	1	2	3	2	2	2	2	2	2	
CO3	2	1	1	2	2	2	2	2	2	2	1	2	2	2
CO4	2	3	2	3	2	2	2	3	2	3	2	3		1
CO5	2	2	2	2	2	2	3	2	1	2	2	3	1	

MAPPING AVG	2.2	2	1.8	2.2	1.8	2	2.2	2.4	1.6	2.2	1.8	2.2	1.5	1.333333

Course Name :Introduction to Fluid Mechanics lab	Course Code 101404P

At the end of course student will able to

CO1	Students should be able to understand the knowledge about the basic properties of fluids
CO2	Students should be able to find out various conditions related to stability of floating bodies
CO3	Students should be able to analyse the fluid motion through Reynolds number
CO4	Students should be able to apply Bernoulli's equation in flow measuring devices together with their calibration
CO5	Students should be able to determine the sources of major and minor losses developed inside the fluid flowing pipe

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	2	3	2	2	1	0	0	3	1	1	1	
CO2	2	3	2	3	2	2	1	0	0	3	1	1	2	
CO3	2	3	2	3	2	2	1	0	0	3	1	1		1
CO4	2	3	2	3	2	2	1	0	0	3	1	1	1	
CO5	2	3	2	3	2	2	1	0	0	3	1	1	1	

| MAPPING AVG | 2 | 3 | 2 | 3 | 2 | 2 | 1 | 0 | 0 | 3 | 1 | 1 | 1.25 | 1 |

Course Name :Introduction to Fluid Mechanics		Course Code 101404
At the end of course student will able to		
CO1	Determine the fluid pressure and use various devices for measuring fluid pressure.	
CO2	Apply Bernoulli's equation to fluid flow problems and boundary layer theory to determine lift and drag forces on a submerged bod	
CO3	Apply Bernoulli's equation to fluid flow problems and boundary layer theory to determine lift and drag forces on a submerged bodExamine the extrema of functions of two variables with / without constraints.	
CO4	Apply appropriate equations and principles to analyze pipe flow problems.	
CO5	Use of different fluid flow measuring devices	

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	1	3	2	2	1	0	0	3	2	2	1	
CO2	2	3	2	2	2	2	1	0	0	3	1	1		1
CO3	2	3	2	3	2	2	1	0	0	3	2	2	2	
CO4	2	3	2	2	2	2	1	0	0	3	1	1	2	
CO5	2	3	1	2	2	2	1	0	0	3	1	1		

| MAPPING AVG | 2 | 3 | 1.6 | 2.4 | 2 | 2 | 1 | 0 | 0 | 3 | 1.4 | 1.4 | 1.66667 | 1 |

Course Name :Introduction to solid mechanics		Course Code 101405
At the end of course student will able to		

CO1	Identify properties of various mechanical Properties of material and their importance in designing a safe component
CO2	Understand how different components will fail under load with help of theories of failure for brittle and ductile materials.
CO3	Apply concepts of stress, strain, principle stress using basic scientific and enhieering principals
CO4	Analyze the concept of bending and shear stresses using scientific theories and mathematics as well as it to create safe designs
CO5	Design and document various components using theries of failure

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	1	1	0	2	0	0	0	0	2	1	
CO2	2	3	2	1	0	2	2	0	0	0	1	2	3	2
CO3	3	1	1	1	0	0	2	0	0	1	0	2	3	2
CO4	0	1	1	1	0	0	1	2	1	2	1	2		1
CO5	0	0	1	2	2	2	3	2	0	3	2	2		1

| MAPPING AVG | 1.4 | 1.4 | 1.2 | 1.2 | 0.6 | 0.8 | 2 | 0.8 | 0.2 | 1.2 | 0.8 | 2 | 2.33333 | 1.5 |

Course Name :Mechanical Engineering	Course Code 101407

At the end of course student will able to	
CO1	Understand thermodynamics terminology and different types of work along with mathematical expression. Have knowledge about thermodynamic properties and mathematical relation between them along with graphical representation..
CO2	Understand, discuss and derived the laws of thermodynamics and apply these laws in various engineering system. Identify high and low grade energy.
CO3	Understand pure substances, ideal gas and gas mixture, saturated state and relation between pressure and temperature of pure substance and its graphical representation.
CO4	Analyse, understand and apply compressibility chart, steam table, thermodynamics parameters and molier chart in different engineering systems.
CO5	Devise the properties of steam, gas and their effect on performance of vapour cycle and gas power cycle. Also determine COP of refrigeration system and demonstrate psychometric processes.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	1	2	2	2	0	0	2	0	2	1	
CO2	3	3	0	1	3	3	3	0	0	2	0	2		2
CO3	2	3	0	1	2	3	2	0	0	2	0	2	1	1
CO4	2	2	1	1	1	3	0	0	0	2	0	2		
CO5	2	2	1	1	2	3	1	0	0	2	0	2	1	1

MAPPING AVG	2.2	2.4	0.6	1	2	2.8	1.6	0	0	2	0	2	1	1.333333

Course Name :Material Testing and Evaluation	Course Code 101406

At the end of course student will able to

CO1	Identify the different engineering materials, properties, manufacturing process of materials.
CO2	Describe the mechanical behaviour and characteristics, elastic and plastic deformation of metals, strength properties and background of fracture mechanics.
CO3	Conduct mechanical testing of various metals like iron, steel and various non-ferrous metals, impact testing, background of fracture toughness of different materials, creep, fatigue.
CO4	Understand the standard testing procedure of bricks, sand, concrete, soils, bitumen and bitumen mixes.
CO5	Describe the properties, mechanical behaviour of polymers, metals, composites, cementitious materials and special materials.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	1	1	2	2	1	0	0	2	0	2	1	
CO2	2	1	2	2	2	2	2	0	0	2	2	2		1
CO3	1	2	1	1	2	0	2	0	0	2	1	1	1	
CO4	2	0	1	2	0	2	1	0	0	2	0	2	2	
CO5	2	1	3	0	1	3	1	0	0	3	2	2		2

