

Course Outcomes of Civil Engineering Department

Course Outcomes of all the courses from Semester-I to Semester-VIII including elective courses:

MA102 Calculus and Differential Equations

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

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| 1. apply differential and integral calculus to solve engineering problems, |
| 2. use power series to solve differential equations appears in engineering field, |
| 3. deal with functions of several variables that are essential in engineering. |

CY102 Chemistry

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

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| 1. relate the fundamentals and their application in various field of engineering, |
| 2. identify and apply the principles of green chemistry in improving the existing technology, |
| 3. categorize the materials on the basis of their properties, |
| 4. select appropriate method of analysis and interpret its result. |

CL105 Physics (Mechanics of Solids)

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

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| 1. analyse structural systems under the effect of forces |
| 2. determine various types of stresses developed in structural elements |
| 3. evaluate properties of materials through experimentation |

CL103 Environmental Studies

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

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| 1. appraise the multidisciplinary nature of environment and sustainability |
| 2. explain types of environmental pollution and its control measures |
| 3. outline social issues related to environment |

CE104 Computer Programming

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

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| 1. demonstrate the importance and apply C language constructs in program development, |
| 2. analyse the problem and select the most appropriate method to solve it, |
| 3. evaluate the correctness of the developed solution. |

ME103 Engineering Graphics

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

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| 1. explain the fundamental principles of engineering graphics and related drawing standards, |
| 2. illustrate the various methods of producing and presenting graphic information, |
| 3. make use of engineering graphics for communication using traditional means and the computer aided tools, |
| 4. develop capability to visualize and represent geometry in two dimensions and in three dimensions, |
| 5. summarize the role of engineering graphics in various engineering disciplines. |

EE103 Elements of Electrical and Electronics Engineering

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

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| 1. interpret the importance of electrical energy and relate its usage in various applications, |
| 2. illustrate the role of circuit elements in different system conditions, |
| 3. distinguish the operational aspects of ac-dc systems and comprehend the principles of electromechanical energy conversion, |
| 4. recognise the functions of electronic devices and basic circuits, |
| 5. apply the concepts of number based conversion and Boolean algebra for digital logic design. |

HS101B/HS101I*

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

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| 1. acquire adequate proficiency in English communication including reading and listening, comprehension, writing and speaking skills, |
| 2. apply the dynamics of communication skills. |

ME104 Mechanical Workshop

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

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| 1. explain the safety measures required while working in the mechanical workshop, |
| 2. interpret an engineering drawing for the given practice job, |
| 3. select and make use of proper hand tools for a given job, |
| 4. develop an understanding of various workshop practices. |

EE104 Electrical Workshop

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

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| 1. identify and propose appropriate electrical and electronic components for relevant applications, |
| 2. select and make use of various laboratory equipment, |
| 3. build simple domestic and industrial wiring systems, |
| 4. apply basic maintenance and troubleshooting skills to house hold electrical appliances, |
| 5. extend the awareness about safe practices in electrical systems. |

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MA202 Linear Algebra

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

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| 1. acquire basic knowledge of matrix theory, |
| 2. comprehend basic concept of vector space and linear transformation, |
| 3. apply the knowledge of linear algebra in engineering problems |

CL104 Introduction to Civil Engineering

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

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| 1. explore the scope of various disciplines of Civil Engineering |
| 2. perceive the Role of a Civil Engineer in the construction industry |
| 3. appraise possible avenues of career and entrepreneurial opportunities in the Civil Engineering profession |

CL301 Structural Mechanics – I

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

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| 1. understand behaviour of statically determinate structural elements and apply analysis methods |
| 2. analyse statically indeterminate structures like propped cantilever |
| 3. evaluate stresses for structures like dam, chimney, retaining wall etc. |
| 4. analyse and describe influence line diagrams for beams and trusses |
| 5. relate application of analysis methods to real life problems |

CL302 Building Construction Materials

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

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| 1. identify various construction materials |
| 2. know and differentiate elemental properties of construction materials |
| 3. demonstrate an appropriate application of construction material |

CL303 Surveying I

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

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| 1. understand various methods of surveying |
| 2. estimate distance, angle and height through different instruments |
| 3. calculate area and volume and to generate maps |
| 4. adopt appropriate survey method for field problem |

CL304 Building & Town Planning

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

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| 1. understand and interpret civil engineering drawings |
| 2. understand principles of planning, building Bye laws, town planning and perspective drawing |
| 3. produce various civil engineering drawings |

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| 4. develop architectural design of building by applying bye laws and principle of planning |
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CL305 Concrete Technology

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

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| 1. understand properties and role of ingredients like cement, aggregate, admixtures etc. to produce better quality concrete |
| 2. execute experiments related to concreting ingredients & mapping of data with codal stipulations. |
| 3. apply design mix concepts to produce concrete with adequate strength and durability |
| 4. perform destructive, semi-destructive and non-destructive tests for concrete. |
| 5. demonstrate advancements in concreting materials and techniques |

