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.

Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Computer-aided Civil Engineering Drawing	**Subject Code BCIES1-301**	**Semester 3rd**
Credit: 1	**L T P - 1 0 0**	**Duration: 15 Hrs.**

COs	**Statement**	**PO1**	**PO2**	**PO 3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**	**PSO 3**
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

Enter Correction levels 1, 2 or 3 as defined below:
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COs, POs, PSOs Mapping

Subject: Surveying	**Subject Code: BCIESI-303**	**Semester : 3rd**
Credit: 2	**L T P - 2-0-0**	**Duration: 30 Hrs.**

CO	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Carry out preliminary surveying in the field of civil engineering applications such as structural, highway engineering and geotechnical engineering plan a survey.	2	1	1	1	-	-	-	-	-	-	-	-	2	2	-

CO2	Taking accurate measurements, field booking, plotting and adjustment of traverse use various conventional instruments involved in surveying with respect to utility.	-	2	-	-	2	-	-	-	-	-	-	-	1	2	-
CO3	Precisely plan a survey for applications such as road alignment and height of the building undertake measurement and plotting in civil engineering.	-	1	2	1	2	1	-	-	-	-	-	-	-	1	1

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COs, POs, PSOs Mapping

Subject: Engineering Mechanics	**Subject Code BMECE0-001**	**Semester 3rd**
Credit: 04	**L T P – 3 1 0**	**Duration: 60 hrs**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	2	-	-	-	-	-	-	-	-	-	-	1	-	3	-

	Engineering Mechanics for furthering the career in Engineering															

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COs, POs, PSOs Mapping

Subject: HUMANITIES-I (Effective Technical Communication)	**Subject Code: BHSMC0-005**	**Semester 3rd**
Credit: 3	**L T P - 3 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers.	2	-	-	-	-	-	-	3	-	3	-	2	2	-	2
CO2	Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience	2	-	-	-	-	-	-	3	-	-	-	2	-	-	-
CO3	Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence.	1	2	-	-	-	-	-	3	-	3	-	2	1	-	2

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Introduction to Civil Engineering	**Subject Code:** BHSMC0-021	**Semester:** 3rd
Credit: 03	**L T P:** 3-0-0	**Duration:** 45 Hrs.

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Identifying the various areas available to pursue and specialize within the overall field of Civil Engineering.	-	-	-	-	-	-	1	-	-	-	2	-	3	-	-
CO2	Understanding the vast interfaces with the society at large & providing inspiration for doing creative and innovative work	2	-	-	-	-	2	-	-	-	-	-	-	3	3	-
CO3	Showcasing the many monuments, heritage structures, etc. and impressive projects to serve as sources of inspiration.	-	-	-	-	-	2	-	-	-	-	1	-	2	-	-
CO4	Highlighting possibilities for taking up entrepreneurial activities in this field.	-	2	-	-	-	-	-	-	-	-	2	-	3	2	-
CO5	Providing a foundation for the student to launch off upon an inspired academic pursuit into this branch of engineering.	-	-	-	-	-	3	-	-	-	-	2	-	3	-	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Computer-aided Civil Engineering Drawing Lab	**Subject Code BCIES1-304**	**Semester 3rd**
Credit: 1	**L T P – 0 0 2**	**Duration: 30 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Design and draw working structural drawings of various concrete structures and their members.	-	-	3	-	3	-	-	-	-	-	-	-	3	-	2
CO2	Understand and interoperate design aids and handbooks.	-	-	-	3	-	-	-	-	-	3	-	2	3	-	-
CO3	Use of relevant Indian Standard specifications applicable to Reinforced concrete structures	3	-	2	-	-	-	-	-	-	-	-	-	-	3	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Surveying Lab	**Subject Code: BCIES1-305**	**Semester : 3rd**
Credit: 2	**L T P - 0-0-4**	**Duration: 60 Hrs.**

