Department of Civil Engineering

**Program Learning Outcomes (PLOs)**

**PLO1:** Engineering knowledge and Skill: 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 analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PLO3:** Design and development of solutions: Design solutions for complex civil engineering problems and design system components to meet the public health and safety, and the cultural, societal, and environmental considerations.

**PLO4:** Conduct investigations of complex 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.

**PLO5:** The engineer and society: Apply reasoning informed by the contextual knowledge to assess various issues while abiding professional civil engineering codes.

**PLO6:** Ethics: Apply principles and professional ethics and follow civil engineering practice norms laid by the various governing bodies.

**PLO7:** Effective 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.

**PLO8:** 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.

**PLO9:** Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and provide engineering solutions for sustainable development of construction materials and structures.

**PLO10:** Modern tool usage: Use modern engineering and IT tools for modeling, designing and analyzing civil structures.

**PLO11:** Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long 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

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|  |  | **L** | **T** | **P** | **C** |
| **21AS101** | **ENGINEERING MATHEMATICS-I** | **3** | **1** | 0 | **4** |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Apply the knowledge of calculus, Gamma & Beta functions for analyzing engineering problems.

**CLO2:** Solve first order differential equation analytically using standard method.

**CLO3:** Demonstrate various physical models through higher order differential equation and solve suchlinear ordinary differential equation.

**CLO4:** Obtain series solution of differential equation and explain application of Bessel’s function

**CLO5:** Understand differentiation and integration of vectors with knowledge of Green's, Gaussdivergence and Stoke's theorems.

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|  |  | **L** | **T** | **P** | **C** |
| **21AS102/202** | **ENGINEERING PHYSICS** | **3** | **1** | 0 | **4** |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** 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.

**CLO2:** An understanding of Physics also helps engineers understand the working and limitations ofexisting devices and techniques, which eventually leads to new innovations and improvements.

**CLO3:** The student would be able to learn the fundamental concepts on Quantum behavior of matter inits micro state.

**CLO4:** The course also helps the students to be exposed to the phenomena of electromagnetism and alsoto have exposure on semiconductor devices such as solar cell.

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|  |  | **L** | **T** | **P** | **C** |
| **21AS103/203** | **ENGINEERING CHEMISTRY** | **3** | **1** | 0 | **4** |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Understand to identify the quality of water and how to improve the quality of water.

**CLO2:** Rationalize bulk properties and processes using thermodynamic considerations.

**CLO3:** Get preliminary understanding on introductory idea about nano materials.

**CLO4:** Analyze the quantitative aspects of fuel combustion, spectroscopy and the mechanism of corrosion.

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|  |  | **L** | **T** | **P** | **C** |
| **21EE101/201** | **BASIC ELECTRICAL ENGINEERING** | **3** | **0** | 0 | **3** |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Learn about transient analysis of RLC circuits with DC excitation.

**CLO2:** Realize the requirement of transformers in transmission and distribution of electric power andother applications.

**CLO3:** Develop an idea on Magnetic circuits, Electromagnetism

**CLO4:** Learn about measuring instruments, single phase and polyphase AC circuits

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|  |  | **L** | **T** | **P** | **C** |
| **21EC101/201** | **BASIC ELECTRONICS ENGINEERING** | **3** | **0** | 0 | **3** |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** To learn the fundamental concepts of semiconductor devices

**CLO2:** An ability to apply the concept of diode in clipper and clamper circuits **CLO3:** Acquire the skills of constructing the different transistors configurations **CLO4:** To learn the basic concepts of integrated circuits

**CLO5:** To Compile the different building blocks in digital electronics using logic gates andimplement simple logic function using basic universal gates

**CLO6:** To acquire the knowledge of microprocessors.

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|  |  | **L** | **T** | **P** | **C** |
| **21ME101/201** | **BASIC MECHANICAL ENGINEERING** | **3** | **0** | 0 | **3** |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Understand the concepts of thermodynamics.

**CLO2:** Apply principles of thermodynamics to real engineering problems.

**CLO3:** Understand the basics of powertrain applications.

**CLO4:** Grasp the elements of robotics.

**CLO5:** Understand the working principles of various measuring tools and devices.

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|  |  | **L** | **T** | **P** | **C** |
| **21CS101/201** | **FUNDAMENTALS OF COMPUTER & C PROGRAMMING** | **3** | **0** | 0 | **3** |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Understand the fundamental concepts of computers, both hardware and software.

**CLO2:** Learn and understand the major system software’s that help in developing of an application.

**CLO3:** Apply and analyse the basic programming constructs in context of C programminglanguage.

**CLO4:** Analyse and evaluate the derived datatypes (array) and the operations that can be performed on them, along with the concept of modularity through functions

**CLO5:** Create and manipulate a database or data storage through files.

**CLO6:** Develop a methodological way of problem solving.

**CLO7:** Learn a programming approach to solve problems.

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|  |  | **L** | **T** | **P** | **C** |
| **21HS101/201** | **COMMUNICATIVE ENGLISH** | 2 | **0** | 0 | 2 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Learners will be able to write effectively using correct grammatical structures.

**CLO2:** Learners will be able to read and speak fluently in English.

**CLO3:** Learners will know the nuances of effective presentations.

**CLO4:** Learners will be able to engage in group discussions, debate, deliver speeches and suchothers.

**CLO5:** Learners will be able to write project reports, research papers, prepare MoM and agendas,and such other documents required to be created in any work place.

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|  |  | **L** | **T** | **P** | **C** |
| **21HS102/202** | **INDIAN POLITY & CONSTITUTION** | 2 | **0** | 0 | 2 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Identify and explore basic concepts in the Constitution and understand their applicability &scope and the importance of the role of judiciary in ensuring checks an balances.

**CLO2:** Differentiate different aspects of Indian Legal System and its related bodies

**CLO3:** To appreciate the critical Interface between fundamental Rights and directive principles ofstate policy and apply the rationale to emerging issues and challenges.

**CLO4:** Know about the enforcement remedies available under the Constitution of India

**CLO5:** To apply Intellectual Property Law principles to real problems and analyse the social impactof Intellectual Property Law and Policy

**CLO6:** To apply the very dynamics of IP Law to the individuals, MNC’s and other possible stakeholders.

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|  |  | **L** | **T** | **P** | **C** |
| **21BM101** | **Biomedical Engineering and Environmental Sciences** | 2 | **0** | 0 | 2 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Improve biological concepts using an engineering approach.

**CLO2:** Explain the importance of measuring characteristics.

**CLO3:** Learn to understand the different biophysical signal measurement.

**CLO4:** Able to understand the interdependence of living organisms and environment

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|  |  | **L** | **T** | **P** | **C** |
| **21CE101** | **BASICS OF CIVIL ENGINEERING AND EARTH SCIENCES** | 2 | **0** | 0 | 2 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** understand about importance and role of Civil engineering.

**CLO2:** Identify and explore basic areas in civil engineering

**CLO3:** Know about Earth interior, Rocks & its types, and Earthquakes.

**CLO4:** learn about various construction materials

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|  |  | **L** | **T** | **P** | **C** |
| **21AS152/252** | **ENGINEERING PHYSICS LAB** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Use the different measuring devices and meters to record the data with precision

**CLO2:** Develop basic communication skills through working in groups in performing the laboratoryexperiments and by interpreting the results

**CLO3:** Apply the mathematical concepts/equations to obtain quantitative results

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|  |  | **L** | **T** | **P** | **C** |
| **21AS153/253** | **ENGINEERING CHEMISTRY LAB** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Understand the basic concepts of measurement techniques.

