

Program	Civil Engineering
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Program Outcome (POs)

PO 1	Engineering Knowledge – Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solutions of complex problems.
PO 2	Problem Analysis – Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/Development of solutions – Design solutions for complex engineering problems and design system components or processes that meet the specified need with appropriate considerations for public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigation of complex problems – Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusion.
PO 5	Modern tool usage – Create, select and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of limitations.
PO 6	The Engineer and society – Apply reasoning informed by the contextual knowledge to assess societal, health, safety legal and cultural issues and consequent responsibilities relevant to professional engineering practice.
PO 7	Environment and Sustainability – Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need of sustainable development.
PO 8	Ethics- Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
PO 9	Individual and Team work – Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication – Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentation, give and receive clear instructions.
PO 11	Project Management and Finance – Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life Long Learning – Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadcast context of technological change.

Program Specific Outcomes (PSOs)

PSO 1	Apply knowledge in analysis, design, survey, testing and construction of civil engineering structures along with knowledge of mathematics, basic science and soft skill to solve complex civil engineering problems.
PSO 2	Understand economic, environmental, societal, health and safety factors involved in Civil Engineering.
PSO 3	Develop skill for continuous self-learning and research in civil engineering to fulfil the needs of society, ethically.

(Academic Coordinator)

(HOD)

Class – SE 2019 Pattern. Semester - I

Course:	BTAP
Course Code:	201001

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE201.1	Identify types of building and basic requirements of building components.	01
CE201.2	Make use of Architectural Principles and Building byelaws for building construction.	02
CE201.3	Plan effectively various types of Residential Building forms according to their utility, functions with reference to National Building Code.	03
CE201.4	Plan effectively various types of Public Buildings according to their utility functions with reference to National Building Code.	04
CE201.5	Make use of Principles of Planning in Town Planning, Different Villages and Safety aspects.	05
CE201.6	Understand different services and safety aspects	06

Course:	MOS
Course Code:	201002

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE202.1	Understand concept of stress-strain and determine different types of stress, strain in determinate, indeterminate homogeneous and composite structures.	01
CE202.2	Calculate shear force and bending moment in determinate beams for different loading conditions and illustrate shear force and bending moment diagram.	02
CE202.3	Explain the concept of shear and bending stresses in beams and demonstrate shear and bending stress distribution diagram.	03
CE202.4	Use theory of torsion to determine the stresses in circular shaft and understand concept of Principal stresses and strains.	04
CE202.5	Analyze axially loaded and eccentrically loaded column.	05
CE202.6	Determine the slopes and deflection of determinate beams and trusses.	06

Course:	FM
Course Code:	201003

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE203.1	Understand the use of Fluid Properties, concept of Fluid statics, basic equation of Hydrostatics, measurement of fluid pressure, buoyancy & floatation and its application for solving practical problems.	01
CE203.2	Understand the concept of fluid kinematics with reference to Continuity equation and fluid dynamics with reference to Modified Bernoulli's equation and its application to practical problems of fluid flow	02
CE203.3	Understand the concept of Dimensional analysis using Buckingham's π theorem, Similarity & Model Laws and boundary layer theory and apply it for solving practical problems of fluid flow.	03
CE203.4	Understand the concept of laminar and turbulent flow and flow through pipes and its application to determine major and minor losses and analyze pipe network using Hardy Cross method.	04
CE203.5	Understand the concept of open channel flow, uniform flow and depth-Energy relationships in open channel flow and make the use of Chezy's and Manning's formulae for uniform flow computation and design of most economical channel section.	05
CE203.6	Understand the concept of gradually varied flow in open channel and fluid flow around submerged objects, compute GVF profile and calculate drag and lift force on fully submerged body.	06

Course:	EM-II
Course Code:	207001

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE204.1	Solve higher order linear differential equations and its applications to modelling and analysing civil engineering problems such as bending of beams, whirling of shafts and mass spring systems.	01
CE204.2	Solve System of linear equations using direct & iterative numerical techniques and develop solutions for ordinary differential equations using single step & multistep methods applied to hydraulics, geotechnics and structural systems.	02
CE204.3	Apply Statistical methods like correlation, regression and probability theory in data analysis and predictions in civil engineering	03

CE204.4	Perform Vector differentiation & integration, analyze the vector fields and apply to fluid flow problems.	04
CE204.5	Solve Partial differential equations such as wave equation, one and two dimensional heat flow equations.	05