CO	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Surveying of an area by chain survey (closed traverse) & plotting.	1	1	-	-	2	-	-	-	1	1	-	-	1	-	2
CO2	Survey of a given area by prismatic compass and surveyor compass and plotting after adjustment.	1	1	-	-	2	-	-	-	1	1	-	-	1	-	2
CO3	Radiation method, intersection methods by plane table survey.	1	1	-	-	2	-	-	-	1	1	-	-	1	-	2
CO4	Two point and three point problems in plane table survey.	1	1	-	-	2	-	-	-	1	1	-	-	1	-	2
CO5	Leveling – Longitudinal and cross-section and plotting.	1	1	-	-	2	-	-	-	1	1	-	-	1	-	2
CO6	Trigonometric leveling using Theodolite.	1	1	-	-	2	-	-	-	1	1	-	-	1	-	2
CO7	Height and distances using principles of tachometer surveying	1	1	-	-	2	-	-	-	1	1	-	-	1	-	2
CO8	a.Measurement of Horizontal angle & vertical angle.b.Distance between inaccessible point by theodolite	1	1	-	-	2	-	-	-	1	1	-	-	1	-	2

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COs, POs, PSOs Mapping

Subject: Engineering Geology	**Subject Code BCIES1-402**	**Semester 4th**
Credit: 2	**L T P - 2 0 0**	**Duration: 30 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	-	-
CO5	The mechanics of soils and fluids and their influence on settlement, liquefaction, and soil slope stability	2	2	-	-	-	-	-	-	-	-	-	2	3	-	-

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COs, POs, PSOs Mapping

Subject: Disaster Preparedness &Planning	**Subject Code BCIES1-403**	**Semester 4th**
Credit: 02	**L T P – 2 0 0**	**Duration: 30 hrs**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	-	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Introduction To Fluid Mechanics	**Subject Code: BCIES1-404**	**Semester 4th**
Credit: 2	**L T P – 2 0 0**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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
CO5	Understand dimensional analysis.	3	3	-	-	-	-	-	-	-	-	-	-	3	-	-

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COs, POs, PSOs Mapping

Subject: Introduction To Solid Mechanics	**Subject Code BCIES1-405**	**Semester 4th**
Credit: 03	**L T P – 3 0 0**	**Duration: 45 hrs**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	2	3	3	3	-	-	-	-	-	-	-	2	-	2	3

	of stress; locate the shear center of thin wall beams															
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

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COs, POs, PSOs Mapping

Subject: Geomatics Engineering	**Subject Code: BCIES1-406**	**Semester : 4th**
Credit: 3	**L T P - 3-0-0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and	2	1	1	-	2	-	-	-	-	-	-	-	2	-	-

	technology to solve broadly-defined engineering problems appropriate to the discipline.														
CO2	An ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline.	1	1	2	-	-	-	-	-	-	-	-	-	2	-
CO3	An ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature.	-	1	-	2	-	-	1	-	-	-	-	-	2	-
CO4	An ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and An ability to function effectively as a member as well as a leader on technical teams.	-	2	-	-	-	-	-	-	2	-	-	-	-	2

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COs, POs, PSOs Mapping

Subject: Materials, Testing & Evaluation	**Subject Code BCIESI-407**	**Semester 4th**
Credit: 02	**L T P – 2 0 0**	**Duration: 30 hrs**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Planning an experimental program, selecting the test configuration, selecting the test specimens and collecting raw data	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2
CO2	Documenting the experimental program including the test procedures, collected data, method of interpretation and final results	-	2		3	-	-	-	-	-	-	-	-	-	3	-
CO3	Operating the laboratory equipment including the electronic instrumentation, the test apparatus and the data collection system	-	-	-	2	2	-	-	-	-	-	-	-	-	-	3
CO4	Measuring physical properties of common structural and geotechnical construction materials	-	-	-	2	-	-	-	-	-	-	-	-	-	3	-
CO5	Interpreting the laboratory data including conversion of the measurements into engineering values and derivation of material properties (strength and stiffness) from the	-	2	2	-	-	-	-	-	-	-	-	-	2	2	-

	engineering values															
CO6	Observing various modes of failure in compression, tension, and shear	-	-	-	3	-	-	-	-	-	-	-	-	-	3	-
CO7	Observing various types of material behaviour under similar loading conditions	-	-	2	-	-	-	-	-	-	-	-	-	-	3	-

