



## MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY BATHINDA-151001 (PUNJAB), INDIA

(A State University Estb. by Govt. of Punjab vide Punjab Act No. 5 of 2015 and Approved u/s 2(f) & 12 (B) of UGC; Member AIU)

Department: **CIVIL ENGINEERING**  
Giani Zail Singh Campus College of Engineering & Technology, MRSPTU Bathinda

Program: **B Tech Civil Engineering (1107)**

### **COURSE ARTICULATION MATRIX (STUDY SCHEME: 2018)**

Subject	Subject Code	Semester	Credit	Duration (Hrs)	LTP	COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Physics	BPHYO-101	1	4	43	3 1 0	CO1	Understanding the concepts of Friction, Stress, Hook's Law, Forces, Strain Energy and Yield criteria.	3	3	3	-	2	1	2	1	2	1	1	2	3	1	2
						CO2	To analyze and solve problems of simple harmonic Oscillator and damped oscillators.	3	2	3	3	3	-	2	1	2	1	1	2	2	-	2
						CO3	Apply knowledge of vector mechanics to study forces in nature.	2	2	3	-	2	1	-	2	2	1	-	3	3	2	2
						CO4	To study concepts of frames of references and rigid body dynamics.	3	3	2	3	2	1	2	-	2	1	1	-	2	1	2

Mathematics-I	BMATO-101	1	4	40	310	C01	To apply differential and integral calculus to notions of curvature and to improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.	1	2	1	--	--	--	--	--	--	--	1	1	--			
						C02	The fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems	2	3	1	--	--	--	--	--	--	--	--	--	--	2	1	--
						C03	The tool of power series and Fourier series for learning advanced Engineering Mathematics.	2	2	2	1	--	--	--	--	--	--	--	--	--	1	2	--
						C04	To deal with functions of several variables that are essential in most branches of engineering.	2	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--
						C05	The essential tool of matrices and linear algebra in a comprehensive manner	2	--	--	2	--	1	--	--	--	--	--	--	--	2	1	--
ENGINEERING GRAPHICS & DESIGN	BMEO-101	1	1	12	100	C01	Introduction to engineering design and its place in society	3	2	3	--	3	--	--	1	--	--	--	3	2	-	1	
						C02	Exposure to the visual aspects of engineering design	2	2	2	--	3	--	--	1	--	--	--	3	2	1	-	
						C03	Exposure to engineering graphics standards	2	2	3	--	3	--	--	1	--	--	--	3	1	1	1	
						C04	Exposure to solid modelling	3	3	3	--	3	--	--	1	--	--	--	3	1	-	-	
						C05	Exposure to computer-aided geometric design	3	3	3	--	3	--	--	1	--	--	--	3	2	2	1	
						C06	Exposure to creating working drawings	3	3	3	--	3	--	--	1	--	--	--	3	2	1	1	
						C07	Exposure to engineering communication	2	2	2	--	3	--	--	1	--	--	--	3	2	1	1	

BASIC ELECTRICAL ENGINEERING	BELEO-101	1	4	42	310	CO1	To understand and analyze basic DC and AC circuits.	2	3	-	-	-	-	-	-	-	1	-	-	3		
						CO2	To study the use and working principle of single-phase transformers.	2	-	-	-	-	3	-	-	-	-	-	1	3	-	-
						CO3	To study the application and working principles of three phase and single-phase induction motors.	2	-	-	-	-	3	-	-	-	-	-	1	3	-	-
						CO4	To introduce to the components of low voltage electrical installations.	2	-	-	-	-	3	-	-	-	-	-	1	3	-	-
Physics Lab	BPHYO-102	1	1.5	-	003	CO1	Student will able to study motion of flywheel, bar pendulum and kater's pendulum.	3	3	-	-	2	1	2	-	2	1	1	2	3	1	2
						CO2	Students shall gain knowledge about torsional pendulum and various factors related with this.	2	-	3	2	3	-	2	1	-	1	1	-	2	-	2
						CO3	Students will able to determine the Elastic Constants/Young's Modulus of a Wire by Searle's method and Modulus of Rigidity of a Wire by Maxwell's needle	2	1	2	-	2	1	-	2	2	1	-	3	2	-	2
						CO4	Students will Study variation of Momentum, Kinetic energy, Velocity of collision of the objects and the Center of Mass with different velocity and mass.	2	3	-	3	2	1	2	-	2	1	1	-	2	1	2
ENGINEERING GRAPHICS & DESIGN	BMEE0-102	1	2	60	004	CO1	Introduction to engineering design/draw and its place in society	3	2	3	--	3	--	--	1	--	--	--	3	2	-	1
						CO2	Exposure to the visual aspects of engineering design/drawing	2	2	2	--	3	--	--	1	--	--	--	3	2	1	
						CO3	Exposure to engineering graphics standards	2	2	3	--	3	--	--	1	--	--	--	3	1	1	1

						C04	Exposure to solid modelling	3	3	3	--	3	--	--	1	--	--	--	3	1	-		
						C05	Exposure to computer-aided geometric design	3	3	3	--	3	--	--	1	--	--	--	3	2	2	1	
						C06	Exposure to creating working drawings	3	3	3	--	3	--	--	1	--	--	--	3	2	1	1	
						CO	Exposure to engineering communication	2	2	2	--	3	--	--	1	--	--	--	3	2	1	1	
Basics Electrical Engineering Lab	BELE0-102	1	1	-	0 0 2	C01	Get an exposure to common electrical components and their ratings.	2	-	-	-	-	3	-	-	2	-	-	1	-	3	-	
						C02	Make electrical connections by wires of appropriate ratings.	2	-	-	-	-	3	-	-	2	-	-	1	2	3	-	
						C03	Understand the usage of common electrical measuring instruments.	2	-	-	-	-	3	-	-	2	-	-	1	-	3	-	
						C04	Understand the basic characteristics of transformers and electrical induction motors.	2	-	-	-	-	3	-	-	2	-	-	1	-	2	3	
Drug Abuse: Problem, Management and Prevention	BHUM0-104	1	0	30	3 0 0	C01	Differentiate between physical and psychological dependence of drug abuse.	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	
						C02	Understand the consequences of drug abuse.	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-
						C03	Explain prevention of drug abuse.	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-
						C04	Identify treatments and management of drug abuse.	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-
CHEMISTRY-I	BCHM0-101	2	4	42	3 1 0	C01	Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.	3	-	-	-	-	-	-	-	-	-	1	3	-	-		
						C02	Rationalize bulk properties and processes using thermodynamic considerations.	3	1	-	-	-	-	-	-	-	-	-	1	3	-	-	

