

Cambridge Institute of Technology

DEPARTMENT OF CIVIL ENGINEERING

Course outcomes of 2015 scheme

| Course Code | Course Name | Course Outcomes-On completion of this course the students will be able to |
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| 15CV32 | STRENGTH OF MATERIALS | CO1. To evaluate the strength of various structural elements internal forces such as compression, tension, shear, bending and torsion. CO2. To suggest suitable material from among the available in the field of Construction and manufacturing. CO3. To evaluate the behavior and strength of structural elements under the action of compound stresses and thus understand failure concepts CO4. To understand the basic concept of analysis and design of members Subjected to torsion. CO5. To understand the basic concept of analysis and design of structural Elements such as columns and struts. |
| 15CV33 | FLUIDS MECHANICS | CO 1. Possess a sound knowledge of fundamental properties of fluids and fluid Continuum CO 2. Compute and solve problems on hydrostatics, including practical applications CO 3. Apply principles of mathematics to represent kinematic concepts related to fluid flow CO 4. Apply fundamental laws of fluid mechanics and the Bernoulli's principle for practical applications CO 5. Compute the discharge through pipes and over notches and weirs |
| 15CV34 | BASICSURVEYING | CO 1. Posses a sound knowledge of fundamental principles Geodetics[L1][PO1] CO 2. Measurement of vertical and horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems.[L2][L3][PO3] CO 3. Capture geodetic data to process and perform analysis for survey problems [L4][PO2] CO 4. Analyse the obtained spatial data and compute areas and volumes. Represent 3D data on plane figures as contours [L4] [PO2] |
| 15CV35 | ENGINEERING GEOLOGY | CO 1. Students will able to apply the knowledge of geology and its role in Civil Engineering CO 2. Students will effectively utilize earth's materials such as mineral, rocks and water in civil engineering practices. CO 3. Analyze the natural disasters and their mitigation. CO 4. Assess various structural features and geological tools in ground water exploration, Natural resource estimation and solving civil engineering problems. CO 5. Apply and asses use of building materials in construction and asses their properties |
| 15CV36 | Building Materials and Construction | CO 1. Select suitable materials for buildings and adopt suitable construction techniques. CO 2. Adopt suitable repair and maintenance work to enhance durability of buildings. |

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| 15CVL37 | BUILDING MATERIALS TESTING LABORATORY | CO 1. Reproduce the basic knowledge of mathematics and engineering in finding the strength in tension, compression, shear and torsion. CO 2. Identify, formulate and solve engineering problems of structural elements subjected to flexure. CO 3. Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials |
| 15CVL38 | BASIC SURVEYING PRACTICE | CO 1. Apply the basic principles of engineering surveying for linear and angular measurements. CO 2. Comprehend effectively field procedures required for a professional surveyor. CO 3. Use techniques, skills and conventional surveying instruments necessary for engineering practice. [L3,L4] [PO5] |
| 15CV42 | Analysis of Determinate Structures | CO 1. Evaluate the forces in determinate trusses by method of joints and sections. CO 2. Evaluate the deflection of cantilever, simply supported and overhanging beams by different methods CO 3. Understand the energy principles and energy theorems and its applications to determine the deflections of trusses and bent frames. CO 4. Determine the stress resultants in arches and cables. CO 5. Understand the concept of influence lines and construct the ILD diagram for the moving loads. |
| 15CV43 | Applied Hydraulics | CO 1. Apply dimensional analysis to develop mathematical modeling and compute the parametric values in prototype by analyzing the corresponding model parameters CO 2. Design the open channels of various cross sections including economical channel sections CO 3. Apply Energy concepts to flow in open channel sections, Calculate Energy dissipation, CO 4. Compute water surface profiles at different conditions CO 5. Design turbines for the given data, and to know their operation characteristics under different operating conditions |
| 15CV44 | Concrete Technology | CO 1. Relate material characteristics and their influence on microstructure of concrete. [L2,L3] [PO1] CO 2. Distinguish concrete behavior based on its fresh and hardened properties. [L2,L4] [PO1, PO2] CO 3. Illustrate proportioning of different types of concrete mixes for required fresh and hardened properties using professional codes. [L3] [PO1, PO2, PO3] |
| 15CV45 | Basic Geotechnical Engineering | CO 1. Will acquire an understanding of the procedures to determine index properties of any type of soil, classify the soil based on its index properties CO 2. Will be able to determine compaction characteristics of soil and apply that knowledge to assess field compaction procedures CO 3. Will be able to determine permeability property of soils and acquires conceptual knowledge about stresses due to seepage and effective stress; Also acquire ability |