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COs, POs, PSOs Mapping

Subject:Civil Engineering- Societal & Global Impact	**Subject Code BHSMC0-022**	**Semester 4th**
Credit: 02	**L T P – 2 0 0**	**Duration: 30 hrs**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	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
CO2	The extent of Infrastructure, its requirements for energy and how they are met: past, present and future.	-	-	-	-	-	-	3	2	-	-	-	-	2	3	-
CO3	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

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COs, POs, PSOs Mapping

Subject: Management-I (Organizational Behavior)	**Subject Code BMNCC0-005**	**Semester 4th**
Credit: 0 (Non-credit Course)	**L T P - 3 0 0**	**Duration: 30 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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

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Department: **CIVIL ENGINEERING**

Giani Zail Singh Campus College of Engineering & Technology, MRSPTU Bathinda.

Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Engineering Geology Lab	**Subject Code BCIES1-409**	**Semester 4th**
Credit: 1	**L T P – 0 0 2**	**Duration: 30 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	-	3	3	-	-	2	-	-	-	-	-	-	3	2	1

	in engineering design e.g. rock slopes, foundation.															
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

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Fluid Mechanics Lab	**Subject Code: BCIES1-410**	**Semester 4th**
Credit: 1	**L T P – 0 0 2**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Be able to measure viscosity.	1	-	-	3	-	-	-	-	-	-	-	-	3	-	-
CO2	Understanding of pressure measuring devices.	2	2	-	3	-	-	-	-	-	-	-	-	3	-	-
CO3	Predict the metacentric height of floating vessel and utility in vessel design.	3	-	-	3	-	-	-	-	-	-	-	-	3	-	-
CO4	Assess the hydrostatic force on flat surface/curved surfaces.	1	-	-	3	-	-	-	-	-	-	-	-	3	-	1
CO5	Calibrate various flow	3	-	2	3	1	-	-	-	-	-	-	-	3	-	-

	measuring devices (venturimeter, orifice meter and notches).															
CO6	Authenticate the Bernoulli's theorem experimentally.	3	-	-	3	-	-	-	-	-	-	-	-	3	-	-
CO7	Predict impact of jets.	2	1	-	3	-	-	-	-	-	-	-	-	3	-	-
CO8	Predict flow visualization-Ideal flow.	3	-	-	3	-	-	-	-	-	-	-	-	3	-	-
CO9	Determine length of establishment of flow.	3	2	-	3	-	-	-	-	-	-	-	-	3	-	-
CO10	Compute velocity distribution in pipes.	3	-	-		-	-	-	-	-	-	-	-	3	-	-
CO11	To determine the transition from laminar to turbulent flow and to ascertain the lower critical Reynolds number.	3	2	-	3	1	-	-	-	-	-	-	-	3	-	1

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COs, POs, PSOs Mapping

Subject: Solid Mechanics Lab	**Subject Code BCIES1-411**	**Semester 4th**
Credit: 01	**L T P – 0 0 2**	**Duration: 30 hrs**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Understanding of the concepts of	3	-	2	-	-	3	2	-	-	-	-	-	-	-	2

	stress and strain.															
CO2	Determination of internal forces and deflections in the beam.	-	-	-	-	3	-	2	2	2	-	-	2	2	2	-
CO3	Understanding the various methods of analysis of beams, trusses and effect of torsion.	2	-	3	-	2	-	3	-	2	-	-	3	2	-	3
CO4	Application of the principles and basic of mechanics of solids in the civil engineering structures	-	2	-	3	-	-	-	-	-	-	2	1	3	2	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Materials, Testing & Evaluation Lab	**Subject Code BCIESI-412**	**Semester 4th**
Credit: 01	**L T P – 0 0 2**	**Duration: 30 hrs**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	3	3	-	-	3	-	-	-	-	-	-	-	-	3	2

	specimen using universal testing machine															
CO4	Acquire knowledge of Brinnel's and Rockwell hardness tests	3	-	-	-	-	-	-	-	-	-	-	-	3	2	2

