

REGENT EDUCATION AND RESEARCH FOUNDATION GROUP OF INSTITUTIONS

Department of Civil Engineering (2020-2021)

Program code	Program Name	Course code	Course Name	Course Outcome
CE-UG	Civil Engineering (B.Tech)	CE801	Professional Elective IV - A Environmental Pollution and Control	<ul style="list-style-type: none"> Define the basic concepts and terminologies regarding air pollution and noise pollution.
				<ul style="list-style-type: none"> Describe the physics of air pollution and noise pollution.
				<ul style="list-style-type: none"> Apply the methods of air pollution and noise pollution measurements .
				<ul style="list-style-type: none"> Analyze different concepts of air and noise pollution solving mathematical problems .
				<ul style="list-style-type: none"> Compare air and noise quality with allowable standards and limits.
CE-UG	Civil Engineering (B.Tech)	CE802D	Professional Elective V - Pavement Design	<ul style="list-style-type: none"> Differentiate between different types of pavements, both structurally and functionally.
				<ul style="list-style-type: none"> Conduct Axle Load Survey and Estimate Design Traffic.
				<ul style="list-style-type: none"> Analyze and design bituminous and cement concrete pavement .
				<ul style="list-style-type: none"> Analyze and design pavement overlay.
				<ul style="list-style-type: none"> Understand the principles of Pavement Maintenance and identify various pavement distresses.
CE-UG	Civil Engineering (B.Tech)	CE891	Structural Engineering Design	<ul style="list-style-type: none"> Design of water tanks.
				<ul style="list-style-type: none"> Analyze and design of aqueducts and box culverts.
				<ul style="list-style-type: none"> Analyze and design of plate girders.
				<ul style="list-style-type: none"> Design and drawing of roof truss, chimney.
CE-UG	Civil Engineering (B.Tech)	CE701	Environmental Engineering	<ul style="list-style-type: none"> CE701-1. Describe different surface and groundwater sources.
				<ul style="list-style-type: none"> CE701-2. Compare between different water samples based on their physical, chemical and biological characteristics.

				<ul style="list-style-type: none"> ● CE701-3. Design different unit processes and operations involved in water treatment.
				<ul style="list-style-type: none"> ● CE701-4. Compare between different wastewater samples based on their physical, chemical and biological characteristics.
				<ul style="list-style-type: none"> ● CE701-5. Design different unit processes and operations involved in wastewater treatment.
				<ul style="list-style-type: none"> ● CE701-6. Solve different mathematical problems regarding different components of sewerage system.
CE-UG	Civil Engineering (B.Tech)	CE702	Water Resource Engineering	<ul style="list-style-type: none"> ● CE702 -1. Learn about hydrological cycle, rainfall measurement and also analyze rainfall over an area
				<ul style="list-style-type: none"> ● CE702 -2. Understand the concepts of irrigation.
				<ul style="list-style-type: none"> ● CE702 -3. Estimate the quantity of water required by different crops in different seasons, and accordingly the irrigation water requirement.
				<ul style="list-style-type: none"> ● CE702 -4. Design channels and other irrigation structures required for irrigation, drainage, soil conservation, flood control and other water-management projects.
				<ul style="list-style-type: none"> ● CE702 -5. Learn about groundwater resources, aquifers and wells
CE-UG	Civil Engineering (B.Tech)	CE703-C	Professional Elective II - Advanced Highway and Transportation Engineering	<ul style="list-style-type: none"> ● CE703 -1. Interpret traffic parameters by applying the knowledge in traffic planning and intersection design.
				<ul style="list-style-type: none"> ● CE703 -2. Explain components of railway track, different railway gauges.
				<ul style="list-style-type: none"> ● CE703 -3. Design track Gradients as per given requirements.
				<ul style="list-style-type: none"> ● CE703 -4. Describe purposes and facilities at railway stations and also explain interlocking as well as modern signal system.
				<ul style="list-style-type: none"> ● CE703 -5. Describe surface defects on railway track and their remedial measures.

				<ul style="list-style-type: none"> ● CE703 -6. Execute construction of runway - taxiway and aprons as per geometric design considering all parameters. Also check the visual aids for air traffic control system.
				<ul style="list-style-type: none"> ● CE703 -7. Assure desire quality in construction of runway and check the requirements of terminal area as per drawing and also design.
CE-UG	Civil Engineering (B.Tech)	CE704-B	Professional Elective III – Hydraulic Structures	<ul style="list-style-type: none"> ● CE704-1. Identify the characteristics of various types of dams and their selection procedure.
				<ul style="list-style-type: none"> ● CE704-2. Perform the reconnaissance survey and, geophysical investigations necessary for selection of suitable dam site.
				<ul style="list-style-type: none"> ● CE704-3. Estimate forces acting on a gravity dams and perform stability analysis.
				<ul style="list-style-type: none"> ● CE704-4. Estimate the seepage loss through embankment dams and suggest necessary remedial measures.
				<ul style="list-style-type: none"> ● CE704-5. Calculate the discharge through the overflow section and design the appropriate energy dissipation structures.
CE-UG	Civil Engineering (B.Tech)	CE705A	Free Elective II - Engineering Materials	<ul style="list-style-type: none"> ● CE705A -1. Understand the principles and importance and also behavior of metals and polymers.
				<ul style="list-style-type: none"> ● CE705A -2. Understand elastic and plastic deformation concepts of metal and polymer
				<ul style="list-style-type: none"> ● CE705A -3. Get concept of ceramic and composite materials.
				<ul style="list-style-type: none"> ● CE705A -4. Understand importance of corrosion and degradation of engineering materials.
				<ul style="list-style-type: none"> ● CE705A -5. Get idea about materials selection methodology.
CE-UG	Civil Engineering (B.Tech)	CE791	Environmental Engg. Lab	<ul style="list-style-type: none"> ● CE791 -1. Experiment various physical characteristics for a given sample of water and wastewater.
				<ul style="list-style-type: none"> ● CE791 -2. Determine various chemical characteristics for a given sample of water and wastewater.

