CURRICULUM & SYLLABUS

CHOICE BASED CREDIT SYSTEM (CBCS)

FOR

BACHELOR OF TECHNOLOGY (B.Tech.)

(4 Year Undergraduate Degree Programme)

IN

CIVIL ENGINEERING

(In Alignment with National Education Policy, 2020)

[w. e. f. 2024-25]

FACULTY OF ENGINEERING AND TECHNOLOGY

SRM UNIVERSITY DELHI-NCR, SONEPAT

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PROGRAM LEARNING OUTCOMES (PLOs)

The curriculum and syllabus for B. Tech. (Civil Engineering) programs conform to outcome based on C-D-I-O Initiative. The framework provides students with an education stressing engineering fundamentals set in the context of Conceiving — Designing — Implementing — Operating (CDIO) real-world systems and products.

In general, the curriculum and syllabus have been structured in such a way that each of the courses meets one or more of these under-mentioned outcomes. Student outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program. Further each course in the program spells out clear educational objectives which are mapped to the student outcomes.

Civil Engineering Graduates will be able to:

PLO1 Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PLO2 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.

PLO3 Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PLO4 Conduct Investigations of Complex Civil Engineering Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems.

PLO5 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 the limitations.

PLO6 The Engineer and the Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PLO7 Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PLO8 Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PLO9 Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PLO10 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 presentations, and give and receive clear instructions.

PLO11 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.

PLO12 Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

PSO1: Is proficient in civil engineering profession or higher education by acquiring thorough knowledge in mathematical, computing and engineering concepts.

PSO2: Apply their knowledge and skills to real life problems thereby not only rendering safe and economical structures against natural calamities but also environmentally sustainable and useful to the society.

PSO3: Train and prepare them to exhibit professional attitude, ethical behaviour, and ability to communicate effectively with everyone and adapt to the latest developments and trends by engaging themselves in life-long learning.

Semester-I

ENGINEERING MATHEMATICS-I (COMMON TO ALL BRANCHES EXCEPT BIO MEDICAL ENGINEERING)	
Course Code:24AS101	**Continuous Evaluation:** 40 Marks
Credits: 4	**End Semester Examination:** 60 Marks
L T P : 3 1 0	
Prerequisite:12th Mathematics	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Develop the essential tool of matrices to compute inverse, eigenvalues and eigenvectors.
2. Apply the knowledge of differentiation, partial differentiation, Maxima and minima of two variables for analysing engineering problems.
3. Apply the multiple integrals in engineering applications.
4. Understand differentiation and integration of vectors with knowledge of Green's, Gauss divergence and Stroke's theorems.
5. Demonstrate the convergence of sequence & series.

Elementary Mathematics-I (For BME only)	
Course Code:24AS104	Continuous Evaluation: 40 Marks
Credits: 2	End Semester Examination:60 Marks
L T P : 2 0 0	
Prerequisite: Nil	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Develop the essential tool of matrices and determinants
2. Apply the knowledge of differentiation in computer science.
3. Apply the integrals in computer applications.
4. Understand the differential equations and their simple applications

ELEMENTARY BIOLOGY (For BME only)	
Course Code: 24AS105	**Continuous Evaluation:** 40 Marks
Credits: 2	**End Semester Examination:** 60 Marks
L T P : 1 1 0	
Prerequisite: Nil	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Explain the complicated relationship between different cellular structures and their roles.
2. Employ experimental ways to solve genetic problems.
3. Explain how animals respond to changes in their environment.
4. When dealing with biological impediments and challenges, problem-solving abilities should be applied.
5. Analyse and interpret the data using appropriate biological methods.
6. Make connections between the various portions of the topics covered in the course

ENGINEERING PHYSICS	
Course Code: 24AS102/24AS202	**Continuous Evaluation:** 40 Marks
Credits: 4	**End Semester Examination:** 60 Marks
L T P : 3 1 0	
Prerequisite: Nil	

COURSE LEARNING OUTCOMES (CLO)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. The student is expected to be familiar with broader areas of Physics such as mechanics of solids, optics, mechanical and electromagnetic waves oscillations and their relevance in Engineering.
2. An understanding of Physics also helps engineers understand the working and limitations of existing devices and techniques, which eventually leads to new innovations and improvements.
3. The student would be able to learn the fundamental concepts on Quantum behavior of matter in its micro state.
4. The course also helps the students to be exposed to the phenomena of electromagnetism and also to have exposure on semiconductor devices such as solar cell.

ENGINEERING CHEMISTRY	
Course Code: 24AS103 /24AS203	**Continuous Evaluation:** 40 Marks
Credits: 4	**End Semester Examination:** 60 Marks
L T P : 3 1 0	
Prerequisite: Nil	

COURSE LEARNING OUTCOMES (CLO)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Understand to identify the quality of water and how to improve the quality of water.
2. Explain states of matter, phase diagram, related applications and polymers.
3. Analyze the quantitative aspects of fuel combustion, spectroscopy
4. Explain the mechanism of corrosion.
5. Get preliminary understanding on introductory idea about nano materials.

BASIC ELECTRICAL ENGINEERING	
Course Code: 24EE101/24EE201	**Continuous Evaluation:** 40 Marks
Credits: 3	**End Semester Examination:** 60 Marks
L T P : 3 0 0	
Prerequisite: Nil	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of the course, students would be able to:

1. To explain the strong basics of electrical engineering and practical implementation of electrical fundamentals.
2. To identify different applications of commonly used electrical machinery.
3. To define various renewable resources available in the power generation.
4. To understand the basic concept of a poly-phase system.

