LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
Accredited by NAAC with 'A' Grade, ISO 9001:2015 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTOMES (R17) MAPPING WITH POs AND PSOs

I SEMESTER (I BTECH -I SEM)

17FE01	**Professional Communication-I**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Use English vocabulary & grammar effectively while speaking and writing.	-	-	-	2	-	-	-	-	3	3	2	-	-	-	-
CO2	Comprehend the given texts and communicate confidently in formal and informal contexts.	-	1	-	2	-	1	-	-	3	3	2	-	-	-	-
CO3	Draft E-mails& Memos	-	-	-	2	-	-	-	-	3	3	2	-	-	-	-
CO4	Understand the written and spoken information thoroughly.	-	1	-	2	-	1	-	-	3	3	2	-	-	-	-
CO5	Face interviews with confidence.	-	-	-	2	-	-	-	-	3	3	2	-	-	-	-
	Average value of CO	-	1.00	-	2.00	-	1.00	-	-	3.00	3.00	2.00	-	-	-	-
17FE04	**Differential equations and Linear Algebra**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Apply first order and first-degree differential equations to find Orthogonal trajectories and to calculate current flow in a simple LCR circuit.	3	2	-	1	-	-	-	-	-	-	1	-	-	-	-
CO2	Discriminate among the structure and procedure of solving a higher order differential equation with constant coefficients and variable coefficients.	3	2	-	1	-	-	-	-	-	-	1	-	-	-	-
CO3	Developing continuous functions as an infinite series and compute the Jacobian to determine the functional dependence.	3	2	-	1	-	-	-	-	-	-	1	-	-	-	-

CO4	Distinguish among the pros and cons between the Row operation methods and Iterative methods in solving system of linear equations.	3	2	-	-	-	-	-	-	-	-	1	-	-	-	-
CO5	Compute the Eigen values and Eigen vectors and powers, Inverse of a square matrix through Cayley – Hamilton theorem	3	2	-	-	-	-	-	-	-	-	1	-	-	-	-
	Average value of CO	3.00	2.00	-	1.00	-	-	-	-	-	-	1.00	-	-	-	-
17FE13	**ENGINEERING PHYSICS**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	Define the nature of Interference and Diffraction.	1	2	-	-	-	-	-	-	-	-	-	2	-	-	-
CO 2	Describe the polarization and LASER, types of lasers and their applications.	3	1	-	-	-	-	-	-	-	-	-	2	-	-	-
CO 3	Analyze the dual nature of matter waves and the crystal structures.	1	3	-	-	-	-	-	-	-	-	-	2	-	-	-
CO 4	Identify the different types of magnetic materials and their applications.	2	3	-	-	-	-	-	-	-	-	-	2	-	-	-
CO 5	Propose the different superconducting materials	2	1	-	-	-	-	-	-	-	-	-	2	-	-	-
	Average value of CO	1.80	2.00	-	-	-	-	-	-	-	-	-	2.00	-	-	-
17CI01	**COMPUTER PROGRAMMING**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Identify basic elements of C programming structures like datatypes, expressions, control statements, various I/O functions and Evaluation of simple mathematical problems using control structures.	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Implementation of derived data types like arrays, strings and various operations.	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-

CO3	Understanding of memory management using pointers and designing of modular programming.	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Construct user defined structures and implements various applications.	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Create text & binary type files and understanding of various file I/O operations.	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-
	Average value of CO	1.67	2.00	2.80	-	-	-	-	-	-	-	-	-	-	-	-
17CE01	**Building Materials and Construction**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Identify suitability of stones and bricks as building materials	2	-	-	-	3	3	3	2	-	2	2	-	2	1	2
CO2	Recognize the importance of lime and cement as building materials	2	-	-	-	3	3	3	2	-	2	2	-	2	1	2
CO3	Make out the appropriate masonry and mortar to be used for building construction	2	-	-	-	3	3	3	2	-	2	2	-	2	1	2
CO4	Pick up the appropriate building components for comfortable construction	2	-	-	-	3	3	3	2	-	2	2	-	2	1	2
CO5	Identify the appropriate type of finishing techniques to be used in buildings	2	-	-	-	3	3	3	2	-	2	2	-	2	1	2
	Average value of CO	2.00	-	-	-	3.00	3.00	3.00	2.00	-	2.00	2.00	-	2.00	1.00	2.00
17FE60	**ENGLISH COMMUNICATION SKILLS LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Articulate English with good pronunciation.	-	-	-	3	-	-	-	-	3	3	2	-	-	-	-
CO2	Manage skilfully through group discussions.	-	-	-	3	-	-	-	-	3	3	2	-	-	-	-
CO3	Communicate with the people effectively.	-	-	-	3	-	-	-	-	3	3	2	-	-	-	-
CO4	Collect and interpret data aptly.	-	-	-	3	-	-	-	-	3	3	2	-	-	-	-

	Average value of CO	-	-	-	3.00	-	-	-	-	3.00	3.00	-	-	-	-	-
17FE63	**ENGINEERING PHYSICS LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Find the wave length of the Laser light source and width of single slit by forming diffraction pattern	**3**	**3**	**3**	**2**	-	-	-	-	**3**	-	**3**	-	-	-	-
CO2	Estimate the Radius of curvature of Plano convex lens by forming Newton's rings	**3**	**3**	**2**	**2**	-	-	-	-	**3**	-	**3**	-	-	-	-
CO3	Analyze the characteristics of different Diodes.	**3**	**3**	**2**	**2**	-	-	-	-	**3**	-	**3**	-	-	-	-
CO4	Determine the energy band gap of a semi-conductor Diode.	**3**	**3**	**2**	**2**	-	-	-	-	**3**	-	**3**	-	-	-	-
	Average value of CO	3.00	3.00	2.25	2.00	-	-	-	-	3.00	-	3.00	-	-	-	-
17CI60	**COMPUTER PROGRAMMING LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Plan solution for a problem and writing a program by understanding the various data types and the conditional statements	2	3	-	-	-	-	-	-	-	2	2	-	1	-	-
CO2	Plan a solution for a problem and writing a program by understanding repetive statements i.e., loops and arrays with different dimensions	2	3	-	-	-	-	-	-	-	2	2	-	1	-	-
CO3	Plan a solution for a problem and writing a program by understanding how to access the address locations of a variables using pointers and how the problem can be divided into sub functions to reduce the complexity	2	3	-	-	-	-	-	-	-	2	2	-	1	-	-

