Vidyavardhini's College of Engineering & Technology

Department of Civil Engineering

Program Outcomes
PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2. 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.
PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4. 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.
PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9. Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. 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.
PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a
PO12. 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

Program Specific Outcomnes
The Graduates will be able to :
PSO1. Employ various approaches, ideologies, code of practice and soft tools for computing and designing real world problems related to Civil Engineering
PSO2. Demonstrate technical aspects, teamwork, managerial and professional skills necessary for efficient solution

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Department of Civil Engineering

Course Outcomes Revised 2019 Syllabus		
FEC101	**C101**	**Engineering Mathematics I**
FEC101.1	C101.1	Apply the concepts of Complex Numbers, to solve Engineering problems.
FEC101.2	C101.2	Apply hyperbolic functions and logarithm of complex number to solve Engineering problems.
FEC101.3	C101.3	Compute the partial differentiation of functions of two & three variables.
FEC101.4	C101.4	Find the nth order derivative of a function using successive differentiation & Compute maxima-minima of a function.
FEC101.5	C101.5	Apply the properties of matrices to find rank of a matrix & to solve system of linear simultaneous equations .
FEC101.6	C101.6	Apply the concept of Numerical Methods to solve system of linear algebraic equations , transcendental equation.
FEC102	**C102**	**Engineering Physics I**
FEC102.1	C102.1	Describe the concepts of quantum mechanics and its applications of Schrodinger's equation to study the simple physical system.
FEC102.2	C102.2	Explain the basic principles and methodologies of crystal structures for their application in crystallography using X-ray diffraction technique.
FEC102.3	C102.3	Understand the concepts of semiconductor physics and applications of semiconductors in electronic devices.
FEC102.4	C102.4	Apply the concepts of interference in thin films for various measurements.

FEC102.5	C102.5	Discuss the properties of Superconductors and Supercapacitors to apply them in the novel applications.
FEC102.6	C102.6	Compare the properties of engineering materials for their current and futuristic applications.
FEC103	**C103**	**Engineering Chemistry I**
FEC103.1	C103.1	Analyze the quality of water and suggest methods of treatment.
FEC103.2	C103.2	Differentiate thermosoftening & thermosetting plastic & select appropriate fabrication method
FEC103.3	C103.3	Understand the concept of microscopic chemistry in terms of atomic and molecular orbital theory & calculate bond order of molecule. thermodynamics
FEC103.4	C103.4	Understand the concept of aromaticity & calculate aromaticity using Huckel's Rule.
FEC103.5	C103.5	Understand Gibb's phase rule & calculate number of phases, component & degree of freedom of one & two component system.
FEC103.6	C103.6	Differentiate ionic, dipolar & Vander waal's intermolecular forces of attraction.
FEC104	**C104**	**Engineering Mechanics**
FEC104.1	C104.1	Illustrate the concept of force, moment and apply the same along with the concept of equilibrium in two and three dimensional systems with the help of FBD.
FEC104.2	C104.2	Demonstrate the understanding of Centroid and its significance and locate the same
FEC104.3	C104.3	Estimate required force to overcome friction and correlate real life application to specific type of friction.
FEC104.4	C104.4	Establish relation between velocity and acceleration of a particle and analyse the motion by plotting the relation
FEC104.5	C104.5	Illustrate different types of motions and establish Kinematic relations for a rigid body

FEC104.6	C104.6	Analyse body in motion using force and acceleration, work-energy, impulse- momentum principles
FEC105	**C105**	**Basic Electrical Engineering**
FEC105.1	C105.1	Apply various network theorems to determine the circuit response / behavior
FEC105.2	C105.2	Evaluate and analyze 1-Φ circuits.
FEC105.3	C105.3	Evaluate and analyze 3-Φ AC circuits
FEC105.4	C105.4	Understand the constructional features and operation of 1-Φ transformer
FEC105.5	C105.5	Illustrate the working principle of 3-Φ machine.
FEC105.6	C105.6	Illustrate the working principle of 1-Φ machines.
FEL101	**C106**	**Engineering Physics I**
FEL101.1	C106.1	Determine the value of Planck's constant (h) and understand its application in quantum mechanics.
FEL101.2	C106.2	Determine different crystal structures and draw miller indices to verify the theory learned in crystallography
FEL101.3	C106.3	Perform the experiments on various semiconductors devices and analyze their characteristics.
FEL101.4	C106.4	Perform the experiments based on interference in thin films and analyze the results.
FEL101.5	C106.5	Perform the experiments based on the super conductor and super capacitors.
FEL101.6	C106.6	Apply the knowledge and concept of physics in designing and developing mini-projects.