**CLO2:** The synthesis, dynamics, chemical transformation and their applications.

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|  |  | **L** | **T** | **P** | **C** |
| **21EE151/251** | **BASIC ELECTRICAL ENGINEERING LAB** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Verify fundamental laws like Ohm’s Law, KCL, KVL, etc.

**CLO2:** Understand the calibration of energy meter.

**CLO3:** Understand open circuit and short circuit test of single-phase transformer.

**CLO4:** Analyse RLC series and parallel circuits

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|  |  | **L** | **T** | **P** | **C** |
| **21EC151/251** | **BASIC ELECTRONICS ENGINEERING LAB** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Measure voltage, frequency and phase of any waveform using CRO.

**CLO2:** Generate sine, square and triangular waveforms with required frequency and amplitude usingfunction generator.

**CLO3:** Analyze the characteristics of different electronic devices such as diodes, transistors and operational amplifiers

**CLO4:** To develop skill to build and verify digital circuits

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|  |  | **L** | **T** | **P** | **C** |
| **21ME151/251** | **BASIC MECHANICAL ENGINEERING LAB** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**COURSE LEARNING OUTCOMES (CLO)**

**CLO1:** The working of thermal power plants.

**CLO2:** The working of 2 and 4 stroke IC engines.

**CLO3:** Different automobile parts, gears and gear trains.

**CLO4:** The working of Refrigeration and Air Conditioning cycles.

**CLO5:** The working principles of flow meters and U-tube manometers.

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|  |  | **L** | **T** | **P** | **C** |
| **21CS151/251** | **C PROGRAMMING LAB** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Understand the Typical C Program Development Environment, compiling, debugging,Linking and executing.

**CLO2:** Introduction to C Programming using Control Statements and Repetition Statement

**CLO3:** Apply and practice logical formulations to solve some simple problems leading to specificapplications.

**CLO4:** Design effectively the required programming components that efficiently solve computingproblems in real world.

**CLO5:** Employ good programming practices such as incremental development, data integrity checking and adherence to style guidelines.

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|  |  | **L** | **T** | **P** | **C** |
| **21HS151/251** | **COMMUNICATIVE ENGLISH LAB** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Learners will be able to write effectively using correct grammatical structures.

**CLO2:** Learners will be able to read and speak fluently in English.

**CLO3:** Learners will know the nuances of effective presentations.

**CLO4:** Learners will be able to engage in group discussions, debate, deliver speeches and such others.

**CLO5:** Learners will be able to write project reports, research papers, prepare MoM and agendas, and such other documents required to be created in any work place.

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|  |  | **L** | **T** | **P** | **C** |
| **21SSE251** | **NSS/NCC/PHYSICAL EDUCATION & YOGA** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

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|  |  | **L** | **T** | **P** | **C** |
| **21ME152/252** | **MECHANICAL WORKSHOP LAB** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Use different manufacturing (Fitting, carpentry, sheet metal, welding, smithy working etc.)processes required to manufacture a product from the raw materials.

**CLO2:** Use different measuring, marking, cutting tools used in the workshop.

**CLO3:** Be aware of the safety precautions while working in the workshop.

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|  |  | **L** | **T** | **P** | **C** |
| **21ME153/253** | **ENGINEERING GRAPHICS & DESIGN LAB** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Understand orthographic projections of points and lines in any position through AutoCAD.

**CLO2:** Imagine and convert isometric view into orthographic projections and vice versa.

**CLO3:** Should be able to understand the simple machine components and draw its projections

# SEMESTER – II

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|  |  | **L** | **T** | **P** | **C** |
| **21AS201** | **ENGINEERING MATHEMATICS-II** | 3 | 1 | 0 | 4 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Develop the essential tool of matrices to compute inverse, eigenvalues and eigenvectors required formatrix diagonalization process.

**CLO2:** Apply Laplace transforms to find the solution of differential equations.

**CLO3:** Solve different problems with help of Fourier series.

**CLO4:** Know, analytic functions and conformal mapping of complex variables.

**CLO5:** Evaluate complex integration and residues.

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|  |  | **L** | **T** | **P** | **C** |
| **21AS102/202** | **ENGINEERING PHYSICS** | 3 | 1 | 0 | 4 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** 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.

**CLO2:** An understanding of Physics also helps engineers understand the working and limitations of existingdevices and techniques, which eventually leads to new innovations and improvements.

**CLO3:** The student would be able to learn the fundamental concepts on Quantum behavior of matter in itsmicro state.

**CLO4:** The course also helps the students to be exposed to the phenomena of electromagnetism and also tohave exposure on semiconductor devices such as solar cell.

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|  |  | **L** | **T** | **P** | **C** |
| **21AS103/203** | **ENGINEERING CHEMISTRY** | 3 | 1 | 0 | 4 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Understand to identify the quality of water and how to improve the quality of water.

**CLO2:** Rationalize bulk properties and processes using thermodynamic considerations.

**CLO3:** Get preliminary understanding on introductory idea about nano materials.

**CLO4:** Analyze the quantitative aspects of fuel combustion, spectroscopy and the mechanism of corrosion.

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|  |  | **L** | **T** | **P** | **C** |
| **21EE101/201** | **BASIC ELECTRICAL ENGINEERING** | 3 | 0 | 0 | 3 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Learn about transient analysis of RLC circuits with DC excitation.

**CLO2:** Realize the requirement of transformers in transmission and distribution of electric power and otherapplications.

**CLO3:** Develop an idea on Magnetic circuits, Electromagnetism

**CLO4:** Learn about measuring instruments, single phase and polyphase AC circuits

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|  |  | **L** | **T** | **P** | **C** |
| **21EC101/201** | **BASIC ELECTRONICS ENGINEERING** | 3 | 0 | 0 | 3 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** To learn the fundamental concepts of semiconductor devices

**CLO2:** An ability to apply the concept of diode in clipper and clamper circuits **CLO3:** Acquire the skills of constructing the different transistors configurations **CLO4:** To learn the basic concepts of integrated circuits

**CLO5:** To Compile the different building blocks in digital electronics using logic gates and implementsimple logic function using basic universal gates

**CLO6:** To acquire the knowledge of microprocessors.

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|  |  | **L** | **T** | **P** | **C** |
| **21ME101/201** | **BASIC MECHANICAL ENGINEERING** | 3 | 0 | 0 | 3 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Understand the concepts of thermodynamics.

**CLO2:** Apply principles of thermodynamics to real engineering problems.

**CLO3:** Understand the basics of powertrain applications.

**CLO4:** Grasp the elements of robotics.

**CLO5:** Understand the working principles of various measuring tools and devices.

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|  |  | **L** | **T** | **P** | **C** |
| **21CS101/201** | **FUNDAMENTALS OF COMPUTER & C PROGRAMMING** | 3 | 0 | 0 | 3 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Understand the fundamental concepts of computers, both hardware and software.