						C03	Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques	3	1	-	-	-	-	-	-	-	1	3	-	-		
						C04	Rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.	3	1	-	-	-	-	-	-	-	-	1	3	-	-	
						C05	List major chemical reactions that are used in the synthesis of molecules	3	-	-	-	-	-	-	-	-	-	1	3	-	-	
MATHEMATICS-II	BMATO-201	2	4	40	310	C01	The mathematics tools needed in evaluating multiple integrals and their usage.	3	1	1	1	2	1	-	1	-	-	2	1	2	1	
						C02	The effective mathematical tools for the solution of differential equation that model physical process.	2	1	2	2	2	1	-	-	1	-	-	2	1	2	1
						C03	The tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems	2	2	1	1	1	2	-	2	2	-	-	1	2	2	2
ENGLISH	BHUMO-101	2	2	25	200	C01	The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.	2	1	2	-	1	2	1	1	1	3	1	2	2	-	2
						C02	Student should be able to write essay, reflective writing in a variety of formats.	1	1	2	-	-	1	-	-	1	3	1	2	-	-	-
						C03	To provide an overview of the various phases of the evolution of Indian writing in English.	1	1	1	1	-	1	1	-	1	2	1	2	1	-	-

PROGRAMMING FOR PROBLEM SOLVING	BCSEO-101	2	5	51	304	CO1	To learn the basic terms related to programming and understand arithmetic expressions.	-	-	-	1	-	1	-	-	-	-	3	3	-	3				
						CO2	To understand the concept of arrays.	3	-	3	-	2	-	-	-	-	-	-	-	-	-	-	1	-	
						CO3	To implement functions and recursion.	-	3	-	2	-	-	-	-	-	3	-	-	-	-	-	-	2	-
						CO4	To learn structure, pointers and file handling.	3	-	-	2	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CHEMISTRY-I LAB	BCHM0-101	2	1	-	002	CO1	Estimate rate constants of reactions from concentration of reactants/products as a function of time	3	2	-	-	-	-	-	-	-	-	-	2	1	1				
						CO2	Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.	3	2	-	-	-	-	-	-	-	-	-	-	-	-	2	1	1	
						CO3	Synthesize a small drug molecule and analyze a salt sample	3	-	3	-	-	-	-	-	-	-	-	-	-	-	2	1	1	
ENGLISH LAB	BHUM0-102	2	1	-	002	CO1	Better Pronunciation and accent	2	1	2	-	-	1	1	-	2	2	-	2	2	-	2			
						CO3	Ability to use functional English	1	-	1	-	-	-	-	1	1	1	-	1	2	-	-	-		
						CO4	Competency in analytical skills and problem solving skills	2	2	1	1	1	2	1	1	1	2	-	1	2	-	2	-	2	
PROGRAMMING FOR PROBLEM SOLVING LAB	BCSEO-102	2	2	-	004	CO1	To learn the basic terms related to programming and understand arithmetic expressions.	-	-	-	1	-	1	-	-	-	-	3	3	-	3				
						CO2	To understand the concept of arrays.	3	-	3	-	2	-	-	-	-	-	-	-	-	-	1	-		
						CO3	To implement functions and recursion.	-	3	-	2	-	-	-	-	-	3	-	-	-	-	-	2	-	

MANUFACTURING PRACTICES (THEORY & LAB.)	BMFPO-101	2	3	80	104	C04	To learn structure, pointers and file handling.	3	-	-	2	-	-	-	-	-	-	3	-	-			
						C01	Gain knowledge of different Manufacturing processes and related aspects which are commonly used	2	1	-	1	-	-	-	1	2	1	-	1	1	1	-	
						C02	Get practical knowledge of dimensional accuracy and tolerances inapplicable in manufacturing applications	1	1	1	-	1	-	-	-	1	-	-	-	-	-	-	-
						C03	Able to fabricate components with own hands using hand tools, machinery and equipments	1	1	-	-	-	-	-	-	2	-	-	-	-	-	-	-
						C04	By using different components be able to make small product assemblies	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
HUMAN VALUES AND PROFESSIONAL ETHICS	BHUM0-103	2	0	30	300	C01	Understand the concept of human values as social fact. Clarity about different universal values and value systems relevant to professions and work.	-	-	-	-	-	-	1	3	2	-	-	3	-	-	-	
						C02	Discern the meanings of values, morality, ethics and their relationship with religion. Able to make sense of some significant related theories.	-	-	-	-	-	-	1	3	2	-	-	3	-	-	1	
						C03	Realize the relevance of Professional ethics and virtues at the workplace and their importance for the benefits of society at large.	-	-	-	-	-	-	2	3	2	-	-	3	-	-	1	
						C04	Appreciate the judicious use of Technology and social laws for the conservation of environment and consequently	-	-	-	-	-	-	2	3	2	-	-	3	-	-	1	

							for the welfare of the humanity.																		
Basic Electronics	BECEEO-001	3	1	15	100	CO1	Analysis of various switching characteristics of PN junction devices and its applications	3	2	2	2	2	1	-	1	1	1	-	1	1	1	-			
						CO2	Recognize the importance of Bipolar junction transistors and Unipolar junction transistors.	3	2	2	2	2	1	-	1	1	1	-	1	1	1	1	1	-	
						CO3	Conceptualize the transistor amplifier and oscillator circuits for various electronics applications	3	2	2	2	2	1	-	1	1	1	-	1	1	1	1	1	1	-
						CO4	Understanding and analysis of the characteristics of operational amplifiers and identify its internal structure	3	2	2	2	2	1	-	1	1	1	-	1	1	1	1	1	1	1
						CO5	Development of basic understanding for various electronics circuits.	3	2	2	2	2	1	-	1	1	1	-	1	1	1	1	1	1	-
COMPUTER AIDED CIVIL ENGINEERING DRAWING	BCIESI-301	3	1	15	100	CO1	Develop Parametric design and the conventions of formal engineering drawing	3	-	3	-	-	-	-	-	-	-	-	-	3	3	-			
						CO2	Produce and interpret 2D & 3D drawings	-	-	2	3	-	-	-	-	-	-	-	-	-	3	3	-		
						CO3	Communicate a design idea/concept graphically/visually	2	-	-	-	-	2	-	-	-	-	-	-	-	3	-	3		
						CO4	Examine a design critically and with understanding of CAD - The student learns to interpret drawings, and to produce designs using a combination of 2D and 3D software.	-	-	3	-	-	2	-	-	-	-	2	-	3	-	-			



						CO5	Get a Detailed study of an engineering artifact	3	-	-	-	-	-	-	-	-	-	2	3	-	1	
ENGINEERING MECHANICS	BMECE0-001	3	4	60	310	CO1	Confidently tackle equilibrium equations, moments and inertia problems	2	-	-	-	-	-	-	-	-	-	-	2	-	-	
						CO2	Master calculator/computing basic skills to use to advantage in solving mechanics problems.	-	3	-	-	-	-	-	-	-	-	-	-	-	3	-
						CO3	Gain a firm foundation in Engineering Mechanics for furthering the career in Engineering	2	-	-	-	-	-	-	-	-	-	-	1	-	3	-
ENERGY SCIENCE & ENGINEERING	BCIESI-302	3	2	30	200	CO1	The objective of this Course is to provide an introduction to energy systems and renewable energy resources, with a scientific examination of the energy field and an emphasis on alternative energy sources and their technology and application.	-	-	-	-	-	2	3	-	-	-	-	1	3	2	2
						CO2	The class will explore society's present needs and future energy demands, examine conventional energy sources and systems, including fossil fuels and nuclear energy, and then focus on alternatives, renewable energy sources such as solar, biomass (conversions), wind power, waves and tidal, geothermal, ocean thermal, hydro and nuclear.	-	-	3	-	-	3	3	-	-	-	-	-	2	2	3