				<ul style="list-style-type: none"> ● CE791 -3. Examine the bacteriological characteristics for a given sample of water and wastewater.
				<ul style="list-style-type: none"> ● CE791 -4. Examine the suitability of a few treatment options for a given sample of water and wastewater.
				<ul style="list-style-type: none"> ● CE791 -5. Compare the determined quality parameters with standards to decide on the suitability of use for the tested water and disposal of tested wastewater.
CE-UG	Civil Engineering (B.Tech)	CE792	Civil Engineering Practice Sessional	<ul style="list-style-type: none"> ● CE792 -1. Analyze the stability of a slope.
				<ul style="list-style-type: none"> ● CE792 -2. Estimate the bearing capacity and settlement of a shallow foundation considering field data.
				<ul style="list-style-type: none"> ● CE792 -3. Design of rectangular and combined footing.
				<ul style="list-style-type: none"> ● CE792 -4. Design of water distribution network.
				<ul style="list-style-type: none"> ● CE792 -5. Design flexible and rigid pavement.
CE-UG	Civil Engineering (B.Tech)	CE793	Free Elective Laboratory	<ul style="list-style-type: none"> ● CE793 -1. Demonstrate the knowledge and skills to conduct and analyzing the results w.r.t. fatigue testing and impact testing.
				<ul style="list-style-type: none"> ● CE793 -2. Acquire the basic knowledge about the methods to enhance the properties of the material from heat treatment process.
				<ul style="list-style-type: none"> ● CE793 -3. Analyze the wear characteristics of ferrous, non-ferrous and composite materials for different parameters.
				<ul style="list-style-type: none"> ● CE793 -4. Apply the knowledge of Non-destructive testing.
				<ul style="list-style-type: none"> ● CE793 -5. Gain knowledge about drawability of sheet metals through cupping test.
CE-UG	Civil Engineering (B.Tech)	CE782	Industrial Training	<ul style="list-style-type: none"> ● CE782 -1. Work in the industry/laboratories as trainees so that they are able to acquire different learning out comes.
				<ul style="list-style-type: none"> ● CE782 -2. Demonstrate skills on different type of process or parameters related to civil engineering.

				<ul style="list-style-type: none"> ● CE782 -3. Understand the concept of facility, location and layout and implement for industrial purposes.
				<ul style="list-style-type: none"> ● CE782 -4. Learn the basic concepts of industrial project and management.
				<ul style="list-style-type: none"> ● CE782 -5. Familiar with organizational behavior and management.
CE-UG	Civil Engineering (B.Tech)	CE(PC)601	Construction Engineering & Management	<ul style="list-style-type: none"> ● CE(PC)601-1. An idea of how structures are built and projects are developed on the field
				<ul style="list-style-type: none"> ● CE(PC)601-2. An understanding of modern construction practices
				<ul style="list-style-type: none"> ● CE(PC)601-3. A good idea of basic construction dynamics- various stakeholders, project objectives, processes, resources required and project economics
				<ul style="list-style-type: none"> ● CE(PC)601-4. A basic ability to plan, control and monitor construction projects with respect to time and cost
				<ul style="list-style-type: none"> ● CE(PC)601-5. An idea of how to optimise construction projects based on costs
				<ul style="list-style-type: none"> ● CE(PC)601-6. An idea how construction projects are administered with respect to contract structures and issues.
				<ul style="list-style-type: none"> ● CE(PC)601-7. An ability to put forward ideas and understandings to others with effective communication processes
CE-UG	Civil Engineering (B.Tech)	CE(PC)602	Engineering Economics, Estimation & Costing	<ul style="list-style-type: none"> ● CE(PC)602-1. Have an idea of Economics in general, Economics of India particularly for public sector agencies and private sector businesses
				<ul style="list-style-type: none"> ● CE(PC)602-2. Be able to perform and evaluate present worth, future worth and annual worth analyses on one of more economic alternatives.
				<ul style="list-style-type: none"> ● CE(PC)602-3. Be able to carry out and evaluate benefit/cost, life cycle and breakeven analyses on one or more economic alternatives.
				<ul style="list-style-type: none"> ● CE(PC)602-4. Be able to understand the technical specifications for various works to be performed for a project and