BASIC ELECTRONICS ENGINEERING	
Course Code: 24EC101/24EC201	**Continuous Evaluation:** 40 Marks
Credits: 3	**End Semester Examination:** 60 Marks
L T P : 3 0 0	
Prerequisite: Nil	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in alignment with National Education Policy (NEP). After completion of the course, students would be able to:

1. To learn the fundamental concepts of semiconductor devices
2. An ability to apply the concept of diode in clipper and clamper circuits
3. Acquire the skills of constructing the different transistor configurations
4. To learn the basic concepts of integrated circuits
5. To Compile the different building blocks in digital electronics using logic gates and implement simple logic functions using basic universal gates
6. To acquire the knowledge of microprocessors.

ENGINEERING MECHANICS	
Course Code: 23ME101/23ME201	**Continuous Evaluation:** 40 Marks
Credits: 3	**End Semester Examination:** 60 Marks
L T P : 3 0 0	
Prerequisite: Nil	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in alignment with National Education Policy (NEP). After completion of course, students would be able to:

1. Understand the concepts of force and moments in equilibrium.
2. Apply principles of mechanics to real engineering problems.
3. Understand the basics of Centroids and MOI.
4. Grasp the elements of rigid body kinematics and kinetics.
5. Understand the mechanics of deformable bodies.

FUNDAMENTALS OF COMPUTER & C PROGRAMMING	
Course Code: 23CS101/23CS201	**Continuous Evaluation:** 40 Marks
Credits: 3	**End Semester Examination:** 60 Marks
L T P : 3 0 0	
Prerequisite: Nil	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Understand the fundamental concepts of computers, both hardware and software.
2. Learn and understand the major system software's that help in developing of an application.
3. Apply and analyse the basic programming constructs in context of C programming language.
4. Analyse and evaluate the derived datatypes (array) and the operations that can be performed on them, along with the concept of modularity through functions
5. Create and manipulate a database or data storage through files.
6. Learn a programming approach to solve problems.

COMMUNICATIVE ENGLISH	
Course Code: 24HS101/24HS201	**Continuous Evaluation:** 40 Marks
Credits: 2	**End Semester Examination:** 60 Marks
L T P : 2 0 0	
Prerequisite: Nil	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Recall and identify English vocabulary words and grammatical structures.
2. Analyse the structure and organization of written texts, identifying the introduction, body, and conclusion.
3. Examine how the use of specific language techniques impacts the effectiveness of communication.
4. Assess and critique public speeches and presentations based on clarity, coherence, and persuasiveness.
5. Evaluate one's own language skills and identify areas for improvement.

HINDI -I	
Course Code: 24HIN-101- I	**Continuous Evaluation:** 40 Marks
Credits: 2	**End Semester Examination:** 60 Marks
L T P : 2 0 0	
Prerequisite: Nil	

GERMAN-I	
Course Code: 24FLGR101- I	**Continuous Evaluation:** 40 Marks
Credits: 2	**End Semester Examination:** 60 Marks
L T P : 2 0 0	
Prerequisite: Basics of English Language	

COURSE LEARNING OUTCOMES (CLOs):

After completion of the course the students will have the ability to:

1. Read and write short, simple texts.
2. Have Fluency in reading and writing.
3. Understand the dialogue between two native speakers and to take part in short, simple conversations using the skills acquired.
4. Know the culture of the countries where the German language is spoken.

FRENCH-I	
Course Code: 24FLFR101-I	**Continuous Evaluation:** 40 Marks
Credits: 2	**End Semester Examination:** 60 Marks
L T P : 2 0 0	
Prerequisite: Basics of English Language	

COURSE LEARNING OUTCOMES (CLOs)

1. After completion of this course, the student will be able **to express and interact in French** used in daily conversations.
2. The student will be able **to write short and simple texts.**
3. The student will be able to **initiate, understand and respond to the queries of cultural significance in various settings.**
4. The student can demonstrate **knowledge and understanding** of French and Francophone culture.

ENVIRONMENTAL BIOENGINEERING	
Course Code: 23ESEB101/23ESEB201	**Continuous Evaluation:** 40 Marks
Credits: 2	**End Semester Examination:** 60 Marks
L T P : 2 0 0	
Prerequisite: Nil	

Course Learning Outcomes (CLOs) – The Syllabus has been prepared in accordance with the NEP-2020 and based on the UGC curriculum framework. Upon completion of this course, learners will be able to:

1. Analyse the environmental pollution and sensitize themselves to adverse health impacts of pollution.
2. Demonstrate to safeguard the Earth's environment and its resources.
3. Explain sustainable development, its goals, challenges, and global strategies.
4. Improve biological concepts using an engineering approach.

INDIAN CONSTITUTION & POLITY	
Course Code: 23VAC102/23VAC202	**Continuous Evaluation:** 40 Marks
Credits: 2	**End Semester Examination:** 60 Marks
L T P : 2 0 0	
Prerequisite: Nil	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in alignment with National Education Policy (NEP). After completion of course, students would be able to:

1. Explain the concept of democracy, diversity and the Constitutional Values
2. Describe the functioning of the three wings of the State
3. Sketch the functioning of decentralised administration under the Constitution of India and appreciate the political dimensions.
4. Examine the scope of various rights and duties under the Constitution of India.