Course:	EG
Course Code:	207003

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE205.1	Explain about the basic concepts of engineering geology, various rocks, and minerals both in lab and on the fields and their inherent characteristics and their uses in civil engineering constructions.	01
CE205.2	Exploring the importance of mass wasting processes and various tectonic processes that hampers the design of civil engineering projects and its implications on environment and sustainability.	02
CE205.3	Recognize effect of plate tectonics, structural geology and their significance and utility in civil engineering activities.	03
CE205.4	Incorporate the various methods of survey, to evaluate and interpret geological nature of the rocks present at the foundations of the dams, percolation tanks, tunnels and to infer site / alignment/ level free from geological defects.	04
CE205.5	Assess the Importance of geological nature of the site, precautions and treatments to improve the site conditions for dams, reservoirs, and tunnels.	05
CE205.6	Explain geological hazards and importance of ground water and uses of common building stones.	06

Class – SE 2019 Pattern. Semester - II

Course:	GTE
Course Code:	201008

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE201.1	Identify and classify the soil based on the index properties and its formation process.	01
CE201.2	Explain permeability and seepage analysis of soil by construction of flow net.	02
CE201.3	Illustrate the effect of compaction on soil and understand the basics of stress distribution.	03
CE201.4	Express shear strength of soil and its measurement under various drainage conditions.	04
CE201.5	Evaluate the earth pressure due to backfill on retaining structures by using different theories.	05
CE201.6	Analysis of stability of slopes for different types of soils.	06

Course:	SUR
Course Code:	201009

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE202.1	Define and Explain basics of plane surveying and differentiate the instruments used for it.	01
CE202.2	Express proficiency in handling surveying equipment and analyse the surveying data from these equipment.	02
CE202.3	Describe different methods of surveying and find relative positions of points on the surface of earth.	03
CE202.4	Execute curve setting for civil engineering projects such as roads, railways etc.	04
CE202.5	Articulate advancements in surveying such as space based positioning systems	05
CE202.6	Differentiate map and aerial photographs, also interpret aerial photographs.	06

Course:	CT
Course Code:	201010

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE203.1	Able to select the various ingredients of concrete and its suitable proportion to achieved desired strength.	01
CE203.2	Able to check the properties of concrete in fresh and hardened state.	02
CE203.3	Get acquainted to concreting equipments, techniques and different types of special concrete.	03
CE203.4	Able to predict deteriorations in concrete and get acquainted to various repairing methods and techniques.	04

Course:	SA
Course Code:	201011

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE204.1	Understand the basic concept of static and kinematic indeterminacy and analysis of indeterminate beams.	01
CE204.2	Analyze redundant trusses and able to perform approximate analysis of multi-story multi-bay frames.	02
CE204.3	Implement application of the slope deflection method to beams and portal frames.	03
CE204.4	Analyze beams and portal frames using moment distribution method.	04
CE204.5	Determine response of beams and portal frames using structure approach of stiffness matrix method.	05
CE204.6	Apply the concepts of plastic analysis in the analysis of steel structures.	06

Course:	PM
Course Code:	201012

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE205.1	Describe project life cycle and the domains of Project Management.	01
CE205.2	Explain networking methods and their applications in planning and management.	02
CE205.3	Categorize the materials as per their annual usage and also Calculate production rate of construction equipment.	03
CE205.4	Demonstrates resource allocation techniques and apply it for manpower planning.	04
CE205.5	Understand economical terms and different laws associated with project management.	05
CE205.6	Apply the methods of project selection and recommend the best economical project.	06

Course:	PBL
Course Code:	201017

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE205.1	Identify the community/ practical/ societal needs and convert the idea into a product/ process/ service.	01
CE205.2	Analyze and design the physical/ mathematical/ ICT model in order to solve identified problem/project.	02
CE205.3	Create, work in team and applying the solution in practical way to specific problem.	03

Class – TE 2019 Pattern. Semester - I

Course:	HWRE
Course Code:	301001

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE301.1	Understand government organizations, apply & analyze precipitation & its abstractions.	01
CE301.2	Understand, apply & analyze runoff, runoff hydrographs and gauging of streams.	02
CE301.3	Understand, apply & analyze floods, hydrologic routing & Q-GIS software in hydrology.	03
CE301.4	Understand, apply & analyze reservoir planning, capacity of reservoir & reservoir economics.	04
CE301.5	Understand water logging & water management, apply & analyze ground water hydrology	05
CE301.6	Understand irrigation, piped distribution network and canal revenue, apply and analyze crop water requirement.	06