				<p>how they impact the cost of a structure.</p> <ul style="list-style-type: none"> ● CE(PC)602-5. Be able to quantify the worth of a structure by evaluating quantities of constituents, derive their cost rates and build up the overall cost of the structure. ● CE(PC)602-6. Be able to understand how competitive bidding works and how to submit a competitive bid proposal.
CE-UG	Civil Engineering (B.Tech)	CE(PC)603	Water Resources Engineering	<ul style="list-style-type: none"> ● CE(PC)603-1. Understand the fundamentals of flow in open channels. ● CE(PC)603-2. Understand the concepts of irrigation. ● CE(PC)603-3. Estimate the quantity of water required by different crops in different seasons, and accordingly the irrigation water requirement. ● CE(PC)603-4. Design channels and other irrigation structures required for irrigation, drainage, soil conservation, flood control and other water-management projects. ● CE(PC)603-5. Learn about groundwater resources, aquifers and wells.
CE-UG	Civil Engineering (B.Tech)	CE(PC)604	Design of Steel Structures	<ul style="list-style-type: none"> ● CE(PC)604-1. Identify the material properties of structural steel. Moreover, the students will identify different bolted and welded connections, analyse and design them for axial and eccentric loads. ● CE(PC)604-2. Design different steel sections subjected to axial compression and tension following Indian codes of practices. ● CE(PC)604-3. Comprehend the differences between laterally supported and unsupported flexure members. Designing of the flexure members using Indian codes of practice. ● CE(PC)604-4. Analyse and design rolled and built up compression members along with base connection subjected to axial compression, bending and tension.

				<ul style="list-style-type: none"> ● CE(PC)604-5. Calculate shear force and bending moment on rolled and built up girders, dimension the section and finally design it following Indian standard design guidelines.
				<ul style="list-style-type: none"> ● CE(PC)604-6. Identify different components of gantry system, calculate lateral and vertical loads acting on the system, dimension the components and design them.
				<ul style="list-style-type: none"> ● CE(PC)604-7. Design different components of an industrial building.
CE-UG	Civil Engineering (B.Tech)	CE(PE)601B	Foundation Engineering	<ul style="list-style-type: none"> ● CE(PE)601B-1. Determine the load carrying capacity of pile foundation.
				<ul style="list-style-type: none"> ● CE(PE)601B-2. Compute the efficiency and settlement of pile group.
				<ul style="list-style-type: none"> ● CE(PE)601B-3. Understand different subsoil exploration methods and interpret field and laboratory test data to obtain design parameters for geotechnical analysis.
				<ul style="list-style-type: none"> ● CE(PE)601B-4. Correlate bearing capacity of shallow foundation from field test data.
				<ul style="list-style-type: none"> ● CE(PE)601B-5. Analyze and design sheet pile structure on the basis of earth pressure theories.
				<ul style="list-style-type: none"> ● CE(PE)601B-6. Understand and apply various types of ground improvement methods for solving complex geotechnical problems.
CE-UG	Civil Engineering (B.Tech)	CE(PE)602B	Structural Analysis – II	<ul style="list-style-type: none"> ● CE(PE)602B-1. Apply the Slope Deflection and Moment Distribution Method to analyze indeterminate structures.
				<ul style="list-style-type: none"> ● CE(PE)602B-2. Develop and analyze the concept of suspension bridge and stiffness girders
				<ul style="list-style-type: none"> ● CE(PE)602B-3. Apply and analyze the concepts of curved beam analysis in hooks, rings and Bow girders.
				<ul style="list-style-type: none"> ● CE(PE)602B-4. Develop the concept bending in unsymmetrical beams.
				<ul style="list-style-type: none"> ● CE(PE)602B-5. Develop the fundamental concepts of plastic analysis using kinematic method and apply them

				in frames and continuous beam analysis.
				<ul style="list-style-type: none"> ● CE(PE)602B-6. Develop and analyze the portal frames using Portal and Cantilever method. Develop and analyze the indeterminate structures (continuous beams and frames) using flexibility and stiffness matrix method.
CE-UG	Civil Engineering (B.Tech)	CE(PC)693	Water Resource Engineering Laboratory	<ul style="list-style-type: none"> ● CE(PC)693-1. Delineate the watershed of any reservoir using DEM.
				<ul style="list-style-type: none"> ● CE(PC)693-2. Determine the average rainfall over a catchment.
				<ul style="list-style-type: none"> ● CE(PC)693-3. Use the raingauge properly for a specified purpose.
				<ul style="list-style-type: none"> ● CE(PC)693-4 . Measure the rate of infiltration of water through the soil.
				<ul style="list-style-type: none"> ● CE(PC)693-5. Measure the sunshine hours in a particular day.
CE-UG	Civil Engineering (B.Tech)	CE(PC)694	Steel Structure Design Sessional	<ul style="list-style-type: none"> ● CE(PC)694-1. Identify the material properties of structural steel. Moreover, the students will identify different bolted and welded connections, analyse and design them for axial and eccentric loads.
				<ul style="list-style-type: none"> ● CE(PC)694-2. Design different steel sections subjected to axial compression and tension following Indian codes of practices.
				<ul style="list-style-type: none"> ● CE(PC)694-3. Comprehend the differences between laterally supported and unsupported flexure members. Designing of the flexure members using Indian codes of practice.
				<ul style="list-style-type: none"> ● CE(PC)694-4. Analyse and design rolled and built up compression members along with base connection subjected to axial compression, bending and tension.
				<ul style="list-style-type: none"> ● CE(PC)694-5. Calculate shear force and bending moment on rolled and built up girders, dimension the section and finally design it following Indian standard design guidelines.
				<ul style="list-style-type: none"> ● CE(PC)694-6. Identify different components of gantry system, calculate lateral and vertical loads acting on the system, dimension the components and

