Department of Civil Engineering		
BTech in Civil Engineering -2019 Scheme		
Semester 1		
Course Code & Course Name	**CO No**	**CO Description**
HUN 101 LIFE SKILLS	1	Define and Identify different life skills required in personal and professional life
	2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress
	3	Explain the basic mechanics of effective communication and demonstrate these through presentations.
	4	Take part in group discussions
	5	Use appropriate thinking and problem solving techniques to solve new problems
	6	Understand the basics of teamwork and leadership

Semester 2		
Course Code & Course Name	**CO No**	**CO Description**
EST 100 ENGINEERING MECHANICS	1	Recall principles and theorems related to rigid body mechanics
	2	Identify and describe the components of system of forces acting on the rigid body
	3	Apply the conditions of equilibrium to various practical problems involving different force system.
	4	Choose appropriate theorems, principles or formulae to solve problems of mechanics.
	5	Solve problems involving rigid bodies, applying the properties of distributed areas and masses
EST 120 BASIC CIVIL AND MECHANICAL ENGINEERING	1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering.
	2	Explain different types of buildings, building components, building materials and building construction
	3	Describe the importance, objectives and principles of surveying.
	4	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps
	5	Discuss the Materials, energy systems, water management and environment for green buildings.

	6	Analyse thermodynamic cycles and calculate its efficiency
	7	Illustrate the working and features of IC Engines
	8	Explain the basic principles of Refrigeration and Air Conditioning
	9	Describe the working of hydraulic machines
	10	Explain the working of power transmission elements
	11	Describe the basic manufacturing, metal joining and machining processes
HUN 102 PROFESSIONAL COMMUNICATION	1	Develop vocabulary and language skills relevant to engineering as a profession
	2	Analyze, interpret and effectively summarize a variety of textual content
	3	Create effective technical presentations
	4	Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus
	5	Identify drawbacks in listening patterns and apply listening techniques for specific needs
	6	Create professional and technical documents that are clear and adhering to all the necessary conventions
ESL 120 CIVIL AND MECHANICAL WORKSHOP	3	Understand the principle, concept, working and applications of relevant technologies and comparison of results with theoretical calculations
	4	Analyze the techniques and skills associated with modern scientific tools such as lasers and fiber optics
	5	Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results
	1	Name different devices and tools used for civil engineering measurements
	2	Explain the use of various tools and devices for various field measurements
	3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work.
	4	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing.
	5	Compare different techniques and devices used in civil engineering measurements
	6	Identify Basic Mechanical workshop operations in accordance with the material and objects
	7	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades

	8	Apply appropriate safety measures with respect to the mechanical workshop trades

Semester 3		
Course Code & Course Name	**CO No**	**CO Description**
CET 201 MECHANICS OF SOLIDS	1	Recall the fundamental terms and theorems associated with mechanics of linear elastic deformable bodies
	2	Explain the behaviour and response of various structural elements under various loading condition
	3	Apply the principles of solid mechanics to calculate internal stress/strain , trees resultants and strain energies in structural elements subjected to axial/traverse landsand bending/twisting moments
	4	Choose appropriate principles or formula to find the elastic constants of materials making use of the information available
	5	Perform stress transformation ,identify principal plains/stresses and maximum shear stress at a point in a structural member
	6	Analyse the given structural member to calculate the safe load or proportion the cross section to carry the load safely
CET 203 FLUID MECHANICS AND HYDRAULICS	1	Recall the relevant principles of hydrostatics and hydraulics of pipe and open channels
	2	Identify or describe the type, characteristics or properties of fluid flow
	3	Estimate the fluid pressure ,perform the stability check of bodies under hydrostatic condition
	4	Compute discharge through pipes or estimate the forces on pipe bends by applying hydraulic principles of continuity ,energy and/ or momentum
	5	Analyze or compute the flow through open channels ,perform the design of prismatic channels
CET205 SURVEYING AND GEOMATICS	1	Apply surveying techniques and principles of leveling for the preparation of contour maps, computation of area-volume and sketching mass diagram
	2	Apply the principles of surveying for triangulation
	3	Apply different methods of traverse surveying and traverse balancing
	4	Identify the possible errors in surveying and apply the corrections in field measurements
	5	Apply the basic knowledge of setting out of different types of curves
	6	Employ surveying techniques using advanced surveying equipments
HUT 200 DESIGN AND ENGINEERING	1	Explain the different concepts and principles involved in design engineering.
	2	Apply design thinking while learning and practicing engineering.
	3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.