FEL102	C107	**Engineering Chemistry I**
FEL102.1	C107.1	Analyze water for its hardness.
FEL102.2	C107.2	Estimate viscosity of lubricant using Redwood viscometer.
FEL102.3	C107.3	Estimate chloride content of water using Mohr's method.
FEL102.4	C107.4	Estimate PH of different solutions using PH meter.
FEL102.5	C107.5	Demonstrate phenol-formaldehyde synthesis.
FEL103	**C108**	**Engineering Mechanics**
FEL103.1	C108.1	Verify the law of polygon, varignon's theorem and find the resultant of given force system
FEL103.2	C108.2	Verify the conditions of equilibrium and find the beam reactions
FEL103.3	C108.3	Analyse the friction between two different surfaces.
FEL103.4	C108.4	Demonstrate the understanding of Centroid and its significance and locate the same
FEL103.5	C108.5	Illustrate different types of motions and establish Kinematic relations for particles and rigid body.
FEL103.6	C108.6	Verify the law of conservation of momentum and find the coefficient of restitution.
FEL104	**C109**	**Basic Electrical Engineering**
FEL104.1	C109.1	Interpret and analyse the behaviour of DC circuits using network theorems
FEL104.2	C109.2	Perform and infer experiment on single phase AC circuits.
FEL104.3	C109.3	Demonstrate experiment on three phase AC circuits
FEL104.4	C109.4	Illustrate the performance of single phase transformer and machines

FEL105	**C110**	**Basic Workshop Practice I**
FEL105.1	C110.1	Acquire the skill to identify and use of the various hand tools and measuring instruments.
FEL105.2	C110.2	Model Various basic prototypes in the trade of fitting such as square, hexagonal and V Male Female joint
FEL105.3	C110.3	Dismantle and Assemble a Personal Computer, perform Basic troubleshooting and maintenance, identify network components and perform Basic networking and crimping.
FEL105.4	C110.4	Perform various basic domestic plumbing operations such as pipe cutting, threading, fitting etc.
FEC201	**C111**	**Engineering Mathematics II**
FEC201.1	C111.1	Solve differential equations of first order & first degree.
FEC201.2	C111.2	Solve linear differential equations with constant coefficients , variable coefficients of higher order.
FEC201.3	C111.3	Apply Beta, Gamma functions and D.U.I.S.to solve improper integrals.
FEC201.4	C111.4	Apply concepts of Double integral of different coordinate systems to compute Area & Mass.
FEC201.5	C111.5	Apply concepts of triple integral of different coordinate systems to find volume of a solids.
FEC201.6	C111.6	Solve Differential equations & Definite integrals using Numerical Methods.
FEC202	**C112**	**Engineering Physics II**
FEC202.1	C112.1	Apply the knowledge of diffraction of light in various engineering applications.

FEC202.2	C112.2	Apply the foundation of laser and fiber optics in development of modern communication systems.
FEC202.3	C112.3	Understand the basics of electrodynamics, which are the prerequisites for satellite communications, and antenna theory.
FEC202.4	C112.4	Explain the fundamentals of theory of relativity and its applications.
FEC202.5	C112.5	Understand the broad outline of nanotechnology and their application to engineering.
FEC202.6	C112.6	Interpret the basic sensing techniques for physical measurements in modern instrumentations.
FEC203	**C113**	**Engineering Chemistry II**
FEC203.1	C113.1	Identify types of corrosion & discuss corrosion control measures.
FEC203.2	C113.2	Analyze the quality of fuel & calculate the oxygen required for combustion of fuel.
FEC203.3	C113.3	Discuss the range of EMS used for molecular transitions in spectroscopic techniques.
FEC203.4	C113.4	Discuss the phenomenon of fluorescence & Phosphorescence.
FEC203.5	C113.5	Understand the concept of electrode potential & calculate EMF of cell.
FEC203.6	C113.6	Understand the principles of green chemistry& calculate Atom economy of chemical reaction.
FEC204	**C114**	**Engineering Graphics**
FEC204.1	C114.1	Apply the basic principles of projections in Projection of Lines and Planes
FEC204.2	C114.2	Apply the basic principles of projections in Projection of Solids & Section of solids
FEC204.3	C114.3	Apply the basic principles of projections in converting 3D view to 2D drawing.
FEC204.4	C114.4	Visualize an object from the given two views.