INSTRUMENTATION & SENSOR TECHNOLOGIES FOR CIVIL ENGINEERING APPLICATIONS	BCIES1-401	4	2	30	200	CO4	Explain the working of refrigeration processes and psychometric properties.	3	3	3	3	3	3	2	2	2	--	3	2	2	1							
						CO1	Technologies based on fundamentals of measurements, sensing and instrumentation.	3	3	2	2	1	1	1	1	-	1	-	1	-	1	1	1	1	-			
						CO2	Development of basic understanding for measuring instruments and sensors.	3	3	2	2	1	1	1	1	-	1	-	1	-	1	1	1	1	1	-		
						CO3	Identify the technologies involved in installation and operations of various types of sensors.	3	3	3	3	2	1	1	1	-	1	-	1	-	1	1	1	1	1	-		
						CO4	Explain the importance of interpretation and analysis of sensor data.	3	3	2	3	2	1	1	1	-	1	-	1	-	1	1	1	1	1	1	1	
						CO5	Implementation and discussion on frequency domain signal processing and analysis.	3	3	2	2	1	1	1	1	-	1	-	1	-	1	1	1	1	1	1	-	
ENGINEERING GEOLOGY	BCIES1-402	4	2	30	200	CO1	Site characterization and how to collect, analyse, and report geologic data using standards in engineering practice.	3	3	-	-	-	-	-	-	-	3	-	-	3	3	-						
						CO2	The fundamentals of the engineering properties of Earth materials and fluids.	3	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2		
						CO3	Rock mass characterization and the mechanics of planar rock slides and topples.	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	
						CO4	Soil characterization and the Unified Soil Classification System.	2	-	-	-	-	-	-	-	-	-	-	-	-	3	-	3	-	3	-	-	
						CO5	The mechanics of soils and fluids and their influence on settlement, liquefaction, and soil slope stability	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	3	-	-	

DISASTER PREPAREDNESS & PLANNING	BCIES1-403	4	2	30	200	CO1	To understand basic concepts in Disaster Management	2	-	2	-	-	-	2	-	-	-	-	-	2			
						CO2	To Understand Definitions and Terminologies used in Disaster Management	-	-	-	-	3	-	2	2	-	-	-	-	2	2	-	
						CO3	To Understand Types and Categories of Disasters	2	-	-	-	2	-	3	-	-	-	-	-	-	2	-	3
						CO4	To Understand the Challenges posed by Disasters	-	2	-	3	-	-	-	-	-	-	2	1	3	2	-	-
						CO5	To understand Impacts of Disasters Key Skills	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-	-
INTRODUCTION TO FLUID MECHANICS	BCIES1-404	4	2	30	200	CO1	Understand the broad principles of fluid statics, kinematics and dynamics.	3	2	1	-	-	-	-	-	-	-	-	-	3	-	-	
						CO2	Understand definitions of the basic terms used in fluid mechanics.	3	-	1	-	-	-	-	-	-	-	-	-	-	3	-	-
						CO3	Understand classifications of fluid flow.	2	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
						CO4	Be able to apply the continuity, momentum and energy principles.	3	3	2	-	1	-	-	-	-	-	-	-	-	3	-	1
						CO	Understand dimensional analysis.	3	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
INTRODUCTION TO SOLID MECHANICS	BCIES1-405	4	3	45	300	CO1	Describe the concepts and principles, understand the theory of elasticity including strain/displacement and Hooke's law relationships; and perform calculations, relative to the strength and stability of structures and mechanical components;	3	3	-	-	-	-	-	-	-	-	-	2	2	-	-	

						CO2	Define the characteristics and calculate the magnitude of combined stresses in individual members and complete structures; analyze solid mechanics problems using classical methods and energy methods;	2	3	3	3	-	-	-	-	-	-	2	-	3	3	
						CO3	Analyse various situations involving structural members subjected to combined stresses by application of Mohr's circle of stress; locate the shear center of thin wall beams	2	3	3	3	-	-	-	-	-	-	-	2	-	2	3
						CO4	Calculate the deflection at any point on a beam subjected to a combination of loads; solve for stresses and deflections of beams under unsymmetrical loading; apply various failure criteria for general stress states at points; solve torsion problems in bars and thin walled members.	2	3	3	3	-	-	-	-	-	-	-	2	-	2	3
GEOMATICS ENGINEERING	BCIES1-406	4	3	45	300	CO1	An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline.	2	1	1	-	2	-	-	-	-	-	-	2	-	-	
						CO2	An ability to design systems, components, or processes meeting specified needs for broadly-defined engineering	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-





CIVIL ENGINEERING – SOCIETAL & GLOBAL IMPACT	BHSMCO-022	4	2	30	200	C04	Measuring physical properties of common structural and geotechnical construction materials	-	-	-	2	-	-	-	-	-	-	-	3	-				
						C05	Interpreting the laboratory data including conversion of the measurements into engineering values and derivation of material properties (strength and stiffness) from the engineering values	-	2	2	-	-	-	-	-	-	-	-	-	2	2	-		
						C06	Observing various modes of failure in compression, tension, and shear	-	-	-	3	-	-	-	-	-	-	-	-	-	-	3	-	
						C07	Observing various types of material behaviour under similar loading conditions	-	-	2	-	-	-	-	-	-	-	-	-	-	-	3	-	
						C01	The impact which Civil Engineering projects have on the Society at large and on the global arena and using resources efficiently and effectively.	-	-	2	-	-	-	3	-	-	-	-	-	-	-	-	-	2
						C02	The extent of Infrastructure, its requirements for energy and how they are met: past, present and future.	-	-	-	-	-	-	3	2	-	-	-	-	-	2	3	-	
						C03	The Sustainability of the Environment, including its Aesthetics.	-	-	-	-	-	-	3	-	-	-	-	-	2	-	-		

						CO4	The potentials of Civil Engineering for Employment creation & its Contribution to the GDP	-	-	-	-	-	-	-	-	-	1	-	3	-					
						CO5	The Built Environment and factors impacting the Quality of Life	-	-	3	-	-	-	-	-	-	-	-	2	-	-				
						CO6	Applying professional and responsible judgment and take a leadership role	-	-	-	-	-	-	-	2	-	-	-	-	-	3				
MANAGEMENT-I (Organizational Behavior)	BMNCC0-005	4	0	45	300	CO1	Technologies based on ecological principles and environmental regulations, which in turn helps in sustainable development.	-	-	3	-	-	2	3	-	-	-	-	-	3	-	-			
						CO2	Conceptualize the processes and various factors involved in the formation of environment.	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-	1	2	
						CO3	Recognize the importance of environment and the sustainable natural resources.	-	-	-	-	-	-	3	-	-	-	-	-	-	-	3	-	-	2
						CO4	Use scientific reasoning to identify and understand environment problems and evaluate potential solution.	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-
						CO5	Identify the impacts of human activities on environment and role of society in these impacts and also the waste management.	3	-	-	-	-	-	-	-	-	-	3	-	-	-	2	-	2	2