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| | | <p>to estimate seepage losses across hydraulic structure</p> <p>CO 4. Will be able to estimate shear strength parameters of different types of soils using the data of different shear tests and comprehend Mohr-Coulomb failure theory.</p> <p>CO 5. Ability to solve practical problems related to estimation of consolidation settlement of soil deposits also time required for the same.</p> |
| 15CV46 | Advanced Surveying | <p>CO 1. Apply the knowledge of geometric principles to arrive at surveying problems</p> <p>CO 2. Use modern instruments to obtain geo-spatial data and analyse the same to appropriate engineering problems.</p> <p>CO 3. Capture geodetic data to process and perform analysis for survey problems with the use of electronic instruments;</p> <p>CO 4. Design and implement the different types of curves for deviating type of alignments.</p> |
| 15CVL47 | Fluid Mechanics and Hydraulic Machines Laboratory | <p>CO 1. Properties of fluids and the use of various instruments for fluid flow measurement.</p> <p>CO 2. Working of hydraulic machines under various conditions of working and their characteristics.</p> |
| 15CVL48 | Engineering Geology Laboratory | <p>CO 1. Identifying the minerals and rocks and utilize them effectively in civil engineering practices</p> <p>CO 2. Understanding and interpreting the geological conditions of the area for the Implementation of civil engineering projects.</p> <p>CO 3. Interpreting subsurface information such as thickness of soil, weathered zone, depth of hardrock and saturated zone by using geophysical methods.</p> <p>CO4.The techniques of drawing the curves of electrical resistivity data and its interpretation for Geotechnical and aquifer boundaries.</p> |
| 15CV51 | DESIGN OF RC STRUCTURAL ELEMENTS | <p>CO 1. understand the design philosophy and principles</p> <p>CO 2. solve engineering problems of RC elements subjected to flexure, shear and torsion</p> <p>CO 3. demonstrate the procedural knowledge in designs of RC structural elements such as slabs, columns and footings</p> <p>CO 4. owns professional and ethical responsibility</p> |
| 15CV52 | ANALYSIS OF INDETERMINATE STRUCTURES | <p>CO 1. Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope deflection method</p> <p>CO 2. Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method.</p> <p>CO 3. Construct the bending moment diagram for beams and frames by Kani's method.</p> <p>CO 4. Construct the bending moment diagram for beams and frames using flexibility</p> |
| 15CV53 | APPLIED GEOTECHNICAL ENGINEERING | <p>CO 1. Ability to plan and execute geotechnical site investigation program for different civil engineering projects</p> <p>CO 2. Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils</p> <p>CO 3. Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures</p> <p>CO 4. Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing</p> |