				design them.
				<ul style="list-style-type: none"> ● CE(PC)694-7. Design different components of an industrial building.
CE-UG	Civil Engineering (B.Tech)	CE(PC)695	Quantity Survey Estimation and Valuation Sessional	<ul style="list-style-type: none"> ● CE(PC)695-1. An introduction to quantity surveying ● CE(PC)695-2. The capability to know analysis and schedule of rates ● CE(PC)695-3. The ability to know specification of materials ● CE(PC)695-4. An understanding about specification of works ● CE(PC)695-5. The introduction to valuation
CE-UG	Civil Engineering (B.Tech)	CE (PC) 501	Design of RC Structures	<ul style="list-style-type: none"> ● CE(PC)501-1. Understand material properties and design methodologies for reinforced concrete structures. ● CE(PC)501-2. Assess different type of loads and prepare layout for reinforced concrete structures. ● CE(PC)501-3. Identify and apply the applicable industrial design codes relevant to the design of reinforced concrete members. ● CE(PC)501-4. Analyze and design various structural elements of reinforced concrete building like beam, slab, column, footing, and staircase. ● CE(PC)501-5. Assessment of serviceability criteria for reinforced concrete beam and slab. ● CE(PC)501-6. Prepare structural drawings and detailing and produce design calculations and drawing in appropriate professional format.
CE-UG	Civil Engineering (B.Tech)	CE (PC) 502	Engineering Hydrology	<ul style="list-style-type: none"> ● CE(PC)502-1. Study the source, occurrence, movement and distribution of water which is a prime resource for development of a nation. ● CE(PC)502-2. Learn about the functioning of reservoirs and estimation of storage capacities.

				<ul style="list-style-type: none"> ● CE(PC)502-3. Learn about flood hazards, estimation of design floods for various structures and methods of estimating effects of passage of floods through rivers and reservoirs.
				<ul style="list-style-type: none"> ● CE(PC)502-4. Know the basic principles of measurement of flow in rivers.
CE-UG	Civil Engineering (B.Tech)	CE (PC) 503	Structural Analysis – I	<ul style="list-style-type: none"> ● CE(PC)503-1. Distinguish between stable and unstable and statically determinate and indeterminate structures.
				<ul style="list-style-type: none"> ● CE(PC)503-2. Apply equations of equilibrium to structures and compute the reactions.
				<ul style="list-style-type: none"> ● CE(PC)503-3. Calculate the internal forces in cable and arch type structures.
				<ul style="list-style-type: none"> ● CE(PC)503-4. Evaluate and draw the influence lines for reactions, shears and bending moments in beams due to moving loads.
				<ul style="list-style-type: none"> ● CE(PC)503-5. Use approximate methods for analysis of statically indeterminate structures.
				<ul style="list-style-type: none"> ● CE(PC)503-6. Calculate the deflections of truss structures and beams.
CE-UG	Civil Engineering (B.Tech)	CE (PC) 504	Soil Mechanics – II	<ul style="list-style-type: none"> ● CE(PC)504-1. Assess the compaction and consolidation characteristics of soil for solving geotechnical problems.
				<ul style="list-style-type: none"> ● CE(PC)504-2. Calculate earth pressure on rigid retaining walls on the basis of classical earth pressure theories.
				<ul style="list-style-type: none"> ● CE(PC)504-3. Analyze and design rigid retaining walls from geotechnical engineering consideration.
				<ul style="list-style-type: none"> ● CE(PC)504-4. Evaluate the bearing capacity of shallow foundation by applying established theory.
				<ul style="list-style-type: none"> ● CE(PC)504-5. Estimate settlement in soils by different methods.
				<ul style="list-style-type: none"> ● CE(PC)504-6. Compute safety of dams and embankments on the basis of various methods of slope stability analysis.

CE-UG	Civil Engineering (B.Tech)	CE (PC) 505	Environmental Engineering – II	<ul style="list-style-type: none"> ● CE(PC)505-1. Define the basic concepts and terminologies of waste water engineering and hazardous waste management.
				<ul style="list-style-type: none"> ● CE(PC)505-2. Describe different home plumbing systems for water supply and wastewater disposal.
				<ul style="list-style-type: none"> ● CE(PC)505-3. Apply the methods of quantifying sanitary sewage and storm sewage.
				<ul style="list-style-type: none"> ● CE(PC)505-4. Solve different mathematical problems regarding different components of sewerage system.
				<ul style="list-style-type: none"> ● CE(PC)505-5. Compare between different wastewater samples based on their physical, chemical and biological characteristics.
				<ul style="list-style-type: none"> ● CE(PC)505-6. Design different unit processes and operations involved in wastewater treatment.
CE-UG	Civil Engineering (B.Tech)	CE (PC) 506	Transportation Engineering	<ul style="list-style-type: none"> ● CE(PC)506-1. Understand the knowledge of planning, design and the fundamental properties of highway materials in highway engineering.
				<ul style="list-style-type: none"> ● CE(PC)506-2. Apply the knowledge of geometric design and draw appropriate conclusion.
				<ul style="list-style-type: none"> ● CE(PC)506-3. Interpret the concept of different methods in design, construction of the pavement.
				<ul style="list-style-type: none"> ● CE(PC)506-4. Interpret traffic parameters by applying the knowledge in traffic planning and intersection design.
				<ul style="list-style-type: none"> ● CE(PC)506-5. Differentiate between different types of pavements. Also design of bituminous and cement concrete pavement.
CE-UG	Civil Engineering (B.Tech)	CE(PC)591	RC Design Sessional	<ul style="list-style-type: none"> ● CE(PC)591-1. Understand material properties and design methodologies for reinforced concrete structures.
				<ul style="list-style-type: none"> ● CE(PC)591-2. Assess different type of loads and prepare layout for reinforced concrete structures.