INSTRUMENTATION & SENSOR TECHNOLOGIES FOR CIVIL ENGINEERING APPLICATIONS LAB	BCIES1-408	4	1	30	002	CO1	Use scientific reasoning to identify the various measuring instruments specifically related to Civil Engineering.	3	2	2	2	2	1	-	1	1	1	-	1	1	1	-				
						CO2	Conceptualize the processes and various factors involved in identifying the need and use of different sensors	3	2	2	2	2	1	-	1	1	1	-	1	1	1	1	1	1	-	
						CO3	Analyze the various performance characteristics of different sensors.	3	2	2	2	2	1	-	1	1	1	-	1	1	1	1	1	1	1	-
						CO4	Development electrical of basic understanding for calibration of instruments and detection of measuring errors.	3	2	2	2	2	1	-	1	1	1	-	1	1	1	1	1	1	1	1
						CO5	Recognize the importance of signal processing and other sensor technologies.	3	2	2	2	2	1	-	1	1	1	-	1	1	1	1	1	1	1	1
ENGINEERING GEOLOGY LAB	BCIES1-409	4	1	30	002	CO1	Ability to categorize rocks and minerals by their origin and engineering properties.	3	-	2	-	-	-	-	-	-	-	-	-	3	-	1				
						CO2	Ability to apply geological principles to rock masses and discontinuities for use in engineering design e.g. rock slopes, foundation.	-	3	3	-	-	2	-	-	-	-	-	-	-	3	2	1			
						CO3	Gain an understanding of the societal relevance of Geological system.	3	-	2	2	-	3	-	-	2	-	-	2	3	-	3				
						CO4	Life-long learning of students about the identification of minerals and rocks.	3	-	-	2	-	-	-	-	-	-	-	3	3	2	2				

FLUID MECHANICS LAB	BEIES1-410	4	1	30	002	C01	Be able to measure viscosity.	1	-	-	3	-	-	-	-	-	-	3	-	-				
						C02	Understanding of pressure measuring devices.	2	2	-	3	-	-	-	-	-	-	-	-	-	3	-	-	
						C03	Predict the metacentric height of floating vessel and utility in vessel design.	3	-	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
						C04	Assess the hydrostatic force on flat surface/curved surfaces.	1	-	-	3	-	-	-	-	-	-	-	-	-	-	3	-	1
						C05	Calibrate various flow measuring devices (venturimeter, orifice meter and notches).	3	-	2	3	1	-	-	-	-	-	-	-	-	-	3	-	-
						C06	Authenticate the Bernoulli's theorem experimentally.	3	-	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
						C07	Predict impact of jets.	2	1	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
						C08	Predict flow visualization-Ideal flow.	3	-	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
						C09	Determine length of establishment of flow.	3	2	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
						C010	Compute velocity distribution in pipes.	3	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-
						C011	To determine the transition from laminar to turbulent flow and to ascertain the lower critical Reynolds number.	3	2	-	3	1	-	-	-	-	-	-	-	-	-	3	-	1
SOLID MECHANICS LAB	BEIES1-411	4	1	30	002	C01	Understanding of the concepts of stress and strain.	3	-	2	-	-	3	2	-	-	-	-	-	2				
						C02	Determination of internal forces and deflections in the beam.	-	-	-	-	3	-	2	2	2	-	-	2	2	2	-		
						C03	Understanding the various methods of analysis of beams, trusses and effect of torsion.	2	-	3	-	2	-	3	-	2	-	-	3	2	-	3		

MATERIALS, TESTING & EVALUATION LAB	BCIES1-412	4	1	30	002	CO4	Application of the principles and basic of mechanics of solids in the civil engineering structures	-	2	-	3	-	-	-	-	-	-	2	1	3	2	-				
						CO1	Learn about specimen preparation for examination all type of physical properties	3	3	-	-	-	-	2	-	2	-	-	-	-	-	-	3	-	-	
						CO2	Understand the characteristics of ferrous, nonferrous and composite material	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	-
						CO3	Conduct and analyse tensile, shear and compression tests of metallic and non-metallic specimen using universal testing machine	3	3	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	3	2
DESIGN OF CONCRETE STRUCTURES-I	BCIES1-501	5	3	45	300	CO1	Identify the different failure modes and determine their design strengths.	3	3	3	-	-	-	-	-	-	-	-	-	2	3	-				
						CO4	Select the most suitable section shape and size for beams according to specific design criteria.	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	-
STRUCTURAL ANALYSIS-I	BCIES1-502	5	4	60	310	CO1	The students will possess the skills to solve statically determinate problems of structural analysis dealing with different loads.	2	3	3	-	-	-	-	-	-	-	-	-	3	3	-				
						CO2	They will be able to apply their knowledge of structural analysis to address structural design problems.	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	3	3	1	
						CO3	They will be able to calculate support reactions of all statically determinate structures	2	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	-

GEOTECHNICAL ENGINEERING	BCIES1-503	5	4	60	310	CO1	The students will be able to apply their knowledge of various phase diagrams and derive various phase relationships of the soil.	3	1	1	-	-	-	2	-	-	-	-	3	3	1	
						CO2	The students will be able to apply their knowledge of index properties,	3	1	2	3	-	-	2	-	-	-	-	-	3	3	1
						CO3	The students will be able to apply their knowledge of the engineering properties of soil.	3	1	3	2	-	-	2	-	-	-	-	-	3	3	1
						CO4	The students will be able to apply their knowledge of stability of slopes.	3	1	3	-	-	-	2	-	-	-	-	-	3	3	1
ENVIRONMENTAL ENGINEERING	BCIES1-504	5	3	45	300	CO1	Estimate sewage generation and design sewer system including Sewage pumping stations.	2	-	3	-	-	-	1	-	-	-	-	3	3	-	
						CO2	Required understanding on the characteristics and composition of sewage, self-purification of streams.	3	-	-	-	2	-	1	-	-	-	-	-	3	3	-
						CO3	Perform basic design of the unit operations and processes for sewage treatment.	3	-	3	-	1	-	1	-	-	-	-	-	3	3	-
						CO4	An ability to develop and conduct appropriate experimentation, analyze and interpret data for future sewage generation & handling.	3	2	-	3	-	-	-	-	-	-	-	2	3	3	2
FLUID MECHANICS-II	BCIED1-511	5	3	45	300	CO1	Understand laminar and turbulent flows.	3	2	2	-	-	-	-	-	-	-	-	3	-	-	
						CO2	Learn about concepts of boundary layer theory.	1	2	3	-	-	-	-	-	-	-	-	-	3	-	-
						CO3	Design open channels for most economical sections.	1	3	3	-	-	-	-	-	-	-	-	-	3	2	-