MCN 201 SUSTAINABLE ENGINEERING	1	Understand the relevance and the concept of sustainability and the global initiatives in this direction
	2	Explain the different types of environmental pollution problems and their sustainable solutions
	3	Discuss the environmental regulations and standards
	4	Outline the concepts related to conventional and non-conventional energy
	5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles
CEL 201 CIVIL ENGINEERING PLANNING AND DRAFTING LAB	1	Illustrate ability to organise civil engineering drawings systematically and professionally
	2	Prepare building drawings as per the specified guidelines.
	3	Assess a complete building drawing to include all necessary information
	4	Create a digital form of the building plan using any drafting software
CEL 203 SURVEY LAB	1	Use conventional surveying tools such as chain/tape and compass for plotting and area determination
	2	Apply levelling principles in field
	3	Solve triangulation problems using theodolite
	4	Employ total station for field surveying
	5	Demonstrate the use of distomat and handheld GPS

Semester 4		
Course Code & Course Name	**CO No**	**CO Description**
CET 202 ENGINEERING GEOLOGY	1	Recall the fundamental concepts of surface processes, subsurface process, minerals, rocks, groundwater and geological factors in civil engineering constructions.
	2	Identify and describe the surface processes, subsurface process, earth materials, groundwater and geological factors in civil engineering constructions.
	3	Apply the basic concepts of surface and subsurface processes, minerals, rocks, groundwater and geological characteristics in civil engineering constructions.
	4	Analyze and classify geological processes, earth materials and groundwater.
	5	Evaluation of geological factors in civil engineering constructions.
CET 204 GEOTECHNICAL ENGINEERING	1	Explain the fundamental concepts of basic and engineering properties of soil
	2	Describe the laboratory testing methods for determining soil parameters

	3	Solve the basic properties of soil by applying functional relationships
	4	Calculate the engineering properties of soil by applying the laboratory test results and the fundamental concepts of soil mechanics
	5	Analyze the soil properties to identify and classify the soil
MCN 202 CONSTITUTION OF INDIA	1	Explain the background of the present constitution of India and features.
	2	Utilize the fundamental rights and duties.
	3	Understand the working of the union executive, parliament and judiciary.
	4	Understand the working of the state executive, legislature and judiciary.
	5	Utilize the special provisions and statutory institutions.
	6	Show national and patriotic spirit as responsible citizens of the country
CET 206 TRANSPORTATION ENGINEERING	1	Apply the basic principles of Highway planning and design highway geometric elements
	2	Apply standard code specifications in judging the quality of highway materials; designing of flexible pavements
	3	Explain phenomena in road traffic by collection, analysis and interpretation of traffic data through surveys; creative design of traffic control facilities
	4	Understand about railway systems, tunnel, harbour and docks
	5	Express basics of airport engineering and design airport elements
CEL 202 MATERIAL TESTING LAB	1	The understand the behaviour of engineering materials under various forms and stages of loading.
	2	Characterize the elastic properties of various materials.
	3	Evaluate the strength and stiffness properties of engineering materials under various loading conditions.
CEL 204 FLUID MECHANICS LAB	1	Apply fundamental knowledge of Fluid Mechanics to corresponding experiments
	2	Apply theoretical concepts in Fluid Mechanics to respective experiments
	3	Analyse experimental data and interpret the results
	4	Document the experimentation in prescribed manner

Semester 5		
Course Code & Course Name	**CO No**	**CO Description**

CET 301STRUCTURAL ANALYSIS 1	1	Apply the principles of solid mechanics to analyse trusses.
	2	Apply energy principles to analyse statically determinate structures.
	3	Identify the problem swith static indeterminacy and understand the basic concepts of tackling such problems by means of the method of consistent deformations
	4	Apply suitable methods of analysis for various types of structures including cabels, suspension bridges and arches.
	5	Analyse the effects of moving loads on structures using influence lines.
	6	Apply specific methods such as slope deflection and moment distribution methods of structural analysis with different characteristics.
CET 303 DESIGN OF CONCRETE STRUCTURES	1	Recall the fundamental concepts of limit state design and code provisions for design of concrete members under bending shear, compression and torsion.
	2	Analyse reinforced concrete sections to determine the ultimate capacity in bending, shear and compression.
	3	Design and detailbeams, slab, stairs and footings using IS code provisions
	4	Design and detail columns using IS code and SP 16 desing charts.
	5	Explain the criteria for earthquake resistant design of structures and ductile detailing of concrete structures subjected to seismic forces.
CET 305 GEOTECHNICAL ENGINEERING 2	1	Understand soil exploration methods
	2	Explain the basic concepts, theories and methods of analysis in foundation engineering.
	3	Calculate bearing capacity, pile capacity, foundation settlement and earth pressure
	4	Analyze shallow and deep foundations
	5	Solve the field problems related to geotechnical engineering
CET 307 CONSTRUCTION TECHNOLOGY AND MANAGEMENT	1	Describe the properties of materials used in construction
	2	Explain the properties of concrete and its determination
	3	Describe the various elements of building construction
	4	Explain the technologies for construction
	5	Describe the procedure for planning and executing public works
	6	Apply scheduling techniques in project planning and control
MCN 301 DIASTER MANAGEMENT	1	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle (Cognitive knowledge level: Understand).
	2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment (Cognitive knowledge level: Understand).
	3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk (Cognitive knowledge level: Understand).
	4	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community (Cognitive knowledge level: Apply)