ENGINEERING PHYSICS LAB	
Course Code: 24AS152/24AS252	**Continuous Evaluation:** 60 Marks
Credits: 1	**End Semester Examination:** 40 Marks
L T P : 0 0 2	
Prerequisite: Nil	

COURSE LEARNING OUTCOMES (CLO)

1. Use the different measuring devices and meters to record the data with precision
2. Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results
3. Apply the mathematical concepts/equations to obtain quantitative results

BASIC ELECTRICAL ENGINEERING LAB	
Course Code: 23EE151/23EE251	**Continuous Evaluation:** 60 Marks
Credits: 1	**End Semester Examination:** 40 Marks
L T P : 0 0 2	
Prerequisite: Nil	

COURSE LEARNING OUTCOMES (CLO)

The syllabus has been prepared in alignment with National Education Policy (NEP). After completion of course, students would be able to:

1. Verify fundamental laws like Ohm's Law, KCL, KVL, etc.
2. Understand the calibration of energy meter.
3. Understand open circuit and short circuit test of single-phase transformer.
4. Analyse RLC series and parallel circuits

BASIC ELECTRONICS ENGINEERING LAB	
Course Code: 24EC151/24EC251	**Continuous Evaluation:** 60 Marks
Credits: 1	**End Semester Examination:** 40 Marks
L T P : 0 0 2	
Prerequisite: Nil	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in alignment with National Education Policy (NEP). After completion of the course, students would be able to:

1. Measure the voltage, frequency, and phase of any waveform using CRO.
2. Generate sine, square, and triangular waveforms with required frequency and amplitude using function generator.
3. Analyze the characteristics of different electronic devices such as diodes, transistors, and operational amplifiers
4. To develop skills to build and verify digital circuits.

BASIC MECHANICAL ENGINEERING LAB	
Course Code: 23ME151/23ME251	**Continuous Evaluation:** 60 Marks
Credits: 1	**End Semester Examination:** 40 Marks
L T P : 0 0 2	
Prerequisite: Nil	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP).
Aftercompletion of course, students would be able to demonstrate:

1. The principle of equilibrium of forces and parallelogram.
2. The effects of friction on the motion.
3. The working and application of engineering components.
4. Develop group working, including task sub-division and integration of individual contributions from the team.

C PROGRAMMING LAB	
Course Code: 23CS151/23CS251	**Continuous Evaluation:** 60 Marks
Credits: 1	**End Semester Examination:** 40 Marks
L T P : 0 0 2	
Prerequisite: Nil	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in alignment with National Education Policy (NEP). After completion of course, students would be able to:

1. Understand the Typical C Program Development Environment, compiling, debugging, Linking and executing.
2. Introduction to C Programming using Control Statements and Repetition Statement

3. Apply and practice logical formulations to solve some simple problems leading to specific applications.
4. Design effectively the required programming components that efficiently solve computing problems in real world.
5. Employ good programming practices such as incremental development, data integrity checking and adherence to style guidelines.

MECHANICAL WORKSHOP LAB	
Course Code: 24ME152/24ME252	**Continuous Evaluation:** 60 Marks
Credits: 1	**End Semester Examination:** 40 Marks
L T P : 0 0 2	
Prerequisite: Nil	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Use different manufacturing (Fitting, carpentry, sheet metal, welding, smithy working etc.) processes required to manufacture a product from the raw materials.
2. Use different measuring, marking, cutting tools used in the workshop.
3. Be aware of the safety precautions while working in the workshop.

ENGINEERING GRAPHICS & DESIGN LAB	
Course Code: 24ME153/24ME253	**Continuous Evaluation:** 60 Marks
Credits: 1	**End Semester Examination:** 40 Marks
L T P : 0 0 2	
Prerequisite: Nil	

COURSE LEARNING OUTCOMES (CLOs)

Once the course is completed, the students will be able to

1. Understand orthographic projections of points and lines in any position through AutoCAD.
2. Imagine and convert isometric view into orthographic projections and vice versa.
3. Should be able to understand the simple machine components and draw its projections
4. Familiarize with projections of lines, planes, solids, isometric projections.

COMMUNICATIVE ENGLISH LAB	
Course Code: 24HS151/24HS251	**Continuous Evaluation:** 60 Marks
Credits: 1	**End Semester Examination:** 40 Marks
L T P : 0 0 2	
Prerequisite: Nil	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After Completion of course, students would be able to:

1. Summarize conversations, demonstrating understanding of the content.
2. Apply communication strategies to maintain conversations and express ideas clearly.
3. Critique and assess various spoken interactions to identify strengths and areas for improvement in communication.
4. Create engaging dialogues or role-plays that demonstrate real-life communicative scenarios.
5. Develop and present persuasive arguments or opinions on various topics in English.

SEMESTER II

ENGINEERING MATHEMATICS-II (COMMON TO ALL BRANCHES EXCEPT BIO MEDICAL ENGINEERING)	
Course Code: 24AS201	**Continuous Evaluation:** 40 Marks
Credits: 4	**End Semester Examination:** 60 Marks
L T P : 3 1 0	
Prerequisite: Engineering Mathematics-I	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Demonstrate various physical models through higher order differential equation and solve such linear ordinary differential equation.
2. Obtain series solution of differential equation and explain applications of Bessel's and Legendre's Differential Equations.
3. Apply Laplace transforms to find the solution of initial value and boundary value problems.
4. Demonstrate the concept of Analytic functions & its constructions, Conformal Mapping
5. Evaluate Complex Integration, Taylor's and Laurent's Expansion, Singularities and Residues.

ELEMENTARY MATHEMATICS-II **(For BME only)**	
Course Code:24AS204	**Continuous Evaluation:** 40 Marks
Credits: 4	**End Semester Examination:** 60 Marks
L T P : 3 1 0	
Prerequisite: Elementary Mathematics-I	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Develop the essential tool of differentiation of several variables.
2. Apply the knowledge of vector calculus in real life applications.
3. Apply the knowledge of Second order differential equations in solving simple problems.
4. Understand the complex number system and their uses.
5. Apply the knowledge to construct analytic functions.