SUSTAINABLE CONSTRUCTION METHODS	BCIED1-512	5	3	45	300	CO4	Will be able to understand surges, momentum principles, specific energy and GVF profiles.	2	3	3	-	-	-	-	-	-	-	3	2	-		
						CO1	Understand the concepts related to Sustainable Development and its three pillars – economic, environment, and society.	3	-	-	-	-	2	2	-	-	-	-	2	3	-	-
						CO2	Understand of the ‘modern’ building material developed using advanced technologies and testing methods.	3	-	2	-	3	-	-	-	-	-	-	2	3	-	1
						CO3	Application of recycled/reconstructed building materials in the construction of green buildings	3	-	-	-	-	2	3	-	-	-	-	2	3	2	-
						CO4	Describe the basic provisions of the Bureau of Indian standards related to select building material.	3	2	2	-	-	-	-	-	-	-	-	3	3	2	-
CONCRETE CONSTRUCTION TECHNOLOGY	BCIED1-513	5	3	45	300	CO1	To understand the behaviour of fresh and hardened concrete.	3	-	-	-	-	-	-	-	2	-	2	3	-	-	
						CO2	To make aware the recent developments in concrete technology.	3	-	2	-	-	3	-	-	-	2	-	2	3	2	1
						CO3	To understand factors affecting the strength, workability and durability of concrete.	-	3	-	3	-	-	-	-	-	-	-	-	3	3	-
						CO4	To impart the methods of proportioning of concrete mixtures.	3	-	2	-	-	-	-	-	-	3	-	-	3	-	3



BUILDING MATERIALS & CONSTRUCTION	BCIED1-521	5	2	30	200	CO1	Predict the properties of building stones and its classifications.	2	2	-	-	-	-	1	-	-	-	-	2	2	-	
						CO2	Understand the concept of various methods of manufacture of bricks.	2	-	2		1	-	-	-	-	-	-	1	3	2	-
						CO3	Explain various types of cements and their applications in construction. Various field and laboratory tests on cement	3	-	-	2	-	-	1	-	-	-	-	-	3	3	-
						CO4	Analyze the importance of mineral and chemical admixtures, requirements of the concrete in construction	2	3	-	-	-	-	-	-	-	-	-	-	2	2	-
						CO5	Explain the suitability of floors in buildings like mosaic flooring, terrazzo flooring, rubber flooring, asphalt flooring.	2	-	2	-	-	-	-	-	-	-	-	-	3	2	-
						CO6	Explain the foundations and uses of different types of foundations.	3	1	-	-	1	-	-	-	-	-	-	-	2	1	-
						CO7	Classification of various types of woods and properties, seasoning of timber.	2	-	1	-	-	-	-	-	-	-	-	-	3	2	-
NUMERICAL METHODS IN CIVIL ENGINEERING	BCIED1-522	5	2	30	200	CO1	Identify the application potential of numerical methods.	3	3	-	1	-	-	-	-	-	-	-	3	3	1	
						CO2	Solve Civil engineering problems using numerical methods.	3	1	-	1	-	-	-	-	-	-	-	3	3	-	
						CO3	Demonstrate application of numerical methods to civil engineering problems.	3	2	-	-	1	-	-	-	-	-	-	3	2	1	

						C04	Apply differential equations and integration to solve civil engineering problems.	3	-	-	2	1	-	-	-	-	-	-	3	3	-		
						C05	Outline and Propose the finite difference techniques.	2	1	-	2	1	-	-	-	-	-	-	3	2	1		
						C06	Apply the concept of partial differential equations and Solve practical problems.	3	2	-	2	1	-	-	-	-	-	-	3	3	1		
RIVER ENGINEERING	BCIED1-523	5	2	30	200	C01	Mechanics of river flow, aggradations and degradation, measurements in rivers.	1	3	3	-	-	-	-	-	-	-	-	3	-	-		
						C02	Physical river models.	2	2	3	-	2	-	-	-	-	-	-	-	-	3	2	-
						C03	River training works.	2	2	3	-	-	-	-	-	-	-	-	-	-	3	-	-
						C04	Design of river training and flood protection structures.	1	2	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CONCRETE TECHNOLOGY LAB	BCIES1-505	5	1	30	002	C01	Determine the consistency, setting time, fineness, specific gravity, compressive strength, etc. of cement.	2	-	-	3	-	-	-	-	-	1	-	-	3	2	-	
						C02	Determine the fineness modulus, grading, density & specific gravity of aggregates.	2	-	-	3	-	-	-	-	-	1	-	-	3	2	-	
						C03	Determine the shape & size, compressive strength and water absorption of bricks & pavers.	2	-	-	3	-	-	-	-	-	1	-	-	3	2	-	
						C04	Describe the properties of concrete & knowledge of concrete mix design philosophy.	3	2	-	3	-	-	-	-	-	1	-	-	3	3	-	

						CO5	Determine the optimum dose of admixtures for concrete.	2	-	-	3	-	-	-	-	-	1	-	-	3	2	-			
						CO6	Give practical exposure of laboratory testing for manhole covers.	2	-	-	2	-	-	-	-	-	1	-	-	3	2	-			
STRUCTURAL ANALYSIS LAB	BCIES1-506	5	1	30	002	CO1	Students will be able to effectively link the theory / analytical concepts.	2	2	-	3	-	-	-	-	-	-	-	-	3	3	1			
						CO2	They will be able to demonstrate the background of the theoretical aspects, with practice and application.	2	-	-	3	2	-	-	-	-	-	-	-	-	-	3	3	-	
						CO3	They will be able to generate and analyze data using experiments and develop observational skill by the exposure to equipment and machines.	-	3	-	3	1	-	-	-	-	-	-	-	-	-	-	3	2	1
						CO4	They will be able to use computing tools in analyzing and presentation of the experimental data.	-	2	-	3	2	-	-	-	-	2	-	-	-	-	-	3	3	1
GEOTECHNICAL ENGINEERING LAB	BCIES1-507	5	1	30	002	CO1	Have thorough knowledge about the procedures of laboratory tests used for determination of physical, index and engineering properties of soils	3	1	3	-	-	-	2	-	-	-	-	-	3	3	3			
						CO2	Have the capability to classify soils based on test results and interpret engineering behavior based on test results	3	1	1	-	-	-	2	-	-	-	-	-	-	-	3	3	3	
						CO3	Be able to evaluate the permeability and shear strength of soils	3	1	1	-	-	-	2	-	-	-	-	-	-	-	3	3	3	



						C03	Able to analyze the History, features of Indian constitution, the role Governor and Chief Minister, role of state election commission, the decentralization of power between central, state and local self-government.	-	-	-	-	2	-	-	-	3	-	-	-	-	1		
						C04	Able to evaluate Preamble, Fundamental Rights and Duties, Zilla Panchayat, block level organization, various commissions like SC/ST/OBC and women.	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	1
DESIGN OF STEEL STRUCTURES-I	BCIES1-601	6	3	45	300	C01	Identify the different failure modes of bolted and welded connections, and determine their design strengths.	-	-	2	-	-	-	-	-	-	-	-	3	2	-		
						C02	Identify the different failure modes of steel tension and compression members and beams, and compute their design strengths.	-	2	3	2	-	-	-	-	-	-	-	-	-	3	3	-
						C03	Select the most suitable section shape and size for tension and compression members and beams according to specific design criteria.	-	2	2	3	-	-	-	-	-	-	-	-	-	3	3	2
STRUCTURAL ANALYSIS-II	BCIES1-602	6	3	45	300	C01	The students will possess the skills to solve statically indeterminate problems of structural analysis dealing with different loads.	2	3	3	-	-	-	-	-	-	-	-	3	3	-		
						C02	They will be able to apply their knowledge of structural analysis to address structural design problems.	3	3	3	-	-	-	-	-	-	-	-	-	3	3	1	