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| | | pressure CO 5. Capable of estimating load carrying capacity of single and group of piles |
| 15CV54 | COMPUTER AIDED BUILDING PLANNING AND DRAWING | CO 1. Gain a broad understanding of planning and designing of buildings CO 2. Prepare, read and interpret the drawings in a professional set up. CO 3. Know the procedures of submission of drawings and Develop working and submission drawings for building CO 4. Plan and design a residential or public building as per the given requirements |
| 15CV551 | AIR POLLUTION AND CONTROL | CO 1. Identify the major sources of air pollution and understand their effects on health and environment. CO 2. Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models. CO 3. Ascertain and evaluate sampling techniques for atmospheric and stack pollutants. CO 4. Choose and design control techniques for particulate and gaseous emissions. |
| 15CV552 | RAILWAYS, HARBOUR, TUNNELING AND AIRPORTS | CO 1. Acquires capability of choosing alignment and also design geometric aspects of railway system, runway and taxiway. CO 2. Suggest and estimate the material quantity required for laying a railway track and also will be able to determine the hauling capacity of a locomotive. CO 3. Develop layout plan of airport, harbor, dock and will be able relate the gained knowledge to identify required type of visual and/or navigational aids for the same. CO 4. Apply the knowledge gained to conduct surveying, understand the tunneling activities. |
| 15CV553 | MASONRY STRUCTURES | CO 1. Explain engineering properties and uses of masonry units, defects and crack in masonry and its remedial measures. CO 2. Summarize various formulae's for finding compressive strength of masonry units. CO 3. Explain permissible stresses and design criteria as per IS: 1905 and SP-20. CO 4. Design different types of masonry walls for different load considerations. |
| 15CV554 | THEORY OF ELASTICITY | CO 1. Ability to apply knowledge of mechanics and mathematics to model elastic bodies as continuum CO 2. Ability to formulate boundary value problems; and calculate stresses and strains CO 3. Ability to comprehend constitutive relations for elastic solids and compatibility constraints; CO 4. Ability to solve two-dimensional problems (plane stress and plane strain) using the concept of stress function. |
| 15CV561 | TAFFIC ENGINEERING | CO 1. Understand the human factors and vehicular factors in traffic engineering design. CO 2. Conduct different types of traffic surveys and analysis of collected data using statistical concepts. CO 3. Use an appropriate traffic flow theory and to comprehend the capacity & signalized intersection analysis. CO 4. Understand the basic knowledge of Intelligent Transportation System. |

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| 15CV562 | SUSTAINABILITY CONCEPTS IN ENGINEERING | <p>CO 1. Learn the sustainability concepts; understand the role and responsibility of engineers in sustainable development.</p> <p>CO 2. Quantify sustainability, and resource availability, Rationalize the sustainability based on scientific merits.</p> <p>CO 3. Understand and apply sustainability concepts in construction practices, designs, product developments and processes across various engineering disciplines.</p> <p>CO 4. Make a decision in applying green engineering concepts and become a lifelong advocate of sustainability in society.</p> |
| 15CV563 | REMOTE SENSING AND GIS | <p>CO 1. Collect data and delineate various elements from the satellite imagery using their spectral signature.</p> <p>CO 2. Analyze different features of ground information to create raster or vector data.</p> <p>CO 3. Perform digital classification and create different thematic maps for solving specific problems</p> <p>CO 4. Make decision based on the GIS analysis on thematic maps.</p> |
| 15CV564 | OCCUPATIONAL HEALTH AND SAFETY | <p>CO 1. Identify hazards in the workplace that pose a danger or threat to their safety or health, or that of others.</p> <p>CO 2. Control unsafe or unhealthy hazards and propose methods to eliminate the hazard.</p> <p>CO 3. Present a coherent analysis of a potential safety or health hazard both verbally and in writing, citing the occupational Health and Safety Regulations as well as supported legislation.</p> <p>CO 4. Discuss the role of health and safety in the workplace pertaining to the responsibilities of workers, managers, supervisors.</p> <p>CO 5. Identify the decisions required to maintain protection of the environment, workplace as well as personal health and safety.</p> |
| 15CVL57 | GEOTECHNICAL ENGINEERING LAB | <p>CO 1. Physical and index properties of the soil</p> <p>CO 2. Classify based on index properties and field identification</p> <p>CO 3. To determine OMC and MDD, plan and assess field compaction program</p> <p>CO 4. Shear strength and consolidation parameters to assess strength and deformation characteristics</p> <p>CO 5. In-situ shear strength characteristics (SPT- Demonstration)</p> |
| 15CVL58 | CONCRETE AND HIGHWAY MATERIALS LABORATORY | <p>CO 1. 1. Conduct appropriate laboratory experiments and interpret the results</p> <p>CO 2. Determine the quality and suitability of cement</p> <p>CO 3. Design appropriate concrete mix</p> <p>CO 4. Determine strength and quality of concrete</p> <p>CO 5. Test the road aggregates and bitumen for their suitability as road material.</p> <p>CO 6. Test the soil for its suitability as sub grade soil for pavements.</p> |
| 15CV61 | CONSTRUCTION MANAGEMENT AND ENTREPRENEURSHIP | <p>CO 1. Understand the construction management process.</p> <p>CO 2. Understand and solve variety of issues that are encountered by every professional in discharging professional duties.</p> <p>CO 3. Fulfill the professional obligations effectively with global outlook</p> |
| 15CV62 | DESIGN OF STEEL STRUCTURAL ELEMENTS | <p>CO 1. Possess a knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions and plastic behaviour of structural steel</p> <p>CO 2. Understand the Concept of Bolted and Welded connections.</p> <p>CO 3. Understand the Concept of Design of compression members, built-up columns and columns splices.</p> <p>CO 4. Understand the Concept of Design of tension members, simple slab base and</p> |