	5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions (Cognitive knowledge level: Understand).
	6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level (Cognitive knowledge level: Understand).
CEL 333 GEOTECHNICAL ENGINEERING LAB	1	Identify and classify soil based on standard geotechnical experimental methods
	2	Perform and analyze permeability tests.
	3	Interpret engineering behavior of soils based on test results
	4	Perform laboratory compaction, CBR and in-place density test for fill quality control in the field
	5	Evaluate the strength of soil by performing various tests viz. direct shear test, unconfined compressive strength test and triaxial shear test
	6	Evaluate settlement characteristics of soils.
CEL 331 MATERIAL TESTING LAB II	1	To describe the basic properties of various construction materials
	2	Characterize the physical and mechanical properties of various construction materials.
	3	Interpret the quality of various construction materials as per IS Codal provisions.

Semester 6		
Course Code & Course Name	**CO No**	**CO Description**
CET 302 STRUCTURAL ANALYSIS 2	1	Understand the principles of plastic theory and its applications in structural analysis.
	2	Examine the type of structure and decide on the method of analysis.
	3	Apply approximate methods of analysis for framed structures to ascertain stress resultants approximately but quickly.
	4	Apply the force method to analyse framed structures.
	5	Apply the displacement methods to analyse framed structures.
	6	Remember basic dynamics, understand the basic principles of structural dynamics and apply the same to simple structures.
CET 304 ENVIRONMENTAL ENGINEERING	1	To appreciate the role of environmental engineering in improving the quality of environment
	2	To plan for collection and conveyance of water and waste water
	3	To enhance natural water purification processes in an engineered environment
	4	To decide on appropriate technology for water and waste water treatment
	1	Elucidate the causes of failure, principles of design of different components of hydraulic structures

CET 306 DESIGN OF HYDRAULIC STRUCTURES	2	Describe the features of canal structures and perform the design of alluvial canals
	3	Perform the hydraulic design of minor irrigation structures such as cross drainage works, canal falls, cross regulator.
	4	Prepare the scaled drawings of different minor irrigation structures
	5	Describe the design principles and features of dams and perform the stability analysis of gravity dams
CET 352 ADVANCED CONCRETE TECHNOLOGY	1	To recall the properties and testing procedure of concrete materials as per IS code
	2	To describe the procedure of determining the properties of fresh and hardened concrete
	3	To design concrete mix using IS Code Methods.
	4	To explain nondestructive testing of concrete
	5	To describe the various special types of concretes
CET 308 COMPREHENSIVE COURSE WORK	1	Learn to prepare for a competitive examination
	2	Comprehend the questions in Civil Engineering field and answer them with confidence
	3	Communicate effectively with faculty in scholarly environments
	4	Analyze the comprehensive knowledge gained in basic courses in the field of Civil Engineering
CEL 332 TRANSPORTATION ENGINEERING LAB	1	Analyse the suitability of soil as a pavement subgrade material
	2	Assess the suitability of aggregates as a pavement construction material
	3	Characterize bitumen based on its properties so as to recommend it as a pavement construction material.
	4	Design bituminous mixes for pavement layers
	5	Assess functional adequacy of pavements based on roughness of pavement surface.
CEL 334 CIVIL ENGINEERING SOFTWARE LAB	1	To undertake analysis and design of multi-storeyed framed structure, schedule a given set of project activities using a software.
	2	To prepare design details of different structural components, implementation plan for a project.
	3	To prepare a technical document on engineering activities like surveying , structural design and project planning.