**CLO2:** Learn and understand the major system software’s that help in developing of an application.

**CLO3:** Apply and analyse the basic programming constructs in context of C programming language.

**CLO4:** Analyse and evaluate the derived datatypes (array) and the operations that can be performedon them, along with the concept of modularity through functions

**CLO5:** Create and manipulate a database or data storage through files.

**CLO6:** Develop a methodological way of problem solving.

**CLO7:** Learn a programming approach to solve problems.

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|  |  | **L** | **T** | **P** | **C** |
| **21HS101/201** | **COMMUNICATIVE ENGLISH** | 2 | 0 | 0 | 2 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Learners will be able to write effectively using correct grammatical structures.

**CLO2:** Learners will be able to read and speak fluently in English.

**CLO3:** Learners will know the nuances of effective presentations.

**CLO4:** Learners will be able to engage in group discussions, debate, deliver speeches and such others.

**CLO5:** Learners will be able to write project reports, research papers, prepare MoM and agendas, and such other documents required to be created in any work place.

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|  |  | **L** | **T** | **P** | **C** |
| **21HS102/202** | **INDIAN POLITY & CONSTITUTION** | 2 | 0 | 0 | 2 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Identify and explore basic concepts in the Constitution and understand their applicability & scopeand the importance of the role of judiciary in ensuring checks an balances.

**CLO2:** Differentiate different aspects of Indian Legal System and its related bodies

**CLO3:** To appreciate the critical Interface between fundamental Rights and directive principles of state policy and apply the rationale to emerging issues and challenges.

**CLO4:** Know about the enforcement remedies available under the Constitution of India

**CLO5:** To apply Intellectual Property Law principles to real problems and analyse the social impact ofIntellectual Property Law and Policy

**CLO6:** To apply the very dynamics of IP Law to the individuals, MNC’s and other possible stakeholders.

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|  |  | **L** | **T** | **P** | **C** |
| **21BM201** | **Biomedical Engineering and Environmental Sciences** | 2 | **0** | 0 | 2 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Improve biological concepts using an engineering approach.

**CLO1:** Explain the importance of measuring characteristics.

**CLO1:** Learn to understand the different biophysical signal measurement.

**CLO1:** Able to understand the interdependence of living organisms and environment

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|  |  | **L** | **T** | **P** | **C** |
| **21CE201** | **BASICS OF CIVIL ENGINEERING AND EARTH SCIENCES** | 2 | **0** | 0 | 2 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Use the different measuring devices and meters to record the data with precision

**CLO2:** Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results

**CLO3:** Apply the mathematical concepts/equations to obtain quantitative results

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|  |  | **L** | **T** | **P** | **C** |
| **21AS153/253** | **ENGINEERING CHEMISTRY LAB** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Understand the basic concepts of measurement techniques.

**CLO2:** The synthesis, dynamics, chemical transformation and their applications

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|  |  | **L** | **T** | **P** | **C** |
| **21EE151/251** | **BASIC ELECTRICAL ENGINEERING LAB** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Verify fundamental laws like Ohm’s Law, KCL, KVL, etc.

**CLO2:** Understand the calibration of energy meter.

**CLO3:** Understand open circuit and short circuit test of single-phase transformer.

**CLO4:** Analyse RLC series and parallel circuits

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| --- | --- | --- | --- | --- | --- |
|  |  | **L** | **T** | **P** | **C** |
| **21EC151/251** | **BASIC ELECTRONICS ENGINEERING LAB** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Measure voltage, frequency and phase of any waveform using CRO.

**CLO2:** Generate sine, square and triangular waveforms with required frequency and amplitude using function generator.

**CLO3:** Analyze the characteristics of different electronic devices such as diodes, transistors and operationalamplifiers

**CLO4:** To develop skill to build and verify digital circuits

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|  |  | **L** | **T** | **P** | **C** |
| **21ME151/251** | **BASIC MECHANICAL ENGINEERING LAB** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** The working of thermal power plants.

**CLO2:** The working of 2 and 4 stroke IC engines.

**CLO3:** Different automobile parts, gears and gear trains.

**CLO4:** The working of Refrigeration and Air Conditioning cycles.

**CLO5:** The working principles of flow meters and U-tube manometers.

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|  |  | **L** | **T** | **P** | **C** |
| **21CS151/251** | **C PROGRAMMING LAB** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Understand the Typical C Program Development Environment, compiling, debugging, Linking andexecuting.

**CLO2:** Introduction to C Programming using Control Statements and Repetition Statement

**CLO3:** Apply and practice logical formulations to solve some simple problems leading to specific applications.

**CLO4:** Design effectively the required programming components that efficiently solve computing problems in real world.

**CLO5:** Employ good programming practices such as incremental development, data integrity checkingand adherence to style guidelines.

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|  |  | **L** | **T** | **P** | **C** |
| **21HS151/251** | **COMMUNICATIVE ENGLISH LAB** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Learners will be able to write effectively using correct grammatical structures.

**CLO2:** Learners will be able to read and speak fluently in English.

**CLO3:** Learners will know the nuances of effective presentations.

**CLO4:** Learners will be able to engage in group discussions, debate, deliver speeches and such others.

**CLO5:** Learners will be able to write project reports, research papers, prepare MoM and agendas, and suchother documents required to be created in any work place.

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|  |  | **L** | **T** | **P** | **C** |
| **21SE251** | **YOGA & PHYSICAL EDUCATION** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

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|  |  | **L** | **T** | **P** | **C** |
| **21ME152/251** | **MECHANICAL WORKSHOP LAB** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Use different manufacturing (Fitting, carpentry, sheet metal, welding, smithy working etc.) processes required to manufacture a product from the raw materials.

**CLO2:** Use different measuring, marking, cutting tools used in the workshop.

**CLO3:** Be aware of the safety precautions while working in the workshop.

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|  |  | **L** | **T** | **P** | **C** |
| **21ME153/253** | **ENGINEERING GRAPHICS & DESIGN LAB** | 0 | **0** | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Understand orthographic projections of points and lines in any position through AutoCAD.

**CLO2:** Imagine and convert isometric view into orthographic projections and vice versa.

**CLO3:** Should be able to understand the simple machine components and draw its projections

# SEMESTER - III

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| --- | --- | --- | --- | --- | --- |
|  |  | **L** | **T** | **P** | **C** |
| **22CE301** | **STRUCTURAL ANALYSIS *–* I** | 3 | 1 | 0 | 4 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Students will learn to draw SFD and BMD.