CO4	Plan a solution for a problem and writing a program by understanding the structures and unions and to access the data from files	2	3	-	-	-	-	-	-	-	2	2	-	1	-	-
	Average value of CO	2.00	3.00	-	-	-	-	-	-	-	2.00	2.00	-	1.00	-	-
17ME60	**ENGINEERING WORKSHOP**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Model and Develop various basic prototypes in the carpentry trade	**3**	**3**	**2**	**2**	-	-	-	-	**3**	-	-	**3**	-	-	-
CO2	Develop various basic prototypes in the trade of Welding	**3**	**3**	**2**	**2**	-	-	-	-	**3**	-	-	**3**	-	-	-
CO3	Develop various basic prototypes in the trade of Tin smithy	**3**	**3**	-	-	-	-	-	-	**3**	-	-	**3**	-	-	-
CO4	Understand various basic House Wiring concepts and implement them in simple electrical connections	**3**	**3**	-	-	-	-	-	-	**3**	-	-	**3**	-	-	-
	Average value of CO	3.00	3.00	2.00	2.00	-	-	-	-	3.00	-	-	3.00	-	-	-
II SEMESTER (I BTECH -II SEM)																
17FE02	**PROFESSIONAL COMMUNICATION – II**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Use appropriate vocabulary to interpret data thoroughly and to write reports effectively.	-	1	-	1	-	1	-	-	3	3	2	-	-	-	-
CO2	Face any situation with confidence and voice opinions/decisions assertively.	-	1	-	1	-	1	-	-	3	3	2	-	-	-	-
CO3	Use English Language effectively in spoken and written forms.	-	1	-	1	-	1	-	-	3	3	2	-	-	-	-
CO4	Work effectively in teams for better result.	-	1	-	1	-	1	-	-	3	3	2	-	-	-	-
CO5	Communicate effectively using verbal and non-verbal dimensions aptly.	-	1	-	1	-	1	-	-	3	3	2	-	-	-	-
	Average value of CO	-	1.00	-	1.00	-	1.00	-	-	3.00	3.00	2.00	-	-	-	-

17FE06	TRANSFORMATION TECHNIQUES & VECTOR CALCULUS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Apply the concepts of Laplace Transforms to solve ordinary differential equations.	**3**	**2**	-	**1**	-	-	-	-	-	-	-	**1**	-	-	-
CO2	Apply Z - Transforms to solve difference equations	**3**	**2**	-	**1**	-	-	-	-	-	-	-	**1**	-	-	-
CO3	Discriminate among Cartesian, Polar and Spherical coordinates in multiple integrals and their respective applications to areas and volumes	**3**	**2**	-	**1**	-	-	-	-	-	-	-	**1**	-	-	-
CO4	Evaluate the directional derivative, divergence and angular velocity of a vector function.	**3**	**2**	-	**1**	-	-	-	-	-	-	-	**1**	-	-	-
CO5	Apply Vector Integration for curves, surfaces and volumes and relationship among themselves.	**3**	**2**	-	**1**	-	-	-	-	-	-	-	**1**	-	-	-
	Average value of CO	3.00	2.00	-	1.00	-	-	-	-	-	-	-	1.00	-	-	-
17FE14	**APPLIED CHEMISTRY**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Analyze the quality of water and its maintenance for industrial purposes.	3	3	-	2		2	2	-	-	-	-	-	-	-	-
CO2	Analyze issues related to fuels, composition, their manufacture and acknowledge the important aspects of bio, nuclear and rocket fuels.	3	2	2	-		2	2	-	-	-	-	-	-	-	-
CO3	Apply the working principles of electrodes and batteries.	3	3	3	2	2	2	2	-	-	-	-	-	-	-	-
CO4	Apply the principles of corrosion in order to maintain various equipments more effectively.	3	3	3	2	2	2	2	-	-	-	-	-	-	-	-

CO5	Identify the important applications of engineering materials like plastics, rubbers and lubricants.	3	3	3	2	2	2	2	-	-	-	-	-	-	-	-
	Average value of CO	3.00	2.80	2.75	-	-	-	2.00	-	-	-	-	-	-	-	-
17CE02	**Applied Mechanics**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Acquire the knowledge of analyzing force and couple systems with regards to practical applications	3	3	-	-	-	3	-	-	-	-	1	-	3	-	1
CO2	Analyze and solve the engineering problems for different types of forces acting on rigid bodies in equilibrium conditions	3	3	-	-	-	3	-	-	-	-	1	-	3	-	1
CO3	Solve the problems associated with frictional forces in different applications	3	3	-	-	-	3	-	-	-	-	1	-	3	-	1
CO4	Locate centroid and determine moment of inertia for composite areas and various cross sections	3	3	-	-	-	3	-	-	-	-	1	-	3	-	1
CO5	Acquire the knowledge to deal with kinematic analysis of particle both in translation and projectile motions	3	3	-	-	-	3	-	-	-	-	1	-	3	-	1
	Average value of CO	3.00	3.00	-	-	-	3.00	-	-	-	-	1.00	-	3.00	-	1.00
17CE03	**Surveying**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Apply the basic Principles in surveying for conducting Chain and Compass survey	1	1	2	2	-	3	2	2	1	2	3	-	1	2	3
CO2	Generate the Elevations and Contours of Different Points in the Field	2	1	2	3	2	2	2	2	1	2	3	-	2	1	3
CO3	Compute the Area and Volume of a Given Field	1	1	2	2	3	3	2	2	1	2	3	-	1	3	2