CL401 Geology and Geotechnical Engineering

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

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| 1. Understand the fundamentals of geology, Structural features of rocks & various geological investigations |
| 2. Acquire knowledge of basics of soil mechanics and soil properties |
| 3. Ability to classify soils and to evaluate soil parameters such as permeability, compaction, shear strength etc. experimentally |

CL402 Structural Mechanics – II

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

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| 1. analyse statically indeterminate structures subjected to gravity and lateral loadings by employing various methods |
| 2. understand concept of prestressing of beam |
| 3. understand elements of structural dynamics |
| 4. conduct experiments, infer and report outcomes |

CL403 Building Construction

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

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| 1. understand the prior checks and regulatory permissions for building construction |
| 2. understand various building components and construction activities |
| 3. identify and select appropriate openings, roofs, flooring and types of finishes for buildings. |
| 4. select appropriate mode of vertical movements and design of staircase |

CL404 Surveying II

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

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| 1. to learn survey methods such as tacheometry, curve settings, hydrographic survey, photogrammetry, remote sensing, GPS and GIS technology |
| 2. to use latest instruments like EDM, total station, GPS etc. |
| 3. to employ appropriate survey methods in land survey, construction projects and to generate maps |

CL405 Fluid Mechanics

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

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| 1. understand and comprehend technical properties of fluids, their estimations and analysis for civil engineering applications |
| 2. apply kinematics and dynamics of flow for solving engineering problems |
| 3. quantify water flow through orifice, mouth piece and estimate losses |
| 4. select and apply knowledge for conveyance of water through close conduits and open channels |

CL406 Surveying

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

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| 1. discover problems of Civil Engineering and review relevant literature |
| 2. discuss & explain various dimensions of problem chosen |
| 3. identify, analyse and compile information in the form of a report and present |

CL501 Design of Structures – I

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

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| 1. Understand material properties and design methodologies for Concrete and Steel structures |
| 2. Analyse and design Reinforced concrete elements like beam, slab, column, footing and staircase |
| 3. Assessment of serviceability criteria Reinforced concrete beam and slab |
| 4. Ability to analyse and design steel elements like tension member, compression member, beam, footing |
| 5. Design different type of connections for steel elements. |

CL502 Water Resources and Irrigation

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

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| 1. Comprehend the hydrological cycle and various hydraulic structures |
| 2. Compute the rainfall and runoff characteristics |
| 3. Evaluate water requirement of various types of crop |

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| 4. Analyze various types of ground and surface water problems |
| 5. Analyze the factors affecting the design of gravity and earth dam. |

CL503 Environmental Engineering – I

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

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| 1. estimate the environmental pollution from available statistics |
| 2. assess the quality of water and wastewater |
| 3. analyses and design water treatment and distribution system |
| 4. analyses and design sewerage system and appropriate wastewater treatment method |

CL504 Transportation Engineering – I

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

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| 1. comprehend basic concepts and components of railways, bridges, docks and harbour |
| 2. design the railway track geometry |
| 3. select appropriate points, crossing and signalling facilities |
| 4. select and recommend appropriate site and section of bridge |

CL505 Advanced Construction

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

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| 1. analyze and select appropriate plants and equipments to optimize the output |
| 2. select and implement appropriate temporary structures |
| 3. identify, analyze and implement deep and heavy foundations |
| 4. select and apply technically sound building services |

CL506 Foundation Engineering

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

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| 1. investigate various types of soils through exploration methods and to compute bearing capacity |
| 2. identify, assess, recommend and design deep and shallow foundation |
| 3. calculate factor of safety for stability of slope and ground improvement techniques |

CL507 Mini Project – I

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

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| 1. practice acquired knowledge within the chosen area of technology for project development |
| 2. identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach |
| 3. reproduce, improve and refine technical aspects for engineering projects |

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| 4. work as an individual or in a team in development of technical projects |
| 5. communicate and report effectively project related activities and findings |

CL601 Design of Structures – II

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

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| 1. Assess types of loads and prepare layout for reinforced concrete structures |
| 2. Analyse and design various structural elements of reinforced concrete building |
| 3. Analyse and design reinforced concrete structures like Retaining Wall, Water Tank, Portal Frame, Slab Type Bridge |
| 4. Demonstrate earthquake resistant design features for various structures |

CL602 Environmental Engineering – II

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

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| 1. identify, analyse and quantify air pollution, effects and design appropriate air pollution control equipment |
| 2. comprehend, analyse and formulate solid waste management strategies |
| 3. assess noise pollution, adverse effects and apply corrective noise pollution control methods |
| 4. know the value of legal provisions for environmental beneficiaries |

CL603 Transportation Engineering – II

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

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| 1. Comprehend basic requirements of highway and airport |
| 2. plan and design highway geometrics |
| 3. select appropriate pavement material and design road pavement |
| 4. select appropriate technology for road construction |
| 5. Assess various parameters of traffic |

CL604 Mini Project – II

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

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| 1. practice acquired knowledge within the chosen area of technology for project development |
| 2. identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach |
| 3. reproduce, improve and refine technical aspects for engineering projects |
| 4. work as an individual or in a team in development of technical projects |
| 5. communicate and report effectively project related activities and findings |