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| | | gusseted base. CO 5. Understand the Concept of Design of laterally supported and un-supported steel beams. |
| 15CV63 | HIGHWAY ENGINEERING | CO 1. Acquire the capability of proposing a new alignment or re-alignment of existing roads, conduct necessary field investigation for generation of required data. CO 2. Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction. CO 3. Design road geometrics, structural components of pavement and drainage. CO 4. Evaluate the highway economics by few select methods and also will have a basic knowledge of various highway financing concepts. |
| 15CV64 | WATER SUPPLY AND TREATMENT ENGINEERING | CO 1. Estimate average and peak water demand for a community. CO 2. Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community. CO 3. Evaluate water quality and environmental significance of various parameters and plan suitable treatment system. CO 4. Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards. |
| 15CV651 | SOLID WASTE MANAGEMENT | CO 1. Analyse existing solid waste management system and to identify their drawbacks. CO 2. Evaluate different elements of solid waste management system. CO 3. Suggest suitable scientific methods for solid waste management elements. CO 4. Design suitable processing system and evaluate disposal sites. |
| 15CV652 | MATRIX METHOD OF STRUCTURAL ANALYSIS | CO 1. Evaluate the structural systems to application of concepts of flexibility and stiffness matrices for simple problems. CO 2. Identify, formulate and solve engineering problems with respect to flexibility and stiffness matrices as applied to continuous beams, rigid frames and trusses. CO 3. Identify, formulate and solve engineering problems by application of concepts of direct stiffness method as applied to continuous beams and trusses. |
| 15CV653 | ALTERNATIVE BUILDING MATERIALS | CO 1. Solve the problems of Environmental issues concerned to building materials and cost effective building technologies; CO 2. Suggest appropriate type of masonry unit and mortar for civil engineering constructions; also they are able to Design Structural Masonry Elements under Axial Compression. CO 3. Analyse different alternative building materials which will be suitable for specific climate and in an environmentally sustainable manner. Also capable of suggesting suitable agro and industrial wastes as a building material. CO 4. Recommend various types of alternative building materials and technologies and design a energy efficient building by considering local climatic condition and building material. |
| 15CV654 | GROUND IMPROVEMENT TECHNIQUES | CO 1. Give solutions to solve various problems associated with soil formations having less strength. CO 2. Use effectively the various methods of ground improvement techniques depending upon the requirements. CO 3. utilize properly the locally available materials and techniques for ground improvement so that economy in the design of foundations of various civil engineering structures |
| 15CV661 | WATER RESOURCES MANAGEMENT | CO 1. Assess the potential of groundwater and surface water resources. CO 2. Address the issues related to planning and management of water resources. CO 3. Know how to implement IWRM in different regions. CO 4. Understand the legal issues of water policy. |