Semester 7		
Course Code & Course Name	**CO No**	**CO Description**
CET 401 DESIGN OF STEEL STRUCTURES	1	Explain the behaviour and properties of structural steel members to resist various structural forces and actions and apply the relevant codes of practice.
	2	Analysis the behaviour of structural steel members and undertake design at both serviceability and ultimate limit states.
	3	Explain the theoretical and practical aspects of design of composite steel structure along with the planning and design aspects

	4	Apply a diverse knowledge of design of steel engineering practices applied to real life problems
	5	Demonstrate experience in the implementation of design of structure on engineering concepts which are applied in the field structural engineering
CEQ 413 SEMINAR	1	Identify academic documents from the literature which are related to her/his areas of interest (Cognitive knowledge level: Apply)
	2	Read and apprehend an academic document from the literature which is related to her/ his areas of interest (Cognitive knowledge level: Analyze).
	3	Prepare a presentation about an academic document (Cognitive knowledge level: Create)
	4	Give a presentation about an academic document (Cognitive knowledge level: Apply)
	5	Prepare a technical report (Cognitive knowledge level:Create).
CED 415 PROJECT PHASE 1	1	Model and solve real world problems by applying knowledge across domains (Cognitive knowledge level: Apply).
	2	Develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: Apply)
	3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: Apply)
	4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply)
	5	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze).
	6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: Apply).
CEL 411 ENVIRONMENTAL ENGINEERING LAB	1	Analyse various physico-chemical and biological parameters of water
	2	Compare the quality of water with drinking water standards and recommend its suitability for drinking purposes
CET 453 CONSTRUCTION PLANNING AND MANAGEMENT	1	Apply knowledge of Planning and Management for planning and execution of Construction Projects
	2	Explain techniques for Project Planning, Scheduling, Construction Administration and Management
	3	Identify the criteria for selecting the appropriate method and tools as per the requirement of each project or site.
	4	Discuss the latest industry standards and technologies used in construction projects for planning and management.
	5	Explain the financial and legal aspects involved in a construction project.
MCN 401 INDUSTRIAL SAFETY ENGINEERING	1	Describe the theories of accident causation and preventive measures of industrial accidents. (Cognitive Knowledge level: Understand)

	2	Explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping. (Cognitive Knowledge level:Understand)
	3	Explain different issues in construction industries. (Cognitive Knowledge level: Understand)
	4	Describe various hazards associated with different machines and mechanical material handling. (Cognitive Knowledge level: Understand)
	5	Utilise different hazard identification tools in different industries with the knowledge of different types of chemical hazards. (Cognitive Knowledge level:Apply)

Semester 8		
Course Code & Course Name	**CO No**	**CO Description**
CET 402 QUANTITY SURVEYING AND VALUATION	1	Define basic terms related to estimation, quantity surveying and contract document
	2	Interpret the item of work from drawings and explain its general specification and unit of measurement.
	3	Make use of given data from CPWD DAR/DSR for calculating the unit rate of different items of work associated with building construction
	4	Develop detailed measurement (including BBS) and BoQ of a various work like buildings, earthwork for road, sanitary and water supply work
	5	Explain various basic terms related to valuation of land and building
	6	Develop valuation of buildings using different methods of valuation.
	5	Determine the Taylor and Fourier series expansion of functions and learn their applications.
CET 464 AIR QUALITY MANAGEMENT	1	Explain the sources of air pollution and different types of air pollutant.
	2	Describe the effect of air pollutants on vegetation, animals, materials and human health.
	3	Discuss the different methods of ambient air quality monitoring system which supports an air quality management program
	4	Explain the meteorological aspects of air pollutant dispersion.
	5	Describe the various air pollution control strategies that can be undertaken to meet the air quality goals.
CET 456 REPAIR AND REHABILITATION OF BUILDINGS	1	Recall the basics ideas and theories associated with Concrete technology and Masonry structures.
	2	Understand the need and methodology of repair and rehabilitation of structures, the various mechanisms used, and tools for diagnosis of structures
	3	Identifying the criterions for repairing / maintenance and the types and properties of repair materials used in site. Learn various techniques for repairing dam- aged and corroded structures

	4	Proposing wholesum solutions for maintenance/rehabilitation and applying methodologies for repair- ing structures or demolishing structures.
	5	Analyse and asses the damage to structures using various tests
CET 438 AIRPORT SEAPORT AND HARBOUR ENGINEERING	1	Explain the basic principles of planning and design for site selection, Airport components based on air traffic characteristics
	2	Explain the basic design principles of Runway orientation, basic runway length and corrections required, Geometric design of runways, Design of taxiways and aprons, Terminal area planning,
	3	Explain various aspects such as Airport markings, Lighting of runway approaches, taxiways and aprons, Air traffic control methods.
	4	Explain the basic principles,site selection characteristics,lay out ,breakwaters, quays, piers, wharves, jetties, transit sheds and warehouses - navigational aids - lighthouses, signals - types – Moorings
	5	Explain the basics of Docks – Functions and types - dry docks, wet docks arrangement of basins and docks
CED416 PROJECT PHASE II	1	Model and solve real-world problems by applying knowledge across domains (Cognitive knowledge level: Apply)..
	2	Develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: Apply).
	3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: Apply).
	4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply).
	5	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze)
	6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: Apply)