FEC205	**C115**	**C Programming**
FEC205.1	C115.1	Write an algorithm to support Structure Programming approach.
FEC205.2	C115.2	Use variables, derived data types and control structures to write c program
FEC205.3	C115.3	Decompose a problem into functions and synthesize a complete program
FEC205.4	C115.4	Use Array and String for solving complex computational problem
FEC205.5	C115.5	Use Structure-Union for solving complex computational problem
FEC205.6	C115.6	Use Pointers for solving complex computational problem
FEC206	**C116**	**Professional Communication and Ethics- I**
FEC206.1	C116.1	Communicate effectively using verbal/non-verbal cues at social and workplace situation.
FEC206.2	C116.2	Select/Use appropriate grammar and vocabulary in oral, written communication
FEC206.3	C116.3	Summarize/Comprehend passages, run plagiarism check softwares and generate plagiarism report for paraphrased passages
FEC206.4	C116.4	Write/ Draft academic, business and technical letter/email
FEC206.5	C116.5	Frame Definition, write user instruction, description of technical object, description of a Technical / Scientific Process
FEC206.6	C116.6	Demonstrate principles of ethics in professional environment

FEL201	C117	**Engineering Physics II**
FEL201.1	C117.1	Perform the experiment based on the diffraction of light to measure the wavelength of light using a diffraction gratingand determine the number of lines/cm on various types of grating by using laser beam.
FEL201.2	C117.2	Perform the experiment using optical fiber to measure the numerical aperture of a given fiber.
FEL201.3	C117.3	Perform the experiment to study the divergence of laser beam.
FEL201.4	C117.4	Perform experiments on nanotechnology using open source simulation software like Avogadro to draw different carbon structures.
FEL201.5	C117.5	Perform the experiments on physics of sensors to study the I-V characteristics of a Photodiode and measure the distance using an ultrasonic distance meter.
FEL201.6	C117.6	Design and implement a mini-project related to physics.
FEL202	**C118**	**Engineering Chemistry II**
FEL202.1	C118.1	Analyse fuel for moisture content.
FEL202.2	C118.2	EstimateNa,k& Ca in the given sample using flame photometer.
FEL202.3	C118.3	Estimate flash point of diesel oil using Abel's apparatus.
FEL202.4	C118.4	Estimate saponification value of vegetable oil.
FEL202.5	C118.5	Estimate acid value of vegetable oil.
FEL203	**C119**	**Engineering Graphics**
FEL203.1	C119.1	Apply the basic principles of projections in Projection of Lines and Planes and Curves

FEL203.2	C119.2	Apply the basic principles of projections in Projection of Solids & Section of solids
FEL203.3	C119.3	Apply basic AutoCAD skills to draw different views of a 3D object
FEL203.4	C119.4	Apply basic AutoCAD skills to draw the isometric view from the given two views
FEL204	**C120**	**C Programming**
FEL204.1	C120.1	Translate given algorithms to a program
FEL204.2	C120.2	Use variables, derived data types and control structures to write c program
FEL204.3	C120.3	Write iterative as well as recursive programs
FEL204.4	C120.4	Represent data in Array and String and manipulate them through a program
FEL204.5	C120.5	Use Structure-Union for solving complex computational problem
FEL204.6	C120.6	Declare pointers and demonstrate call by reference concept
FEL205	**C121**	**Professional Communication and Ethics- I**
FEL205.1	C121.1	Listen and comprehend all types of spoken discourse successfully
FEL205.2	C121.2	Speak fluently and make effective professional presentations run plagiarism check softwares and generate plagiarism report.
FEL205.3	C121.3	Read large quantities of text in a short time to comprehend, summarise and evaluate content
FEL205.4	C121.4	Draft precise business letters, academic essays and technical guidelines.
FEL205.5	C121.5	Dress finely and conduct themselves with confidence in social, academic and professional situation
FEL205.6	C121.6	Respond to moral dilemmas successfully