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COs, POs, PSOs Mapping

Subject: Design of Concrete Structures-I	**Subject Code BCIES1-501**	**Semester 5th**
Credit: 03	**L T P – 3 0 0**	**Duration: 45 hrs**

CO	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	Identify the different failure modes and determine their design strengths.	3	3	3	-	-	-	-	-	-	-	-	-	2	3	-
CO2	Select the most suitable section shape and size for beams according to specific design criteria.	-	3	3	-	-	-	-	-	-	-	-	-	2	3	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Structural Analysis-I	**Subject Code: BCIES1-502**	**Semester: 5th**
Credit: 04	**L T P: 3-1-0**	**Duration: 60 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	The students will possess the skills to solve statically determinate problems of structural analysis dealing with diff. 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	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Geotechnical Engineering	**Subject Code BCIES1-503**	**Semester 5th**
Credit: 04	**L T P - 3 1 0**	**Duration: 60 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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

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COs, POs, PSOs Mapping

Subject: Environmental Engineering	**Subject Code: BCIES1-504**	**Semester: 5th**
Credit: 03	**L T P: 3-0-0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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

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COs, POs, PSOs Mapping

Subject: FLUID MECHANICS-II	**Subject Code: BCIED1-511**	**Semester 5th**
Credit: 3	**L T P – 3 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	-
CO4	Will be able to understand surges, momentum principles, specific energy and GVF profiles.	2	3	3	-	-	-	-	-	-	-	-	-	3	2	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Sustainable Construction Methods	**Subject Code BCIED1-512**	**Semester 5th**
Credit: 3 (Departmental Elective-I)	**L T P - 3 0 0**	**Duration: 45 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Concrete Construction Technology	**Subject Code BCIED1-513**	**Semester 5th**
Credit: 3 (Departmental Elective-I)	**L T P - 3 0 0**	**Duration: 45 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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

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COs, POs, PSOs Mapping

Subject: Building Materials & Construction	**Subject Code: BCIED1-521**	**Semester: 5th**
Credit: 02	**L T P: 2-0-0**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Predict the properties of building stones and its classifications.	2	2	-	-	-	-	1	-	-	-	-	-	3	2	-
CO2	Understand the concept of various methods of manufacture of bricks.	2	-	2	-	1	-	-	-	-	-	-	1	3	3	-
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	-	-	-	-	-	-	-	-	-	-	3	3	-
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	-	-	-	-	-	-	-	3	3	-
CO7	Classification of various types of woods and properties, seasoning of timber.	2	-	1	-	-	-	-	-	-	-	-	-	3	2	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Numerical Methods in Civil Engineering	**Subject Code: BCIED1-522**	**Semester: 5th**
Credit: 02	**L T P: 2-0-0**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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
CO4	Apply differential equations and integration to solve civil	3	-	-	2	1	-	-	-	-	-	-	-	3	3	-

	engineering problems.															
CO5	Outline and Propose the finite difference techniques.	2	1	-	2	1	-	-	-	-	-	-	-	3	2	1
CO6	Apply the concept of partial differential equations and Solve practical problems.	3	2	-	2	1	-	-	-	-	-	-	-	3	3	1

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COs, POs, PSOs Mapping

Subject: RIVER ENGINEERING	**Subject Code: BCIED1-523**	**Semester 5th**
Credit: 2	**L T P – 2 0 0**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Mechanics of river flow, aggradations and degradation, measurements in rivers.	1	3	3	-	-	-	-	-	-	-	-	-	3	-	-
CO2	Physical river models.	2	2	3	-	2	-	-	-	-	-	-	-	3	2	-
CO3	River training	2	2	3	-	-	-	-	-	-	-	-	-	3	-	-

	works.														
CO4	Design of river training and flood protection structures.	1	2	3	-	-	-	-	-	-	-	-	-	3	-	-