CO4	Generalize the Usage of Theodolite and Tacheometry in Civil Engineering Aspects	3	1	2	3	2	3	2	2	1	2	3	-	2	1	3
CO5	Evaluate the Requirements for Setting the Curves In Civil Engineering Applications	1	1	2	2	3	3	2	2	1	2	3	-	1	2	3
	Average value of CO	1.60	1.00	2.00	2.40	2.50	2.80	2.00	2.00	1.00	2.00	3.00	-	1.40	1.80	2.80
17FE64	**APPLIED CHEMISTRY LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	Assess quality of water based on the procedures given.	3	3	-	2	-	-	-	-	2	-	-	-	-	-	-
CO 2	Distinguish different types of titrations in volumetric analysis after performing the experiments listed in the syllabus.	2	3	-	2	-	-	-	-	2	1	-	-	-	-	-
CO 3	Acquire practical knowledge related to preparation of polymers.	3	2	-	2	-	-	-	-	2	-	-	-	-	-	-
CO 4	Exhibit skills in performing experiments based on theoretical fundamentals.	2	2	-	2	-	-	-	-	2	1	-	-	-	-	-
	Average value of CO	2.50	2.50	-	2.00	-	-	-	-	2.00	1.00	-	-	-	-	-
17CE60	**Computer based Engineering Drawing Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Draw simple objects using functional tools in AutoCAD	3	-	1	2	-	-	2	-	-	1	2	-	3	2	-
CO2	Develop and draw the positions and views of points, lines, planes and solids using AutoCAD	3	-	1	2	-	-	2	-	-	1	2	-	3	2	-
CO3	Develop and draw the orthographic and isometric projections of simple objects using Auto-CAD	3	-	1	2	-	-	2	-	-	1	2	-	3	2	-
CO4	Develop and draw the projections of the solids by developing the surfaces using AutoCAD	**3**	-	**1**	**2**	-	-	**2**	-	-	**1**	**2**	-	**3**	**2**	-

	Average value of CO	3.00	-	1.00	2.00	-	-	2.00	-	-	1.00	2.00	-	3.00	2.00	-
17CE61	**Civil Engineering Drafting Techniques Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Draw simple objects based on principles of geometry	**2**	**2**	**1**	**1**	-	-	-	-	**1**	-	-	-	**2**	**2**	-
CO2	Develop the projections of an object based on the angles of projection	**2**	**2**	**1**	**1**	-	-	-	-	**1**	-	-	-	**2**	**2**	-
CO3	Draft simple objects using ArchiCAD software	**2**	**2**	**3**	**2**	-	-	-	-	**1**	-	-	-	**2**	**2**	-
CO4	Develop, draw and edit simple objects related to civil engineering applications using ArchiCAD	**2**	**2**	**3**	**2**	-	-	-	-	**1**	-	-	-	**2**	-	-
	Average value of CO	2.00	2.00	2.00	1.50	-	-	-	-	1.00	-	-	-	2.00	2.00	-
17CE62	**Survey field work Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Compute linear and angular measurements in the field using chain and compass	**3**	**2**	**2**	**3**	-	-	-	-	-	-	**2**	-	**3**	**2**	-
CO2	Plot a given area using plane table in the field	**3**	**3**	**2**	**3**	-	-	-	-	-	-	**2**	-	**3**	**2**	-
CO3	Determine the elevations of different points in the field	**3**	**3**	**2**	**3**	-	-	-	-	-	-	**2**	-	**3**	**2**	-
	Average value of CO	3.00	2.67	2.00	3.00	-	-	-	-	-	-	2.00	-	3.00	2.00	-
III SEMESTER (II BTECH -I SEM)																
17FE07	**Numerical Methods & Fourier Analysis**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Compare the rate of accuracy between various methods in approximating the root of and equation and Distinguish among the criteria of selection and procedures of various Numerical Integration Rules.	**3**	**2**	-	**2**	-	-	-	-	-	-	**1**	-	-	-	-

CO2	Estimate the best fit polynomial for the given tabulated data using the methods of Newton's Interpolation formulae and Lagrange's Interpolation.	**3**	**2**	-	**2**	-	-	-	-	-	-	**1**	-	-	-	-
CO3	Apply various Numerical methods in solving and initial value problem involving and ordinary differential equation.	**3**	**2**	-	**2**	-	-	-	-	-	-	**1**	-	-	-	-
CO4	Estimate the unknown dependent variables using curve fitting methods.	**3**	**2**	-	**2**	-	-	-	-	-	-	**1**	-	-	-	-
CO5	Generate the single valued functions in the form of Fourier series and obtain the Fourier Transforms	**3**	**2**	-	-	-	-	-	-	-	-	**1**	-	-	-	-
	Average value of CO	3.00	2.00	-	2.00	-	-	-	-	-	-	1.00	-	-	-	-
17EE51	**Fundamentals of Electrical Engineering**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Analyze the different types of electical networks	3	2	1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	Understand the working of AC machines and their applications	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Use the techniques to measure efficiency and regulation of AC machines	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Demonstrate the characteristics of different electronic devices and their applications	2	1	2	-	-	-	-	-	-	-	-	-	-	-	-
	Average value of CO	2.25	2.00	1.67	1.00	-	-	-	-	-	-	-	-	-	-	-
17CE04	**Strength of Materials-I**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Assess the stresses and strains in a member subjected to different loadings	2	2	1	-	-	-	-	-	-	-	-	2	3	-	1

CO2	Analyze the various beams subjected to different loads using shear force and bending moment diagrams	2	2	1	-	-	-	-	-	-	-	-	2	3	-	1
CO3	Compute the shear and bending stress distribution in several members of different sections	2	2	1	-	-	-	-	-	-	-	-	2	3	-	1
CO4	Compute the twisting moment and shear stress induced in shafts and evaluate the pull component in springs	2	2	1	-	-	-	-	-	-	-	-	2	3	-	1
CO5	Interpret the stresses in thick and thin cylindrical and spherical shells under different loads and directions and member forces in a truss	2	2	1	-	-	-	-	-	-	-	-	2	3	-	1
	Average value of CO	2.00	2.00	1.00	-	-	-	-	-	-	-	-	2.00	3.00	-	1.00
17CE05	**Engineering Geology**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Demonstrate the importance of geological principles	1	-	-	-	-	-	-	-	-	-	-	1	1	-	-
CO2	Differentiate minerals based on physical properties	2	-	-	-	-	-	-	-	-	-	-	1	1	-	-
CO3	Distinguish various types of rocks based on their characteristic features	1	-	-	-	-	-	-	-	-	-	-	1	1	-	-
CO4	Interpret geological structures	3	-	-	-	-	-	-	-	-	-	-	1	1	-	-
CO5	Judge geophysical and geological considerations	1	-	-	-	-	-	-	-	-	-	-	1	1	-	-
	Average value of CO	1.60	-	-	-	-	-	-	-	-	-	-	1.00	1.00	-	-
17CE06	**Mechanics of Fluids**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Exposed to basic principles of fluid properties, pressure measurement for various devices and calculate the hydrostatic forces for submerged conditions	**3**	**3**	-	-	-	-	-	-	-	-	-	**1**	**3**	-	-