FEL206	**C122**	**Basic Workshop Practice II**
FEL206.1	C122.1	Use different carpentry tools and perform the basic operations like joints and wood turning practice.
FEL206.2	C122.2	Demonstrate the use of furnace and produce the simple forging job.
FEL206.3	C122.3	Demonstrate the safe wiring practices for the connection of simple electrical load/equipment.
FEL206.4	C122.4	Demonstrate the skill to fabricate and assemble PCB.
CEC301	**C201**	**Engineering Mathematics-III**
CEC301.1	C201.1	Apply the concept of Laplace transform to solve the real integrals in engineering problems.
CEC301.2	C201.2	Apply the concept of Inverse Laplace transform of various functions in engineering problems.
CEC301.3	C201.3	Apply the concept of Fourier series to expand periodic functions.
CEC301.4	C201.4	Find orthogonal trajectories and analytic function by using concepts of complex variable theory.
CEC301.5	C201.5	Apply matrix theory to solve the system of linear equations and eigen values and eigen vectors and their applications.
CEC301.6	C201.6	Solve Partial differential equations by applying numerical solution for one dimensional heat and wave equations.
CEC302	**C202**	**Mechanics of Solids**
CEC302.1	C202.1	To evaluate stress-strain behavior of elastic members and thin cylinders subjected to internal pressure.

CEC302.2	C202.2	To analyse the determinate beams and frames for the internal forces (SF, BM, AF) to draw SFD, BMD, AFD.
CEC302.3	C202.3	To calculate the moment of inertia for cross sections and analyze the material response under the action of flexure and shear.
CEC302.4	C202.4	To predict and compute the angle of twist, shear stresses developed in torsion and also to evaluate direct and bending stresses in the axially and eccentrically loaded columns.
CEC302.5	C202.5	To evaluate principal stresses with their directions using analytical and graphical methods.
CEC302.6	C202.6	To evaluate slope and deflections for the beams supported and loaded in different ways.
CEC303	**C203**	**Engineering Geology**
CEC303.1	C203.1	Students will be able to explain the concepts of geology & its application for safe, stable & economical design of any civil engineering structure
CEC303.2	C203.2	Students will be able to investigate & intrepret the litholocal characters of rock specimen and distinguish them.
CEC303.3	C203.3	Students will be able to describe the structural elements of the rocks and implement the knowledge for collection and analysis of the geological data using maps
CEC303.4	C203.4	Students will be able to compute RQD for rock masses & interpret geological conditions for dam & reservoir site
CEC303.5	C203.5	Students will be able to compute rock mass rating for assessing tunnelling conditions & ground water potential
CEC303.6	C203.6	Students will be able to intrepret causes of geological hazards & their prevention
CEC304	**C204**	**Architectural Planning & Design of Buildings**

CEC304.1	C204.1	Design Residential & Commercial building making use of the codes of practices, principle of planning.
CEC304.2	C204.2	Sketch the components and services of building structure using code of practice.
CEC304.3	C204.3	Sketch one and two-point perspective drawings for any object.
CEC304.4	C204.4	Illustrate the concepts of town plannig making use of master plan
CEC304.5	C204.5	Prepare the report for green building certification process as per IGBC norms.
CEC304.6	C204.6	
CEC305	**C205**	**Fluid Mechanics- I**
CEC305.1	C205.1	Identify of various properties of fluids and derive the laws when fluid is at rest and calculate Hydrostatic force and is location for a given geometry
CEC305.2	C205.2	Compute force of buouyancy on a partially or fully submerged body and Analyze the stability of a floating body
CEC305.3	C205.3	Classify velocity potential function and stream function and solve for velocity and Acceleration of a fluid at a given location in a fulid flow
CEC305.4	C205.4	Derive Euler's Equation of motion and construct Bernoulli's equation
CEC305.5	C205.5	Calculate the flow through various devices like orifices, mouthpieces, notches and weirs
CEC305.6	C205.6	Identify the compressible flow, propagation of pressure waves and stagnation properties
CEL301	**C206**	**Mechanics of Solids**
CEL301.1	C206.1	To evaluate the stress-strain behaviour of materials and assess the structural behaviour by the virtue of stresses developed and deformation of elastic members.