						CO3	They will be able to calculate support reactions of statically indeterminate structures.	2	-	3	-	-	-	-	-	-	-	3	3	-						
TRANSPORTATION ENGINEERING-I	BCIES1-603	6	3	45	300	CO1	The student will learn about essentials of highway planning and features of highway development in India.	-	-	-	-	-	2	-	1	-	3	-	1	3	-	-				
						CO2	The student will learn how to do selection of highway alignment and design the geometric elements of highways.	2	-	3	2	-	-	-	-	-	-	-	-	-	-	-	-	2	1	
						CO3	The student will learn how to carry out traffic studies and implement traffic regulation and control measures and intersection design.	-	-	-	3	2	-	-	-	-	-	1	1	-	-	-	-	-	-	2
						CO4	The student will know about characteristic properties of road construction materials and design the flexible and rigid pavements as per IRC guidelines.	-	3	-	-	-	-	1	-	2	2	-	1	3	-	-	-	-		
FOUNDATION ENGINEERING	BCIES1-604	6	3	45	300	CO1	Learn about types and purposes of different foundation systems and structures.	3	2	3	2	-	-	2	-	-	-	-	-	3	3	2				
						CO3	Have an exposure to the systematic methods for designing foundations.	3	2	3	3	-	-	2	-	-	-	-	-	-	3	3	2			
						CO4	Be able evaluate the feasibility of foundation solutions to different types of soil conditions considering the time effect on soil behavior	3	2	3	2	-	-	2	-	-	-	-	-	-	3	3	2			
						CO4	Have necessary theoretical backgroundi for design and construction of foundation systems.	3	2	3	2	-	-	2	-	-	-	-	-	-	3	3	2			

IRRIGATION ENGINEERING – I	BCIED1-611	6	2	30	200	CO1	Recognize the concepts, techniques and modernization of irrigation.	3	2	3	-	2	-	-	-	-	-	-	3	-	-				
						CO2	Plan and design lined and un-lined canals for irrigations.	2	1	3	-	-	-	-	-	-	-	-	-	-	-	3	2	-	
						CO3	Apply different theories/ methods to design lined and un-lined canals.	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	3	2	-
						CO4	Learn losses in canals and its control measures.	1	2	3	-	2	-	-	-	-	-	-	-	-	-	-	3	-	-
						CO5	Design and construction of well and tube well.	1	3	3	-	2	-	-	-	-	-	-	-	-	-	-	3	1	-
						CO6	Learn about river training works.	3	2	2	-	2	-	-	-	-	-	-	-	-	-	-	3	-	1
MATRIX METHODS OF ANALYSIS	BCIED1-612	6	2	30	200	CO1	Students will be able to analyze skeletal i.e. framed structures.	3	3	-	-	-	-	-	-	-	-	-	3	3	-				
						CO2	They will be able to differentiate between the flexibility and stiffness methods of structural analysis.	3	3	-	-	1	-	-	-	-	-	-	-	-	-	3	3	1	
						CO3	They will be able to access computers that permits the use of the stiffness method for analyzing traditional civil engineering structures, air frame, space structures etc.	2	3	-	-	3	-	-	-	-	-	-	-	-	-	3	3	-	
RURAL WATER SUPPLY & ONSITE SANITATION	BCIED1-613	6	2	30	200	CO1	Knowledge about water supply scheme in rural areas.	3	-	-	-	-	2	2	-	-	-	-	3	3	-				
						CO2	Knowledge about environmental sanitation methods and design in rural areas.	3	-	3	-	-	2	2	-	-	-	-	-	-	-	3	3	-	





WATER & WASTEWATER TREATMENT	BCIED1-631	6	3	45	300	CO3	They will learn in detail the design methods prescribed by the Indian Roads Congress for flexible and rigid pavements in India	-	-	3	-	2	-	-	2	1	1	-	-	3	-	2					
						CO4	The students will get exposure to methodology of strengthening of existing pavement structures and some modern pavement design concepts.	-	-	-	3	1	-	-	1	-	2	2	-	-	1	-	-	-	-		
						CO1	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, welfare, and environmental factors.	3	-	3	-	-	-	2	-	-	-	-	-	-	-	-	-	3	3	-	-
						CO2	An ability to develop and conduct appropriate experimentation, analyze and interpret data for future demand & supply.	2	-	-	3	-	-	-	-	-	-	-	-	-	-	-	3	3	3	-	-
						CO3	Estimate sewage generation and design sewer system including Sewage pumping stations.	3	-	3	-	-	-	1	-	-	-	-	-	-	-	-	-	3	3	-	-
						CO4	Required understanding on the characteristics and composition of sewage, self Purification of streams.	3	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	3	3	-	-
						CO5	Perform basic design of the unit operations and processes for sewage treatment.	2	-	3	-	-	-	1	-	-	-	-	-	-	-	-	-	3	3	-	-

GROUND IMPROVEMENT TECHNIQUES	BCIED1-632	6	3	45	300	CO1	Ability to understand the necessity of ground improvement and potential of a ground for improvement	3	2	3	2	-	-	2	-	-	-	-	3	2	2		
						CO2	To gain comprehensive understanding about the improvement of in-situ cohesive soils as well as Cohesion less soils	3	2	3	2	-	-	2	-	-	-	-	-	-	3	3	2
						CO3	Competence to analyze an in-situ ground, identification of ground improvement techniques feasible, selection of the ideal method, its planning , design, implementation and evaluation of improvement level	3	2	3	2	-	-	2	-	-	-	-	-	-	3	2	2
PAVEMENT CONSTRUCTION AND MANAGEMENT	BCIED1-633	6	3	45	300	CO1	The students will learn about various engineering methods used for construction and maintenance of different types of pavement structures.	3	-	-	2	-	-	1	-	-	-	2	-	3	-	-	
						CO2	The student shall get familiar with the methods of evaluation of pavement structures to undertake various types of maintenance management strategies.	-	1	3	-	-	-	-	2	1	2	-	-	-	-	3	1
						CO3	They will learn the concept of pavement management system and pavement performance prediction, which will not only help them in field applications but also in research at the postgraduate level after completion of their graduation	-	3	-	-	2	2	-	-	-	-	-	2	-	-	-	3