CO2	Apply the principles of conservation of mass for fluid flow problems	**3**	**3**	-	-	-	-	-	-	-	-	-	**1**	**3**	-	-
CO3	Apply the momentum and energy equation to fluid mechanics and laminar flow problems and flow measurement applications	**3**	**3**	-	-	-	-	-	-	-	-	-	**1**	**3**	-	-
CO4	Compute the energy losses in pipes, flow parameters in laminar flow conditions and exposed to the basics of boundary layer theory	**3**	**3**	-	-	-	-	-	-	-	-	-	**1**	**3**	-	-
CO5	Apply dimensional analysis as a tool in solving problems in the field of fluid mechanics and apply the laws of similarity	**3**	**2**	-	-	-	-	-	-	-	-	-	**1**	**3**	-	-
	Average value of CO	3.00	2.80	-	-	-	-	-	-	-	-	-	1.00	3.00	-	-
17CE07	**Concrete Technology**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	State the concept of concrete and the component materials	1	-	-	-	-	-	-	-	-	-	-	1	-		1
CO2	Assess the required properties of concrete	1	-	-	-	-	-	-	-	-	-	-	1	-		1
CO3	Know the importance of various tests to determine strength of concrete	1	-	-	-	-	-	-	-	-	-	-	1	-	2	1
CO4	Comprehend the various types of special concrete	1	-	-	-	-	-	-	-	-	-	-	1	-	2	1
CO5	Compute the mix proportions for design as per IS code	2	2	3	-	-	-	-	-	-	-	-	1	3		2
	Average value of CO	1.20	2.00	3.00	-	-	-	-	-	-	-	-	1.00	3.00	2.00	1.20
17CE63	**Engineering Geology Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Demonstrate the importance of geological principles	1	-	-	-	-	-	-	-	-	-	-	1	-	1	-
CO2	Differentiate minerals based on physical properties	2	-	-	-	-	-	-	-	1	1	-	1	-	1	-

CO3	Distinguish various types of rocks based on their characteristic features	2	-	-	-	-	-	-	-	1	1	-	1	-	1	-
CO4	Interpret geological structures	-	2	-	-	**3**	-	-	-	1	1	-	1	-	1	-
	Average value of CO	1.67	2.00	-	-	3.00	-	-	-	1.00	1.00	-	1.00	-	1.00	-
17CE64	**Solid mechanics Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Perform necessary experiments to determine the mechanical properties of materials under different loading conditions	**3**	**2**	-	-	**2**	-	-	-	**1**	**1**	-	**1**	**3**	-	**2**
CO2	Analyze the experimental results for assessment of the strength of the given material	**3**	**2**	-	-		-	-	-	**1**	**1**	-	**1**	**3**	-	**2**
	Average value of CO	3.00	2.00	-	-	2.00	-	-	-	1.00	1.00	-	1.00	3.00	-	2.00
17CE65	**Advanced Survey field work lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Obtain angular measurements in the field using theodolite	**3**	**1**	-	-	**1**	-	-	-	**1**	**1**	-	**1**	-	**2**	-
CO2	Determine the elevations of different points in the field using theodolite and total stations	**3**	**1**	-	-	**3**	-	-	-	**1**	**1**	-	**1**	-	**3**	-
CO3	Operate the total station to take out the measurements for desired objectives	**2**	**1**	-	-	**3**	-	-	-	**1**	**1**	-	**1**	-	**3**	-
CO4	Establish the setting out of works in the field	**2**	**1**	-	-		-	-	-	**1**	**1**	-	**1**	-	**2**	-
	Average value of CO	2.50	1.00	-	-	2.33	-	-	-	1.00	1.00	-	1.00	-	2.50	-
IV SEMESTER (II BTECH -II SEM)																
17FE03	**Environmental Science**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Identify environmental problems arising due to engineering and technological activities that help to be the part of sustainable solutions	**3**	**3**	-	-	-	**2**	-	-	-	-	**1**	-	-	-	-

CO2	Evaluate local, regional and global environmental issues related to resources and their sustainable management.	**3**	-	-	-	-	**2**	-	-	-	-	**1**	-	-	-	-
CO3	Identify the importance of ecosystem and biodiversity for maintaining ecological balance.	**3**	**3**	**2**	-	-	**2**	-	-	-	-	**1**	-	-	-	-
CO4	Acknowledge and prevent the problems related to pollution of air, water and soil.	**3**	**3**	-	-	-	**2**	-	-	-	-	**1**	-	-	-	-
CO5	Interpret the significance of implementing environmental laws and abatement devices for environmental management.	**3**	-	**2**	-	-	-	**2**	-	-	-	**1**	-	-	-	-
	Average value of CO	3.00	3.00	2.00	-	-	2.00	2.00	-	-	-	1.00	-	-	-	-
17FE08	**Probability and Statistics**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Predict various probabilistic situations based on the laws of probability and random variables.	**2**	**3**	**1**	**3**	-	-	-	-	-	-	-	**1**	-	-	**1**
CO2	Distinguish among the criteria of selection and application of Binomial, Poisson, Normal and Exponential distributions.	**2**	**3**	**1**	**3**	-	-	-	-	-	-	-	**1**	-	-	**1**
CO3	Estimate the point and interval estimators of mean and proportion for the given Sample data.	**2**	**3**	**1**	**3**	-	-	-	-	-	-	-	**1**	-	-	**1**
CO4	Apply various sample tests like Z-test, t-test, F-test and $\chi 2$-test for decision making regarding the population based on sample data	**2**	**3**	**1**	**3**	-	-	-	-	-	-	-	**1**	-	-	**1**
CO5	Estimate the level of correlation, the linear relationship using the regression lines for the given bivariate data.	**2**	**3**	**1**	**3**	-	-	-	-	-	-	-	**1**	-	-	**1**