CEL301.2	C206.2	To analyse the material response under the action of shear and the effect of flexure (bending).
CEL301.3	C206.3	To determine the angle of twist and shear stress developed in torsion.
CEL301.4	C206.4	To evaluate the slope and deflection of beams supported and loaded in different ways.
CEL302	**C207**	**Engineering Geology**
CEL302.1	C207.1	Identify various rock/ ore forming minerals on the basis of physical properties.
CEL302.2	C207.2	Explain the characteristics of Igneous, Sedimentary and Metamorphic rocks and assess their suitability as construction material and foundation rock.
CEL302.3	C207.3	Sketch & Interpret the geological map and assess the suitability of the site for Civil Engineering
CEL302.4	C207.4	Solve the borehole problems and interpret it in order to understand subsurface Geology of the area.
CEL302.5	C207.5	Calculate RQD and evaluate the rock masses for Civil Engineering Works
CEL303	**C208**	**Architectural Planning & Design of Buildings**
CEL303.1	C208.1	Plan and sketch working drawing for residential building by implementing the principles of planning of buildings, Green building principles, byelaws, regulations and codes for planning.
CEL303.2	C208.2	Plan and sketch working drawing for public building by implementing the principles of planning of buildings, Green building principles, byelaws, regulations and codes for planning
CEL303.3	C208.3	Sketch structural details of any component of the building.
CEL303.4	C208.4	Prepare perspective views for all types of buildings.

CEL304	C209	**Fluid Mechanics- I**
CEL304.1	C209.1	Examine the metacentric height of floating body and analyse it's stability
CEL304.2	C209.2	Verify the Bernouli's equation
CEL304.3	C209.3	Determine the Discharge Coefficient of Venturimeter, orificemeter, nozzlemeter , mouthpiece, weirs (Broad Crested weir and Ogee weir) and Notches (Rectangular and Triangular notch)
CEL304.4	C209.4	Determine the value of coefficient of contraction, coefficient of velocity and coefficient of discharge for the given orifice
CEL305	C210	**Skill Based Lab Course-I**
CEL305.1	C210.1	To illustrate various Computer Aided Drawing and Drafting (CADD) tools available for civil engineering projects in the market.
CEL305.2	C210.2	To sketch a Line plan and Developed Plan of a residential and a Public Building using CADD tools.
CEL305.3	C210.3	To illustrate various commands, features, capabilities, and functions of a peculiar building information modeling (BIM) Software.
CEL305.4	C210.4	To sketch and model a residential building of G+1 Building and also families required for the same.
CEM301	C211	**Mini Project – 1 A**
CEM301.1	C211.1	Identify problems based on societal /research needs and formulate a solution strategy.
CEM301.2	C211.2	Apply Knowledge and skill to solve societal problems in a group.
CEM301.3	C211.3	Develop interpersonal skills to work as member of a group or leader.
CEM301.4	C211.4	Draw the proper inferences from available results through theoretical/ experimental/simulations.

CEM301.5	C211.5	Analyse the impact of solutions in societal and environmental context for sustainable development.
CEM301.6	C211.6	Use standard norms of engineering practices
CEC401	**C212**	**Engineering Mathematics - IV**
CEC401.1	C212.1	Apply the concepts of vector calculus to evaluation of line integrals, surface integrals using Green's theorem, Stoke's theorem & Gauss Divergence.
CEC401.2	C212.2	Use the concepts of complex integration for evaluating integrals, computing residues & evaluate various contour integrals.
CEC401.3	C212.3	Apply the concepts of correlation, regression and curve fitting to the engineering problems.
CEC401.4	C212.4	Apply the concepts of probability and expectation , Variance for the analysis of data.
CEC401.5	C212.5	Apply the concept of probability distribution to engineering problems & testing hypothesis of small samples using small sampling theory.
CEC401.6	C212.6	Apply the concept of parametric and non-parametric tests for analyzing practical problems.
CEC402	**C213**	**Structural Analysis**
CEC402.1	C213.1	Calculate axial forces on co planar truss using methods of sections and methods of joints and also calculate radial shear, normal thrust and bending moment in 3-hinged parabolic arch.
CEC402.2	C213.2	Apply the principle and draw ILD for axial forces in trusses, reactions, SF and BM in beams.
CEC402.3	C213.3	Calculate rotation and displacement at a joint of frames and deflection at any joint of truss will able to compute static and kinematic indeterminacy of the structure.