HINDI-II	
Course Code:24HIN201-II	**Continuous Evaluation:** 40 Marks
Credits: 2	**End Semester Examination:** 60 Marks
L T P : 2 0 0	
Prerequisite: Nil	

Course Description:

विश्वविद्यालय ने वर्ष 2024-25 सत्र से स्नातक स्तर पर हिंदी विषय का पाठ्यक्रम तैयार किया है | हिंदी विषय के प्रश्न पत्र की सामग्री निर्धारण में ज्ञान तथा शिक्षा के बदलते परिप्रेक्ष्य को ध्यान में रखा गया है| इस सत्र में हिंदी लघु कथाओं को सम्मिलित किया गया है| छात्रों की मौखिक अभिव्यक्ति की क्षमता का विकास करने में निहित मूल्यों का महत्वपूर्ण योगदान होता है , इससे विद्यार्थियों की कल्पना शक्ति के विकास के साथ-साथ मनोरंजन भी होता है| संचार कौशल में मुहावरे, लोकोक्तियां, पत्र लेखन और अपठित गद्यांश की समझ के द्वारा हिंदी का प्रचार-प्रसार होगा| इस प्रकार साहित्य के ज्ञान की अभिवृद्धि वैश्वीकरण के संदर्भ में प्रासंगिकता और उपयोगिकता सिध्द करती है |

GERMAN-II	
Course Code: 24FLGR201- II	**Continuous Evaluation:** 40 Marks
Credits: 2	**End Semester Examination:** 60 Marks
L T P : 2 0 0	
Prerequisite: Basics of English Language	

COURSE LEARNING OUTCOMES (CLOs):

After completion of the course the students will have the ability to:

1. Read and write short, simple texts.
2. Have Fluency in reading and writing.
3. Understand the dialogue between two native speakers and to take part in short, simple conversations using the skills acquired.
4. Know the culture of the countries where the German language is spoken.

FRENCH-II	
Course Code: 24FLFR201-II	**Continuous Evaluation:** 40 Marks
Credits: 2	**End Semester Examination:** 60 Marks
L T P : 2 0 0	
Prerequisite: French-I	

COURSE LEARNING OUTCOMES (CLOs)

1. After completion of this course, the student will be able to express and interact in French used in daily conversations.

2. The student will be able to write short and simple texts.

3. The student will be able to initiate, understand and respond to the queries of cultural significance in various settings.

4. The student can demonstrate knowledge and understanding of French and Francophone culture.

SEMESTER III

Course Name: Structural Analysis – I	
Course Code: 23CE301	Continuous Evaluation: 40 Marks
Credits: 03	End Semester Examination: 60 Marks
L T P : 3 0 0	
Prerequisite: 23CE301	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will learn to draw SFD and BMD.
2. Students will analyze the beam.
3. Students will learn evaluation of stresses by various methods.
4. Students will learn behaviour of column by various load condition.
5. Students will cables and suspension bridges.

Course Name: Surveying – I	
Course Code: 23CE302	Continuous Evaluation: 40 Marks
Credits: 03	End Semester Examination: 60 Marks
L T P : 3 0 0	
Prerequisite: 23CE302	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will learn importance and basics of surveying.
2. Students will learn measurements by various methods.
3. Students will learn about leveling and Tacheometer.
4. Students will learn about Plane table surveying and curve setting.
5. Students will learn Coordinates by satellite-based method.

Course Name: Fluid Mechanics	
Course Code: 23CE303	Continuous Evaluation: 40 Marks
Credits: 03	End Semester Examination: 60 Marks
L T P : 3 0 0	
Prerequisite: 23CE303	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will learn behavior and performance of fluid at rest and motion.
2. Students will learn about behavior of flowing fluid through pipe.
3. Students will learn about various devices used to measure fluid pressure.
4. Students will learn about various devices used to measure fluid velocity and discharge.
5. Students will understand dimensional analysis utilization.

Course Name: Environmental Engineering	
Course Code: 23CE304	Continuous Evaluation: 40 Marks
Credits: 03	End Semester Examination: 60 Marks
L T P : 3 0 0	
Prerequisite: 23CE303	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will learn about water sources and demand of water analysis.
2. Students will learn characteristics of water.
3. Students will understand various schemes of water supply.
4. Students will design water treatment plant.

Course Name: Structural Analysis Lab	
Course Code: 23CE352	Continuous Evaluation: 60 Marks
Credits: 01	End Semester Examination: 40 Marks
L T P : 0 0 2	
Prerequisite: 23CE352	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will learn reciprocal and moment area theorem.
2. Students will analyze truss and curved member.
3. Students will analyze hinged arches.
4. Students will determine elastic properties of beam and truss.

Course Name: Surveying – I Lab	
Course Code: 23CE352	Continuous Evaluation: 60 Marks
Credits: 01	End Semester Examination: 40 Marks
L T P : 0 0 2	
Prerequisite: 23CE352	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will use all type of survey instruments.
2. Students will learn about field book and instrument adjustment.
3. Student will prepare map of small area.

Course Name: Fluid Mechanics Lab	
Course Code: 23CE353	Continuous Evaluation: 60 Marks
Credits: 01	End Semester Examination: 40 Marks
L T P : 0 0 2	
Prerequisite: 23CE353	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will learn about working principle and function of hydraulic equipment's.
2. Students will get hands on training on all type of hydraulic equipment.
3. Students will learn to take observations while in operation.
4. Students will learn to interpret the results.

Course Name: Environmental Engineering Lab	
Course Code: 23CE354	Continuous Evaluation: 60 Marks
Credits: 01	End Semester Examination: 40 Marks
L T P : 0 0 2	
Prerequisite: 23CE354	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will analyze physical and chemical characteristics of waste water.
2. Students will estimate the organic strength of waste water.
3. Students will learn growth of microorganisms.