	Average value of CO	2.00	3.00	1.00	3.00	-	-	-	-	-	-	-	1.00	-	-	1.00
17CE08	**Strength of Materials-2**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Analyze the compound stresses and failure theories	3	2	1	-	-	-	-	-	-	-	-	1	3	-	1
CO2	Analyze and evaluate the stresses in columns	2	2	1	-	-	-	-	-	-	-	-	1	3	-	1
CO3	Compute deflections in beams due to different loading conditions	3	2	1	-	-	-	-	-	-	-	-	1	3	-	2
CO4	Analyze the fixed beams subjected to different loading three moment equation method	2	2	1	-	-	-	-	-	-	-	-	1	3	-	2
CO5	Compute stress in unsymmetrical bending and shear centre for a different sections	3	2	1	-	-	-	-	-	-	-	-	1	3	-	1
	Average value of CO	2.60	2.00	1.00	-	-	-	-	-	-	-	-	1.00	3.00	-	1.40
17CE09	**Hydraulics and Hydraulic Machinery Systems**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Solve the open channel problems for uniform flows	3	2	2	-	-	-	-	-	-	-	-	1	3	-	1
CO2	Analyze various forms of non-uniform flows and to estimate formation of hydraulic jump and subsequent energy losses	3	2	2	-	-	-	-	-	-	-	-	1	3	-	1
CO3	Determine the impact force and work done for different types of vanes	3	3	3	-	-	-	-	-	-	-	-	1	3	-	1
CO4	Analyze suitability of turbines for different types for different applications	2	1	1	-	-	-	-	-	-	-	-	1	2	-	1
CO5	Identify the suitability of centrifugal and reciprocating pumps for different applications and calculate their efficiencies	2	1	1	-	-	-	-	-	-	-	-	1	2	-	1
	Average value of CO	2.60	1.80	1.80	-	-	-	-	-	-	-	-	1.00	2.60	-	1.00
17CE10	**Structural Analysis -1**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**

CO1	Analyze conjugate beams	**3**	**3**	-	-	-	-	-	-	-	-	-	**1**	**3**	-	**2**
CO2	Analyze propped cantilevers, fixed beams	**3**	**3**	-	-	-	-	-	-	-	-	-	**1**	**3**	-	**2**
CO3	Analyze continuous beams subjected to different loads	**3**	**3**	-	-	-	-	-	-	-	-	-	**1**	**3**	-	**2**
CO4	Perform calculations using slope deflection method for structural analysis	**3**	**3**	-	-	-	-	-	-	-	-	-	**1**	**3**	-	**2**
CO5	Analyse different structural components using Castigliano's theorem for indeterminate structures	**3**	**3**	-	-	-	-	-	-	-	-	-	**1**	**3**	-	**2**
	Average value of CO	3.00	3.00	-	-	-	-	-	-	-	-	-	1.00	3.00	-	2.00
17CE11	**Geo Technical Engineering-1**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Compute and analyze different classifications and properties of soil	**2**	**2**	**1**	-	-	-	-	-	-	-	-	**1**	**2**	-	**2**
CO2	Determine consistency and compaction parameters of soils	**1**	**2**	**1**	-	-	-	-	-	-	-	-	**1**	**2**	-	**2**
CO3	Determine permeability and effective stresses in soil	**2**	**2**	**2**	-	-	-	-	-	-	-	-	**1**	**2**	-	**1**
CO4	Analyze shear behavior of soils under different load/ drainage conditions	**2**	**2**	**2**	-	-	-	-	-	-	-	-	**1**	**2**	-	**2**
CO5	Determine the stress distribution in soils under different loading conditions and analyze consolidation properties of soils	**3**	**3**	**2**	-	-	-	-	-	-	-	-	**1**	**2**	-	**2**
	Average value of CO	2.00	2.20	1.60	-	-	-	-	-	-	-	-	1.00	2.00	-	1.80
17CE66	**Fluid Mechanics Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Develop knowledge on the fundamental principles of fluid flow	**2**	**2**	-	-	**1**	-	-	-	**1**	**1**	-	**1**	-	**1**	-

CO2	Apply the laws of conservation of mass, energy and momentum to solve practical problems in fluid mechanics	**2**	**2**	-	-	**1**	-	-	-	**1**	**1**	-	**1**	-	**1**	-
CO3	Practically visualize the functioning and performance of hydraulic turbines and pumps	**2**	**2**	-	-	**1**	-	-	-	**1**	**1**	-	**1**	-	**1**	-
	Average value of CO	2.00	2.00	-	-	1.00	-	-	-	1.00	1.00	-	1.00	-	1.00	-
17CE67	**Concrete Technology Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Find the properties of bricks and cement	2	-	-	-	1	-	-	-	1	1	-	1	-	1	1
CO2	Determine the properties of aggregates	2	-	-	-	1	-	-	-	1	1	-	1	-	1	1
CO3	Identify the properties of concrete	2	-	-	-	3	-	-	-	1	1	-	1	-	1	1
	Average value of CO	2.00	-	-	-	1.67	-	-	-	1.00	1.00	-	1.00	-	1.00	1.00
17CE68	**Computer Aided Building Drawing Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Sketch the different sign conventions used in building drawing	-	-	-	-	3	-	-	-	1	1	-	1	-	1	2
CO2	Draw different views of buildings with a suitable scale	-	-	-	-	3	-	-	-	1	1	-	1	-	1	2
CO3	Develop 3-D view of building & staircase	-	-	-	-	3	-	-	-	1	1	-	1	-	1	2
	Average value of CO	-	-	-	-	3.00	-	-	-	1.00	1.00	-	1.00	-	1.00	2.00
V SEMESTER (III BTECH -I SEM)																
17CE12	**STRUCTURAL ANALYSIS-2**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Analyze the three-hinged and two-hinged arches	3	3	-	-	-	-	-	-	-	-	-	1	3	-	2
CO2	Estimate the impact of cables and suspension bridges on structures.	3	3	-	-	-	-	-	-	-	-	-	1	3	-	2
CO3	Assess the impact of moving loads on structures.	3	3	-	-	-	-	-	-	-	-	-	1	3	-	2