CEC402.4	C213.4	Apply flexibility method and make use of Clapeyron's theorem to analyse the indeterminate structures.
CEC402.5	C213.5	Analyze the indeterminate structures such as beams & simple rigid jointed frames using direct stiffness method.
CEC402.6	C213.6	Analyze the indeterminate structures using Moment Distribution as Stiffness method and make plastic analysis.
CEC403	**C214**	**Surveying**
CEC403.1	C214.1	Apply the principles of surveying and field procedures to conduct the various surveys related to Civil Engineering.
CEC403.2	C214.2	Apply the principles of levelling & Contouring in profile levelling for road projects, tunneling, laying of sewer line etc.
CEC403.3	C214.3	Demonstrate the concept of theodolite survey, its principles for various applications in civil engineering fields.
CEC403.4	C214.4	Employ different methods of tacheometric surveying and apply knowledge of total station and other EDM on field.
CEC403.5	C214.5	Implement the concepts of plane table surveying, computation of area and volume by using various surveying instruments on field
CEC403.6	C214.6	Use the knowledge of setting out various types of curves by linear and angular methods for civil engineering projects
CEC404	**C215**	**Building Materials &Concrete Technology**
CEC404.1	C215.1	To develop and implement the conceptual knowledge of building materials in the construction industry.
CEC404.2	C215.2	Explain & interpret manufacturing process of basic construction materials & other natural materials

CEC404.3	C215.3	To examine properties & constituents of concrete and their effects on concrete properties
CEC404.4	C215.4	Determine the properties of fresh and hardened concrete & durability assessment for concrete
CEC404.5	C215.5	To design concrete mixes in accordance to codal provisions
CEC404.6	C215.6	To explore the new technology for manufacturing, testing and quality of concrete.
CEC405	**C216**	**Fluid Mechanics-II**
CEC405.1	C216.1	Students will be able to Analyze flow through pipes, various losses through pipes, pipe network and power transmission through nozzle
CEC405.2	C216.2	Students will be able to interpret laminar flow through circular pipe, parallel plates (stationary and moving)
CEC405.3	C216.3	Students will be able to examine rough and smooth boundaries for a turbulent flow through circular pip
CEC405.4	C216.4	Students will be able to make inferences on forces on submerged bodies due to formation of boundary layer.
CEC405.5	C216.5	Students will be able to apply the moment of momentum principle to various applications.
CEC405.6	C216.6	Students will be able to establish relations between prototype and model based on dimensional analysis
CEL401	**C217**	**Structural Analysis**
CEL401.1	C217.1	Calculate axial forces on co planar truss using methods of sections and methods of joints and also calculate radial shear, normal thrust and bending moment in 3-hinged parabolic arch.
CEL401.2	C217.2	Apply the principle and draw ILD for axial forces in trusses, reactions, SF and BM in beams.

CEL401.3	C217.3	Calculate rotation and displacement at a joint of frames and deflection at any joint of truss will able to compute static and kinematic indeterminacy of the structure.
CEL401.4	C217.4	Apply flexibility method and make use of Clapeyron's theorem to analyse the indeterminate structures.
CEL401.5	C217.5	Analyze the indeterminate structures such as beams & simple rigid jointed frames using direct stiffness method.
CEL401.6	C217.6	Analyze the indeterminate structures using Moment Distribution as Stiffness method and make plastic analysis.
CEL402	**C218**	**Surveying**
CEL402.1	C218.1	Determine the area of an irregular plot by Chain, theodolite & modern Surveying methods
CEL402.2	C218.2	Calculate the bearings for positionoing a particular point on surface of earth.
CEL402.3	C218.3	Apply traversing knowledge for calculating area of survey and locatig important points
CEL402.4	C218.4	Apply Surveying knowledge for carrying out feasibility studies of any knew project
CEL403	**C219**	**Building Materials &Concrete Technology**
CEL403.1	C219.1	determine physical and mechanical properties of materials used in the manufacturing of concrete like cement and aggregates.
CEL403.2	C219.2	test the physical attributes and mechanical strength of burnt clay bricks used in the construction of structures
CEL403.3	C219.3	determine the various properties of fresh and hardened concrete with and without the addition of admixtures.