**CLO2:** Students will analyze the beam

**CLO3:** Students will learn evaluation of stresses by various methods

**CLO4:** Students will learn behaviour of column by various load condition.

**CLO5:** Students will learn behaviour of column by various load condition

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|  |  | **L** | **T** | **P** | **C** |
| **22CE302** | **SURVEYING *–* I** | 3 | 0 | 0 | 3 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Students will explain importance and basics of surveying

**CLO2:** Students will learn measurements by various methods.

**CLO3:** Students will use leveling and Tacheometer.

**CLO4:** Students will learn about Plane table surveying and curve setting.

**CLO5:** Students will measure Coordinates by satellite-based method.

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| **22EC301** | **INSTRUMENTATION & SENSORS** | | **L** | **T** | **P** | **C** |
| 3 | 0 | 0 | 3 |
| *Co-requisite* | None | | | | | |
| *Pre-requisite* | 21EC101 / 21EC201 | | | | | |
| *Data Books /*  *Codes / Standards* |  | | | | | |
| *Course Category* | PC | PROFESSIONAL CORE | | | | |
| *Course designed by* | Department of Civil Engineering | | | | | |
| *Approval* |  | | | | | |

**CLO1:**Summarize various performance characteristics of instruments and the quality of measurement.

**CLO2:**Interpret the type of transducer based on the transduction principles.

**CLO3:**Identify the relevant transducer for measurement of physical quantities.

**CLO4:**Discover the additional attributes in advanced sensors and their role in Civil Engineering.

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|  |  | **L** | **T** | **P** | **C** |
| **21CE304** | **FLUID MECHANICS** | 3 | 0 | 0 | 3 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Students will learn behavior and performance of fluid at rest and motion **CLO2:** Students will learn about behavior of flowing fluid through pipe **CLO3:** Students will learn about various devices used to measure fluid pressure

**CLO4:** Students will learn about various devices used to measure fluid velocity and discharge

**CLO5:** Students will understand dimensional analysis utilization

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|  |  | **L** | **T** | **P** | **C** |
| **21CE305** | **ENVIRONMENTAL ENGINEERING *–* I** | 3 | 0 | 0 | 3 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Students will learn about water sources and demand of water analysis

**CLO2:** Students will study characteristics of water

**CLO3:** Students will understand various schemes of water supply

**CLO4:** Students will design water treatment plant

**CLO5:** Students will learn about water conveyance and distribution networks

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|  |  | **L** | **T** | **P** | **C** |
| **21FLGR301** | **GERMAN LANGUAGE PHASE I** | 2 | 0 | 0 | 2 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** After completion of this student will be able to read and write short, simple texts.

**CLO2:** After completion of this student will have Fluency in reading and writing.

**CLO3:** After completion of this student will be able understand a dialogue between two native speakersand to take part in short, simple conversations using the skills acquired.

**CLO4:** student will able to know the culture of the countries where the German language is spoken.

**CLO5:** Developing pronunciation so that they can read the text and e-mail during their employment, instructing them to write their own CV and developing a fundamental conversation with anyGerman national.

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|  |  | **L** | **T** | **P** | **C** |
| **22FLFR-1** | **FRENCH LANGUAGE PHASE I** | 2 | 0 | 0 | 2 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** After completion of this student will be able to read and write short, simple texts.

**CLO2:** After completion of this student will have Fluency in reading and writing.

**CLO3:** After completion of this student will be able understand a dialogue between two native speakersand to take part in short, simple conversations using the skills acquired.

**CLO4:** student will able to know the culture of the countries where the French language is spoken.

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|  |  | **L** | **T** | **P** | **C** |
| **21CE351** | **STRUCTURAL ANALYSIS LAB** | 0 | 0 | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Students will learn reciprocal and moment area theorem

**CLO2:** Students will analyze truss and curved member

**CLO3:** Students will investigate hinged arches

**CLO4:** Students will determine elastic properties of beam and truss

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|  |  | **L** | **T** | **P** | **C** |
| **21CE352** | **SURVEYING-I LAB** | 0 | 0 | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Students will use all type of survey instruments.

**CLO2:** Students will learn about field book and instrument adjustment

**CLO3:** Student will prepare map of small area

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|  |  | **L** | **T** | **P** | **C** |
| **21CE354** | **FLUID MECHANICS LAB** | 0 | 0 | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Students will learn about working principle and function of hydraulic equipment’s

**CLO2:** Students will get hands on training on all type of hydraulic equipment.

**CLO3:** Students will learn to take observations while in operation.

**CLO4:** Students will learn to interpret the results

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|  |  | **L** | **T** | **P** | **C** |
| **22CE355** | **ENVIRONMENTAL ENGINEERING LAB** | 0 | 0 | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Students will analyze physical and chemical characteristics of waste water

**CLO2:** Students will estimate the organic strength of waste water

**CLO3:** Students will learn growth of microorganisms

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|  |  | **L** | **T** | **P** | **C** |
| **21CS201** | **Technical Training-I (Essentials of Block Chain & IoT)** | 0 | 0 | 1 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Familiarise the functional/operational aspects of cryptocurrency ECOSYSTEM.

**CLO2:** Understand emerging abstract models for Block chain Technology.

**CLO3:** Identify major research challenges and technical gaps existing between theory and practice in cryptocurrency domain.

**CLO4:** To analyze various protocols of IoT.

**CLO5:** To design portable IoT using appropriate boards.

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|  |  | **L** | **T** | **P** | **C** |
| **21SS351** | **EFFECTIVE COMMUNICATION SKILLS** | 0 | 0 | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

After the completion of the training, the student will have ability:

**CLO1:** To communicate effectively and interact with people with confidence.

**CLO2:** To demonstrate and differentiate between various forms of communication.

**CLO3:** To apply effective communication skills confidently which a student needs to get aheadin job and life.

# SEMESTER - IV

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| --- | --- | --- | --- | --- | --- |
|  |  | **L** | **T** | **P** | **C** |
| **21AS401** | **NUMERICAL METHODS** | 3 | 1 | 0 | 4 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Find solutions by various numerical methods to get approximation solutions of algebraic a

transcendental, simultaneous linear equations.

**CLO2:** Get interpolating values by different numerical methods.

**CLO3:** Do differentiation and integrations of tabular data.

**CLO4:** To find numerical solutions of ordinary and partial differential equations.

**CLO5:** Understand curve fitting and find largest and smallest eigen values according to use in applications.

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|  |  | **L** | **T** | **P** | **C** |
| **21CE401** | **STRUCTURAL ANALYSIS *–* II** | 3 | 1 | 0 | 4 |
|  | **Prerequisite** |  |  |  |  |
|  | 21CE301 |  |  |  |  |

**CLO1:** Students will analyze the structure using different displacement method

**CLO2:** Student will understand the behavior of structure under bending

**CLO3:** Students will draw the influence diagram of determinate and indeterminate structures.

**CLO4:** Students will analyze the different types of arches

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|  |  | **L** | **T** | **P** | **C** |
| **22CE402** | **DESIGN OF STEEL STRUCTURES** | 4 | 0 | 0 | 4 |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Students will design various types of connections

**CLO2:** Students will design tension member **CLO3:** Students will design compression members **CLO4:** Students will design various types of girders

**CLO5:** Students will design roof truss and purlin with various bearing conditions.

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|  |  | **L** | **T** | **P** | **C** |
| **21CE403** | **ADVANCED SURVEYING** | 3 | 0 | 0 | 3 |
|  | **Prerequisite** |  |  |  |  |
|  | 21CE302 |  |  |  |  |

**CLO1:** Students will explain principle of surveying on very large scale

**CLO2:** Students will learn different types of errors and adjustment in measurement

**CLO3:** Students will determine absolute positions of a point **CLO4:** Students will learn setting out works and photogrammetry **CLO5:** Students will learn concepts of remote sensing and GIS