CO4	Draw influence lines for analysis purpose and analyse the continuous beams and portal frames	3	3	-	-	-	-	-	-	-	-	-	1	3	-	2
CO5	Describe the basics of stiffness and flexibility methods for structural loads analysis	3	3	-	-	-	-	-	-	-	-	-	1	3	-	2
	Average value of CO	3.00	3.00	-	-	-	-	-	-	-	-	-	1.00	3.00	-	2.00
17CE13	**DESIGN OF REINFORCED CONCRETE STRUCTURES-1**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Analyze and design the RCC structures using working stress methods.	2	2	3	-	-	-	-	-	-	-	-	1	3	-	1
CO2	Design the singly and doubly reinforced RC beams in limit state method	2	2	3	-	-	-	-	-	-	-	-	1	3	-	1
CO3	Illustrate the shear reinforcement for different elements of a building	2	2	3	-	-	-	-	-	-	-	-	1	3	-	1
CO4	Design the one way and two-way slabs with different end conditions	2	2	3	-	-	-	-	-	-	-	-	1	3	-	1
CO5	Design the columns subjected to axial load, uni-axial and bi-axial moments.	2	2	3	-	-	-	-	-	-	-	-	1	3	-	1
	Average value of CO	2.00	2.00	3.00	-	-	-	-	-	-	-	-	1.00	3.00	-	1.00
17CE14	**HIGHWAY ENGINEERING**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Discriminate the studies of highway planning, development, surveys and alignment.	1	-	-	-	-	-	-	-	-	-	-	1	1	-	1
CO2	Design the geometric elements of highway	2	3	2	-	-	-	-	-	-	-	-	1	2	-	1
CO3	Identify the suitability of appropriate highway materials based on their properties	2	3	-	-	-	-	-	-	-	-	-	1	1	-	1

CO4	Design the Flexible and Rigid pavement using IRC codes.	1	3	2	-	-	-	-	-	-	-	-	1	3	-	2
CO 5	Interpret the elements of traffic management.	1	1		-	-	-	-	-	-	-	-	1	2	-	1
	Average value of CO	1.40	2.50	2.00	-	-	-	-	-	-	-	-	1.00	1.80	-	1.20
17CE15	**HYDROLOGY**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Estimate the average rainfall over a basin and identify the various methods to determine the water losses	3	2	-	-	-	-	-	-	-	-	-	1	2	-	1
CO2	Compute direct run off from total rain fall.	3	2	-	-	-	-	-	-	-	-	-	1	2	-	1
CO3	Develop unit hydrograph and storm hydrograph	3	2	-	-	-	-	-	-	-	-	-	1	2	-	1
CO4	Assess the flood magnitude and carry out flood routing.	3	1	-	-	-	-	-	-	-	-	-	1	2	-	1
CO5	Determine aquifer parameters and yield of wells.	3	2	-	-	-	-	-	-	-	-	-	1	2	-	1
	Average value of CO	3.00	1.80	-	-	-	-	-	-	-	-	-	1.00	2.00	-	1.00
17CE18	**CONSTRUCTION MANAGEMENT**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Identify the key aspects of Project Management	-	-	-	-	-	-	-	-	-	-	1	1	1	-	2
CO2	Plan and schedule the project.	-	1	-	-	-	-	-	-	-	-	2	1	1	-	2
CO3	Utilize both labour and materials effectively.	-	-	-	-	-	-	-	-	-	-	1	1	1	-	2
CO4	Perform detailed network analysis to complete project within schedule.	-	3	2	-	-	-	-	-	-	-	2	1	3	-	2
CO5	Deal contracts and bidding processes.	-	-	-	-	-	-	-	-	-	-	1	1	1	-	2
	Average value of CO	-	2	2	-	-	-	-	-	-	-	1.4	1	1.4	-	2
17CE69	**TRANSPORTATION ENGINEERING LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Categorize and analyze the properties of road aggregates.	3	-	3	-	-	2	-	-	-	-	2	-	2	3	3

CO2	Determine and analyze the properties of bitumen.	3	-	3	-	-	2	-	-	-	-	2	-	2	3	3
CO3	Determine the suitability of aggregates and bitumen for pavement designs.	3	-	3	-	-	2	-	-	-	-	2	-	2	3	3
	Average value of CO	3.00	-	3.00	-	-	2.00	-	-	-	-	2.00	-	2.00	3.00	3.00
17CE70	**GEO TECHNICAL ENGINEERING LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Determine the index and engineering properties of soils	**2**	-	-	-	**2**	-	-	-	1	1	-	1	-	**2**	**2**
CO2	Perform field tests for soil investigations.	**3**	-	-	-	**3**	-	-	-	1	1	-	1	-	**2**	**2**
CO3	Apply field conditions for computing and analyzing the experimental data.	**2**	**2**	-	-		-	-	-	1	1	-	1	-	**2**	**2**
CO4	Analyze the results and infer the validity of the results	**2**	-	-	-		-	-	-	1	1	-	1	-	**2**	**2**
	Average value of CO	2.25	2.00	-	-	2.50	-	-	-	1.00	1.00	-	1.00	-	2.00	2.00
17CE90	**GREEN BUILDINGS**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Categorize the benefits of a green building.	1	-	-	-	-	1	1	-	-	-	-	1	-	-	1
CO2	Assess the impact of climate in the design of a green building	1	-	-	-	-	1	1	-	-	-	-	1	-	-	1
CO3	Identify appropriate materials for constructing a green building	1	-	-	-	-	1	2	-	-	-	-	1	-	-	1
CO4	Plan the various options for energy and resource conservation in a green building	2	-	-	-	-	1	2	-	-	-	-	1	-	-	1
CO5	Optimally use renewable energy resources and Plan the building for best green building rating system	2	-	-	-	-	1	3	-	-	-	-	1	-	-	1
	Average value of CO	1.40	-	-	-	-	1.00	1.80	-	-	-	-	1.00	-	-	1.00
VI SEMESTER (III BTECH -II SEM)																
17CE20	**DESIGN OF STEEL STRUCTURES**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**

CO1	Identify the different structural steel elements and their connection system	2	2	3	-	-	-	-	-	-	-	-	1	3	-	3
CO2	Design the compression and tension members.	3	3	3	-	-	-	-	-	-	-	-	1	3	-	3
CO3	Analyse and design the beams.	3	3	3	-	-	-	-	-	-	-	-	1	3	-	3
CO4	Design the column bases and built-up columns.	3	3	3	-	-	-	-	-	-	-	-	1	3	-	3
CO5	Design the roof trusses.	3	3	3	-	-	-	-	-	-	-	-	1	3	-	3
	Average value of CO	2.80	2.80	3.00	-	-	-	-	-	-	-	-	1.00	3.00	-	3.00
17CE21	**IRRIGATION AND WATER RESOURCES ENGINEERING**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Analyze the stability of Gravity dams	3	3	2	-	-	-	-	-	-	-	-	1	2	-	2
CO2	Design the impervious floors for Diversion Head Works.	2	2	2	-	-	-	-	-	-	-	-	1	2	-	2
CO3	Estimate Irrigation Water Requirements.	3	2	2	-	-	-	1	-	-	-	-	1	2	-	2
CO4	Design the erodible and non-erodible canals	2	2	3	-	-	-	-	-	-	-	-	1	2	-	2
CO5	Interpret the design principles of Cross Drainage Works	2	1		-	-	-	-	-	-	-	-	1	2	-	2
	Average value of CO	2.40	2.00	2.25	-	-	-	1.00	-	-	-	-	1.00	2.00	-	2.00
17CE22	**WATER AND WASTE WATER ENGINEERING**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Estimate the water demand for the community and assess the significance of water quality parameters	2	1	-	-	-	-	-	-	-	-	-	1	1	-	1
CO2	Design the sedimentation-based water treatment systems	3	2	3	-	-	-	-	-	-	-	-	1	3	-	2
CO3	Design the filtration and disinfection-based water treatment systems	3	2	3	-	-	-	-	-	-	-	-	1	3	-	2