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| | | CO 5. Select the method for water harvesting based on the area. |
| 15CV662 | ENVIRONMENTAL PROTECTION AND MANAGEMENT | CO 1. Appreciate the elements of Corporate Environmental Management systems complying to international environmental management system standards CO 2. Lead pollution prevention assessment team and implement waste minimization options CO 3. Develop, Implement, maintain and Audit Environmental Management systems for Organizations. |
| 15CV663 | NUMERICAL METHODS AND APPLICATIONS | The students will have a clear perception of the power of numerical techniques, ideas and would be able to demonstrate the applications of these techniques to problems drawn from Industry, management and other engineering fields. |
| 15CV664 | FINITE ELEMENT METHOD | The student will have the knowledge on advanced methods of analysis of structures |
| 17CVL67 | SOFTWARE APPLICATION LAB | Use software skills in a professional set up to automate the work and thereby reduce cycle time for completion of the work |
| 15CVL68 | EXTENSIVE SURVEY PROJECT /CAMP | CO 1. Apply Surveying knowledge and tools effectively for the projects CO 2. Understanding Task environment, Goals, responsibilities, Task focus, working in Teams towards common goals, Organizational performance expectations, technical and behavioral competencies. CO 3. Application of individual effectiveness skills in team and organizational context, goal setting, time management, communication and presentation skills. CO 4. Professional etiquettes at workplace, meeting and general CO 5. Establishing trust based relationships in teams & organizational environment CO 6. Orientation towards conflicts in team and organizational environment, Understanding sources of conflicts, Conflict resolution styles and techniques |
| 15CV71 | MUNICIPAL AND INDUSTRIAL WASTE WATER ENGINEERING | CO 1. Acquires capability to design sewer and Sewerage treatment plant. CO 2. Evaluate degree of treatment and type of treatment for disposal, reuse and recycle. CO 3. Identify waste streams and design the industrial waste water treatment plant. CO 4. Manage sewage and industrial effluent issues. |
| 15CV72 | DESIGN OF RCC AND STEEL STRUCTURES | CO 1. Students will acquire the basic knowledge in design of RCC and Steel Structures. CO 2. Students will have the ability to follow design procedures as per codal provisions and skills to arrive at structurally safe RC and Steel members. |
| 15CV73 | HYDROLOGY AND IRRIGATION ENGINEERING | CO 1. Understand the importance of hydrology and its components. CO 2. Measure precipitation and analyze the data and analyze the losses in precipitation. CO 3. Estimate runoff and develop unit hydrographs. CO 4. Find the benefits and ill-effects of irrigation. CO 5. Find the quantity of irrigation water and frequency of irrigation for various crops. CO 6. Find the canal capacity, design the canal and compute the reservoir capacity. |

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| 15CV741 | DESIGN OF BRIDGES | CO 1. Understand the load distribution and IRC standards. CO 2.Design the slab and T beam bridges. CO 3.Design Box culvert, pipe culvert CO 4.Use bearings, hinges and expansion joints and CO 5.Design Piers and abutments. |
| 15CV742 | GROUND WATER & HYDRAULICS | CO1.Find the characteristics of aquifers. CO2.Estimate the quantity of ground water by various methods. CO3.Locate the zones of ground water resources. CO4.Select particular type of well and augment the ground water storage. |
| 15CV743 | DESIGN CONCEPT OF BUILDING SERVICES | CO 1. Describe the basics of house plumbing and waste water collection and disposal. CO 2. Discuss the safety and guidelines with respect to fire safety. CO 3. Describe the issues with respect to quantity of water, rain water harvesting and roof top harvesting. CO 4. Understand and implement the requirements of thermal comfort in buildings |
| 15CV744 | STRUCTURAL DYNAMICS | CO 1. Apply knowledge of mathematics, science, and engineering by developing the equations of motion for vibratory systems and solving for the free and forced response. CO 2. Basic understanding of fundamental analysis methods for dynamic systems Interpret dynamic analysis results for design, analysis and research purposes CO 3. Apply structural dynamics theory to earthquake analysis, response, and design of structures |
| 15CV751 | URBAN TRANSPORTATION AND PLANNING | CO 1. Design, conduct and administer surveys to provide the data required for transportation planning. CO 2. Supervise the process of data collection about travel behavior and analyze the data for use in transport planning. CO 3. Develop and calibrate modal split, trip generation rates for specific types of land use developments. CO 4. Adopt the steps that are necessary to complete a long-term transportation plan. |
| 15CV752 | PREFABRICATED STRUCTURES | CO 1. Use modular construction, industrialised construction CO 2. Design prefabricated elements CO 3. Design some of the prefabricated elements CO 4. Use the knowledge of the construction methods and prefabricated elements in buildings |
| 15CV753 | REHABILITATION AND RETROFITTING OF STRUCTURES | CO 1. Understand the cause of deterioration of concrete structures. CO 2. Able to assess the damage for different type of structures CO 3. Summarize the principles of repair and rehabilitation of structures CO 4. Recognize ideal material for different repair and retrofitting technique |
| 15CV754 | REINFORCED EARTH STRUCTURES | CO 1. identify, formulate reinforced earth techniques that are suitable for different soils and in different structures; CO 2. understand the laboratory testing concepts of Geosynthetics CO 3. design RE retaining structures and Soil Nailing concepts CO 4. Determine the load carrying capacity of Foundations resting on RE soil bed. CO 5. asses the use of Geosynthetics in drainage requirements and landfill designs |
| 15CVL76 | ENVIRONMENTAL ENGINEERING LABORATORY | CO 1. Acquire capability to conduct experiments and estimate the concentration of different parameters. CO 2. Compare the result with standards and discuss based on the purpose of analysis. |