MAPPING AVG	1.6	1.2	1.6	1.2	1.4	1.8	1.4	0	0	2.2	1	1.8	1.33333	1.5

Course Name :SOCIETAL AND GLOBAL IMPACT	Course Code 101401

At the end of course student will able to

CO1	Students will grasp history, assess civil engineering, evaluate global sustainability, use GIS, and compare Human Development Index of India and Ecological Footprint globally
CO2	Throughout this course, students will grasp the significance of Civil Engineering in global impact, explore both ancient and modern marvels in the field, and envision thetrajectory of Civil Engineering future trajectory of Civil Engineering
CO3	At the course end, students will grasp habitat infrastructure, including transportation, technology, energy, water systems, and sustainability methods
CO4	Students will master traditional and futuristic environmental methods, covering waste, water treatment, pollution control, sustainability measures for environmental balance
CO5	Students will understand facilities management, energy-efficient, secure, aesthetically pleasing built environments, exploring sustainability methodologies
CO6	After this course, students will show expertise in environmental analysis, sustainable construction, project management, stakeholder welfare, and innovative sustainability in project development

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	0	0	0	2	2	0	2	1	2	1	
CO2	2	1	1	2	2	2	1	0	2	1	2	1		1
CO3	2	2	2	2	2	3	2	2	2	2	2	1		2
CO4	0	1	2	2	1	2	2	2	0	3	1	1		
CO5	1	2	1	1	2	2	2	2	1	1	2	2	1	
CO6	1	1	0	0	0	0	0	0	0	0	0	0		

| MAPPING AVG | 1.33333 | 1.33333 | 1.16667 | 1.16667 | 1.16667 | 1.5 | 1.5 | 1.33333 | 0.83333 | 1.5 | 1.33333 | 1.16667 | 1 | 1.5 |

Course Name :STRUCTURAL ANALYSIS	Course Code 101408

At the end of course student will able to

CO1	Have a knowledge about the manufacturing process, material properties of various steel sections, knows about various design philosophy of steel structure and also have a concept of limit state and working stress design.
CO2	Understand about various types of connection required for connecting structural steel, various forms of failure for members & connection under tensile, compressive, combined action.
CO3	Understand the principle of design of Tension and Compression members. Also know about the design based on net sectional area including shear lags effects and block failure consideration.
CO4	Analyze & Design columns while taking consideration of various effects of buckling and performing sway and non- sway analysis and concepts required for design of Lacing and battening system.
CO5	Design laterally supported & unsupported beams also built-up beams. Understand about the design of Plate girders and its various components
CO6	Understand Beam-Columns interactions, concept of P-M Interaction & moment application and also effects of flexural torsional buckling & Bi-axial bending.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	2	1	0	0	1	0	0	2	1	2	1	2
CO2	3	3	2	1	0	0	1	0	0	3	1	1	2	0
CO3	3	3	2	1	1	0	1	0	0	3	1	1	0	2
CO4	2	2	1	2	1	0	1	0	0	3	1	2	2	1
CO5	2	2	2	0	1	0	1	0	0	2	1	2	1	0
CO6	2	2	2	1	0	0	1	0	0	2	1	2	0	1

| MAPPING AVG | 2.33333 | 2.5 | 1.83333 | 1 | 0.5 | 0 | 1 | 0 | 0 | 2.5 | 1 | 1.66667 | 1 | 1 |

Course Name :Material testing and evaluation lab	Course Code 101406P

At the end of course student will able to		
CO1	Ability to apply knowledge of mathematics and engineering calculating the mechanical properties of structural materials	
CO2	Ability to functions on multidisciplinary exams in the area of materials testing	
CO3	Ability to use the the techniques, skills and modern engineering tools necessary for enginnering	
CO4	understanding of profesional and ethical responsibility in the areas of material testing	
CO5	Ability to communicate effectively the mechanical properties of material	

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	2	0	2	0	0	0	1	0	1	1	0
CO2	2	2	1	3	0	2	1	0	0	1	1	1	1	1
CO3	3	3	1	0	0	2	1	0	0	1	1	1	2	1
CO4	3	3	2	3	0	2	1	0	0	1	2	3	1	1
CO5	0	0	1	2	0	2	1	0	0	1	2	3	1	0

MAPPING AVG	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
MAPPING AVG	2.2	2.2	1.2	2	0	2	0.8	0	0	1	1.2	1.8	1.2	0.6

SEMESTER - V

Course Name : GeotechnicalEngineering-1	Course Code :101503

At the end of course student will able to	
CO1	Understand the different types of soil based on their formation mechanism and the various phase diagrams and derive various phase relationships of the soil.
CO2	Understand the behaviour of soils based on their moisture contents and Classify any soils based on their particle size distribution and index properties;
CO3	Determine the permeability of soils through various laboratory and field tests; Analytically calculate the effective permeability of anisotropic soil mass and the seepage
CO4	Understand the physical significance of effective stress and its relation with pore pressure, Plot various stress distribution diagrams along the depth of the soil mass, and the effect of capillary action and seepage flow direction on the effective stress at a point in the soil mass
CO5	Determine the permeability of soils through various laboratory and field tests; Analytically calculate the effective permeability of anisotropic soil mass and the seepage quantities and pore water pressures below the ground, Graphically plot the equipotentail.
CO6	Analytically compute the vertical stress in a semi-infinite soil mass due to various loading conditions and Plot isobars due various loading conditions.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	1	1	2	0	3	0	0	3	2	2	2	0
CO2	2	2	2	2	3	2	3	0	0	2	2	2	1	1
CO3	2	3	2	2	2	2	2	0	0	2	2	1	0	0