CO4	Interpret the importance of sewage quality parameters and design the primary treatment units	3	2	3	-	-	-	-	-	-	-	-	1	3	-	2
CO5	Design the secondary treatment and sludge handling aspects of sewage treatment plant	3	2	3	-	-	-	-	-	-	-	-	1	3	-	2
	Average value of CO	2.80	1.80	3.00	-	-	-	-	-	-	-	-	1.00	2.60	-	1.80
17CE23	**GEO TECHNICAL ENGINEERING-2**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Interpret the principles of soil exploration.	**3**	**1**	-	-	-	-	-	-	-	-	-	**1**	**2**	-	**2**
CO2	Design different types of foundations.	**3**	**2**	**3**	-	-	-	-	-	-	-	-	**1**	**2**	-	**2**
CO3	Determine safe bearing capacity for design of buildings.	**3**	**2**	-	-	-	-	-	-	-	-	-	**1**	**3**	-	**2**
CO4	Design different types of retaining walls.	**3**	**2**	**3**	-	-	-	-	-	-	-	-	**1**	**2**	-	**2**
CO5	Design the special foundations and perform stability analysis of slopes.	**3**	**1**	**2**	-	-	-	-	-	-	-	-	**1**	**2**	-	**2**
	Average value of CO	3.00	1.60	2.67	-	-	-	-	-	-	-	-	1.00	2.20	-	2.00
17CE25	**RAILWAYS, AIRPORT PLANNING AND HARBOUR ENGINEERING**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Illustrate the rail network development and railway planning in India.	1	-	-	-	-	-	-	-	-	-	-	1	1	-	1
CO2	Analyse different technical aspects of railway junctions.	1	-	-	-	-	-	-	-	-	-	-	1	1	-	1
CO3	Characterise the concepts of railway Interlocking and signalling systems.	1	-	-	-	-	-	-	-	-	-	-	1	1	-	1
CO4	Identify the technical issues related to planning and design of airports	1	-	-	-	-	-	-	-	-	-	-	1	1	-	1

CO5	Describe the technical components of harbour.	1	-	-	-	-	-	-	-	-	-	-	1	1	-	1
	Average value of CO	1.00	-	-	-	-	-	-	-	-	-	-	1.00	1.00	-	1.00
17CE26	**CONSTRUCTION TECHNIQUES AND EQUIPMENT PLANNING**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Identify the best construction equipment for site work and heavy civil projects	1	-	-	-	-	-	-	-	-	-	-	1	1	-	1
CO2	Choose the construction equipment based on their capabilities	2	-	-	-	-	-	-	-	-	-	-	1	1	-	1
CO3	Categorize the different types of cranes for field use	1	-	-	-	-	-	-	-	-	-	-	1	1	-	1
CO4	Classify the pile driving equipment for construction purpose	2	-	-	-	-	-	-	-	-	-	-	1	1	-	1
CO5	Plan the form work and usage of miscellaneous equipment.	2	-	-	-	-	-	-	-	-	-	-	1	1	-	1
	Average value of CO	1.60	-	-	-	-	-	-	-	-	-	-	1.00	1.00	-	1.00
17CE71	**ENVIRONMENTAL ENGINEERING LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Perform the different laboratory techniques for examining the water quality parameters.	3	-	-	-	3	-	-	-	1	1	-	1	-	2	1
CO2	Perform the different laboratory techniques for examining the wastewater quality parameters.	3	-	-	-	3	-	-	-	1	1	-	1	-	2	1
CO3	Analyze the laboratory data and comment with respect to permissible limits and field conditions.	1	2	-	-	1	-	2	-	1	1	-	1	-	1	1
	Average value of CO	2.33	2.00	-	-	2.33	-	2.00	-	1.00	1.00	-	1.00	-	1.67	1.00
17CE72	**COMPUTER AIDED ANALYSIS AND DESIGN LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**

CO1	Apply structural analysis software to analyze and design the beams, 2D and 3D frames.	-	2	3	-	3	-	-	-	1	1	-	1	2	-	2
CO2	Design of retaining walls and foundations using STAAD Pro	-	2	3	-	3	-	-	-	1	1	-	1	2	-	2
CO3	Analyze, design and draw the details of RCC and steel structural elements.	-	2	3	-	3	-	-	-	1	1	-	1	2	-	2
	Average value of CO	-	2.00	3.00	-	3.00	-	-	-	1.00	1.00	-	1.00	2.00	-	2.00
17CE91	**LOW COST AND ECO-FRIENDLY BUILDING TECHNOLOGY**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Select appropriate traditional materials for construction	1	1	-	-	-	-	1	-	-	-	-	1	1	-	1
CO2	Select appropriate eco-friendly materials for construction	1	1	-	-	-	-	1	-	-	-	-	1	1	-	1
CO3	Analyze the eco-friendly technologies for low cost construction	1	2	-	-	-	-	2	-	-	-	-	1	1	-	1
CO4	Describe prefabrication techniques and assess the wind effects on low rise buildings	1	1	-	-	-	-	1	-	-	-	-	1	1	-	1
CO5	Categorize the approaches followed in disaster prone areas.	1	1	-	-	-	-	1	-	-	-	-	1	1	-	1
	Average value of CO	1.00	1.20	-	-	-	-	1.20	-	-	-	-	1.00	1.00	-	1.00
VII SEMESTER (IV BTECH -I SEM)																
17CE28	**ESTIMATION & QUANTITY SURVEYING**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Estimate the quantities for various types of structures.	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**2**	**2**	**-**	**2**
CO2	Calculate the quantities of different items in buildings and roads.	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**2**	**2**	**-**	**2**
CO3	Compute the quantity estimate for canals.	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**2**	**2**	**-**	**2**