EARTHQUAKE ENGINEERING	BCIED1-634	6	3	45	300	CO1	The students will gain an experience in the implementation of Earthquake Engineering on engineering concepts which are applied in field Structural Engineering.	-	3	2	2	-	-	-	-	-	-	-	3	2	-				
						CO2	The students will get a diverse knowledge of earthquake engineering practices applied to real life problems.	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-
						CO3	The students will learn to understand the theoretical and practical aspects of earthquake engineering along with the planning and design aspects.	-	3	-	2	-	-	-	-	-	-	-	-	-	-	-	2	3	-
TRANSPORTATION ENGINEERING LAB	BCIES1-605	6	1	30	002	CO1	The student will learn the laboratory testing of different kinds of highway construction materials such as Soil, Aggregate and Bitumen.	3	1	-	2	1	-	2	-	-	1	1	-	3	-	1			
						CO2	The student will learn to check the suitability of highway construction material so as to exercise better quality control in a road construction project.	-	-	3	-	1	-	1	2	-	2	1	-	3	-				
COMPUTER-AIDED CIVIL ENGINEERING DRAWING	BCIES1-606	6	1	30	002	CO1	Design and draw working structural drawings of various concrete etc structures and their members.	3	-	3	-	3	-	-	-	-	-	-	3	-	2				
						CO2	Understand and interoperate design aids and handbooks.	3	-	-	3	-	-	-	-	3	-	2	3	-	-				
						CO3	Use of relevant Indian Standard specifications	3	-	2	-	-	-	-	-	-	-	-	3	3	-				

						applicable to Reinforced concrete structures																	
DESIGN OF CONCRETE STRUCTURES-II	BCIES1-701	7	3	45	300	C01	Identify and compute the design loads on RCC components.	3	2	-	-	-	-	-	-	-	-	3	-	-			
						C02	Able to analyze and design with detailing RCC members.	-	3	2	3	-	-	-	-	-	-	-	-	-	3	-	
						C03	Ability to design and check for serviceability (crack and deflection) and ultimate limit state conditions.	-	3	3	2	-	2	-	-	2	-	-	-	-	-	3	2
						C04	Apply relevant Indian Standard provisions to ensure safety and serviceability of RCC structural elements.	3	-	-	3	-	-	-	-	-	-	-	3	2	-	-	
PROFESSIONAL PRACTICE & LAW	BCIES1-702	7	3	45	300	C01	Understand the preparation of an abstract estimate for a residential building, roads, irrigation projects, bridges, etc.	2	2	-	-	-	-	-	-	-	-	2	-	2	-	2	
						C02	Analyse the units for various quantities of items of work.	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-
						C03	Evaluate the rates for various items of work	2	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
						C04	Design and prepare bar bending schedule for reinforcement works.	-	-	2	-	-	-	-	-	-	-	2	-	-	2	-	
						C05	Understand how to prepare a Notice inviting tender document for bidding.	2	-	-	-	-	-	-	-	-	-	2	-	-	2	-	
						C06	Evaluate the valuation of building.	2	-	-	2	-	1	-	-	-	-	-	-	-	-	2	-
						C07	Preparation of standard specifications for different items of building construction.	-	-	2	-	-	1	-	-	-	-	2	-	2	2	2	-

IRRIGATION ENGINEERING-II	BCIED1-711	7	2	30	200	CO1	To study types of diversion headworks, seepage theories.	1	-	3	-	-	-	-	-	-	-	3	-	-		
						CO2	To design weirs.	2	-	3	-	-	-	-	-	1	-	-	-	3	1	-
						CO3	To learn about spillways.	2	-	3	-	-	-	-	-	-	-	-	-	3	-	-
						CO4	Design of canal regulators, canal falls, cross drainage works.	1	2	3	-	-	-	-	-	1	-	-	-	3	1	-
						CO5	Classify canal outlets, design outlets.	1	2	3	-	-	-	-	-	-	-	-	-	3	-	1
AIR & NOISE POLLUTION AND CONTROL	BCIED1-712	7	2	30	200	CO1	Explain basic principles on various aspects of atmospheric chemistry.	3	-	-	-	-	3	-	-	-	-	3	3	-		
						CO2	Identify the major sources, effects and monitoring of air and noise pollutants.	3	3	-	-	-	3	-	-	-	-	-	3	3	-	
						CO3	Understand the key transformations and meteorological influence on air and noise.	3	-	-	-	-	3	2	-	-	-	-	3	3	-	
						CO4	Relate and analyse the pollution regulation on its scientific basis.	3	3	-	-	-	3	-	-	-	-	-	3	3	-	
GEOTECHNICAL DESIGN	BCIED1-713	7	2	30	200	CO1	Learn about types and purposes of different underground structures.	3	2	3	2	-	-	2	-	-	-	3	2	2		
						CO2	Have an exposure to the systematic methods for designing foundations.	3	2	3	2	-	-	2	-	-	-	-	3	3	2	
						CO3	Be able evaluate the feasibility of foundation solutions to different types of soil conditions considering the time effect on soil behavior.	3	2	3	2	-	-	2	-	-	-	-	3	2	2	

						CO4	Have necessary theoretical background for design and construction of foundation systems	3	2	3	2	-	-	2	-	-	-	-	-	3	2	2			
PRESTRESSED CONCRETE	BCIED1-721	7	2	30	200	CO1	Students will understand the general mechanical behavior of prestressed concrete.	3	-	-	-	-	-	-	-	-	-	-	-	2	2	-			
						CO2	Students will be able to analyze and design prestressed concrete flexural members.	-	3	3	3	-	-	-	-	-	-	-	-	-	-	-	3	3	-
						CO3	Students will be able to analyze and design for vertical and horizontal shear in prestressed concrete.	-	3	3	3	-	-	-	-	-	-	-	-	-	-	-	3	3	-
SOLID & HAZARDOUS WASTE MANAGEMENT	BCIED1-722	7	2	30	200	CO1	Do sampling and characterization of solid waste.	3	-	-	-	-	3	-	-	-	-	-	-	3	3	-			
						CO2	Analysis of hazardous waste constituents including QA/QC issues	-	3	-	-	-	3	2	-	-	-	-	-	-	-	3	3	-	
						CO3	Apply steps in solid waste management like waste reduction at source, collection techniques, recycling, transport, optimization of solid waste.	-	3	3	-	-	3	-	-	-	-	-	-	-	-	-	3	3	2
						CO4	Analyse treatment & disposal techniques and economics of the onsite vs. offsite waste management.	-	3	3	-	-	3	-	-	-	-	1	-	3	3	2			