				<ul style="list-style-type: none"> ● CE(PC)591-3. Identify and apply the applicable industrial design codes relevant to the design of reinforced concrete members.
				<ul style="list-style-type: none"> ● CE(PC)591-4. Analyze and design various structural elements of reinforced concrete building like beam, slab, column, footing, and staircase.
				<ul style="list-style-type: none"> ● CE(PC)591-5. Assessment of serviceability criteria for reinforced concrete beam and slab.
				<ul style="list-style-type: none"> ● CE(PC)591-6. Prepare structural drawings and detailing and produce design calculations and drawing in appropriate professional format.
CE-UG	Civil Engineering (B.Tech)	CE(PC)594	Soil Mechanics Laboratory	<ul style="list-style-type: none"> ● CE(PC)594-1. Identify different types of soil by visual inspection.
				<ul style="list-style-type: none"> ● CE(PC)594-2. Determine natural moisture content and specific gravity of various types of soil.
				<ul style="list-style-type: none"> ● CE(PC)594-3. Estimate in-situ density by core cutter method and sand replacement method.
				<ul style="list-style-type: none"> ● CE(PC)594-4. Analyze grain size distribution and Atterberg limits for soil.
				<ul style="list-style-type: none"> ● CE(PC)594-5. Perform laboratory tests to determine permeability and compaction characteristics of soil.
				<ul style="list-style-type: none"> ● CE(PC)594-6. Determine shear strength parameters of soil by unconfined compression test and vane shear test.
				<ul style="list-style-type: none"> ● CE(PC)594-7. Determine shear strength parameters of soil by direct shear test.
				<ul style="list-style-type: none"> ● CE(PC)594-8. Perform triaxial test to determine shear strength parameters of soil.
				<ul style="list-style-type: none"> ● CE(PC)594- 9. Determine California Bearing Ratio (CBR) of soil.
				<ul style="list-style-type: none"> ● CE(PC)594- 10. Prepare technical laboratory report.
CE-UG	Civil Engineering (B.Tech)	CE(PC)595	Environmental Engineering Laboratory	<ul style="list-style-type: none"> ● CE(PC)595 -1. Experiment various physical characteristics for a given sample of water and wastewater.
				<ul style="list-style-type: none"> ● CE(PC)595 -2. Determine various chemical characteristics for a given

				sample of water and wastewater.
				<ul style="list-style-type: none"> ● CE(PC)595 -3. Examine the bacteriological characteristics for a given sample of water and wastewater.
				<ul style="list-style-type: none"> ● CE(PC)595 -4. Examine the suitability of a few treatment options for a given sample of water and wastewater.
				<ul style="list-style-type: none"> ● CE(PC)595 -5. Compare the determined quality parameters with standards to decide on the suitability of use for the tested water and disposal of tested wastewater.
CE-UG	Civil Engineering (B.Tech)	CE(PC)596	Transportation Engineering Laboratory	<ul style="list-style-type: none"> ● CE(PC)596 -1. Identify different types of aggregate with the help of shape test.
				<ul style="list-style-type: none"> ● CE(PC)596 -2. Determine crushing strength value, impact value and abrasion value of aggregate.
				<ul style="list-style-type: none"> ● CE(PC)596 -3. Determine Specific Gravity for both aggregate and bitumen. Also determine water absorption of aggregate.
				<ul style="list-style-type: none"> ● CE(PC)596 -4. Analyze Penetration value, Softening point value, flash-fire point value and ductility value of bitumen.
				<ul style="list-style-type: none"> ● CE(PC)596 -5. Determine CBR value of sub-grade soil.
				<ul style="list-style-type: none"> ● CE(PC)596 -6. Perform Marshall Stability test.
CE-UG	Civil Engineering (B.Tech)	CE(PC)597	Computer Applications in Civil Engineering	<ul style="list-style-type: none"> ● CE(PC)597 -1. Use the computer as a problem-solving tool.
				<ul style="list-style-type: none"> ● CE(PC)597 -2. Identify and formulate Civil Engineering problems solvable by computers.
				<ul style="list-style-type: none"> ● CE(PC)597 -3. Perform linear algebra and matrix operations and their application to solve Civil Engineering problems.
				<ul style="list-style-type: none"> ● CE(PC)597 -4. Solve sets of linear equations and determine roots and nonlinear equations.
				<ul style="list-style-type: none"> ● CE(PC)597 -5. Construct, interpret and solve simple optimization problems.