CO4	Prepare and write specifications and rate analysis.	1	-	-	-	-	-	-	2	-	-	-	2	1	-	2
CO5	Perform valuation of the property as per the prevailing regulations.	1	-	-	-	-	-	-	2	-	-	-	2	1	-	2
	Average value of CO	**1.60**	**2.00**	**-**	**-**	**-**	**-**	**-**	**1.40**	**-**	**-**	**-**	**2.00**	**1.60**	**-**	**2.00**
17CE29	**REMOTE SENSING AND GIS APPLICATIONS**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Interpret the concepts of Photogrammetry and its applications such as determination of heights of objects on terrain.	2	-	-	-	-	-	-	-	-	-	-	1	1	-	1
CO2	Illustrate the Electromagnetic spectrum and utilize the energy interactions of EMR with atmosphere and earth surface features for GIS data generation	3	-	-	-	-	-	-	-	-	-	-	1	1	-	1
CO3	Analyze the methods of map projections and understand coordinate systems on GIS Software packages to produce high resolution thematic maps.	2	-	-	-	-	-	-	-	-	-	-	1	1	-	1
CO4	Apply the concepts of vector and raster data model for representation of topological earth features and its importance.	2	-	-	-	-	-	-	-	-	-	-	1	1	-	1
CO5	Apply the RS & GIS techniques for solving civil engineering applications	2	-	-	-	-	-	-	-	-	-	-	1	1	-	1
	Average value of CO	**2.20**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.00**	**1.00**	**-**	**1.00**
17CE30	**DESIGN OF REINFORCED CONCRETE STRUCTURES-2**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Design the footings	3	3	3	-	-	-	-	-	-	-	-	2	3	-	2
CO2	Design the piles	3	3	3	-	-	-	-	-	-	-	-	2	3	-	2

CO3	Design different slabs	3	3	3	-	-	-	-	-	-	-	-	2	3	-	2
CO4	Design the stair cases	3	3	3	-	-	-	-	-	-	-	-	2	3	-	2
CO5	Design cantilever type retaining walls	3	3	3	-	-	-	-	-	-	-	-	2	3	-	2
	Average value of CO	**3.00**	**3.00**	**3.00**	-	-	-	-	-	-	-	-	**2.00**	**3.00**	-	**2.00**
17CE31	**PRESTRESSED CONCRETE**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Identify the different methods of pre-stressing.	1	-	-	-	-	-	-	-	-	-	-	1	1	-	1
CO2	Compute the effective pre-stress including the short- and long-term losses.	1	-	-	-	-	-	-	-	-	-	-	1	1	-	1
CO3	Analyze the different losses of pre-stressing	2	2	2	-	-	-	-	-	-	-	-	2	2	-	2
CO4	Design prestressed concrete beams under flexure.	3	2	2	-	-	-	-	-	-	-	-	2	2	-	2
CO5	Design prestressed concrete beams under shear and torsion and interpret the relevant IS code provisions for prestressed concrete.	3	2	2	-	-	-	-	-	-	-	-	2	2	-	2
	Average value of CO	**2.00**	**2.00**	**2.00**	-	-	-	-	-	-	-	-	**1.60**	**1.60**	-	**1.60**
17CE35	**ENVIRONMENTAL ENGINEERING**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Evaluate the impacts of air pollution due to meteorology and estimate the ground level concentrations of pollutants at any location using available air quality models	3	-	-	-	-	1	-	-	-	-	-	1	1	-	1
CO2	Design the air pollution control equipment	2	-	2	-	-	1	-	-	-	-	-	1	2	-	1
CO3	Apply appropriate measures to estimate and reduce noise pollution	2	-	-	-	-	1	-	-	-	-	-	1	1	-	1

CO4	Apply appropriate techniques for management of solid waste in the society	2	-	2	-	-	1	-	-	-	-	-	1	2	-	1
CO5	Analyze the impacts of hazardous waste flow in society and apply the principles of environmental management to develop solutions to major environmental problems	2	-	-	-	-	1	-	-	-	-	-	1	1	-	1
	Average value of CO	**2.20**	**-**	**2.00**	**-**	**-**	**1.00**	**-**	**-**	**-**	**-**	**-**	**1.00**	**1.40**	**-**	**1.00**
17CE73	**GIS AND COMPUTER APPLICATIONS IN CIVIL ENGINEERING LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Digitize and create thematic map and extract important features using GIS software.	-	2	2	-	3	-	-	-	1	1	-	1	2	-	2
CO2	Analyze and interpret the maps created using GIS for specific applications.	-	2	2	-	3	-	-	-	1	1	-	1	2	-	2
CO3	Develop coding for civil engineering problems and analyze the results.	-	2	2	-	3	-	-	-	1	1	-	1	2	-	2
	Average value of CO	**-**	**2**	**2**	**-**	**3**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**2**	**-**	**2**
17CE74	**QUANTITY ESTIMATION AND PROJECT MANAGEMENT LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Estimate the quantities for different items of civil engineering using software tools.	-	2	-	-	2	-	-	2	1	1	-	1	3	-	2
CO2	Prepare the estimate of different items of RCC elements.	-	2	-	-	2	-	-	2	1	1	-	1	3	-	2
CO3	Control the project for execution of civil engineering projects through systematic planning.	-	2	-	-	3	-	-	2	1	1	-	1	3	-	3
	Average value of CO	**-**	**2**	**-**	**-**	**2.3**	**-**	**-**	**2**	**1**	**1**	**-**	**1**	**3**	**-**	**2.33**
17CE92	**ENVIRONMENTAL SANITATION**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**

CO1	Recognize the basic terminology of Environmental sanitation	**2**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**
CO2	Interpret the control approaches of Communicable and non-communicable diseases	**2**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**
CO3	Identify and assess the control approaches for rodent and vectors	**2**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**
CO4	Classify the appropriate sanitation measures for several institutions.	**2**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**
CO5	Categorize the sanitation aspects for rural and refuse management	**3**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**
	Average value of CO	**2.2**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**

Head of the Department