SEMESTER IV

Course Name: Programming Using Python	
Course Code: 24CE401	Continuous Evaluation: 40 Marks
Credits: 03	End Semester Examination: 60 Marks
L T P : 3 0 0	
Prerequisite: 24CE401	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

Course Name: Soil Mechanics	
Course Code: 23CE402	Continuous Evaluation: 40 Marks
Credits: 03	End Semester Examination: 60 Marks
L T P : 3 0 0	
Prerequisite: 23CE402	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will understand the concept of three phase system in soil.
2. Student will learn the role of water in soil and seepage system.
3. Student will learn about soil stress distribution and stress influence.
4. Students will learn soil parameters in drainage conditions.
5. Students will understand the mechanism of compaction and its effect.
6. Students will estimate the settlement of soil due to consolidation.

Course Name: Design of Steel Structure	
Course Code: 23CE403	Continuous Evaluation: 40 Marks
Credits: 03	End Semester Examination: 60 Marks
L T P : 3 0 0	
Prerequisite: 23CE403	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will design various types of connections.
2. Students will design tension member.

3. Students will design compression members.
4. Students will design various types of girders.
5. Students will design roof truss and purl in with various bearing conditions.

Course Name: Structural Analysis-II	
Course Code: 23CE404	Continuous Evaluation: 40 Marks
Credits: 04	End Semester Examination: 60 Marks
L T P : 3 1 0	
Prerequisite: 23CE404	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will analyze the structure using different displacement method.
2. Student will understand the behavior of structure under bending.
3. Students will draw the influence diagram of determinate and indeterminate structures.
4. Students will analyze the different types of arches.

Course Name: Surveying – II Lab	
Course Code: 23CE451	Continuous Evaluation: 60 Marks
Credits: 01	End Semester Examination: 40 Marks
L T P : 0 0 1	
Prerequisite: 23CE451	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will get training on theodolite of basic measurements.
2. Students will get hand on training on total station of basic measurements.
3. Students will plot a map of small area by total station with software.

Course Name: Soil Mechanics Lab	
Course Code: 23CE452	Continuous Evaluation: 60 Marks
Credits: 01	End Semester Examination: 40 Marks
L T P : 0 0 1	
Prerequisite: 23CE452	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will estimate index properties of soil.
2. Students will get hands on training on consistency calculation.
3. Students will estimate shear strength of soil by various test.
4. Students will get hands on training on density test and permeability test.

Course Name: Structural Analysis Lab	
Course Code: 23C453	Continuous Evaluation: 60 Marks
Credits: 01	End Semester Examination: 40 Marks
L T P : 0 0 1	
Prerequisite: 23CE453	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will learn reciprocal and moment area theorem.
2. Students will analyze truss and curved member.
3. Students will analyze hinged arches.
4. Students will determine elastic properties of beam and truss.

SEMESTER V

Course Name: FOUNDATION ENGINEERING	
Course Code: 23CE501	Continuous Evaluation: 40 Marks
Credits: 4	End Semester Examination: 60 Marks
L T P : 3 1 0	
Prerequisite: 23CE402	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Student will be able to understand basic knowledge of the concept of Sub-Surface Exploration.
2. Students will learn about shallow Foundation and its concepts
3. Students will learn about the pile Foundation and its concepts
4. Students will learn about Cassion Foundation

Course Name : DESIGN OF REINFORCED CONCRETE STRUCTURE	
Course Code: 23CE502	Continuous Evaluation: 40 Marks
Credits: 4	End Semester Examination: 60 Marks
L T P : 3 1 0	
Prerequisite: None	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will learn various design philosophies
2. Students will design a beam structure
3. Students will design a slab structure
4. Students will design short column, long column and footing
5. Students will design footing and pile foundation

Course Name: TRANSPORTATION ENGINEERING	
Course Code: 24CE503	Continuous Evaluation: 40 Marks
Credits: 4	End Semester Examination: 60 Marks
L T P : 3 1 0	
Prerequisite: None	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will Understand the concepts and standards adopted in Planning, alignment and surveys
2. Students will Understand the concepts and standards adopted Design and construction

of Highways

3. Students will Understand the traffic characteristics, traffic control devices and principles of signal /intersection design
4. Students will know about that the characteristics, properties and testing procedures of aggregate and bituminous materials
5. Students will knowledge about bituminous mixes and their designs

Course Name : FOUNDATION ENGINEERING LAB	
Course Code: 23CE551	Continuous Evaluation: 60 Marks
Credits: 1	End Semester Examination: 40 Marks
L T P : 0 0 2	
Prerequisite: None	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Student will Know about the estimate index properties of soils
2. Student will know about the estimate consolidation parameters of clayey soil.
3. Student will know about the estimate shear strength parameters of soil by triaxial shear test.
4. Student will know about the estimate the relative density and maximum dry density of soils.
5. Student will get knowledge about plate load test

Course Name : TRANSPORTATION ENGINEERING LAB	
Course Code: 23CE552	Continuous Evaluation: 60 Marks
Credits: 1	End Semester Examination: 40 Marks
L T P : 0 0 2	
Prerequisite: None	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Student will get knowledge about the characterization of highway materials
2. Student will familiar with testing of aggregate and bituminous materials
3. Student will familiar with standard specifications

Course Name : LIVE PROJECTS – II (SURVEY CAMP) & INDUSTRIAL VISITS	
Course Code: 23CE553	Continuous Evaluation: 60 Marks
Credits: 1	End Semester Examination: 40 Marks
L T P : 0 0 1	
Prerequisite: 21CE453	

INDUSTRIAL INTERNSHIP LEARNING OUTCOMES (IILOs):

1. Students will be able to establish RL.
2. Students will be able to fix stations for Surveying.
3. Students will be able to draw contours on the drawing sheet