CO4	2	2	1	2	1	2	3	0	0	3	2	2	1	0
CO5	2	2	2	1	3	3	1	3	0	3	2	2	2	0
CO6	2	2	2	1	0	2	0	0	0	2	0	3	0	0

DHS/PO MAPPING	1.83333	2.16667	1.66667	1.5	1.83333	1.83333	2	0.5	0	2.5	1.66667	2	1	0.166667

Course Name : Mechanics of Material	Course Code :101506

At the end of course student will able to

CO1	Understand importance of properties of various mechanical Properties of material and their importance in designing a safe component
CO2	Identify mode of failure under load with help of theories of failure for brittle and ductile materials.
CO3	Apply advance concepts of stress, strain, principle stress using mohr circles
CO4	Analyze the concept of bending and shear stresses using scientific theories and mathematics as well as it to create safe design of column
CO5	Design and document about column design using Eulers theory and Rankine theory

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	1	1	2	3	0	0	3	1	2	1	0
CO2	2	3	2	1	0	2	3	0	1	1	3	3	3	2
CO3	3	1	1	1	0	0	3	0	1	1	0	2	3	2
CO4	0	2	1	1	0	0	0	3	1	2	2	2	0	1
CO5	2	1	2	2	2	2	3	3	0	3	2	3	0	1
DHS/PO MAPPING	1.8	1.8	1.4	1.2	0.6	1.2	2.4	1.2	0.6	2	1.6	2.4	1.4	1.2

Course Name : Transportation engineering	Course Code :101507

At the end of course student will able to

CO1	By the conclusion of this course, students will understand road classification, road development in India, current Indian road projects, and methods for highway alignment and project preparation
CO2	At the end of this course students will possess a comprehensive understanding of highway geometric design, encompassing various elements and problem-solving techniques
CO3	By the conclusion of this course, students will exhibit a thorough grasp of traffic engineering encompassing traffic characteristics, flow analysis, regulation, intersection and parking facility design, highway lighting, and problem-solving techniques
CO4	Students will comprehensively learn the essential materials for highway construction, covering soils, stone aggregates, bituminous binders, paving mixes, Portland cement, and concrete, along with their crucial properties, testing standards, and diverse requirements for specific pavement types
CO5	Students gain in-depth knowledge of pavement design principles covering flexible and rigid pavements, performance factors, stress analysis, IRC standards-based design methods, and problem-solving proficiency

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1	0	0	0	1	2	0	2	1	2	2	0
CO2	2	1	1	2	2	2	1	0	2	1	2	1	2	0
CO3	0	2	2	2	2	3	2	2	2	2	2	1	1	2
CO4	0	1	2	2	1	2	2	2	0	3	1	1	2	0
CO5	1	2	1	1	2	2	2	3	1	1	2	2	1	1
DHS/PO MAPPING	0.8	1.4	1.4	1.4	1.4	1.8	1.6	1.8	1	1.8	1.6	1.4	1.6	0.6

Course Name : ANALYSIS & DESIGN OF CONCRETE STRUCTURE	Course Code :101501

At the end of course student will able to

CO1	Understand various concept related to sustainable development of structures, principles of stability and role of structural & architectural engineer also recognize the design philosophy of reinforced concrete structures.
CO2	Understand basic concepts of reinforced concrete design, material stress–strain curves, and safety factors to know the properties of concrete structures.
CO3	Illustrate the concepts of various design methodologies, identify grades of concrete and steel, types of loads acting on structures and recall the concept of Stress block parameters and use the design concept of working stress method, limit state method for designing different structural components.
CO4	Understand how to calculate a moment-curvature diagram for a flexural section with and without compression reinforcement; calculate the cracked stiffness of various concrete components and apply them to frame analyses; explain with examples why and when ductility is important in structural design.
CO5	Describe shear force-transfer mechanisms; calculate shear strength of reinforced concrete systems; explain the fundamental behaviour and load transfer mechanisms of various slab systems for structural concrete buildings in particular two-way slabs.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	1	1	2	0	3	0	0	3	2	2	2	0
CO2	2	2	2	2	3	2	3	0	0	2	2	2	1	2
CO3	2	3	2	1	2	2	2	0	0	2	2	2	2	0
CO4	2	2	1	2	1	2	2	0	0	3	2	2	1	0
CO5	2	2	2	1	3	3	1	3	0	3	3	2	0	2
CO6	2	2	2	1	0	2	0	0	0	2	0	3	2	0
DHS/PO MAPPING	1.8	2.2	1.6	1.4	2.2	1.8	2.2	0.6	0	2.6	2.2	2	1.2	0.8

Course Name : Environmental Engineering -I		Course Code :101502

At the end of course student will able to

CO1	Understanding of the water quantity demand and water quality. Different laboratory methods for determination for water quality.
CO2	Understanding of the basic principles related to water purification units; plain sedimentation, coagulation and flocculation etc
CO3	Design and analysis of various water treatment units like; filtration, disinfection, water softening and other miscellaneous treatments etc.
CO4	Design and analysis of water distribution system. Introduction to air noise pollution.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	1	1	2	3	0	0	1	0	2	1	1
CO2	2	2	1	1	1	2	3	0	0	1	0	1	1	2
CO3	2	2	1	1	1	3	3	0	0	1	0	1	1	1
CO4	2	2	2	2	0	3	3	0	0	1	0	2	2	0

DHS/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	2	2	1.5	1.25	0.75	2.5	3	0	0	1	0	1.5	1.25	1