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|  |  | **L** | **T** | **P** | **C** |
| **21CE404** | **SOIL MECHANICS** | 3 | 0 | 0 | 3 |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Students will understand the concept of three phase system in soil **CLO2:** Student will learn the role of water in soil and seepage system **CLO3:** Student will learn about soil stress distribution and stress influence **CLO4:** Students will learn soil parameters in drainage conditions

**CLO5:** Students will understand the mechanism of compaction and its effect

**CLO6:** Students will estimate the settlement of soil due to consolidation

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|  |  | **L** | **T** | **P** | **C** |
| **22CE405** | **ENVIRONMENTAL ENGINEERING *–*II** | 3 | 0 | 0 | 3 |
|  | **Prerequisite** |  |  |  |  |
|  | 21CE305 |  |  |  |  |

**CLO1:** To get basic knowledge of sewage collection and design of sewers

**CLO2:** To get basic knowledge of sewage composition and its characteristics

**CLO3:** Assess the contamination in the soil and to select suitable remediation methods based oncontamination.

**CLO4:** Prepare the suitable disposal system for particular waste.

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|  |  | **L** | **T** | **P** | **C** |
| **21FLGR401** | **GERMAN LANGUAGE PHASE II** | 2 | 0 | 0 | 2 |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** After completion of this student will be able to read and write short, simple texts.

**CLO2:** After completion of this student will have Fluency in reading and writing.

**CLO3:** After completion of this student will able to use language creatively and spontaneously.

**CLO4:** Students will get awareness of cross-cultural and intercultural difference.

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|  |  | **L** | **T** | **P** | **C** |
| **22FLFR-II** | **FRENCH LANGUAGE PHASE II** | 2 | 0 | 0 | 2 |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** After completion of this student will be able to read and write short, simple texts.

**CLO2:** After completion of this student will have Fluency in reading and writing.

**CLO3:** After completion of this student will able to use language creatively and spontaneously.

**CLO4:** After completion of this student will able to know the culture of the countries where theFrench language is spoken.

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|  |  | **L** | **T** | **P** | **C** |
| **21CE453** | **SURVEYING *–* II LAB** | 0 | 0 | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Students will get training on theodolite of basic measurements

**CLO2:** Students will get hand on training on total station of basic measurements

**CLO3:** Students will plot a map of small area by total station with software

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|  |  | **L** | **T** | **P** | **C** |
| **21CE454** | **SOIL MECHANICS LAB** | 0 | 0 | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Students will estimate index properties of soil

**CLO2:** Students will get hands on training on consistency calculation

**CLO3:** Students will estimate shear strength of soil by various test

**CLO4:** Students will get hands on training on density test and permeability test

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| **21CE455** | **COMPUTER AIDED DRAWING - I** | | **L** | **T** | **P** | **C** |
| 0 | 0 | 2 | 1 |
| *Co-requisite* | None | | | | | |
| *Pre-requisite* | None | | | | | |
| *Data Books / Codes /*  *Standards* |  | | | | | |
| *Course Category* | P/W | Practical / Workshop | | | | |
| *Course- designed by* | Department of Civil Engineering | | | | | |
| *Approval* |  | | | | | |

**CLO1:**Acquire Knlowdge about Preparation of plan, elevation and sections of various types of buildings manually and using AutoCAD.

**CLO2:**Acquire Knlowdge about Improve imagination and creative skills in planning, Designing and detailing

various types of structural Elements

**CLO3:**Acquire Knlowdge about Basic Knlowdge about Analysis and Design of various structures by using STAAD Pro V8i/ ETABS

**CLO4:**Acquire Knlowdge about Application of different building codes in the design of concrete and steel structures by using STAAD Pro V8i/ ETABS

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|  |  | **L** | **T** | **P** | **C** |
| **21CE457** | **LIVE PROJECT-I (STEEL STRUCTURES) & INDUSTRIAL VISITS** | 0 | 0 | 1 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Students will explain the basics of Steel Structures.

**CLO2:** Students will learn about the method of erecting a steel structure.

**CLO3:** Students will describe about the precautions to be taken at the site of steel structures.

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|  |  | **L** | **T** | **P** | **C** |
| **21CS202** | **Technical Training-II (Artificial Intelligence and Machine Learning)** | 0 | 0 | 1 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Describe basic AI algorithms (e.g., standard search algorithms or resolution).

**CLO2:** Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem

**CLO3:** To identify potential application domains of machine learning in practice.

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|  |  | **L** | **T** | **P** | **C** |
| **21SS452** | **TEAMWORK & INTERPERSONAL SKILLS** | 0 | 0 | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** To be confident working in a team and leading it as well.

**CLO2:** To categorize the work and achieve expected performance within the time frame & willbe able to adapt himself to work under various kinds of stress and re-energize himself to bounceback from such situations.

**CLO3:** To get benefitted from Emotional Quotient in building stronger professional relationships and achieving career and personal goals.

**CLO4:** To face complex problems and effectively deal with it in the job due to CriticalThinking & Problem-Solving Skills.

# SEMESTER V

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|  |  | **L** | **T** | **P** | **C** |
| **22CE501** | **DESIGN OF CONCRETE STRUCTURES *–* I** | 4 | 0 | 0 | 4 |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Students will learn various design philosophies

**CLO2:** Students will design a beam structure

**CLO3:** Students will design a slab structure

**CLO4:** Students will design short column, long column and footing

**CLO5:** Students will design footing and pile foundation

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|  |  | **L** | **T** | **P** | **C** |
| **22CE502** | **FOUNDATION ENGINEERING** | 3 | 1 | 0 | 4 |
|  | **Prerequisite** |  |  |  |  |
|  | 21CE404 |  |  |  |  |

**CLO1:** Student will be able to understand basic knowledge of the concept of Sub-SurfaceExploration.

**CLO2:** Students will learn about shallow Foundation and its concepts **CLO3:** Students will learn about the pile Foundation and its concepts **CLO4:** Students will learn about Cassion Foundation

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|  |  | **L** | **T** | **P** | **C** |
| **21CE503** | **HYDROLOGY** | 3 | 0 | 0 | 3 |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Students will explain scope and application of hydrology to engineering problems

**CLO2:** Students will learn types and measurement of precipitation

**CLO3:** Students will describe about measurement of evaporation and transpiration.

**CLO4:** Students will learn about measurement of runoff

**CLO5:** Students will understand about hydrograph.

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|  |  | **L** | **T** | **P** | **C** |
| **22CE504** | **TRANSPORTATION ENGINEERING *–* I** | 3 | 1 | 0 | 4 |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Students will Understand the concepts and standards adopted in Planning, alignment andsurveys

**CLO2:** Students will Understand the concepts and standards adopted Design and construction of Highways

**CLO3:** Students will Understand the traffic characteristics, traffic control devices and principles ofsignal /intersection design

**CLO4:** Students will know about that the characteristics, properties and testing procedures of aggregate and bituminous materials

**CLO5:** Students will knowledge about bituminous mixes and their designs

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|  |  | **L** | **T** | **P** | **C** |
| **22CE552** | **FOUNDATION ENGINEERING LAB** | 0 | 0 | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Student will Know about the estimate index properties of soils

**CLO2:** Student will know about the estimate consolidation parameters of clayey soil.

**CLO3:** Student will know about the estimate shear strength parameters of soil by triaxial shear test. **CLO4:** Student will Know about the estimate the relative density and maximum dry density of soils. **CLO5:** Student will get knowledge about plate load test.