Course:	WSE
Course Code:	301002

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE302.1	Define, identify, describe reliability of water sources, estimate water requirement for various sectors	01
CE302.2	Ascertain and interpret water treatment method required to be adopted with respect to source and raw water characteristics	02
CE302.3	Design various components of water treatment plant and distribution system	03
CE302.4	Understand and compare contemporary issues and advanced treatment operations and process available in the market, including packaged water treatment plant	04
CE302.5	Design elevated service reservoir capacity and understand the rainwater harvesting	05
CE302.6	Understand the requirement of water treatment plant for infrastructure and government schemes.	06

Course:	DSS
Course Code:	301003

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE303.1	Ability to Demonstrate knowledge about the types of steel structures, steel code provisions and design of the adequate steel section subjected to tensile force.	01
CE303.2	Determine the adequate steel section subjected to compression load and design of built up columns along with lacing and battening	02
CE303.3	Design eccentrically loaded column for section strength and column bases for axial load and uniaxial bending	03
CE303.4	Design of laterally restrained and unrestrained beam with and without flange plate using rolled steel section.	04
CE303.5	Analyze the industrial truss for dead, live and wind load and design of gantry girder for moving load.	05
CE303.6	Understand the role of components of welded plate girder and design cross section for welded plate girder including stiffeners and its connections.	06

Course:	EEFM
Course Code:	301004

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE304.1	Understand basics of construction economics.	01
CE304.2	Develop an understanding of financial management in civil engineering projects.	02
CE304.3	Prepare and analyze the contract account.	03
CE304.4	Decide on right source of fund for construction projects.	04
CE304.5	Understand working capital and its estimation for civil engineering projects.	05
CE304.6	Illustrate the importance of tax planning & understand role of financial regulatory bodies	

Course:	CM
Course Code:	301005c

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE305.1	Understand the overview of construction sector.	01
CE305.2	Illustrate construction scheduling, work study and work measurement.	02
CE305.3	Acquaint various labor laws and financial aspects of construction projects.	03
CE305.4	Explain elements of risk management and value engineering.	04
CE305.5	State material and human resource management techniques in construction.	05
CE305.6	Understand basics of artificial intelligence techniques in civil engineering.	06

Class – TE 2019 Pattern. Semester - II

Course:	WWE
Course Code:	301012

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE301.1	Recall sanitation infrastructure, quantification and characterization of wastewater, natural purification of streams.	01
CE301.2	Design preliminary and primary unit operations in waste water treatment plant.	02
CE301.3	Understand theory and mechanism of aerobic biological treatment system and to design activated sludge process	03
CE301.4	Understand and design suspended and attached growth wastewater treatment systems.	04
CE301.5	Explain and apply concept of contaminant removal by anaerobic, tertiary and emerging wastewater treatment systems.	05
CE301.6	Compare various sludge management systems and explain the potential of recycle and reuse of wastewater treatment	06

Course:	DRCS
Course Code:	301013

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE302.1	Apply relevant IS provisions to ensure safety and serviceability of structures, understand the design philosophies and behavior of materials: steel & concrete.	01
CE302.2	Recognize mode of failure as per LSM and evaluate moment of resistance for singly, doubly rectangular, and flanged sections.	02
CE302.3	Design & detailing of rectangular one way and two-way slab with different boundary conditions	03
CE302.4	Design & detailing of dog legged and open well staircase	04
CE302.5	Design & detailing of singly/doubly rectangular/flanged beams for flexure, shear, bond and torsion.	05
CE302.6	Design & detailing of short columns subjected to axial load, uni-axial/bi-axial bending and their footings.	06

Course:	RS&GIS
Course Code:	301014

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE303.1	Understand basics of construction economics.	01
CE303.2	Develop an understanding of financial management in civil engineering projects.	02
CE303.3	Prepare and analyze the contract account.	03
CE303.4	Decide on right source of fund for construction projects.	04
CE303.5	Understand working capital and its estimation for civil engineering projects.	05
CE303.6	Illustrate the importance of tax planning & understand role of financial regulatory bodies	06

Course:	ADS
Course Code:	301015c

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE304.1	Recognize the concept of triangulation for fixing the ground control points	01
CE304.2	Differentiate most probable values for different measurement and adjust those in a given figure	02
CE304.3	Summarize the concepts of astronomical and hydrographic surveying	03
CE304.4	Demonstrate the use of aerial photographs for mapping	04
CE304.5	Analyze use of modern surveying instruments in the field	05
CE304.6	Execute GPS and the associated software of different applications in civil engineering	06