REPAIR & REHABILITATION OF STRUCTURES	BCIED1-723	7	2	30	200	C01	Know the strategies of maintenance and repair.	1	1	-	-	-	1	-	-	-	-	-	1	-	-						
						C02	Understand the properties of repair materials.	1	1	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-		
						C03	Understand the various properties of concrete.	1	1	-	1	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	
						C04	Get an idea of repair techniques.	1	1	-	1	-	1	-	-	-	-	-	-	-	-	-	-	1	1	-	
						C05	Understand the retrofitting strategies and techniques.	1	1	-	1	1	1	-	-	-	-	-	-	-	-	-	-	1	-	1	
SOFTWARE LAB	BCIES1-704	7	1	30	002	C01	To design the whole project like roads, building etc. with the help of softwares	-	3	3	2	3	-	-	-	-	-	-	2	2	3	-					
						C02	To deal with project management in real time	-	-	-	-	-	-	-	-	-	3	-	3	3	-	-	3	-	-	3	
ESSENCE OF INDIAN KNOWLEDGE TRADITION	BMNCCO-006	7	0	30	200	C01	Know about Vedas, Upavedas, Vedangas, etc.	-	-	-	-	-	2	-	2	-	-	-	-	-	2	-	1				
						C02	Provide important insight into the processes of observation, mitigation, and adaptation of changes in climate.	-	-	2	-	-	2	-	-	-	-	-	-	-	-	-	-	3	-	1	
						C03	Understand Indian knowledge system with knowledge, innovations and practices of indigenous and local communities around the world.	-	-	-	-	-	3	-	2	-	-	-	-	-	-	-	-	-	3	-	1
						C04	Know the importance of Yoga, including conscious breathing, meditation, lifestyle and diet changes, visualization, etc. in human life.	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-

						CO5	Know about ancient Indian knowledge systems with case studies.	-	-	-	-	-	3	-	-	-	-	-	2	-	-			
TRANSPORTATION ENGINEERING-II	BCIES1-801	8	3	45	300	CO1	The students will learn about importance of railways and Air transportation systems in the social and economic development of the country.	-	3	-	-	-	2	-	1	-	3	-	1	-	3	-		
						CO2	The students will come to know about engineering aspects of components of railway track and its geometric design, layouts of stations and yards, and railway signaling and interlocking systems.	2	-	3	2	-	-	2	-	1	-	-	-	-	3	1	-	
						CO3	The students will learn about planning and design of runway and taxiway, airport configurations and visual aids required for safe and efficient air transportation system.	-	-	-	3	2	-	-	-	-	1	1	-	-	-	-	-	3
						CO1	Identify and compute the design loads on a typical steel building.	3	2	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-
DESIGN OF STEEL STRUCTURES-II	BCIED1-811	8	3	45	300	CO2	Able to analyze and design with detailing of steel flexural members.	-	3	2	3	-	-	-	-	-	-	-	-	-	3	-		
						CO3	Ability to design and check for serviceability (crack and deflection) and ultimate limit state conditions.	-	3	3	2	-	2	-	-	2	-	-	-	-	-	3	2	
						CO4	Apply relevant Indian Standard provisions to ensure safety and serviceability of structural steel elements.	3	-	-	3	-	-	-	-	-	-	-	3	2	-	-		
						CO1	The students shall learn about the importance and application	3	-	-	1	-	2	-	-	-	1	-	2	-	3	-		
PORT &	BCIED	8	3	45	300	CO1	The students shall learn about the importance and application	3	-	-	1	-	2	-	-	-	1	-	2	-	3	-		



ENVIRONMENTAL IMPACT ASSESSMENT & LIFE CYCLE ANALYSES	BCIED1-813	8	3	45	300		of fourth major mode of transportation, i.e., waterways, after covering highways, railways, and airports in the previous semesters.															
						CO2	They will understand the need for providing various civil engineering structures at the ports and harbours, and their construction, maintenance, and navigational aspects.	-	3	-	1	2	-	2	-	-	-	2	-	-	2	-
						CO3	They will come to know about the functions of different components of harbours and ports for the purpose of safe and efficient water transportation.	-	-	3	-	-	-	-	2	-	1	-	-	3	-	1
						CO1	Knowledge about EIA tools & methodologies, auditing and documentation of EIA.	3	-	-	-	-	3	-	-	-	-	-	-	3	3	-
						CO2	Students will gain competency and understanding of the significance of chemical and biological reactions in environmental problems and solutions.	3	-	3	-	-	3	-	-	-	-	-	3	3	-	
						CO3	Students will understand the theory behind the analytical techniques.	3	-	-	-	3	-	-	-	-	-	-	3	3	-	
						CO4	Students will learn the use of microbiological methods for treating water and waste water.	3	-	3	-	-	3	-	-	-	-	-	3	3	-	

ENGINEERING HYDROLOGY	BCIED1-821	8	2	30	200	CO1	Understand the interaction among various processes in the hydrological cycle.	1	2	1	-	-	-	-	-	-	-	3	-	-			
						CO2	Calculate the average annual rainfall of any area using the rain gauge data and inter-relations of various parameters as infiltration, evapo-transpiration etc.	-	2	3	-	-	-	-	-	-	-	-	-	-	3	-	-
						CO3	Understand the various components of hydrographs and to estimate the run-off.	1	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
						CO4	Estimation of peak flows by rational method, unit hydrograph theory, Gumbels's method.	1	2	3	-	-	-	-	-	-	-	-	-	-	3	-	1
BRIDGE ENGINEERING	BCIED1-822	8	2	30	200	CO1	The students will learn about the planning and construction of bridges, which is one of the most important components of the transportation infrastructure.		3	-	1	-	2	-	-	-	1	-	2	-	-	3	
						CO2	They will learn about different types of bridges, their choice, site selection, loads, with special emphasis on RCC and steel bridges.	-	-	3	-	2	-	2	-	1	-	2	-	3	2	-	
						CO3	They will also learn about components of sub-structure and super-structure of the bridges along with construction and maintenance aspects of bridges.	3	-	2	-	-	-	-	2	-	1	-	-	-	3	1	

SOIL REINFORCING TECHNIQUES	BCIED1-823	8	2	30	200	CO1	Competence in identification of ideal geo-synthetic function and ability to select the ideal product to serve the function.	3	2	2	2	-	-	2	-	-	-	-	3	2	2			
						CO2	Ability to analyse and design the application of geo-synthetics.	3	2	1	2	-	-	1	-	-	-	-	-	-	-	2	2	1
						CO3	Competence construction practices and evaluation of post construction improvement.	3	2	2	2	-	-	2	-	-	-	-	-	-	-	3	2	2
INDUSTRIAL STRUCTURES	BCIED1-824	8	2	30	200	CO1	Various distress and damages to concrete and masonry structures, the importance of maintenance of structures, types and properties of repair materials etc.	2	3	3	3	2	2	-	-	-	-	-	3	3	-			
						CO2	Assessing damage to structures and various repair techniques.	-	-	-	-	3	2	-	-	-	-	2	-	-	-	3	3	
ADVANCED INSPECTION & TESTING LAB	BCIES1-802	8	1	30	002	CO1	Perform different NDTs on hardened concrete & highway.	3	-	1	3	-	-	-	-	-	-	-	3	3	-			
						CO2	Improve quality control during construction.	3	2	-	3	-	-	-	-	-	-	1	3	3	-			
						CO3	Improve product reliability.	2	2	-	3	-	-	-	-	-	-	1	3	3	-			
						CO4	Give information on repair criteria.	2	3	-	3	-	-	-	-	-	-	-	3	3	1			
						CO5	Predict accident prevention analysis and to reduce costs.	3	3	-	3	-	-	-	-	-	-	1	1	3	3	1		