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|  |  | **L** | **T** | **P** | **C** |
| **22CE555** | **TRANSPORTATION ENGINEERING *–* I LAB** | 0 | 0 | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Student will get knowledge about the characterization of highway materials **CLO2:** Student will familiar with testing of aggregate and bituminous materials **CLO3:** Student will familiar with standard specifications

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|  |  | **L** | **T** | **P** | **C** |
| **21CE557** | **LIVE PROJECTS *–* II (SURVEY CAMP) & INDUSTRIAL VISITS** | 0 | 0 | 1 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | 21CE453 |  |  |  |  |

**CLO1:** Students will be able to establish RL.

**CLO2:** Students will be able to fix stations for Surveying.

**CLO3:** Students will be able to draw contours on the drawing sheet

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|  |  | **L** | **T** | **P** | **C** |
| **21CS301** | **Technical Training-III (Design Thinking and Augmented Virtual Reality)** | 0 | 0 | 1 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **NIL** |  |  |  |  |

**CLO1:** Recognize the importance of DT

**CLO2:** Explain the phases in the DT process

**CLO3:** List the steps required to complete each phase in DT process

**CLO4:** Apply each phase in the DT process

**CLO5:** Prepare the student for participating in the production of highly integrative immersive applications

**CLO6:** To establish and cultivate a broad and comprehensive understanding of this rapidly evolving and commercially viable field of Computer Science

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|  |  | **L** | **T** | **P** | **C** |
| **21SS553** | **PRESENTATION & SPEAKING SKILLS** | 0 | 0 | 2 | 1 |
|  | **Prerequisite** |  |  |  |  |
|  | **NIL** |  |  |  |  |

**CLO1:** To be confident in presenting himself in front of audience.

**CLO2:** To become professional in his approach towards work culture.

**CLO3:** To enhance the level of communication skills while interacting with others.

# SEMESTER-VI

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|  |  | **L** | **T** | **P** | **C** |
| **21CE601** | **STRUCTURAL ANALYSIS-III** | 3 | 1 | 0 | 4 |
|  | **Prerequisite** |  |  |  |  |
|  | 21CE401 |  |  |  |  |

**CLO1:** To familiar with Analysis indeterminate beams and plane frames with and without sway

**CLO2:** To know about the flexibility method of analysis **CLO3:** To know about the stiffness method of analysis **CLO4:** To know about the software of structural analysis

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|  |  | **L** | **T** | **P** | **C** |
| **22CE602** | **CONSTRUCTION MANAGEMENT** | 3 | 0 | 0 | 3 |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Supervise and execute all the construction jobs with the knowledge of the different construction techniques.

**CLO2:** Identify the building defects and apply suitable repair techniques to rectify them

**CLO3:** Evaluate the costs of equipment and make proper selection of the suitable construction equipment

**CLO4:** Ensure the proper completion of a construction task using particular construction equipment

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|  |  | **L** | **T** | **P** | **C** |
| **22CE603** | **TRANSPORTATION ENGINEERING – II** | **3** | **1** | **0** | **4** |
|  | **Prerequisite** |  |  |  |  |
|  | 21CE603 |  |  |  |  |

**CLO1:** To familiar with Design of Flexible and Rigid Pavement

**CLO2:** To get knowledge about Highway construction: Non-Bituminous and bituminous pavements

**CLO3:** To get knowledge about highway maintenance, drainage and hill roads

**CLO4:** To get knowledge about highway economics, finance and tunnels

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|  |  | **L** | **T** | **P** | **C** |
| **21CE604** | **IRRIGATION ENGINEERING** | **3** | **0** | **0** | **3** |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** To get knowledge types of irrigation

**CLO2:** Get an exposure about canal irrigation and land reclamation

**CLO3:** To get knowledge about canal and rivers

**CLO4:** To get knowledge canal head works and regulation works

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| **22CE605** | **DESIGN OF CONCRETE STRUCTURES – II** | | **L** | **T** | **P** | **C** |
| 4 | 0 | 0 | 4 |
| *Co-requisite* | None | | | | | |
| *Pre-requisite* | 21CE402 | | | | | |
| *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 CORE | | | | |
| *Course designed by* | Department of Civil Engineering | | | | | |
| *Approval* |  | | | | | |

**CLO1:** Students will know the design of Retaining wall

**CLO2:** Students will have adequate knowledge on flat slab

**CLO3:** Students Know the Water tanks

**CLO4:** Students will know the design of various staircases

**CLO5:** Students will know the concept of RC walls and Shear wall

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|  |  | **L** | **T** | **P** | **C** |
| **21BS101** | **MANAGEMENT AND ORGANISATIONAL BEHAVIOUR** | **3** | **0** | **0** | **3** |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Understand the concept of management

**CLO2:** Learn about different management skills requirements for the corporate world.

**CLO3:** Demonstrate application of previous knowledge testing of Principles of Management in solving businessproblems.

**CLO4:** Understand the human behaviour and its contribution at work place

**CLO5:** Understand the competitiveness in businesses.

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|  |  | **L** | **T** | **P** | **C** |
| **22CE653** | **TRANSPORTATION ENGINEERING – II LAB** | **0** | **0** | **2** | **1** |
|  | **Prerequisite** |  |  |  |  |
|  | 21CE603 |  |  |  |  |

**CLO1:** To get knowledge about the characterization of highway materials

**CLO2:** Have enough knowledge about mix designs

**CLO3:** Have enough knowledge about modern equipment for traffic studies & pavement evaluation

**CLO4:** Understand the standard specifications of IS/IRC/MoRTH

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|  |  | **L** | **T** | **P** | **C** |
| **21CE657** | **LIVE PROJECTS – III (RCC STRUCTURES) & INDUSTRIAL VISITS** | **0** | **0** | **1** | **1** |
|  | **Prerequisite** |  |  |  |  |
|  | 21CE402, 21CE501 |  |  |  |  |

**CLO1:** Students will learn about the basics of RCC Structures.

**CLO2:** Students will learn about the method of erecting a RCC structure.

**CLO3:** Students will learn about the precautions to be taken at the site of a RCC structures.

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|  |  | **L** | **T** | **P** | **C** |
| **21CS302** | **Technical Training-IV (Big Data Analytics, Tools and Techniques)** | **0** | **0** | **1** | **1** |
|  | **Prerequisite** |  |  |  |  |
|  | NIL |  |  |  |  |

**CLO1:** To provide an overview of an exciting field of big data analytics.

**CLO2:** To introduce the tools required to manage and analyze big data like Hadoop, NoSQL MapReduce.

**CLO3:** To learn the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.

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|  |  | **L** | **T** | **P** | **C** |
| **21SS655** | **PROFESSIONAL WRITING SKILLS** | **0** | **0** | **2** | **1** |
|  | **Prerequisite** |  |  |  |  |
|  | NIL |  |  |  |  |

**CLO1:** To understand the importance of professional writing required in workplace.

**CLO2:** To explore different formats in resume, cover letters & other business-related letters.

**CLO3:** To develop knowledge, skills and understanding people in-group and individually.

**CLO4:** To apply communication strategies either in-group or one on one basis and will be confident to lead the discussion among them.