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| | | CO 3. Determine type of treatment, degree of treatment for water and waste water. CO 4. Identify the parameter to be analyzed for the student project work in environmental stream. |
| 15CVL77 | COMPUTER AIDED DETAILING OF STRUCTURES | CO 1. Prepare detailed working drawings |
| 15CV81 | QUANTITY SURVEYING AND CONTRACTS MANAGEMENT | CO 1. Prepare detailed and abstract estimates for roads and building. CO 2. Prepare valuation reports of buildings. CO 3. Interpret Contract document's of domestic and international construction works |
| 15CV82 | DESIGN OF PRE STRESSED CONCRETE ELEMENTS | CO 1. Understand the requirement of PSC members for present scenario. CO 2. Analyse the stresses encountered in PSC element during transfer and at working. CO 3. Understand the effectiveness of the design of PSC after studying losses CO 4. Capable of analyzing the PSC element and finding its efficiency. CO 5. Design PSC beam for different requirements. |
| 15CV831 | EARTHQUAKE ENGINEERING | 1 CO. Acquire basic knowledge of engineering seismology CO 2. Develop response spectra for a given earthquake time history and its implementation to estimate response of a given structure. CO 3. Understanding of causes and types of damages to civil engineering structures during different earthquake scenarios CO 4. Analyze multi-storied structures modeled as shear frames and determine lateral force distribution due to earthquake input motion using IS-1893 procedures. CO 5. Comprehend planning and design requirements of earthquake resistant features of RCC and Masonry structures thorough exposure to different IS-codes of practices. |
| 15CV832 | HYDRAULIC STRUCTURES | CO 1. Check the stability of gravity dams and design the dam. CO 2. Estimate the quantity of seepage through earth dams. CO 3. Design spillways and aprons for various diversion works. CO 4. Select particular type of canal regulation work for canal network. |
| 15CV833 | PAVEMENT DESIGN | CO 1. Systematically generate and compile required data's for design of pavement (Highway & Airfield). CO 2. Analyze stress, strain and deflection by boussinesq's, burmister's and westergaard's theory. CO 3. Design rigid pavement and flexible pavement conforming to IRC58-2002 and IRC37-2001. CO 4. Evaluate the performance of the pavement and also develops maintenance statement based on site specific requirements. |
| 15CV834 | ADVANCED FOUNDATION DESIGN | CO 1. Estimate the size of isolated and combined foundations to satisfy bearing capacity and settlement criteria. CO 2. Estimate the load carrying capacity and settlement of single piles and pile groups including laterally loaded piles CO 3. Understand the basics of analysis and design principles of well foundation, drilled piers and caissons CO 4. Understand basics of analysis and design principles of machine foundations |



PRINCIPAL
CAMBRIDGE INSTITUTE OF TECHNOLOGY
K.R. PURAM, BANGALORE-560 036.