

Civil Engineering: III Semester		
S.No.	Course Code	Course Outcomes
1	AHT 006	<ol style="list-style-type: none"> <li>1. Remember the concept of Laplace transform and apply in solving real life problems.</li> <li>2. Apply the concept of Fourier transform to evaluate engineering problems.</li> <li>3. Understand to evaluate roots of algebraic and transcendental equations.</li> <li>4. Solve the problem related interpolation, differentiation, integration and the solution of differential equations.</li> <li>5. Understand the concept of correlation, regression, moments, skewness and kurtosis and curve fitting.</li> </ol>
2	AHT 008	<ol style="list-style-type: none"> <li>1. Students are expected to become more aware of themselves, and their surroundings (family, society, nature)</li> <li>2. They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.</li> <li>3. They would have better critical ability.</li> <li>4. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).</li> <li>5. It is hoped that they would be able to apply what they have learnt to their own self in different day-to- day settings in real life, at least a beginning would be made in this direction.</li> </ol>
3	CET001	<ol style="list-style-type: none"> <li>1. Compare the properties of most common and advanced building materials.</li> <li>2. understand the typical and potential applications of these materials</li> <li>3. understand the relationship between material properties and structural form</li> <li>4. understand the importance of experimental verification of material properties</li> <li>5. understand the properties of low cost and advanced material used in construction.</li> </ol>
4	CET002	<ol style="list-style-type: none"> <li>1. Learn chain survey, compass survey, Theodolite survey , levelling, error calculation &amp; adjustment and</li> <li>2. Learn how curves are plotted and constructed for highways and railway projects</li> <li>3. Use latest instruments like Digital Theodolite, Auto Level, EDM, Total station</li> <li>4. Understand the various methods of plane table surveying and its importance in survey.</li> <li>5. Understand about various types of errors in surveying and how to rectify them.</li> </ol>
5	CET003	<ol style="list-style-type: none"> <li>1. 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;</li> <li>2. 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;</li> <li>3. Analyze various situations involving structural members subjected to combined stresses by application of Mohr's circle of stress; locate the shear centre of thin wall beams;</li> <li>4. 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;</li> </ol>

		5. Analyze the stresses developed in thin cylinders and concept of torsional equation in shafts, solve torsion problems in bars and thin walled members;
6	CST 005	<ol style="list-style-type: none"> <li>1. Develop essential programming skills in computer programming concepts like data types.</li> <li>2. Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.</li> <li>3. Illustrate the process of structuring the data using lists, tuples, and dictionaries.</li> <li>4. Demonstrate using built-in functions and operations to navigate the file system.</li> <li>5. Interpret the concepts of modules and user-defined functions in Python.</li> </ol>
<b>Civil Engineering: IV Semester</b>		
S.No.	Course Code	Course Outcomes
1	CST 003	<ol style="list-style-type: none"> <li>1. Compare functions using asymptotic analysis and describe the relative merits of worst-case, average-case, and bestcase analysis.</li> <li>2. Become familiar with a variety of sorting algorithms and their performance characteristics (e.g., running time, stability, space usage) and be able to choose the best one under a variety of requirements.</li> <li>3. Understand and identify the performance characteristics of fundamental algorithms and data structures and be able to trace their operations for problems such as sorting, searching, selection, operations on numbers, and graphs.</li> <li>4. Solve real-world problems using arrays, stacks, queues, and linked lists.</li> <li>5. Become familiar with the major graph algorithms and their analyses. Employ graphs to model engineering problems when appropriate.</li> </ol>
2	AHT 007	<ol style="list-style-type: none"> <li>1. Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers.</li> <li>2. Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions.</li> <li>3. Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience.</li> <li>4. Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence.</li> <li>5. It would enable them to evaluate their efficacy as fluent &amp; efficient communicators by learning the voice dynamics.</li> </ol>
3	CET004	<ol style="list-style-type: none"> <li>1. Analyse trusses and study displacement response of statically determinate structural systems using energy methods:</li> <li>2. apply unit load method and strain energy method for determination of deflection of statically determinate beams, frames &amp; pin jointed trusses</li> <li>3. Analyse statically indeterminate structures using strain energy method and method of consistent deformation</li> <li>4. know about moving loads and influence lines</li> <li>5. Know about Statically determinate and indeterminate suspension bridges and arches</li> </ol>
4	CET005	<ol style="list-style-type: none"> <li>1. Identify Quality Control tests on concrete making materials</li> <li>2. Understand the behaviour of fresh and hardened concrete</li> <li>3. Design concrete mixes as per IS and ACI codes</li> <li>4. Understand the durability requirements of concrete</li> <li>5. Understand the need for special concretes</li> </ol>
5	CET006	<ol style="list-style-type: none"> <li>1. Understand the broad principles of fluid statics, kinematics and dynamics</li> </ol>