SEMESTER VI

Course Name : CONSTRUCTION TECHNIQUES AND EQUIPMENTS	
Course Code: 23CE601	Continuous Evaluation: 40 Marks
Credits: 3	End Semester Examination: 60 Marks
L T P : 3 0 0	
Prerequisite: None	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Supervise and execute all the construction jobs with the knowledge of the different construction techniques
2. Identify the building defects and apply suitable repair techniques to rectify them
3. Evaluate the costs of equipment and make proper selection of the suitable construction equipment
4. Ensure the proper completion of a construction task using particular construction equipment

Course Name: Structural Analysis-II	
Course Code: 23CE404	Continuous Evaluation: 40 Marks
Credits: 04	End Semester Examination: 60 Marks
L T P : 3 1 0	
Prerequisite: 23CE404	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will analyze the structure using different displacement method.
2. Student will understand the behavior of structure under bending.
3. Students will draw the influence diagram of determinate and indeterminate structures.
4. Students will analyze the different types of arches.

Course Name: MATERIAL TESTING LAB	
Course Code: 23CE651	Continuous Evaluation: 60 Marks
Credits: 1	End Semester Examination: 40 Marks
L T P : 0 0 2	
Prerequisite: None	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will understand the properties of cement, concrete and its testing procedure.
2. Students will understand and carry out design mix as per BIS and ACI.

3. Students will study and understand properties of fresh concrete.
4. Students will carry out testing on concrete cube and cylinder.
5. Students will carry out testing on concrete beam & understand and perform NDT of concrete.

Course Name: LIVE PROJECTS – III (RCC STRUCTURES) & INDUSTRIAL VISITS	
Course Code: 23CE652	Continuous Evaluation: 60 Marks
Credits: 1	End Semester Examination: 40 Marks
L T P : 0 0 1	
Prerequisite: 23CE403, 23CE502	

INDUSTRIAL INTERNSHIP LEARNING OUTCOMES (IILOs):

1. Students will learn about the basics of RCC Structures.
2. Students will learn about the method of erecting a RCC structure.
3. Students will learn about the precautions to be taken at the site of a RCC structures.

SEMESTER VII

Estimating, Costing and Evaluation	
Course Code: 24CE701	Continuous Evaluation: 40 Marks
Credits: 4	End Semester Examination: 60 Marks
L T P : 3 1 0	
Prerequisite: None	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will understand the roles and responsibilities of a project manager.
2. Students will prepare schedule of activities in a construction project.
3. Students will prepare tender and contract document for a construction project

Prestressed Concrete Structures	
Course Code: 23CE702	Continuous Evaluation: 40 Marks
Credits: 3	End Semester Examination: 60 Marks
L T P : 3 0 0	
Prerequisite: None	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students know the basic concept of prestressing, stress concepts and material used in prestressing.
2. Students will have adequate knowledge on Different losses in prestress,deflection in structures.
3. Students know the design of Prestressed Concrete for flexure, shear and torsion.
4. Students know the Concept of transfers of prestress & end zone reinforcement.
5. Students know the Design of Prestressed Concrete Sections.

Minor Project	
Course Code: 23CE751	Continuous Evaluation: 60 Marks
Credits: 4	End Semester Examination: 40 Marks
L T P : 0 0 8(4)	
Prerequisite: None	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Have concluded a small-scale research work related to field of their interest.

Live Project – IV (Highways) & Industrial Training	
Course Code: 24CE752	Continuous Evaluation: 60 Marks
Credits: 1	End Semester Examination: 40 Marks
L T P : 0 0 1	
Prerequisite: None	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will have basic knowledge of Highway Construction.
2. Students will learn about the various construction practices followed at Highway Construction.
3. Students will have in-depth knowledge of the precautions to be taken at the site of Highway.

SEMESTER VIII

Major Project (Industrial Internship)	
Course Code: 23CE851	Continuous Evaluation: 60 Marks
Credits: 12	End Semester Examination: 40 Marks
L T P : 0 0 24 (6)	
Prerequisite: 23CE751, 23CE752, 23CE652, 23CE553, 23CE454	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students will learn about the various requirements at the site.
2. Students will learn about the safety requirements at the site.
3. Students will understand about management of both material and human resource.
4. Students will be competent in execution of a civil engineering site.
5. Students will learn about the concepts of research.
6. Students will have a more research-oriented mindset.
7. Students will be competent to carry out research in field of civil engineering.

Department Elective Courses in Degree of Civil Engineering

Prestressed Concrete Structures	
Course Code: 23CEP01	Continuous Evaluation: 40 Marks
Credits: 3	End Semester Examination: 60 Marks
L T P : 3 0 0	
Prerequisite: None	

COURSE LEARNING OUTCOMES (CLOs)

The syllabus has been prepared in accordance with National Education Policy (NEP). After completion of course, students would be able to:

1. Students know the basic concept of prestressing, stress concepts and material used in prestressing.
2. Students will have adequate knowledge on Different losses in prestress,deflection in structures.
3. Students know the design of Prestressed Concrete for flexure, shear and torsion.
4. Students know the Concept of transfers of prestress & end zone reinforcement.
5. Students know the Design of Prestressed Concrete Sections.