				<ul style="list-style-type: none"> ● CE(PC)597 -6. Develop programs for Civil Engineering analysis and design problems.
				<ul style="list-style-type: none"> ● CE(PC)597 -7. Use various software used in industries for analysis and design.
CE-UG	Civil Engineering (B.Tech)	CE(ES)401	Introduction to Fluid Mechanics	<ul style="list-style-type: none"> ● CE (ES) 401-1. Define basic terms, values and laws in the areas of fluids properties, statics, kinematics and dynamics of fluids, and hydraulic design of pipe systems;
				<ul style="list-style-type: none"> ● CE (ES) 401-2. Describe methods of implementing fluid mechanics laws and phenomena while analyzing the operational parameters of hydraulic problems;
				<ul style="list-style-type: none"> ● CE (ES) 401-3. Practically apply tables and diagrams, and equations that define the associated laws;
				<ul style="list-style-type: none"> ● CE (ES) 401-4. Calculate and optimize operational parameters of hydraulic problems;
				<ul style="list-style-type: none"> ● CE (ES) 401-5. Explain the correlation between different operational parameters;
				<ul style="list-style-type: none"> ● CE (ES) 401-6. Select engineering approach to problem solving based on the acquired physics and mathematical knowledge.
CE-UG	Civil Engineering (B.Tech)	CE(ES)402	Introduction to Solid Mechanics	<ul style="list-style-type: none"> ● CE (ES) 402-1. Identify the equilibrium conditions and elastic properties of axially loaded bars through stress-strain and force-displacement curves.
				<ul style="list-style-type: none"> ● CE (ES) 402-2. Identify the principal plane and principal stresses through Mohr circle.
				<ul style="list-style-type: none"> ● CE (ES) 402-3. Calculate the hoop and meridional stresses in thin cylinders and spherical shells.
				<ul style="list-style-type: none"> ● CE (ES) 402-4. Identify different degrees of freedoms for support conditions like hinge, roller and fixed constraints.

				<ul style="list-style-type: none"> ● CE (ES) 402-5. Calculate the bending moment, shear force and deflection of beams for uniformly distributed, concentrated, linearly varying and external concentrated moment.
				<ul style="list-style-type: none"> ● CE (ES) 402-6. Calculate the member forces in a plane truss using Method of Joint and Method of Section.
				<ul style="list-style-type: none"> ● CE (ES) 402-7. Identify torsional moment and twist on a circular shaft and calculate the shear stress.
				<ul style="list-style-type: none"> ● CE (ES) 402-8. To know the concepts of strain energy due to axial load, bending and shear.
				<ul style="list-style-type: none"> ● CE (ES) 402-9. To calculate the buckling load of columns using Euler's theory for different support constraints
CE-UG	Civil Engineering (B.Tech)	CE (PC) 401	Soil Mechanics – I	<ul style="list-style-type: none"> ● CE (PC) 401-1. Classify soil as per grain size distribution curve and understand the index properties.
				<ul style="list-style-type: none"> ● CE (PC) 401-2. Apply the concept of total stress, effective stress and pore water pressure for solving geotechnical problems.
				<ul style="list-style-type: none"> ● CE (PC) 401-3. Assess the permeability of different types of soil and solve flow problems.
				<ul style="list-style-type: none"> ● CE (PC)401-4. Estimate the seepage loss, factor of safety against piping failure using flow net related to any hydraulic structure.
				<ul style="list-style-type: none"> ● CE (PC) 401-5. Determine vertical stress on a horizontal plane within a soil mass subjected to different types of loading on the ground surface and also the maximum stressed zone or isobar below a loaded area.
				<ul style="list-style-type: none"> ● CE (PC) 401- 6. Apply the concept of shear strength to analyze different geotechnical problems and determine the shear strength parameters from lab and field tests.
CE-UG	Civil Engineering (B.Tech)	CE(PC)402	Environmental Engineering – I	<ul style="list-style-type: none"> ● CE(PC)402 -1. Define the basic concepts and terminologies of water supply engineering and solid waste management

				<ul style="list-style-type: none"> ● CE(PC)402 -2. Describe different surface and groundwater sources; and composition and characteristics of municipal solid waste
				<ul style="list-style-type: none"> ● CE(PC)402 -3. Apply the methods of quantifying water requirement and MSW generation
				<ul style="list-style-type: none"> ● CE(PC)402-4. Solve different mathematical problems regarding different components of water supply systems, distribution networks and MSW management systems
				<ul style="list-style-type: none"> ● CE(PC)402 -5. Compare between different water samples based on their physical, chemical and biological characteristics
				<ul style="list-style-type: none"> ● CE(PC)402 -6. Design different unit processes and operations involved in water treatment and MSW management
CE-UG	Civil Engineering (B.Tech)	CE(PC)403	Surveying & Geomatics	<ul style="list-style-type: none"> ● CE(PC)403-1. Define and state the scope of surveying and geomatics in civil engineering
				<ul style="list-style-type: none"> ● CE(PC)403-2. Understand the basic principles of surveying and geomatics engineering
				<ul style="list-style-type: none"> ● CE(PC)403-3. Apply the different methods of surveying and geomatics to measure the features of interest
				<ul style="list-style-type: none"> ● CE(PC)403-4. Analyze the traditional and advanced methods of surveying
				<ul style="list-style-type: none"> ● CE(PC)403-5. Evaluate the different techniques of surveying and geomatics in solving real world problems.
				<ul style="list-style-type: none"> ● CE(PC)403-6. Design and construct solutions for real world problems related to surveying and geomatics.
CE-UG	Civil Engineering (B.Tech)	CE(PC)404	Concrete Technology	<ul style="list-style-type: none"> ● CE(PC)404 -1. Test all the required properties of concrete materials as per IS code.
				<ul style="list-style-type: none"> ● CE(PC)404 -2. Compute the properties of concrete at fresh and hardened state.
				<ul style="list-style-type: none"> ● CE(PC)404 -3. Design the concrete mix as per latest IS code methods.
				<ul style="list-style-type: none"> ● CE(PC)404 -4. Ensure quality control