		<p>2. Understand definitions of the basic terms used in fluid mechanics</p> <p>3. Understand classifications of fluid flow</p> <p>4. Be able to apply the continuity, momentum and energy principles</p> <p>5. Be able to apply dimensional analysis</p>
6	CST 006	<p>1. Understand cyber-attacks and types of cybercrimes, and familiarity with cyber forensics</p> <p>2. Realize the importance of cyber security and various forms of cyber-attacks and countermeasures.</p> <p>3. Get familiar with obscenity and pornography in cyberspace and understand the violation of the Right to privacy on the Internet.</p> <p>4. Appraise cyber laws and how to protect themselves and, ultimately, the entire Internet community from such attacks.</p> <p>5. Elucidate the various chapters of the IT Act 2008 power of the Central and State Governments to make rules under IT Act 2008</p>

<b>Civil Engineering: V Semester</b>		
<b>S.No.</b>	<b>Course Code</b>	<b>Course Outcomes</b>
1	<b>BCET 501</b>	<p>1. Students will understand the general mechanical behaviour of reinforced concrete.</p> <p>2. Students will be able to analyze and design reinforced concrete flexural members.</p> <p>3. Student will be able to analyze and design reinforced concrete compression members.</p> <p>4. Students will be able to analyze and design for vertical and horizontal shear in reinforced concrete.</p> <p>5. Students will be able to analyze transfer and development length of concrete reinforcement</p>
2	<b>BCET 502</b>	<p>1. Determine soil physical characteristics (including unit weight / density - water content relationship)</p> <p>2. Determine the coefficient of permeability and equivalent hydraulic conductivity in stratified soil</p> <p>3. Describe the purposes and different phases of a soil investigation, soil exploration program, soil exploration methods and soil identification in the field.</p> <p>4. Discuss the concept of effective stress and determine stress distribution within a soil mass.</p> <p>5. Explain the 'shear strength' of soil, describe the direct shear test method and interpret direct shear test results</p>
3	<b>BCET 503</b>	<p>1. Understand the broad principles of fluid statics, kinematics and dynamics</p> <p>2. Understand definitions of the basic terms used in fluid mechanics</p> <p>3. Understand classifications of fluid flow</p> <p>4. Be able to apply the continuity, momentum and energy principles</p> <p>5. Be able to apply dimensional analysis</p>
4	<b>BCET 504 (A)</b>	<p>1. Analyze structures using force method</p> <p>2. Analyze structures using displacement method</p> <p>3. Learn Clapeyrons theorem and its applications</p> <p>4. Analyze structures using matrix methods</p>

		5. Analyze structures using plastic analysis
5	<b>BOEC 505 (B)</b>	<ol style="list-style-type: none"> <li>1. Understand concepts of Pavement performance</li> <li>2. Understand Pavement construction procedures; and Design flexible and Rigid Pavement</li> <li>3. Fully conversant with topics like design and performance of pavement surface, sub-grade theory, load transfer systems and joints behaviour consideration</li> <li>4. To Classify Highway Construction and their Maintenance</li> <li>5. Understand various traffic characteristics and analysis and use the data for road design</li> </ol>
<b>Civil Engineering: VI Semester</b>		
<b>S.No.</b>	<b>Course Code</b>	<b>Course Outcomes</b>
1	<b>BCET 601</b>	<ol style="list-style-type: none"> <li>1. Be able to perform analysis and design of reinforced concrete members and connections.</li> <li>2. Be able to identify and interpret the appropriate relevant industry design codes</li> <li>3. To become familiar with professional and contemporary issues in the design and fabrication of reinforced concrete members.</li> <li>4. Understand the properties and role of various constituent materials used in concrete making</li> <li>5. Understand the theory and principles of design and solution of Reinforced Concrete structures.</li> </ol>
2	<b>BCET 602</b>	<ol style="list-style-type: none"> <li>1. To provide a sound understanding of different sources of water.</li> <li>2. To understand the different methods used to calculate water demands.</li> <li>3. To learn different plumbing methods to transport water to different sources.</li> <li>4. To study about wastewater and its physical, chemical &amp; biological aspects.</li> <li>5. To study different types of sewers and its layout.</li> </ol>
3	<b>BCET 603</b>	<ol style="list-style-type: none"> <li>1. Ability to solve open channel flow problems through the selection and use of appropriate equations.</li> <li>2. An ability to apply your knowledge of mathematics, science, and engineering.</li> <li>3. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.</li> <li>4. Ability to explain the physical mechanisms of hydraulic jumps, surges, and critical, uniform, and gradually-varying flows.</li> <li>5. Ability to explain and apply mathematical relationships for hydraulic jumps, surges, and critical, uniform, and gradually-varying flows</li> </ol>
4	<b>BCET 604(A)</b>	<ol style="list-style-type: none"> <li>1. Determine bearing capacity of soil and retaining wall.</li> <li>2. Determine the settlement of different type of foundation</li> <li>3. Understand the purposes of soil investigation, soil exploration program, soil exploration methods and soil identification in the field.</li> <li>4. Obtain the effective stress and determine stress distribution within a soil mass</li> <li>5. Calculate the 'shear strength' of soil, describe the direct shear test method and interpret direct shear test results.</li> </ol>
5	<b>BOEC 605 (A)</b>	<ol style="list-style-type: none"> <li>1. Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, and have some basic knowledge on international aspect of management</li> <li>2. To understand the planning process in the organization</li> </ol>