23CEP02	**INTRODUCTION TO FINITE ELEMENT METHOD**	**L**	**T**	**P**	**C**
		3	0	0	3
Co-requisite	None				
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category	PE PROFESSIONAL ELECTIVE				
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

At the end of the course, student will be able to:

1 Develop shape functions and stiffness matrices for spring and bar elements

2 Develop global stiffness matrices and global load vectors

3 Apply natural and arial coordinate systems to constant strain triangle and linear strain triangle elements

4 Analyze planar structural systems using finite element modelling

23CEP03	**AIR AND NOISE POLLUTION AND CONTROL**	**L**	**T**	**P**	**C**
		3	0	0	3
Co-requisite	None				
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category	PE PROFESSIONAL ELECTIVE				
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

At the end of the course, student will be able to:

1 Explain environment, impact of various activities on environment, sustainable development, ecology and biodiversity conservation

2 Explain air pollution, its effects and control methods

3 Explain noise pollution, its effects and control measures

4 understand the sources, types and composition of municipal solid waste and the methods of solid waste disposal

23CEPE04	HYDROLOGY	L	T	P	C
		3	0	0	3
Co-requisite	None				
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category	PC PROFESSIONAL CORE				
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

1. Students will learn scope and application of hydrology to engineering problems
2. Students will learn types and measurement of precipitation
3. Students will learn about measurement of evaporation and transpiration.
4. Students will learn about measurement of runoff
5. Students will understand about hydrograph.

23CEPE05	ADVANCED CONCRETE TECHNOLOGY	L	T	P	C
		3	0	0	3
Co-requisite	None				
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category	PE PROFESSIONAL ELECTIVE				
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

At the end of the course, student will be able to:

1 Test of all the concrete materials as per IS code.

2 Design the concrete mix using ACI and IS code methods.

3 Determine of the properties of fresh and hardened of concrete.

4 Design special concretes and their specific applications.

5 Ensure quality control while testing/ sampling and acceptance criteria.

23CEPE06	OPEN CHANNEL HYDRAULICS	L	T	P	C
		3	0	0	3
Co-requisite	None				
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category	PE PROFESSIONAL ELECTIVE				
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

At the end of the course, student will be able to:

1. Explain the flow and its types.
2. Understand the various channels and effect of depth
3. Understand the flow in various kind of channels
4. Understand about various elements of hydraulic structures

23CEPE07	RAILWAY AND AIRPORT ENGINEERING	L	T	P	C
		3	0	0	3
Co-requisite	None				
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category	PE PROFESSIONAL ELECTIVE				
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

At the end of the course, the students will be able to:

1. Gain Engineering knowledge of the subject and apply it for the solution of problems related to railway and airport engineering.
2. Design points and crossings, design runway pavements, make investigations, use modern tools and develop solutions to problems related to railway / airport engineering.
3. Understand the engineering solutions in societal context for sustainable development that takes care of environment and optimal use of resources.
4. Understand the norms of engineering practice and the need for life-long learning as per their exposure to relevant latest IS/RDSO/FAA/ICAO specifications.

23CEPE08	DESIGN OF WASTE WATER TREATMENT PROCESSES	L	T	P	C
		3	0	0	3
Co-requisite	None				
Pre-requisite	23CE304				
Data Books / Codes / Standards					
Course Category	PC PROFESSIONAL CORE				
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

1. To get basic knowledge of sewage collection and design of sewers
2. To get basic knowledge of sewage composition and its characteristics
3. Assess the contamination in the soil and to select suitable remediation methods based on contamination.
4. Prepare the suitable disposal system for particular waste.

23CEPE09	Building Construction Materials	L	T	P	C
		0	0	0	3
Co-requisite					
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category					
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

After completing this course, the students will be able to:

1. Demonstrate the ability to know about different materials such as stones, bricks, Tiles, wood, aluminum, glass & paints and their classification, manufacture and structural requirements
2. Ability to know about the materials used in making of concrete such as cement and admixtures.
3. Graduates will demonstrate the various types of ventilations, air conditioning, types of air conditioning, fire protection and classification of fire hazards and fire-resistant materials used in construction.
4. Graduates will demonstrate the types of masonry, finishers and form work, requirements, standards.

23CEPE10	DISASTER MANAGEMENT	L	T	P	C
		3	0	0	3
Co-requisite	None				
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category	PE PROFESSIONAL ELECTIVE				
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

At the end of the course, student will be able to:

1 Knowledge of the significance of disaster management

2 Analyze the occurrences, reasons and mechanism of various types of natural disaster

3 Analyze the occurrences, reasons and mechanism of various types of man-made disaster

4 Understand the preventive measures as Civil Engineer with latest codal provisions

23CEPE11	**EARTHQUAKE ANALYSIS AND DESIGN**	**L**	**T**	**P**	**C**
		3	0	0	3
Co-requisite	None				
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category	PE PROFESSIONAL ELECTIVE				
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

At the end of the course, student will be able to:

1 Explain earthquake and seismology

2 Design earthquake resistant building

3 Understand effect of lateral loading on building

4 Understand provision by BIS for earthquake resistance of a building

23CEPE12	**BRIDGE ENGINEERING**	**L**	**T**	**P**	**C**
		3	0	0	3
Co-requisite	None				
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category	PE PROFESSIONAL ELECTIVE				
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

At the end of the course, student will be able to:

1 Design the slab culvert, Box culvert

2 Design the T beam bridge and substructures

3 Design the Bridge bearings

4 Design the steel bridge for railways

23CEPE13	DESIGN OF ADVANCE CONCRETE STRUCTURES	L	T	P	C
		4	0	0	4
Co-requisite	None				
Pre-requisite	23CE502				
Data Books / Codes / Standards	IS 1343,1980, IS Code of Practice for Prestressed Concrete. IS 3370,1976(Part I to IV), Indian Standard Code of Practice for Liquid Retaining structures IS 456 - 2000, Indian Standard of Practice for Plain and Reinforced Concrete. IS 1893 - 4326 & 13920 Indian Standard code of practice for earthquake Resistant design of structures.				
Course Category	PC	PROFESSIONAL ELECTIVE			
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

1. Students Know the design of Retaining wall and Beam
2. Students will have adequate knowledge on flat slab and Staircase designs
3. Students Know the Water tanks, Silos and Bunkers designs
4. Students Know the design of Prestressed Concrete designs
5. Students Know the Concept of Yield line Theory