				while testing/ sampling.
				<ul style="list-style-type: none"> ● CE(PC)404 -5. Design the special type of concrete for specific application purposes.
				<ul style="list-style-type: none"> ● CE(PC)404 -6. Use the admixture as per requirement.
CE-UG	Civil Engineering (B.Tech)	CE (HS) 401	Civil Engineering – Societal and Global Impact	<ul style="list-style-type: none"> ● CE (HS) 401-1. The impact which Civil Engineering projects have on the Society at large and on the global arena and using resources efficiently and effectively.
				<ul style="list-style-type: none"> ● CE (HS) 401-2. The extent of Infrastructure, its requirements for energy and how they are met: past, present and future
				<ul style="list-style-type: none"> ● CE (HS) 401-3. The Sustainability of the Environment, including its Aesthetics,
				<ul style="list-style-type: none"> ● CE (HS) 401-4. The potentials of Civil Engineering for Employment creation and its Contribution to the GDP
				<ul style="list-style-type: none"> ● CE (HS) 401-5. The Built Environment and factors impacting the Quality of Life
				<ul style="list-style-type: none"> ● CE (HS) 401-6. The precautions to be taken to ensure that the above-mentioned impacts are not adverse but beneficial.
				<ul style="list-style-type: none"> ● CE (HS) 401-7. Applying professional and responsible judgement and take a leadership role
CE-UG	Civil Engineering (B.Tech)	CE(ES)491	Fluid Mechanics Laboratory	<ul style="list-style-type: none"> ● CE(ES)491-1. Calibrate the notch and orifice meter.
				<ul style="list-style-type: none"> ● CE(ES)491-2. Evaluate the performance of pump and turbine.
				<ul style="list-style-type: none"> ● CE(ES)491-3. Determine the various hydraulic coefficients.
				<ul style="list-style-type: none"> ● CE(ES)491-4. Determine the minor losses through pipes.
				<ul style="list-style-type: none"> ● CE(ES)491-5. Measure the water surface profile due to formation of hydraulic jump.
				<ul style="list-style-type: none"> ● CE(ES)491-6. Measure the water surface profile for flow over Broad crested weir.
CE-UG	Civil Engineering	CE(ES)492	Solid Mechanics	<ul style="list-style-type: none"> ● CE(ES)492-1. Demonstrate the method and findings of tension and

	(B.Tech)		Laboratory	<p>compression tests on ductile and brittle materials.</p> <ul style="list-style-type: none"> ● CE(ES)492-2.Explain the method of bending tests on mild steel beam and concrete beam. ● CE(ES)492-3.Demonstrate the method and findings of Torsion test on mild steel circular bar and concrete beam. ● CE(ES)492-4.Illustrate the concept of hardness and explain the procedure and findings of Brinnel and Rockwell tests. ● CE(ES)492-5.Demonstrate the concept and procedure of calculation of spring constant and elaborate its use in Civil Engineering. ● CE(ES)492-6.Demonstrate the method and findings of Izod and Charpy impact tests. ● CE(ES)492-7.Understand the concepts of fatigue test.
CE-UG	Civil Engineering (B.Tech)	CE(ES)493	Engineering Geology Laboratory	<ul style="list-style-type: none"> ● CE(ES)493-1. Define and state the role of engineering geology in civil engineering ● CE(ES)493-2. Understand origin of rocks and geologic structures ● CE(ES)493-3. Apply different tools to identify rocks and minerals in hand specimen and under microscope ● CE(ES)493-4. Analyze the geological structures through drawing the cross sections from the geological maps ● CE(ES)493-5. Evaluate the results obtained from different geological experiments ● CE(ES)493-6. Investigate the natural hazards/disasters that are caused by the geological reasons
CE-UG	Civil Engineering (B.Tech)	CE(PC)493	Surveying & Geomatics Laboratory	<ul style="list-style-type: none"> ● CE(PC)493-1. State the interdependency and advancement of different surveying methods ● CE(PC)493-2. Comprehend the working principles of different surveying and geomatics instruments and experiments