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COs, POs, PSOs Mapping

Subject: Concrete Technology Lab	**Subject Code: BCIES1-505**	**Semester: 5th**
Credit: 01	**L T P: 0-0-2**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Determine the consistency, setting time, fineness, specific gravity, compressive strength, etc. of cement.	3	-	-	3	-	-	-	-	-	1	-	-	3	3	-
CO2	Determine the fineness modulus, grading, density & specific gravity of aggregates.	3	-	-	3	-	-	-	-	-	1	-	-	3	3	-
CO3	Determine the shape & size, compressive strength and	3	-	-	3	-	-	-	-	-	1	-	-	3	2	-

	water absorption of bricks & pavers.														
CO4	Describe the properties of concrete & knowledge of concrete mix design philosophy.	3	2	-	3	-	-	-	-	-	1	-	-	3	3	1
CO5	Determine the optimum dose of admixtures for concrete.	2	-	-	3	-	-	-	-	-	1	-	-	3	2	-
CO6	Give practical exposure of laboratory testing for manhole covers.	3	-	-	2	-	-	-	-	-	1	-	-	3	2	1

Enter Correction levels 1, 2 or 3 as defined below:

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Department: **CIVIL ENGINEERING**

Giani Zail Singh Campus College of Engineering & Technology, MRSPTU Bathinda.

Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Structural Analysis Lab	**Subject Code: BCIES1-506**	**Semester: 5th**
Credit: 01	**L T P: 0-0-2**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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

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COs, POs, PSOs Mapping

Subject: Geotechnical Engineering lab	**Subject Code BCIES1-507**	**Semester 5th**
Credit: 01	**L T P - 0 0 2**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	3	1	1	-	-	-	2	-	-	-	-	-	3	3	3

	engineering behavior based on test results															
CO3	Be able to evaluate the permeability and shear strength of soils	3	1	1	-	-	-	2	-	-	-	-	-	3	3	3
CO4	Be able to evaluate settlement characteristics of soils	3	1	3	-	-	-	2	-	-	-	-	-	3	3	3
CO5	Be able to evaluate compaction characteristics required for field application	3	1	3	-	-	-	2	-	-	-	-	-	3	3	3

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Environmental Engineering Lab	**Subject Code: BCIES1-508**	**Semester: 5th**
Credit: 01	**L T P: 0-0-2**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Discuss about importance of water and its quality analysis.	2	3	-	3	-	2	-	-	-	-	-	-	3	3	-
CO2	Analyse various physico-chemical and biological parameters of water in case of quality requirements.	3	3	-	3	-	-	-	-	-	-	-	-	3	3	-
CO3	Assess complete water quality assessment for EIA	-	-	3	3	-	-	2	-	-	-	-	-	3	3	-

	and domestic supplies.															
CO4	Suggest various types of treatment methods required to purify raw water with different contaminants.	3	-	3	3	-	-	-	-	-	-	-	-	3	3	-
CO5	Assess complete waste water quality assessment for their disposal.	2	3	-	3	-	-	-	-	-	-	-	-	3	3	-

Enter Correction levels 1, 2 or 3 as defined below:

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Constitution of India	**Subject Code: BMNCCO-001**	**Semester: 5th**
Credit: 0 (Mandatory Course)	**L T P - 2 0 0**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Able to understand historical background of the constitutional making and its importance for building a democratic India, the structure of Indian government, the structure of state government, the local administrations.	-	-	2	-	-	-	-	3	-	-	-	-	2	-	-
CO2	Able to apply the	-	-		-	-	-	2	-	-	-	-	-	-	2	

	knowledge on directive principle of state policy, the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.														
CO3	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
CO4	Able to evaluate Preamble, Fundamental Rights and Duties, Zilla Panchayat, block level organization, various commissions like SC/ST/OBC and women.	-	-		-	-	-	-	-	2	-	-	-	-	1	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Structural Analysis-II	**Subject Code: BCIES1-602**	**Semester: 6th**
Credit: 03	**L T P: 3-0-0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	The students will possess the skills to solve statically determinate problems of structural analysis dealing with diff. 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	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Transportation Engineering - I	**Subject Code: BCIES1-603**	**Semester: 6th**
Credit: 3 (Departmental Core Course)	**L T P - 3 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	The student will learn about essentials of highway planning and features of	-	-	-	-	-	2	-	1	-	3	-	1	3	-	-