Course Name : Hydrology and Water Resources Engineering		Course Code :101505

At the end of course student will able to

CO1	Various components of hydrologic cycle that affect the movement of water in the earth.
CO2	Various Stream flow measurements technique.
CO3	The concepts of movement of ground water beneath the earth.
CO4	The basic requirements of irrigation and various irrigation techniques, requirements of the crops.
CO5	Distribution systems for canal irrigation and the basics of design of unlined and lined irrigation canals design.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	0	3	2	3	1	0	1	0	0	1	1	2	2	0
CO2	0	3	2	3	2	2	2	0	0	1	2	3	1	2
CO3	0	3	2	3	2	2	2	0	0	1	2	3	1	1
CO4	0	3	2	3	2	2	2	0	0	1	2	3	1	0
CO5	0	3	2	3	1	0	1	0	0	1	1	2	0	1

DHS/PO MAPPING	0	3	2	3	1.6	1.2	1.6	0	0	1	1.6	2.6	1	0.8

Course Name :Summer Internship-II	Course Code :100510

At the end of course student will able to

CO1	It aims to cultivate entrepreneurial skills within the context of civil engineering construction
CO2	It could involve fostering an understanding of business models, market analysis, and feasibility studies specifically within the tech industry.
CO3	The goals might include developing skills in ideation, prototyping, and business planning, and understanding the essentials of technology commercialization.
CO4	Furthermore, students might learn about intellectual property rights, pitching, and the process of bringing structural innovations to the market.
CO5	Creative strategies for pursuing, exploiting and further developing new opportunities.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	2	1	0	2	1	0	3	2	2	2	1	0
CO2	1	2	2	1	1	2	3	0	3	3	2	3	0	2
CO3	1	2	3	2	2	2	3	2	3	3	3	3	1	1
CO4	1	2	3	2	2	2	3	2	2	3	1	2	1	0
CO5	1	1	2	1	0	2	2	0	3	2	3	3	0	1
DHS/PO MAPPING	1	1.6	2.4	1.4	1	2	2.4	0.8	2.8	2.6	2.2	2.6	0.6	0.8

Course Name : Hydraulic Engineering	Course Code :101504

At the end of course student will able to

CO1	Summarize the concept of boundary layer and its mathematical calculations.
CO2	Understand different flow parameters and their importance and formulate varius types of flow in real life as well as research field.
CO3	Interpret and illustrate the main concepts of unsteady flow in pipes for civil engineering applications and its used in various sectors of society
CO4	Explain varius types of nonuniform flow measurind device, and the application of mathamaticals techniques to analyse such types of flows.
CO5	Explain and apply open channel fow theory to the analysis of gradually varied flow scenarios, hydraulic structure, hydraulic jumps and channels involving a series of prismatic sections and hydraulic structures.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	0	0	0	0	0	0	0	0	0	0	1	0
CO2	2	1	1	1	0	0	1	0	0	1	1	1	0	2

CO3	2	1	1	0	0	2	0	0	0	1	0	1	1	1
CO4	3	2	0	1	1	0	0	0	0	0	0	0	0	0
CO5	2	1	0	0	0	0	1	0	0	1	0	0	1	1
DHS/PO MAPPING	2.2	1.4	0.4	0.4	0.2	0.4	0.4	0	0	0.6	0.2	0.4	0.6	0.8

Course Name :Transportation Engineering LAB	Course Code :101507P

At the end of course student will able to

CO1	Students will able to Identify engineering properties of aggregate
CO2	At the end of this course students will identify the grade & properties of bitumen
CO3	By the conclusion of this course, students will exhibit peak hour traffic & peak time for a given location on the road.
CO4	Students will comprehensively learn toCalculate design speed, maximum speed & minimum speed limits of a location through spot speed.
CO5	Student will be able to draw parking accumulation curve and find out parking duration & turnover of parking lot/stretch

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	1	0	2	0	0	0	1	0	0	1	0
CO2	1	1	1	2	0	2	0	0	0	1	1	0	2	0
CO3	3	2	1	1	0	2	1	0	1	1	1	2	0	1
CO4	2	3	2	3	0	3	1	0	1	1	2	3	2	1
CO5	0	0	1	1	0	3	1	0	2	1	2	3	1	0
DHS/PO MAPPING	1.6	1.4	1.2	1.6	0	2.4	0.6	0	0.8	1	1.2	1.6	1.2	0.4

Course Name : Hydrology and Water Resources Engineering LAB	Course Code :101505P

At the end of course student will able to

CO1	Able to Measure of Rainfall by non –recording rain gauge.
CO2	Able to Measure of rainfall by recording rain gauge.
CO3	Able to determine mean rainfall of an area by Thiessen mean Polygon method.
CO4	Able to determine mean rainfall of an area by isohyetal method.
CO5	Able to determine the velocity of a running of a stream in a canal by current meter and calculate the approximate discharge of the canal.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	0	2	0	0	0	0	1	0	1	1	0
CO2	0	0	1	3	0	2	2	0	0	1	1	1	0	1
CO3	1	1	1	0	0	2	3	0	0	1	1	1	2	0
CO4	0	1	0	2	0	2	3	0	0	1	2	3	1	0
CO5	0	0	1	1	0	2	3	0	0	1	2	3	1	1
DHS/PO MAPPING	0.6	0.8	0.8	1.2	0.4	1.6	2.2	0	0	1	1.2	1.8	1	0.4