		<p>3. To understand the concept of organization</p> <p>4. Demonstrate the ability to directing, leadership and communicate effectively</p> <p>5. To analysis isolate issues and formulate best control methods</p>
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<b>Civil Engineering: VII Semester</b>		
<b>S.No.</b>	<b>Course Code</b>	<b>Course Outcomes</b>
1	BCET 701	<p>1. To introduce the students to the area of water and wastewater treatment.</p> <p>2. The course will cover water chemistry; characteristics of water &amp; wastewater; primary, secondary &amp; tertiary treatment processes.</p> <p>3. To learn about solid waste management and its disposal.</p> <p>4. To have insight knowledge of Industrial waste that causes pollution on large basis.</p> <p>5. To learn about purification of wastewater and its usage for various irrigation purposes.</p>
2	BCET 702	<p>1. Identify and compute the design loads on a typical steel building.</p> <p>2. Able to identify and interpret the appropriate relevant industry design codes.</p> <p>3. Identify the different failure modes of steel tension and compression members and beams, and compute their design strengths.</p> <p>4. Students will be able to check and specify the serviceability requirements of the designed steel structures.</p> <p>5. Identify the different failure modes of bolted and welded connections, and determine their design strengths.</p>
3	BCET 703 (C)	<p>1. Understand the porous medium properties that control groundwater flow and transport, including porosity, hydraulic conductivity, and compressibility.</p> <p>2. Derive effective hydraulic conductivity for various cases of heterogeneous subsurface formations.</p> <p>3. Apply groundwater flow equations to confined and unconfined aquifers.</p> <p>4. Analyze pump test data to determine aquifer properties.</p> <p>5. Estimate travel times for groundwater contaminants in a saturated aquifer.</p>
4	BOEC 704 (A)	<p>1. Provide a background in the theory of hydrological processes and their measurement.</p> <p>2. Apply science and engineering fundamentals to solve current problems and to anticipate, mitigate and prevent future problems in the area of water resources management.</p> <p>3. An ability to manipulate hydrological data and undertake widely-used data analysis.</p> <p>4. A systematic understanding of the nature of hydrological stores and fluxes and a critical awareness of the methods used to measure, analyze and forecast their variability; and the appropriate contexts for their application.</p> <p>5. Can define the key components of a functioning groundwater, can determine the main aquifer properties – permeability, transmissivity and storage Identify geological formations capable of storing and transporting groundwater.</p>
<b>Civil Engineering: VIII Semester</b>		

S.No.	Course Code	Course Outcomes
1	<b>BOEC 804 (A)</b>	<ol style="list-style-type: none"> <li>1. Students will get the understanding of different types of hydropower schemes and their purposes.</li> <li>2. Students will get to learn how to plan and design the different types of hydraulic structures.</li> <li>3. Student will learn concepts and aspects of Location, components Structures involved in a Hydropower plant.</li> <li>4. Student will have proper understanding of various appurtenances used in any Hydro project.</li> <li>5. Students will learn about how electricity is transferred &amp; distributed from hydro power plant.</li> </ol>
2	<b>BCET 801</b>	<ol style="list-style-type: none"> <li>1. An understanding of modern construction practices.</li> <li>2. A good idea of basic construction dynamics- various stakeholders, project objectives, Processes, resources required and project economics.</li> <li>3. A basic ability to plan, control and monitor construction projects with respect to time and cost.</li> <li>4. An idea how construction projects are administered with respect to contract structures and issues.</li> <li>5. An idea about the latest earth moving equipments &amp; machinery used in construction projects.</li> </ol>
3	<b>BCET- 802</b>	<ol style="list-style-type: none"> <li>1. The students will gain an experience in the implementation of Earthquake Engineering on engineering concepts which are applied in field Structural Engineering.</li> <li>2. The students will get a diverse knowledge of earthquake engineering practices applied to real life problems</li> <li>3. The students will learn to understand the theoretical and practical aspects of earthquake engineering along with the planning and design aspects</li> <li>4. The students will learn to understand the seismic codal provision prescribed by IS:1893</li> <li>5. The students will learn to understand the concept of Risk and Hazardous condition due to earthquake.</li> </ol>
4	<b>BCET 803 (A)</b>	<ul style="list-style-type: none"> <li>· Various components of hydrologic cycle that affect the movement of water in the earth.</li> <li>· Various Stream flow measurements technique.</li> <li>· The concepts of movement of ground water beneath the earth.</li> <li>· The basic requirements of irrigation and various irrigation techniques, requirements of the crops.</li> <li>· Distribution systems for canal irrigation and the basics of design of unlined and lined irrigation canals design.</li> </ul>

**Civil Engineering: M.Tech I Semester**

S.No.	Course Code	Course Outcomes
1	<b>AHT30</b>	1. Learn distinct methods of solving simultaneous equations.