	highway development in India.															
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	-	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Foundation Engineering	**Subject Code BCIES1-604**	**Semester6th**
Credit: 03	**L T P - 3 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Learn about types and purposes of different foundation systems and structures.	3	2	3	2	-	_	2	-	-	-	-	-	3	3	2
CO2	Have an exposure to the systematic methods for designing foundations.	3	2	3	3	-	-	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	3	2
CO4	Have necessary theoretical background for design and construction of foundation systems.	3	2	3	2	-	-	2	-	-	-	-	-	3	3	2

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: IRRIGATION ENGINEERING-I	**Subject Code: BCIED1-611**	**Semester 6th**
Credit: 2	**L T P – 2 0 0**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3

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

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COs, POs, PSOs Mapping

Subject: Matrix Methods of Analysis	**Subject Code: BCIED1-612**	**Semester: 6th**
Credit: 02	**L T P: 2-0-0**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Rural Water Supply and Onsite Sanitation Systems	**Subject Code: BCIED1-613**	**Semester: 6th**
Credit: 02	**L T P: 2-0-0**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Knowledge about water	3	-	-	-	-	2	2	-	-	-	-	-	3	3	-

	supply scheme in rural areas.															
CO2	Knowledge about environmental sanitation methods and design in rural areas.	3	-	3	-	-	2	2	-	-	-	-	-	3	3	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Construction Project Planning & Systems	**Subject Code BCIED1-621**	**Semester 6th**
Credit: 02	**L T P – 2 0 0**	**Duration: 30 hrs**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Learn the structure of construction companies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Learn the management functions of construction companies	-	-	-	-	-	-	-	1	-	-	2	-	2	-	-
CO3	Practice contract management applications	-	-	-	-	-	-	-	-		-	2	-	-	-	2
CO4	Use project management applications	-	-	-	-	-	-	-	-	2	-	3	-	-	-	3

CO5	Plan construction projects	-	-	-	-	-	-	-	-	-	-	2	-	2	-	2
CO6	Gain information about construction risk analysis.	-	-	-	-	-	-	-	-	-	-	3	-	-	-	3

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COs, POs, PSOs Mapping

Subject: Building Construction Practice	**Subject Code BCIED1-622**	**Semester 6th**
Credit: 2 (Departmental Elective-IV)	**L T P - 2 0 0**	**Duration: 30 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Identify the components of building and understand the impacts on materials.	2	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	Identify the factors to be considered in the construction of buildings and develop the construction practices and techniques.	3	-	3	-	-	-	-	-	2	-	-	3	3	-	-
CO3	Identify the practices for Sub Structure and Super Structure construction.	3	3	3	-	-	-	-	-	-	-	-	-	3	2	-
CO4	Identify the importance of sustainable development/construction approach.	3	-	-	-	-	2	3	-	-	-	-	-	3	-	2

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COs, POs, PSOs Mapping

Subject: Pavement Design	**Subject Code: BCIED1-623**	**Semester: 6th**
Credit: 2 (Departmental Elective Course)	**L T P - 2 0 0**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	The students will learn about how to design the crust thickness of highway and airfield pavements.	3	-	-	2	-	1	-	-	-	-	-	2	3	-	-
CO2	They will learn the design principles and methods of flexible and rigid pavements being used worldwide.	-	3	-	1	2	-	2	-	-	-	-	-	-	2	-
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	-	-	-	3	1	-	-	1	-	2	2	-	-	1	-

	some modern pavement design concepts.															