Course Name : Environmental Engineering -LAB	Course Code :101502P

At the end of course student will able to

CO1	Understanding of the water quantity demand and water quality. Different laboratory methods for determination for water quality.
CO2	Understanding of the basic principles related to water purification units; plain sedimentation, coagulation and flocculation etc
CO3	Design and analysis of various water treatment units like; filtration, disinfection, water softening and other miscellaneous treatments etc.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	1	1	2	3	0	0	1	0	0	1	1
CO2	2	1	1	2	2	2	3	0	0	0	0	0	2	1
CO3	2	1	1	1	1	2	3	0	0	0	0	0	1	0
DHS/PO MAPPING	2	1.33333	1	1.33333	1.33333	2	3	0	0	0.33333	0	0	1.33333	0.666667

Course Name : Hydraulic Engineering LAB	Course Code :101504P

At the end of course student will able to

CO1	Students should be able to understand the knowledge about the basic properties of fluids
CO2	Students should be able to find out various conditions related to stability of floating bodies
CO3	Students should be able to analyse the fluid motion through Reynolds number
CO4	Students should be able to apply Bernoulli's equation in flow measuring devices together with their calibration

CO5	Students should be able to determine the sources of major and minor losses developed inside the fluid flowing pipe	

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	0	2	0	0	0	0	1	0	1	1	0
CO2	0	0	1	3	0	2	2	0	0	1	1	1	0	1
CO3	1	1	1	0	0	2	3	0	0	1	1	1	2	0
CO4	0	1	0	2	0	2	3	0	0	1	2	3	1	0
CO5	0	0	1	1	0	2	3	0	0	1	2	3	1	1
DHS/PO MAPPING	0.6	0.8	0.8	1.2	0.4	1.6	2.2	0	0	1	1.2	1.8	1	0.4

Course Name : GeotechnicalEngineering-1 LAB	Course Code :101503

At the end of course student will able to	
CO1	Physical and index properties of the soil
CO2	Classify based on index properties and field identification
CO3	TO determine particle size disrtubution of the soil.
CO4	To determine OMC and MDD, plan and assess field compaction program
CO5	Shear strength and consolidation parameters to assess strength and deformation characteristics
CO6	In-situ shear strength characteristics(SPT-Demonstration)

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	0	1	0	1	0	0	0	0	0	3	0	0	1	0
CO2	3	2	0	2	0	0	0	0	0	3	0	1	1	2
CO3	3	2	0	2	0	0	0	0	0	3	0	1	1	2
CO4	3	2	0	2	0	0	0	0	0	3	0	1	0	2
CO5	3	2	0	2	0	0	0	0	0	3	0	1	1	1
CO6	3	1	1	1	0	3	0	0	0	3	0	0	2	0

DHS/PO MAPPING	2.5	1.66667	0.16667	1.66667	0	0.5	0	0	0	3	0	0.66667	1	1.166667

Course Name :Design of Hydraulic Structure	Course Code :101612

At the end of course student will able to

CO1	Understanding of the necessity of irrigation, principles, its advantages and Disadvantages
CO2	Understanding of soil-water-plant relationship, efficiencies of irrigation and application of the various terms defining the relationships between soil, water and plants and scheduling of irrigation.
CO3	unlined canals
CO4	Understanding of Design principles for gravity and earthen dams
CO5	Understanding of Design of Head and cross regulators; Design of canal falls, transitions and cross drainage works

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	1	2	2	1	2	2	0	0	1	1	0
CO2	2	2	2	2	2	2	2	3	2	1	1	1	1	1
CO3	2	1	1	1	3	2	3	3	2	2	0	2	0	1
CO4	2	3	3	2	2	2	2	2	3	2	2	2	1	0
CO5	2	2	1	1	2	2	3	2	2	2	2	3	1	2

DHS/PO MAPPING	2.2	2	1.8	1.4	2.2	2	2.2	2.4	2.2	1.4	1	1.8	0.8	0.8

Course Name :Construction Engineering & Management	Course Code :101602

At the end of course student will able to

CO1	Understanding and Knowing about the different construction materials properties
CO2	knowing about the special concrete
CO3	knowing about the tests on concrete
CO4	understanding the concept of precast concrete structures
CO5	site visit and preparation of report

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2

CO1	2	3	3	2	2	2	1	3	1	2	2	1	2	0
CO2	3	2	2	2	1	2	3	2	2	2	2	3	1	1
CO3	2	2	1	2	2	0	1	2	2	2	1	0	1	0
CO4	2	3	2	3	2	2	2	3	2	3	3	3	1	0
CO5	2	2	2	2	2	2	3	2	1	2	2	3	1	1
CO6	0	0	0	0	0	0	0	0	0	0	0	0	0	0

DHS/PO MAPPING	1.83333	2	1.66667	1.83333	1.5	1.33333	1.66667	2	1.33333	1.83333	1.66667	1.66667	1	0.333333

Course Name :ENGINEERING ECONOMICS ESTIMATION AND COSTING	Course Code :101604

At the end of course student will able to

CO1	Ability to work out approximate and detail quantity estination of any building or bridge from the given place
CO2	Ability to understand and define the general and detailed speciation for various types of building work
CO3	Ability to understand evaluation , tender,contract and the and other legal requirements in construction
CO4	Distribution system for canal irrigation and the basics of design of unlined and lined irrigation canal design
CO5	Ability to analyse rates and values for various items of various civil engineer structures

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	0	0	2	0	0	0	0	1	0	2	1	1
CO2	0	0	0	3	0	2	2	0	0	1	1	3	2	0
CO3	0	0	0	0	0	2	3	0	0	1	1	2	2	2
CO4	0	0	0	3	0	2	3	0	0	1	2	3	1	0
CO5	0	0	0	1	0	2	3	0	0	1	2	3	0	1

| DHS/PO MAPPING | 0.4 | 0.4 | 0 | 1.4 | 0.4 | 1.6 | 2.2 | 0 | 0 | 1 | 1.2 | 2.6 | 1.2 | 0.8 |

Course Name : Environmental Engineering-II	Course Code :101605

At the end of course student will able to	
CO1	Understanding of generation and collection of waste water, design of sewerage system
CO2	Understanding of the physical and biological characteristics of waste water, basic of microbiology biological process
CO3	Design of various waste water treatment units, understanding of the various anaerobic processes
CO4	Introduction to municipal solid waste management
CO5	