# SEMESTER – VII

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| --- | --- | --- | --- | --- | --- |
|  |  | **L** | **T** | **P** | **C** |
| **22CE701** | **ESTIMATING AND COSTING** | **3** | **0** | **0** | **3** |
|  | **Prerequisite** |  |  |  |  |
|  | NIL |  |  |  |  |

**CLO1:** Students will forecast the approximate cost of the projects through preliminary and detailed estimates..

**CLO2:** Students will acquire Knowledge about the preparation of rate analysis for various items.

**CLO3:** Students will Acquire Knowledge about the Specification of materials and also various of Woks and buildings

**CLO4:** Students will prepare tender and contract document for a construction project

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|  |  | **L** | **T** | **P** | **C** |
| **21CE70**  **2** | **TEMPORARY STRUCTURES** | **3** | **0** | **0** | **3** |
|  | **Prerequisite** |  |  |  |  |
|  | NIL |  |  |  |  |

**CLO1:** Students will be familiar with temporary structures installations for construction projects.

**CLO2:** Students will have thorough understanding of Temporary structures in residential andcommercial buildings.

**CLO3:** Students will Be familiar with Temporary structures in Dams, bridges and Tunnelling

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|  |  | **L** | **T** | **P** | **C** |
| **21CE75**  **1** | **MATERIAL TESTING LAB** | **0** | **0** | **2** | **1** |
|  | **Prerequisite** |  |  |  |  |
|  | NIL |  |  |  |  |

**CLO1:** Students will understand the properties of cement, concrete and its testing procedure

**CLO2:** Students will understand and carry out design mix as per BIS and ACI.

**CLO3:** Students will study and understand properties of fresh concrete. **CLO4:** Students will carry out testing on concrete cube and cylinder. **CLO5:** Students will carry out testing on concrete beam.

**CLO6:** Students will understand and perform NDT of concrete.

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| **22CE752** | **COMPUTER AIDED DRAWING - II** | | **L** | **T** | **P** | **C** |
| 0 | 0 | 2 | 1 |
| *Co-requisite* | None | | | | | |
| *Pre-requisite* | 22CE455,22CE501,22CE605 | | | | | |
| *Data Books / Codes /*  *Standards* |  | | | | | |
| *Course Category* | P/W | Practical / Workshop | | | | |
| *Course- designed by* | Department of Civil Engineering | | | | | |
| *Approval* |  | | | | | |

**CLO1:** Acquire knowledge about Preparation of plan, elevation and sections of various types of RCC Structural Elements by using AutoCAD.

**CLO2:** Acquire knlowdge about Improve imagination and creative skills in Designing and detailing various types of

**CLO3:** RCC structural Elements by using AutoCAD.

Acquire knlowdge about Bar Bending & Scheduling of RCC structures by using Auto cadd

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|  |  | **L** | **T** | **P** | **C** |
| **21CE75**  **7** | **LIVE PROJECTS – IV (HIGHWAYS) & INDUSTRIAL VISITS** | **0** | **0** | **1** | **1** |
|  | **Prerequisite** |  |  |  |  |
|  | NIL |  |  |  |  |

**CLO1:** Students will have basic knowledge of Highway Construction

**CLO2:** Students will learn about the various construction practices followed at Highway Construction.

**CLO3:** Students will have in-depth knowledge of the precautions to be taken at the site of Highway.

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|  |  | **L** | **T** | **P** | **C** |
| **21CE759** | **MINOR PROJECT** | **0** | **0** | **8** | **4** |
|  | **Prerequisite** |  |  |  |  |
|  | NIL |  |  |  |  |

**CLO1:** Have concluded a small-scale research work related to field of their interest

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|  |  | **L** | **T** | **P** | **C** |
| **21CS401** | **Technical Training – V (DATA STRUCTURES USING C++)** | **0** | **0** | **2** | **1** |
|  | **Prerequisite** |  |  |  |  |
|  | NIL |  |  |  |  |

**CLO1:** Understand object-oriented programming and advanced C++ concepts.

**CLO2:** Be able to explain the difference between object-oriented programming and procedural programming.

**CLO3:** Be able to program using more advanced C++ features such as composition of objects, operator

overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling,etc.

**CLO4:** To understand the basic concepts of data structure and their implementation through C++

**CLO5:** To impart the basic concepts of data structures and algorithms. **CLO6:** To understand concepts about searching and sorting techniques **CLO7:** To understand basic concepts about stacks, queues, lists.

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|  |  | **L** | **T** | **P** | **C** |
| **21SS756** | **INTERPERSONAL SKILLS: STRATEGIES** | **0** | **0** | **2** | **1** |
|  | **Prerequisite** |  |  |  |  |
|  | NIL |  |  |  |  |

**CLO1:** To develop knowledge, skills and understanding people in-group and individually.

**CLO2:** To learn to apply communication strategies either in-group or one on one basis and will be confident to lead the discussion among them.

# SEMESTER – VIII

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| --- | --- | --- | --- | --- | --- |
|  |  | **L** | **T** | **P** | **C** |
| **21CE859** | **INDUSTRIAL TRAINING\*/ PROJECT WORK** | **0** | **0** | **24** | **12** |
|  | **Prerequisite** |  |  |  |  |
|  | 21CE757 |  |  |  |  |

**CLO1:** Students will explain about the various requirements at the site.

**CLO2:** Students will learn about the safety requirements at the site.

**CLO3:** Students will understand about management of both material and human resource.

**CLO4:** Students will be competent in execution of a civil engineering site.

**CLO5:** Students will describe the concepts of research.

**CLO6:** Students will have a more research-oriented mindset.

**CLO7:** Students will be competent to carry out research in field of civil engineering.

# PROFESSIONAL ELECTIVES

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| --- | --- | --- | --- | --- | --- |
|  |  | **L** | **T** | **P** | **C** |
| **21CEP01** | **STRUCTURAL DYNAMICS** | **3** | **0** | **0** | **3** |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Explain the meaning of earthquake and seismology **CLO2:** Understand the various degree of freedom system **CLO3:** Learn the design aspect related to earthquake

**CLO4:** Understand about the seismic performance and repair of structures

**CLO5:** Study about various codes related to earthquake

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|  |  | **L** | **T** | **P** | **C** |
| **21CEP02** | **INTRODUCTION TO FINITE ELEMENT METHOD** | **3** | **0** | **0** | **3** |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Develop shape functions and stiffness matrices for spring and bar elements

**CLO2:** Develop global stiffness matrices and global load vectors

**CLO3:** Apply natural and arial coordinate systems to constant strain triangle and linear strain triangle elements

**CLO4:** Analyze planar structural systems using finite element modelling

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|  |  | **L** | **T** | **P** | **C** |
| **21CEP03** | **ROCK MECHANICS** | **3** | **0** | **0** | **3** |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Explain the problems associated with underground excavations

**CLO2:** Understand rock mass classification

**CLO3:** Explain about the failure criteria of rock

**CLO4:** understand about in-situ stresses from field test data

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|  |  | **L** | **T** | **P** | **C** |
| **21CEP04** | **GEOSYNTHETICS AND ITS APPLICATION** | **3** | **0** | **0** | **3** |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Identify the type of geosynthetics and their relevance in geotechnical field.