				<ul style="list-style-type: none"> ● CE(PC)493-3. Execute the different methods of surveying and geomatics to measure the features of interest
				<ul style="list-style-type: none"> ● CE(PC)493-4. Examine the results obtained from the surveying and geomatics experiments
				<ul style="list-style-type: none"> ● CE(PC)493-5. Critically appraise the different techniques of surveying and geomatics in measuring and assessing the features of interest
				<ul style="list-style-type: none"> ● CE(PC)493-6. Design and construct solutions for real world problems related to surveying and geomatics.
CE-UG	Civil Engineering (B.Tech)	CE (PC) 494	Concrete Technology Laboratory	<ul style="list-style-type: none"> ● CE(PC)494-1. Demonstrate the method and findings of tension and compression tests on concrete.
				<ul style="list-style-type: none"> ● CE(PC)494-2. Understand the concepts of different test on hardened concrete.
				<ul style="list-style-type: none"> ● CE(PC)494-3. Calculate the specific gravity of concrete ingredients.
				<ul style="list-style-type: none"> ● CE(PC)494-4. Find out the mix proportion of high grade of concrete.
				<ul style="list-style-type: none"> ● CE(PC)494-5. Measure the workability of concrete mix.
				<ul style="list-style-type: none"> ● CE(PC)494-6. Know about the quality of concrete.
				<ul style="list-style-type: none"> ● CE(PC)494-7. Understand the different properties of cement.
CE-UG	Civil Engineering (B.Tech)	CE (ES) 301	Engineering Mechanics	<ul style="list-style-type: none"> ● CE (ES) 301-1. Use scalar and vector analytical techniques for analyzing forces in statically determinate structures and apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems.
				<ul style="list-style-type: none"> ● CE (ES) 301-2. Analyse the truss by using different methods and also get general idea about beams, frames, machines
				<ul style="list-style-type: none"> ● CE (ES) 301-3. Calculate moment of Inertia of standard plane section & their composites and find centroid of simple figures as well as composite sections
				<ul style="list-style-type: none"> ● CE (ES) 301-4. Understand basic kinematics concepts – displacement,

				velocity and acceleration (and their angular counterparts).
				<ul style="list-style-type: none"> ● CE (ES) 301-5. Understand basic dynamics concepts – force, momentum, work, energy and be able to apply Newton’s laws of motion.
				<ul style="list-style-type: none"> ● CE (ES) 301-6. Understand and be able to apply other basic dynamics concepts - the Work-Energy principle, Impulse-Momentum principle and the coefficient of restitution.
				<ul style="list-style-type: none"> ● CE (ES) 301-7. Extend all of concepts of linear kinetics to systems in general plane motion
				<ul style="list-style-type: none"> ● CE (ES) 301-8. Learn to solve dynamics problems. Appraise given information and determine which concepts apply, and choose an appropriate solution strategy, and attain an introduction to basic machine parts such as pulleys and mass-spring systems.
CE-UG	Civil Engineering (B.Tech)	CE(ES)302	Energy Science and Engineering	<ul style="list-style-type: none"> ● CE(ES)302 -1. Understand the need of energy conservation and the concept of the various methods of energy storage.
				<ul style="list-style-type: none"> ● CE(ES)302 -2. Identify the impact of renewable and non-renewable energy sources on environment.
				<ul style="list-style-type: none"> ● CE(ES)302 -3. Illustrate the concepts of Direct Energy Conservation system & their applications.
				<ul style="list-style-type: none"> ● CE(ES)302 -4. Design environment friendly buildings.
CE-UG	Civil Engineering (B.Tech)	CE (HS) 302	Introduction to Civil Engineering	<ul style="list-style-type: none"> ● CE (HS) 302-1. Get an overview idea of Civil Engineering
				<ul style="list-style-type: none"> ● CE (HS) 302-2. Get an illustration of the use and properties of various construction materials
				<ul style="list-style-type: none"> ● CE (HS) 302-3. Understand general aspect of various structures related to civil engineering
				<ul style="list-style-type: none"> ● CE (HS) 302-4. Understand fundamentals of architecture & town planning

				<ul style="list-style-type: none"> ● CE (HS) 302-5. Get general idea on environmental engineering & its sustainability, geotechnical Engineering, hydraulics, hydrology & water resources engineering, ocean Engineering
				<ul style="list-style-type: none"> ● CE (HS) 302-6. Get general idea on surveying & geomatics, traffic & transportation Engineering, structural Engineering, repairs & rehabilitation of structures and power plant structures
				<ul style="list-style-type: none"> ● CE (HS) 302-7. Get knowledge about Computational Methods, IT, IoT related to civil engineering
CE-UG	Civil Engineering (B.Tech)	CE(ES)392	Computer-aided Civil Engineering Drawing	<ul style="list-style-type: none"> ● CE(ES)392 -1. Demonstrate basic concepts of the AUTOCAD software.
				<ul style="list-style-type: none"> ● CE(ES)392 -2. Manipulate drawings through editing and plotting techniques.
				<ul style="list-style-type: none"> ● CE(ES)392 -3. Understand and demonstrate dimensioning concepts and also techniques.
				<ul style="list-style-type: none"> ● CE(ES)392 -4. Exercise on several tools (layers, dimensions, texting etc.)
				<ul style="list-style-type: none"> ● CE(ES)392 -5. Draw building components like walls, lintels, doors and windows using CAD software.
				<ul style="list-style-type: none"> ● CE(ES)392 -6. Draw a plan of building and dimensioning.