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	1	1	2	3	0	0	1	0	2	1	0
CO2	2	2	1	2	1	2	3	0	0	1	0	1	2	1
CO3	2	2	1	2	1	3	3	0	0	1	0	1	1	2
CO4	2	2	2	2	0	3	3	0	0	1	0	2	1	0
CO5	0	0	0	0	0	0	0	0	0	0	0	0	0	1

DHS/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	1.6	1.6	1.2	1.4	0.6	2	2.4	0	0	0.8	0	1.2	1	0.8

Course Name :GEOTECHNICAL ENGINEERING - II	Course Code :101606

At the end of course student will able to	
CO1	Student will demonstrate an ability to apply the theoretical knowledge to understand the behaviour of soil consolidation & determine various consolidation parameters of soil through laboratory test; Evaluate ground settlements against time.
CO2	Able to determine graphically and analytically the stress state in any plane of the soil mass; Perform various shear strength tests and appreciate the different field conditions which they simulate; understand the significance of shear strength parameters in various geotechnical analyses; Evaluate the stiffness of soil using shear strength parameters.
CO3	Able to differentiate various modes of slope failure; Evaluate factor of safety of infinite slopes based on different ground conditions; understand various methods for computation of factor of safety for finite slopes.
CO4	Able to specify a strategy for site investigation to identify the soil deposits and determine the depth and spatial extent within the ground; Understand various investigation techniques and their in-situ applications; Prepare a soil investigation report based on borehole log data and various in-situ tests like SPT, CPT, etc.
CO5	Able to understand the basic concept of earth pressure; Retaining walls; and of sheet piles

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	1	2	3	3	0	3	1	2	2	2	1
CO2	3	3	3	3	3	3	3	0	3	3	2	2	1	1

CO3	3	3	2	2	2	3	2	0	3	1	2	3	0	2
CO4	3	2	1	3	3	3	1	3	3	2	2	2	1	1
CO5	3	3	1	3	3	0	1	3	3	1	2	2	1	0

DHS/PO MAPPING	3	2.8	1.6	2.4	2.6	2.4	2	1.2	3	1.6	2	2.2	1	1

Course Name : DESIGN OF STEEL STRUCTURE	Course Code :101603

At the end of course student will able to

CO1	Have a knowledge about the manufacturing process, material properties of various steel sections, knows about various design philosophy of steel structure and also have a concept of limit state and working stress design.
CO2	Understand about various types of connection required for connecting structural steel, various forms of failure for members & connection under tensile, compressive, combined action.
CO3	Understand the principle of design of Tension and Compression members. Also know about the design based on net sectional area including shear lags effects and block failure consideration.
CO4	Analyze & Design columns while taking consideration of various effects of buckling and performing sway and non- sway analysis and concepts required for design of Lacing and battening system.
CO5	Design laterally supported & unsupported beams also built-up beams. Understand about the design of Plate girders and its various components
CO6	Understand Beam-Columns interactions, concept of P-M Interaction & moment application and also effects of flexural torsional buckling & Bi-axial bending.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	1	1	2	0	3	0	0	3	2	2	1	
CO2	2	2	2	2	3	2	3	0	0	2	2	2		2
CO3	2	3	2	1	2	2	2	0	0	2	2	2	2	
CO4	2	2	1	2	1	2	2	0	0	3	2	2	1	
CO5	2	2	2	1	3	3	1	3	0	3	3	2	1	
CO6	2	2	2	1	0	2	0	0	0	2	0	3	1	
DHS/PO MAPPING	1.8	2.2	1.6	1.4	2.2	1.8	2.2	0.6	0	2.6	2.2	2	1.25	2

Course Name : ENGINEERING ECONOMICS ESTIMATION AND COSTING LAB	Course Code :101604P

At the end of course student will able to

CO1	Calculate the quantities of different items in a building and different types of roads and structures
CO2	Handle the tendering process for executing any civil engineering work

CO3	Assess the value of any property
CO4	Recognize the process and importance of cost estimation, cost budgeting and cost control
CO5	Estimate the rate per unit of any item of work

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	0	2	0	0	0	0	1	0	1	1	1
CO2	0	0	1	3	0	2	2	0	0	1	1	1	2	0
CO3	1	1	1	0	0	2	3	0	0	1	1	1	0	1
CO4	0	1	0	2	0	2	3	0	0	1	2	3	0	0
CO5	0	0	1	1	0	2	3	0	0	1	2	3	1	2
DHS/PO MAPPING	0.6	0.8	0.8	1.2	0.4	1.6	2.2	0	0	1	1.2	1.8	0.8	0.8

SEMESTER - VII

Course Name :Concrete Technology	Course Code :101710

At the end of course student will able to

CO1	Explain the properties of the constituent material of concrete
CO2	Describe the physical and mechanical properties of concrete
CO3	Study the behaviour of at its fresh and hardened state, desceibe and carry out test related to the use of concrete site
CO4	Understand the factor influncing concrete mix and know the BIS method of mix design
CO5	Define special concrete , their application for practical purpose
CO6	

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	2	1	2	2	3	3	1	2	1	3	1	0
CO2	1	2	1	3	3	2	1	0	2	1	2	2	2	1
CO3	1	2	2	2	3	0	2	3	1	2	2	1	0	2
CO4	1	1	2	2	0	2	2	2	1	2	1	1	1	2
CO5	2	2	1	1	2	2	2	3	1	1	2	2	2	0