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COs, POs, PSOs Mapping

Subject: Water & Wastewater Treatment	**Subject Code: BCIED1-631**	**Semester: 6th**
Credit: 03	**L T P: 3-0-0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	3	-	-	-	-	-	1	-	-	-	-	-	3	3	-

	streams.															
CO5	Perform basic design of the unit operations and processes for sewage treatment.	2	-	3	-	-	-	1	-	-	-	-	-	3	3	-

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COs, POs, PSOs Mapping

Subject: Ground Improvement Techniques	**Subject Code BCIED1-632**	**Semester6th**
Credit: 03	**L T P - 3 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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 ,	3	2	3	2	-	-	2	-	-	-	-	-	3	2	2

	design, implementation and evaluation of improvement level															

Enter Correction levels 1, 2 or 3 as defined below:

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

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Department: **CIVIL ENGINEERING**

Giani Zail Singh Campus College of Engineering & Technology, MRSPTU Bathinda.

Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Pavement Construction & Maintenance	**Subject Code: BCIED1-633**	**Semester: 6th**
Credit: 3 (Departmental Elective Course)	**L T P - 3 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: EARTHQUAKE ENGINEERING	**Subject Code BCIED1-634**	**Semester 6th**
Credit: 03	**L T P – 3 0 0**	**Duration: 45 hrs**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Transportation Engineering Lab	**Subject Code: BCIES1-605**	**Semester: 6th**
Credit: 1 (Departmental Core Course)	**L T P - 0 0 2**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Computer-aided Civil Engineering Drawing Lab-II	**Subject Code BCIES1-606**	**Semester 6th**
Credit: 1	**L T P – 0 0 2**	**Duration: 30 Hrs.**

COs	**Statement**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Design and draw working structural drawings of various concrete 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 applicable to Reinforced concrete structures	3	-	2	-	-	-	-	-	-	-	-	-	3	3	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Design Of Concrete Structure-II	**Subject Code BCIESI-701**	**Semester 7th**
Credit: 03	**L T P – 3 0 0**	**Duration: 45 hrs**

CO		**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO10**	**PO11**	**PO12**	**PSO 1**	**PSO 2**	**PSO 3**
CO 1	Identify and compute the design loads on RCC components.	3	2	-	-	-	-	-	-	-	-	-	-	3	-	-
CO 2	Able to analyze and design with detailing RCC members.	-	3	2	3	-	-	-	-	-	-	-	-	-	3	-
CO 3	Ability to design and check for serviceability (crack and deflection) and ultimate limit state conditions.	-	3	3	2	-	2	-	-	2	-	-	-	-	3	2
CO 4	Apply relevant Indian Standard provisions to ensure safety and serviceability of RCC structural elements.	3	-	-	3	-	-	-	-	-	-	-	3	2	-	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: PROFESSIONAL PRACTICE & LAW	**Subject Code: BCIES1-702**	**Semester : 7th**
Credit: 3	**L T P - 3 0 0**	**Duration: 45Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Understand the preparation of an abstract estimate for a residential building, roads, irrigation projects, bridges, etc.	2	2	-	-	-	-	-	-	-	-	2	-	2	-	2
CO2	Analyse the units for various quantities of items of work.	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-
CO3	Evaluate the rates for various items of work	2	2	-	-	-	-	-	-	-	-	-	-	2	-	-
CO4	Design and prepare bar bending schedule for reinforcement works.	-	-	2	-	-	-	-	-	-	-	2	-	-	2	-
CO5	Understand how to prepare a Notice inviting tender document for bidding.	2	-	-	-	-	-	-	-	-	-	2	-	-	2	-
CO6	Evaluate the valuation of building.	2	-	-	2	-	1	-	-	-	-	-	-	-	2	-
CO7	Preparation of standard specifications for different items of building construction.	-	-	2	-	-	1	-	-	-	-	2	-	2	2	-

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COs, POs, PSOs Mapping

Subject: Irrigation Engineering-II	**Subject Code: BCIED1-711**	**Semester: 7th**
Credit: 02	**L T P – 2-0-0**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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

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COs, POs, PSOs Mapping

Subject: Air & Noise Pollution and Control	**Subject Code: BCIED1-712**	**Semester: 7th**
Credit: 02	**L T P: 2-0-0**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	-