**CLO2:** Understand the mechanism of formation of different geosynthetics.

**CLO3:** Analyse and compute different properties of geosynthetics.

**CLO4:** Apply the knowledge for designing the structures using Geosynthetic materials.

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|  |  | **L** | **T** | **P** | **C** |
| **21CEP05** | **POLLUTION CONTROL AND WASTE MANAGEMENT** | **3** | **0** | **0** | **3** |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Describe environment, impact of various activities on environment, sustainabledevelopment, ecology and biodiversity conservation

**CLO2:** Explain air pollution, its effects and control methods

**CLO3:** learn noise pollution, its effects and control measures

**CLO4:** understand the sources, types and composition of municipal solid waste and the methods of solid waste disposal

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|  |  | **L** | **T** | **P** | **C** |
| **21CEP06** | **GROUND WATER ENGINERING** | **3** | **0** | **0** | **3** |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Study about ground water flow

**CLO2:** Explain about aquifers

**CLO3:** Describe about tube wells

**CLO4:** Understand about recharging of ground water

**CLO5:** Understand about salty water

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|  |  | **L** | **T** | **P** | **C** |
| **21CEP07** | **HEALTH MONITORING OF STRUCTURES** | **3** | **0** | **0** | **3** |
|  | **Prerequisite** |  |  |  |  |
|  | Nil |  |  |  |  |

**CLO1:** Explain about Evaluation of Structure **CLO2:** Investigate the material damage **CLO3:** Understand about data interpretation **CLO4:** Understand about assessment

**CLO5:** Explain various case studies

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|  |  | **L** | **T** | **P** | **C** |
| **21CEP08** | **EARTHQUAKE ANALYSIS AND DESIGN** | **3** | **0** | **0** | **3** |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Explain earthquake and seismology

**CLO2:** Design earthquake resistant building

**CLO3:** Understand effect of lateral loading on building

**CLO4:** Understand provision by BIS for earthquake resistance of a building

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| **21CEP09** | **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* |  | | | | | |

CLO1: Knowledge of the significance of disaster management

CLO2: Analyze the occurrences, reasons and mechanism of various types of natural disaster

CLO3: Analyze the occurrences, reasons and mechanism of various types of man-made disaster

CLO4: Understand the preventive measures as Civil Engineer with latest codal provisions

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| **21CEP10** | **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* |  | | | | | |

CLO1: Test of all the concrete materials as per IS code.

CLO2: Design the concrete mix using ACI and IS code methods.

CLO3: Determine of the properties of fresh and hardened of concrete.

CLO4: Design special concretes and their specific applications.

CLO5: Ensure quality control while testing/ sampling and acceptance criteria.

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| **21CEP11** | **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* |  | | | | | |

CLO1: Design the slab culvert, Box culvert

CLO2: Design the T beam bridge and substructures

CLO3: Design the Bride bearings

CLO4: Design the steel bridge for railways

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| **21CEP12** | **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* |  | | | | | |

CLO1: Explain the flow and its types.

CLO2: Understand the various channels and effect of depth

CLO3: Understand the flow in various kind of channels

CLO4: Understand about various elements of hydraulic structures

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| **21CEP13** | **GEOTECHNICAL ENGINEERING** | | **L** | **T** | **P** | **C** |
| 3 | 0 | 0 | 3 |
| *Co-requisite* | None | | | | | |
| *Pre-requisite* | 21CE502 | | | | | |
| *Data Books /*  *Codes / Standards* |  | | | | | |
| *Course Category* | PE | PROFESSIONAL ELECTIVE | | | | |
| *Course designed by* | Department of Civil Engineering | | | | | |
| *Approval* |  | | | | | |

CLO1: Familiar with concept of earth dam design

CLO2: including stability analysis under seepage

CLO3: To get knowledge about stability of slopes under different drainage conditions using different

methods

CLO4: To get knowledge about design principles of retaining structures and coffer dams

CLO5: To get knowledge about the concept of soil stabilization

CLO6: To get knowledge about dynamic load in machine foundation analysis

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| **21CEP14** | **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* |  | | | | | |

CLO1: Gain Engineering knowledge of the subject and apply it for the solution of problems related to

railway and airport engineering.

CLO2: Design points and crossings, design runway pavements, make investigations, use modern tools and develop solutions to problems related to railway / airport engg.

CLO3: Understand the engineering solutions in societal context for sustainable development that takes care of environment and optimal use of resources.

CLO4: 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.

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|  |  | **L** | **T** | **P** | **C** |
| **21CEP17** | **SOFTWARE ELECTIVE – III (ETABS)** | **1** | **0** | **4** | **3** |
|  | **Prerequisite** |  |  |  |  |
|  | **Nil** |  |  |  |  |

**CLO1:** Study about Introduction to the use of Etabs.

**CLO2:** Understand about graphical interface Basic modeling- element types – meshing- AutomaticLine Constraint

**CLO3:** Learn about Analysis for wind and earthquake analysis, including the response spectra analysis

**CLO4:** Understand about Concrete Design Steel design with optimization

**CLO5:** Understand about Construction sequence loading including time dependent material properties

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|  |  | **L** | **T** | **P** | **C** |
| **21CE457** | **LIVE PROJECTS – I (STEEL STRUCTURES) & NDUSTRIAL VISITS** | **0** | **0** | **1** | **1** |
|  | **Prerequisite** |  |  |  |  |
|  | 21CE303 |  |  |  |  |

**CLO1:** Students will basic knowledge of Steel Structures.

**CLO2:** Students will learn about the methodology of erecting a steel structure.

**CLO3:** Students will have in-depth knowledge about the precautions to be taken at the site of a steel structures.

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|  |  | **L** | **T** | **P** | **C** |
| **21CE557** | **LIVE PROJECTS – II (SURVEY CAMP) & INDUSTRIAL VISITS** | **0** | **0** | **1** | **1** |
|  | **Prerequisite** |  |  |  |  |
|  | 21CE403 |  |  |  |  |

**CLO1:** Students will be able to establish RL.

**CLO2:** Students will be able to fix stations for Surveying.

**CLO3: S**tudents will be able to draw contours on the drawing sheet

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|  |  | **L** | **T** | **P** | **C** |
| **21CE657** | **LIVE PROJECTS – III (RCC STRUCTURES) & INDUSTRIAL VISITS** | **0** | **0** | **1** | **1** |
|  | **Prerequisite** |  |  |  |  |
|  | 21CE501 |  |  |  |  |

**CLO1:** Students will have basic knowledge of RCC Structures.

**CLO2:** Students will learn about the method of erecting a RCC structure.

**CLO3:** Students will have in-depth knowledge about the precautions to be taken at the site of a RCCstructures.

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|  |  | **L** | **T** | **P** | **C** |
| **21CE757** | **LIVE PROJECTS – IV (HIGHWAY) & INDUSTIAL VISITS** | **0** | **0** | **1** | **1** |
|  | **Prerequisite** |  |  |  |  |
|  | 21CE603 |  |  |  |  |

**CLO1:** Students will have basic knowledge of Highway Construction.

**CLO2:** Students will learn about the various construction practices followed at Highway Construction.

**CLO3:** Students will have in-depth knowledge of the precautions to be taken at the site of Highway.