CO/PO MAPPING AVG	1.4	1.6	1.6	1.8	2	1.6	2	2.2	1.2	1.6	1.6	1.8	1.2	1

Course Name : Foundation Engineering	Course Code :101722
At the end of course student will able to	

CO1	Understand various Types of foundation
CO2	Understand about In Situ-test (field test of soil)
CO3	Understand about various analysis and design of foundation
CO4	Understand reason behind the structure and foundation failure.
CO5	Understand about behavior/nature of the soil

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1	1	1	2	2	3	0	2	0	2	1	1
CO2	2	2	1	3	3	2	3	0	1	3	3	3	1	0
CO3	3	3	2	2	3	2	3	2	0	2	3	2	2	1
CO4	2	3	2	2	0	3	3	3	0	2	0	2	1	2
CO5	1	1	1	1	1	2	3	3	0	2	2	3	0	1

CO/PO MAPPING AVG	1.8	2	1.4	1.8	1.6	2.2	2.8	2.2	0.2	2.2	1.6	2.4	1	1

Course Name :HUMAN RESOURCE DEVELOPMENT	Course Code :101714
At the end of course student will able to	

CO1	Effectively manage and plan key human resourcefunctions within organisation.
CO2	Examine current issues,trends,practices and processes in HRM.
CO3	Contribute to employee performance management and organisational effectiveness.
CO4	Problem-solve human resource challenge.
CO5	Develop effective written and oral communication skill.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2

CO1	0	1	1	1	2	2	2	3	3	2	1	3	1	0
CO2	0	1	1	1	2	3	3	3	2	2	2	3	0	1
CO3	0	1	1	1	1	2	2	3	3	2	2	3	2	2
CO4	0	1	1	1	2	2	1	2	2	3	2	2	1	1
CO5	0	1	1	2	2	2	3	3	3	2	2	2	2	1

CO/PO MAPPING AVG	0	1	1	1.2	1.8	2.2	2.2	2.8	2.6	2.2	1.8	2.6	1.2	1

Course Name :Professional Practice Law and Ethics	Course Code :101701

At the end of course student will able to

CO1	Illustrate the core values that enrich the ethical behavior of an engineer
CO2	Understand the concepts of Professional rights, Employee rights, Confidentiality, conflicts of interest and Intellectual Property Rights
CO3	To make the students understand the types of roles they are expected to play in the society as practitioners of the civil engineering profession.
CO4	To develop some ideas of the legal and practical aspects of their profession

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	0	0	1	0	0	3	3	0	0	1	0	0	1	0
CO2	0	0	0	0	1	3	3	3	0	1	0	1	1	1
CO3	0	0	0	0	1	3	2	3	0	1	0	0	0	2
CO4	0	0	1	0	1	3	2	2	0	1	0	2	2	0

CO/PO MAPPING AVG	0	0	0.5	0	0.75	3	2.5	2	0	1	0	0.75	1	0.75

Course Name :Project-I	Course Code :100709

At the end of course student will able to

CO1	students typically include developing skills in project management, research, problem-solving, and applying theoretical knowledge to practical scenarios.
CO2	It involves enhancing abilities in critical thinking, innovation, technical presentation, and documentation.environment.

CO3	The outcomes might also focus on fostering teamwork, communication, and a deep understanding of the chosen project's domain.
CO4	Apply the theoretical concepts to solve industrial problems with teamwork and multidisciplinary approach.
CO5	Reflect and evaluate on experiences that might lead to future employment.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	0	1	1	0	1	0	3	0	0	1	1	3	1	0
CO2	2	2	1	2	2	0	1	0	0	1	2	2	1	1
CO3	0	2	2	1	3	0	2	0	0	1	2	1	2	0
CO4	1	1	2	2	0	0	2	0	0	1	1	2	0	2
CO5	1	2	1	1	2	0	2	0	0	1	2	2	1	0

CO/PO MAPPING AVG	0.8	1.6	1.4	1.2	1.6	0	2	0	0	1	1.6	2	1	0.6

Course Name : Summer Internship-III	Course Code :100707

At the end of course student will able to	
CO1	It aims to cultivate entrepreneurial skills within the context of civil engineering construction
CO2	It could involve fostering an understanding of business models, market analysis, and feasibility studies specifically within the tech industry.
CO3	The goals might include developing skills in ideation, prototyping, and business planning, and understanding the essentials of technology commercialization.
CO4	Furthermore, students might learn about intellectual property rights, pitching, and the process of bringing structural innovations to the market.
CO5	Creative strategies for pursuing, exploiting and further developing new opportunities.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	2	1	0	2	1	0	3	2	2	2	1	2
CO2	1	2	2	1	1	2	3	0	3	3	2	3	1	2
CO3	1	2	3	2	2	2	3	2	3	3	3	3	2	0
CO4	1	2	3	2	2	2	3	2	2	3	1	2	0	1
CO5	1	1	2	1	0	2	2	0	3	2	3	3	1	2

CO/PO MAPPING AVG	1	1.6	2.4	1.4	1	2	2.4	0.8	2.8	2.6	2.2	2.6	1	1.4

Course Name :Economic Policy of India	Course Code :101838

At the end of course student will able to

CO1	This course will help students understand the key issues related to the Indian economy.
CO2	tand be more effective, in positions of responsibility and decision making.
CO3	improving their employment prospects and career advancement.
CO4	The course exposes students to the intricacies of India's economic, political and social developments both in the past and present times
CO5	At the end of the module the students should be able to demonstrate their understanding of the economic concepts of environmental policy.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1	1	2	2	1	3	2	1	2	0	1	0
CO2	2	1	1	2	2	2	1	2	2	2	2	1	1	2
CO3	2	1	1	1	2	2	2	3	3	3	2	2	2	2
CO4	2	2	1	2	2	2	2	2	3	2	2	2	2	1
CO5	1	2	1	1	2	2	2	3	1	1	2	2	0	1