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COs, POs, PSOs Mapping

Subject: Geotechnical Design	**Subject Code BCIED1-713**	**Semester 7th**
Credit: 02	**L T P - 2 0 0**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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

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COs, POs, PSOs Mapping

Subject: PRESTRESSED CONCRETE	**Subject Code BCIED1-721**	**Semester 7th**
Credit: 02	**L T P – 2 0 0**	**Duration: 30 hrs**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Solid & Hazardous Waste Management	**Subject Code: BCIED1-722**	**Semester: 7th**
Credit: 02	**L T P: 2-0-0**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Essence of Indian Knowledge Tradition	**Subject Code: BMNCC0-006**	**Semester: 7th**
Credit: 00 (Mandatory Non-Credit Course)	**L T P: 2-0-0**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Know about Vedas, Upavedas, Vedangas, etc.	-	-	-	-	-	2	-	2	-	-	-	-	2	-	1
CO2	Provide important insight into the processes of observation, mitigation, and adaptation of changes in climate.	-	-	2	-	-	2	-	-	-	-	-	-	3	-	1
CO3	Understand Indian knowledge system with knowledge, innovations and practices of indigenous and local communities around the world.	-	-	-	-	-	3	-	2	-	-	-	-	3	-	1
CO4	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	-	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Transportation Engineering - II	**Subject Code: BCIES1-801**	**Semester: 8th**
Credit: 3 (Departmental Core Course)	**L T P - 3 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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 signalling and interlocking systems.	2	-	3	2	-	-	2	-	1	-	-	-	3	1	-
CO3	The students will learn about planning and design of runway and taxiway,	-	-	-	3	2	-	-	-	-	1	1	-	-	-	3

	airport configurations and visual aids required for safe and efficient air transportation system.															

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Port & Harbour Engineering	**Subject Code: BCIED1-812**	**Semester: 8th**
Credit: 3 (Departmental Elective Course)	**L T P - 3 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	The students shall learn about the importance and application of fourth major mode of transportation, i.e., waterways, after covering highways, railways, and airports in the previous semesters.	3	-	-	1	-	2	-	-	-	1	-	2	-	3	-
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

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Environmental Impact Assessment and Life Cycle Analyses	**Subject Code: BCIED1-813**	**Semester: 8th**
Credit: 03	**L T P: 3-0-0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	-

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Engineering Hydrology	**Subject Code: BCIED1-821**	**Semester 8th**
Credit: 2	**L T P – 2 0 0**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	1	-	3	-	-	-	-	-	-	-	-	-	3	-	-

	and to estimate the run-off.														
CO4	Estimation of peak flows by rational method, unit hydrograph theory, Gumbels's method.	1	2	3	-	-	-	-	-	-	-	-	-	3	-	1

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low)- upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

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.

Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Bridge Engineering	**Subject Code: BCIED1-822**	**Semester: 8th**
Credit: 2 (Departmental Elective Course)	**L T P - 2 0 0**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	3	-	2	-	-	-	-	2	-	1	-	-	-	3	1

	maintenance aspects of bridges.															

Enter Correlation levels 1, 2 or 3 as defined below:

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Programme: **B Tech Civil Engineering (2018 Scheme)**

COs, POs, PSOs Mapping

Subject: Soil Reinforcing Techniques	**Subject Code BCIED1-823**	**Semester 8th**
Credit: 02	**L T P - 2 0 0**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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

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Programme: **B Tech Civil Engineering (2018 Scheme)**

CO,PO,PSOMapping

Subject: Industrial Structures	**Subject Code BCIED1-824**	**Semester 8th**
Credit: 02	**L T P – 2 0 0**	**Duration: 30 hrs**

CO	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
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

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COs, POs, PSOs Mapping

Subject: Advance Inspection & Testing Lab	**Subject Code: BCIES1-802**	**Semester: 8th**
Credit: 01	**L T P: 0-0-2**	**Duration: 30 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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

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