CL701 Construction and Project Management

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

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| 1. identify, analyze and implement suitable planning and management techniques |
| 2. create network, calculate project duration and optimize the time and minimize the cost |
| 3. implement resource allocation and control techniques |
| 4. plan and implement quality and safety management |

CL702 Professional Practice

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

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| 1. apply knowledge of tendering and contracting in civil engineering practices |
| 2. frame the specifications of material and workmanship for construction projects |
| 3. understand various legal aspects of construction projects |
| 4. estimate the quantity and compute the probable cost of various structures |
| 5. apply estimation and valuation techniques to solve engineering problems |

CL703 Design of Structures III

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

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| 1. analyse and design industrial steel structures including connections |
| 2. analyse and design steel plate girder and footover bridge |
| 3. apply plastic method for analysis of beams |
| 4. design elements of masonry structures |

CL704 Minor Project

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

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| 1. practice acquired knowledge within the chosen area of technology for project development |
| 2. identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach |
| 3. reproduce, improve and refine technical aspects for engineering projects |
| 4. work as an individual or in a team in development of technical projects |
| 5. report project related activities effectively to peers and mentors |

SP701 Practical Training

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

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| 1. explore preferred field of specialization and develop analytical / hardware / software / experimental / observation skills |
| 2. manage technical content and work |
| 3. prepare and present technical report |

CL801 Major Project

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

1. Use various tools and techniques to study existing systems
2. Critically analyse existing systems, thereby select and justify parameters to be improved
3. Start and manipulate proposed engineering solution as per industry / research / societal need
4. Achieve precision in uses of the tools related to their experiments/fabrication
5. Reorganize and refine various components of technology to optimize the resources at large
6. Appraise the potential of technology for scalability and wide spectrum of applications
7. Report project related activities effectively to peers, mentors and society
8. Follow and value health, safety and ethical practices during project

Department Elective I & II

CL611 Advanced Structural Mechanics

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

1. derive stiffness matrix and load vectors for various planar structural elements
2. analyse two dimensional structures like beam, truss, frame and grid
3. apply finite element method for one dimensional problems
4. develop spread sheets and computer programs for two dimensional structures

CL622 Advanced Construction Technologies

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

1. understand, select and implement specialized construction techniques
2. select and apply appropriate bridge construction techniques
3. conceptualize and erect pre-cast and pre-fabricated structures
4. select and construct appropriate underground and offshore structures

CL714 Reinforced Earth and Geosynthetics

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

1. estimate properties of reinforced earth and geosynthetics
2. analyze and design reinforced earth wall
3. design geosynthetics for pavement construction
4. device environmental conservation techniques using geosynthetics

CL651 Docks, Harbour and Airport Engineering

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

1. comprehend requirements of dock, harbour and airport
2. plan and design various components of dock, harbour and airport
3. select appropriate aids for operation of dock, harbour and airport

CL723 Maintenance and Rehabilitation of Structures

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

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| 1. comprehend aspects related to maintenance of different structures |
| 2. demonstrate factors affecting durability and compatibility aspects of concrete |
| 3. illustrates different techniques for evaluating cause of distress in concrete |
| 4. apply different repair materials and techniques for strengthening & retrofitting of structures |
| 5. discover different construction failures through investigation |

CL793 Hydraulic Structures

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

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| 1. describe and interpret knowledge related to different dams, outlet works and drop structures. |
| 2. analyze and design different types of dams, spillways and falls. |
| 3. relate and select different combination of hydraulic structures. |

CL763 Hazardous Waste Management and Legislation

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

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| 1. characterize, identify, classify and estimate sources of hazardous wastes |
| 2. identify and apply hazardous waste reduction, treatment and disposal technique |
| 3. evolve hazardous waste management plans based on current situations, national and international legislations |

CL621 Prestressed Concrete

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

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| 1. compute stresses due to prestressing |
| 2. assess losses in prestress, short and long term deflection, flexural and shear strength of beam |
| 3. design pre-tensioned and post-tensioned beam |

CL734 Traffic Engineering and Design

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

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| 1. perform traffic studies, analysis and design road network |
| 2. develop engineering solutions to ease traffic congestion in cities and improve road safety |
| 3. perform economic analysis of transportation projects |

CL631 Sustainable Building Technologies

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

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| 1. identify, understand and apply concepts of sustainable development |
| 2. select and effectively apply sustainable green building materials and construction aspects |
| 3. conduct quantitative estimation and implement methodologies for resource conservation |
| 4. comprehend various provisions in the National and International Green Building Codes |

CL671 Geomatics

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

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| 1. understand principle and relevance of advanced technologies like Remote Sensing, Geodesy, GPS and GIS. |
| 2. select appropriate tools, technique and software for various applications |
| 3. analyse and suggest suitable solution to solve the problems |

CL713 Earthquake Resistant Design

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

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| 1. understand phenomenon, causes and effects of earthquake |
| 2. apply concepts of dynamics to earthquake problems |
| 3. design earthquake resistant RCC structures using codal provisions |
| 4. design earthquake resistant masonry structures |