CO/PO MAPPING AVG	1.6	1.4	1	1.4	2	2	1.6	2.6	2.2	1.8	2	1.4	1.2	1.2

Course Name :Railway Engineering	Course Code :101818

At the end of course student will able to

CO1	Understand the importance of railway infrastructure.
CO2	Describe the railway zoning, gauges and wheels.
CO3	Define the different components of Railway and its permanent way.
CO4	Analyze the geometric design of railway Engineering and its super elevation design.
CO5	Illustrate the concepts of high speed tracks, station and yards of railways.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1	1	0	2	0	0	0	1	0	2	1	0

CO2	2	2	1	2	2	3	2	3	1	2	2	2	2	1
CO3	2	2	2	2	3	2	2	3	1	2	2	1	2	1
CO4	2	2	2	3	0	2	3	0	0	1	2	1	0	0
CO5	2	2	2	1	3	3	2	3	3	2	3	2	1	2

CO/PO MAPPING AVG	1.8	1.8	1.6	1.8	1.6	2.4	1.8	1.8	1	1.6	1.8	1.6	1.2	0.8

Course Name :River Engineering	Course Code :101805

At the end of course student will able to

CO1	Student will be able to understand the basics of River engineering.
CO2	Student will be able to understand the concepts of River behaviour.
CO3	Student will be able to compute river morphology and understanding of sediment transport mechanism.
CO4	Student will be able to understand the unsteady flow process in River.
CO5	Student will be able to understand about different types of River training works

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	1	2	1	2	0	1	2	2	1	0
CO2	2	2	2	2	2	2	3	0	0	1	2	1	0	2
CO3	2	2	3	2	3	2	2	2	1	3	3	0	0	0
CO4	3	3	2	3	2	2	3	2	1	1	2	1	0	0
CO5	2	2	3	2	3	3	2	3	3	2	2	3	1	0
CO/PO MAPPING AVG	2.4	2.2	2.4	2.2	2.2	2.2	2.2	1.8	1	1.6	2.2	1.4	0.4	0.4

Course Name :PRESTRESSED CONCRETE DESIGN	Course Code :101808

At the end of course student will able to

CO1	Illustrate the core values that enrich the ethical behavior of an engineer
CO2	Understand the concepts of Professional rights, Employee rights, Confidentiality, conflicts of interest and Intellectual Property Rights
CO3	To make the students understand the types of roles they are expected to play in the society as practitioners of the civil engineering profession.
CO4	To develop some ideas of the legal and practical aspects of their profession
CO5	Analyze and design of end block of prestressed concrete members

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	0	1	1	0	1	0	3	0	0	1	1	3	1	0
CO2	2	2	1	2	2	0	1	0	0	1	2	2	1	1
CO3	0	2	2	1	3	0	2	0	0	1	2	1	2	0
CO4	1	1	2	2	0	0	2	0	0	1	1	2	0	2
CO5	1	2	1	1	2	0	2	0	0	1	2	2	1	0
CO/PO MAPPING AVG	0.8	1.6	1.4	1.2	1.6	0	2	0	0	1	1.6	2	1	0.6

Course Name :Solid and Hazardous Waste Management	Course Code :101828

At the end of course student will able to

CO1	Provide comprehensive and historical overviews of hazardous wastes management from both scientific and engineering principles.
CO2	Describe factors which will determine the characterization, the distribution and fate of chemical compounds in the environment.
CO3	Understand how quantitative risk assessments are conducted for toxic substances and their adverse effects on living organisms and the environment, and the limitations of the results of these analyses.
CO4	Introduce the environmental audits and pollution prevention programs, including the LEED Green Building Rating System, as effective waste management practices.
CO5	Identify the most common techniques for preventing, minimizing, recycling, disposing and treatment of waste and their application on site remediation.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	2	1	2	2	3	3	1	2	1	3	0	1
CO2	1	2	1	3	3	2	1	0	2	1	2	2	1	2
CO3	1	2	2	2	3	0	2	3	1	2	2	1	0	1
CO4	1	1	2	2	0	2	2	2	1	2	1	1	2	0
CO5	2	2	1	1	2	2	2	3	1	1	2	2	1	0

| CO/PO MAPPING AVG | 1.4 | 1.6 | 1.6 | 1.8 | 2 | 1.6 | 2 | 2.2 | 1.2 | 1.6 | 1.6 | 1.8 | 0.8 | 0.8 |

Course Name :Project-II	Course Code :101801

At the end of course student will able to	
CO1	In Project-I students typically include developing skills in project management, research, problem-solving, and applying theoretical knowledge to practical scenarios.
CO2	It involves enhancing abilities in critical thinking, innovation, technical presentation, and documentation.environment.
CO3	The outcomes might also focus on fostering teamwork, communication, and a deep understanding of the chosen project's domain.
CO4	Apply the theoretical concepts to solve industrial problems with teamwork and multidisciplinary approach.
CO5	Reflect and evaluate on experiences that might lead to future employment.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	2	2	2	0	1	0	1	3	2	1	1	0
CO2	2	2	3	3	3	2	3	2	1	2	2	2	2	1
CO3	1	1	2	2	1	2	1	0	3	2	3	3	1	1
CO4	2	2	2	2	3	0	2	0	2	3	2	2	2	2
CO5	1	1	2	1	1	2	1	0	3	1	3	3	0	2

CO/PO MAPPING AVG	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	1.4	1.6	2.2	2	2	1.2	1.6	0.4	2	2.2	2.4	2.2	1.2	1.2