23CEPE14	IRRIGATION ENGINEERING	L	T	P	C
		3	0	0	3
Co-requisite	None				
Pre-requisite	23CE303				
Data Books / Codes / Standards					
Course Category	PC	PROFESSIONAL CORE			
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

1. To get knowledge types of irrigation
2. Get an exposure about canal irrigation and land reclamation
3. To get knowledge about canal and rivers
4. To get knowledge canal head works and regulation works

23CEPE15	Solid Waste Management	L	T	P	C
		0	0		3
Co-requisite					
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category					
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs): After studying this course, students will be able to:

1. Analyze existing solid waste management system and to identify their drawbacks.
2. Evaluate different elements of solid waste management system.
3. Suggest suitable scientific methods for solid waste management elements.
4. Design suitable processing system and evaluate disposal sites.

23CEPE16	GROUND IMPROVEMENT TECHNIQUES	L	T	P	C
		3	0	0	3
Co-requisite	None				
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category	PE PROFESSIONAL ELECTIVE				
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

1. Students will be familiar with selection of ground improvement techniques based on soil conditions.
2. Students will able to understand the concepts of various ground improvement techniques.

23CEPE17	GEOTECHNICAL ENGINEERING	L	T	P	C
		3	0	0	3
Co-requisite	None				
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category	PE PROFESSIONAL ELECTIVE				
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

1. Familiar with concept of earth dam design including stability analysis under seepage.
2. To get knowledge about stability of slopes under different drainage conditions using different methods.
3. To get knowledge about design principles of retaining structures and coffer dams.
4. To get knowledge about the concept of soil stabilization.

23CEPE18	ROCK MECHANICS	L	T	P	C
		3	0	0	3
Co-requisite	None				
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category	PE PROFESSIONAL ELECTIVE				
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

1. To learn about in-situ stresses from field test data.
2. To learn about rock mass classification
3. To get knowledge about the failure criteria of rock.
4. To get knowledge about various in-situ stresses from field test data.

23CEPE19	**GEOSYNTHETICS AND ITS APPLICATION**	**L**	**T**	**P**	**C**
		3	0	0	3
Co-requisite	None				
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category	PE PROFESSIONAL ELECTIVE				
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

1. Identify the type of geosynthetics and their relevance in geotechnical field.
2. Understand the mechanism of formation of different geosynthetics.
3. Analyse and compute different properties of geosynthetics.
4. Apply the knowledge for designing the structures using Geosynthetic materials.

23CEPE20	**ADVANCE STRUCTURAL ANALYSIS**	**L**	**T**	**P**	**C**
		3	1	0	4
Co-requisite	None				
Pre-requisite	23CE301, 23CE602				
Data Books / Codes / Standards					
Course Category	PC PROFESSIONAL ELECTIVE				
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

1. To familiar with Analysis indeterminate beams and plane frames with and without sway
2. To know about the flexibility method of analysis
3. To know about the stiffness method of analysis
4. To know about the software of structural analysis

23CEPE21	TEMPORARY STRUCTURES	L	T	P	C
		3	0	0	3
Co-requisite	None				
Pre-requisite	None				
Data Books / Codes / Standards	IS 8758: 2013				
Course Category	PE	PROFESSIONAL ELECTIVE			
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

1. Students will be familiar with temporary structures installations for construction projects.
2. Students will have thorough understanding of Temporary structures in residential and commercial buildings.
3. Students will Be familiar with Temporary structures in Dams, bridges and Tunnelling

23CEPE22	MAINTENANCE AND REPAIR OF STRUCTURES	L	T	P	C
		3	0	0	3
Co-requisite	None				
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category	PE	PROFESSIONAL ELECTIVE			
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

1. Students will be familiar with the relevant method of maintaining different building structures
2. Students will able to test the structures to predict its stability.
3. Students will able to select the relevant materials for repair of structures.
4. Students will able to apply the relevant methods of repair for the masonry structures and Students will able to restore the damages of building structural elements using suitable method of repair.

23CEPE23	HEALTH MONITORING OF STRUCTURES	L	T	P	C
		3	0	0	3
Co-requisite	None				
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category	PE	PROFESSIONAL ELECTIVE			
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

Students will able to:

1. Explain about Evaluation of Structure.
2. Investigate the material damage.
3. Understand about data interpretation.
4. Understand about assessment and various case studies.

23CEPE24	**DESIGN AND DETAILING OF STRUCTURES**	**L**	**T**	**P**	**C**
		3	0	0	3
Co-requisite	None				
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category	PE	PROFESSIONAL ELECTIVE			
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

Students will able to:

1. Explain about Detailing requirement, principles of limit state design concepts.
2. Concepts of earthquake-resistant design.
3. Understand about detailing of flexural member.
4. Understand about detailing of compression member.
5. Understand about connections detailing.

23CEPE25	**DESIGN OF MASONRY STRUCTURES**	**L**	**T**	**P**	**C**
		3	0	0	3
Co-requisite	None				
Pre-requisite	None				
Data Books / Codes / Standards					
Course Category	PE	PROFESSIONAL ELECTIVE			
Course designed by	Department of Civil Engineering				
Approval					

COURSE LEARNING OUTCOMES (CLOs):

Student will able to

1. Acquire knowledge about the Reinforced Masonry and Load Combination.
2. Acquire knowledge about the Concrete Masonry Units with applications and Prefabricated Masonry.

3. Acquire knowledge about the Materials of masonry construction and Thermal Effects.
4. Acquire knowledge about the design concept of reinforced Masonry beam and Deflection.
5. Acquire knowledge about the design concept of reinforced Masonry Shear Wall.