	<b>1</b>	<p>2. well-versed with partial differential equations and their solutions and applications.</p> <p>3. Acquire the knowledge of transformation to ease the complex problems.</p> <p>4. Acquaintance with basics of random variables and their distribution for dealing with events by chance.</p> <p>5. Study different mathematical domains to deal with real-time engineering problems.</p>
<b>2</b>	<b>CET-301</b>	<p>1. To impart the principles of elastic structural analysis and behaviour of indeterminate structures.</p> <p>2. To impart knowledge about various methods involved in the analysis of indeterminate structures.</p> <p>3. To apply these methods for analyzing the indeterminate structures to evaluate the response of structures.</p> <p>4. To enable the student get a feeling of how real-life structures behave</p> <p>5. To make the student familiar with latest computational techniques and software used for structural analysis.</p>
<b>3</b>	<b>CET-302</b>	<p>1. Solve advanced problems of elasticity and plasticity understanding the basic concepts.</p> <p>2. Apply numerical methods to solve continuum problems</p> <p>3. Analyse the bending of various types of beams under static loading conditions and compute the shear stress distribution for different cross sections of beams.</p> <p>4. Compute the torsion for the circular shaft and analyse the crippling load and equivalent length for various types of columns of different end conditions</p> <p>5. Compute the deflection of beams and shafts under static loading and stresses in thin walled cylindrical and spherical vessels</p>
<b>4</b>	<b>CET-303</b>	<p>1. Solve ordinary and partial differential equations in structural mechanics using numerical methods.</p> <p>2. Write a program to solve a mathematical problem.</p>
<b>5</b>	<b>CET-306</b>	<p>1. Use analytical methods for the solution of thin plates and shells. Use analytical methods for the solution of shells.</p> <p>2. Apply the numerical techniques and tools for the complex problems in thin plates. Apply the numerical techniques and tools for the complex problems in shells.</p>
<b>6</b>	<b>AHT-303</b>	<p>CO1: Write clearly and fluently to produce effective technical documents.</p> <p>CO2: Demonstrate an appropriate communication style to different types of audiences both orally and written as per demand of their professional careers.</p> <p>CO3: Communicate in an ethically responsible manner.</p>
<b>Civil Engineering: M.Tech II Semester</b>		
<b>S.No.</b>	<b>Course</b>	<b>Course Outcomes</b>

	Code	
1	CET-311	<ol style="list-style-type: none"> <li>1. Design steel structures/ components by different design processes.</li> <li>2. Analyze and design beams and columns for stability and strength, and drift</li> <li>3. Design welded and bolted connections</li> <li>4. Analyse and design Foot Bridge.</li> <li>5. Design industrial components using cold formed steel sections/composite sections</li> </ol>
2	CET 314	<ol style="list-style-type: none"> <li>1.To analyse the special structures by understanding their behaviour</li> <li>2. To design and prepare detail structural drawings for execution citing relevant IS codes</li> <li>3. To estimate the crack width and deflection with regard to the serviceability</li> <li>4. To analyse and design a grid floor system</li> <li>5. To analyse and design a flat slab system</li> </ol>
3	CET 310	<ol style="list-style-type: none"> <li>1.Analyse and study dynamics response of single degree freedom system using fundamental theory and equation of motion</li> <li>2.Analyse and study dynamics response of multi-degree freedom system using fundamental theory and equation of motion</li> <li>3. Use the available software for dynamic analysis</li> </ol>
4	(CET-309)	<ol style="list-style-type: none"> <li>1. Use Finite Element Method for structural analysis.</li> <li>2. Execute the Finite Element Program/ Software.</li> <li>3. Solve continuum problems using finite element analysis.</li> </ol>

<b>Civil Engineering: M.Tech III SEM</b>	
Course Code	Course Outcomes
CET-322(ELECTIVE)	<ol style="list-style-type: none"> <li>1: understand the aspect of costing aspects in decision making and inventory.</li> <li>.</li> <li>2: Perceived knowledge of project execution</li> <li>3: understand the cost behaviour and profit planning marginal costing.</li> <li>4: understand the aspect of MRP, ERP and TQM.</li> <li>5: Analyze the quantitative techniques for cost management.</li> </ol>