Class – BE 2019 Pattern. Semester - I

Course:	FE
Course Code:	401001

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE401.1	Perform subsurface investigations for foundations using different methods.	01
CE401.2	Estimate the bearing capacity of shallow foundations	02
CE401.3	Calculate immediate and primary consolidation settlement of shallow foundations.	03
CE401.4	Decide the capacity of a pile and pile group.	04
CE401.5	Understand the steps in geotechnical design of shallow foundations and well foundations.	05
CE401.6	Analyze problems related to expansive soil and overcome them using design principles, construction techniques in black cotton soil.	06

Course:	TRE
Course Code:	401002

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE402.1	Understand principles and practices of transportation planning.	01
CE402.2	Demonstrate knowledge of traffic studies, analysis and their interpretation.	02
CE402.3	Design Geometric Elements of road pavement.	03
CE402.4	Evaluate properties of highway materials as a part of road pavement.	04
CE402.5	Appraise different types of pavements and their design.	05
CE402.6	Understand the fundamentals of Bridge Engineering and Railway Engineering	06

Course:	IWRP&M
Course Code:	401003c

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE403.1	Understand concerned organizations, IWRP & M objectives, principles, challenges, application & analysis of IWRP&M approaches & principles in a case study.	01
CE403.2	Understand PIM, WDS, WALMI, agriculture in the concept of integrated water resources, apply and analyse water requirements for food production	02
CE403.3	Understand assessment of surface and ground water quality, EIA, CPCB regulations, application & analysis of effluent quality standards as per CPCB	03
CE403.4	Understand water economics and funding, application & analysis of planning for a sustainable water future	04
CE403.5	Understand legal regulatory settings of IWRP & M, application & analysis of inter-basin water transfers and IWRP & M	05
CE403.6	Understand flood control & power generation for IWRP & M, application QIGIS for analysis of a basin for IWRP & M	06

Course:	AP&C
Course Code:	401004a

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE404.1	Recall air pollution, legislation and regulations.	01
CE404.2	Evaluate air pollutant concentrations as a function of meteorology.	02
CE404.3	Interpret sampling results with prescribed standards.	03
CE404.4	Assess emission inventory and air quality models.	04
CE404.5	Compare the air pollution control equipments.	05
CE404.6	Infer indoor air pollution and its mitigation.	

Class – BE 2019 Pattern. Semester - II

Course:	DHS
Course Code:	401011

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE401.1	To study different types of dams and instrumentation	01
CE401.2	To study the stability analysis of Gravity Dam	02
CE401.3	To study the spillways and design philosophy of Ogee spillway.	03
CE401.4	To study the failures and stability analysis of an earthen dam	04
CE401.5	To study design of canals and types of canal structures	05
CE401.6	Analysis of design of diversion headwork and of Cross drainage work	06

Course:	QSCT
Course Code:	401012

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE202.1	Understand concept of estimates and prepare approximate estimate for various for Civil Engineering works.	01
CE202.2	Describe tendering process, construction contracts, and aspects of Arbitration and prepare tender documents	02
CE202.3	Prepare detailed estimate of various items of work by different methods and calculate quantity of steel from Bar bending schedule	03
CE202.4	Apply engineering knowledge to prepare estimate for roads, culverts, and water tank (Elevated storage tank)	04
CE202.5	Apply concepts of specification to draft brief specification, detailed specification and prepare detailed rate analysis report.	05
CE202.6	Evaluate depreciation and valuation of property on the basis of present condition, specifications and market trend.	06

Course:	I&D
Course Code:	401013c

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE203.1	Summarize types of irrigation methods	01
CE203.2	Estimate evapotranspiration and crop-water requirement.	02
CE203.3	Understand component parts and their design considerations of lift irrigation system.	03
CE203.4	Design drip and sprinkler irrigation systems	04
CE203.5	Understand basics of salt affected soils and estimate leaching requirement.	05
CE203.6	Design surface and subsurface drainage systems.	06

Course:	GS&SC
Course Code:	401014e

Course Outcome (COs)

CO Code	CO statement	Mapping with Course Content (Unit No.)
CE204.1	Describe the importance of energy and minimization by altering the building materials.	01
CE204.2	Understand the importance green construction and green rating system	02
CE204.3	Introduce the applications of energy conservation and efficiency practices in buildings.	03
CE204.4	Understand phases and approval involved in smart city project.	04
CE204.5	Assess the national and global experience of smart cities.	05
CE204.6	Understand the importance of sustainable development and current protocol of sustainable development goals.	06