CEL403.4	C219.4	study the different basic non-destructive tests conducted in the laboratory or on site to determine the durability and strength of existing concrete structures.
CEL403.5	C219.5	utilize the knowledge of mix design in the manufacturing of concrete, in the laboratory.
CEL403.6	C219.6	understand the practical scenario of the commonly used building materials in terms of their availability, cost and significance through market surveys.
CEL404	**C220**	**Fluid Mechanics-II**
CEL404.1	C220.1	Verify the Reynold's experiment & Assess the flow pattern and velocity distribution in pipe flow
CEL404.2	C220.2	Estimate the viscosity of fluid
CEL404.3	C220.3	Calculate the losses in pipes (major & minor)
CEL404.4	C220.4	learn the water hammer phenomenon through demonstration
CEL404.5	C220.5	learn the wind tunnel testing through demonstration
CEL405	**C221**	**Skill Based Lab Course-II**
CEL405.1	C221.1	To prepare plans, elevation, and 3D views with the help of output of Total Station
CEL405.2	C221.2	To compute height of a structure, area of a plot, demarcating boundaries using the output of Total Station.
CEL405.3	C221.3	To compute the point, line and area features using Global Navigation Satellite System.
CEL405.4	C221.4	To plot various existing features in a geographic area on a GIS platform.

CEM401	C222	Mini Project – 1 B
CEM401.1	C222.1	Identify problems based on societal /research needs and formulate a solution strategy.
CEM401.2	C222.2	Apply Knowledge and skill to solve societal problems in a group.
CEM401.3	C222.3	Develop interpersonal skills to work as member of a group or leader.
CEM401.4	C222.4	Draw the proper inferences from available results through theoretical/ experimental/simulations.
CEM401.5	C222.5	Analyse the impact of solutions in societal and environmental context for sustainable development.
CEM401.6	C222.6	Use standard norms of engineering practices
CEC501	C301	Theory of Reinforced Concrete Structures
CEC501.1	C301.1	Evaluate the design parameters of a beam for given condition by using WSM
CEC501.2	C301.2	Evaluate the design parameters of a beam for given condition by using LSM.
CEC501.3	C301.3	Evaluate the design parameters of a Slab for given condition by using LSM.
CEC501.4	C301.4	Evaluate the design parameters of Column for given condition by using LSM.
CEC501.5	C301.5	Evaluate the design parameters of a L & T beam, shear and torsional reinforcement for given condition by using LSM.
CEC501.6	C301.6	Evaluate the design parameters of a footing for given condition by using LSM.
CEC502	C302	Applied Hydraulics
CEC502.1	C302.1	Examine the dynamic force exerted by jet of water on stationary, moving, hinged and series of plates.
CEC502.2	C302.2	Distinguish between different types of hydraulic turbine, characteristics curves and its application under

		different circumstances.
CEC502.3	C302.3	Analyze centrifugal pump by incorporating velocity triangles diagrams
CEC502.4	C302.4	Identify the hydraulic behavior for the uniform channel flow and design the most economical section of the channels.
CEC502.5	C302.5	Calculate the hydraulic jump, surges, uniform and gradually varying flow for non-uniform flow.
CEC502.6	C302.6	Demonstrate the working mechanism of hydraulic machines.
CEC503	**C303**	**Geotechnical Engineering-I**
CEC503.1	C303.1	Solve numericals by making use of fundamental definition and relationships.
CEC503.2	C303.2	Understand clay minerology and calculate plasticity characteristics of soil using given data.
CEC503.3	C303.3	Classify soil type & group using Indian soil classification system.
CEC503.4	C303.4	Calculate permeability & seepage of soil using laboratory and field data.
CEC503.5	C303.5	Calculate total and effective stress of a soil sample.
CEC503.6	C303.6	Understand soil exploration process & calculate compactive characteristics of a soil sample.
CEC504	**C304**	**Transportation Engineering**
CEC504.1	C304.1	To sumarise Roadways, Railways, Airways and Waterways Transportation Modes.
CEC504.2	C304.2	To understand the planning of highway and calculate the geometric parameters essential for highway construction.
CEC504.3	C304.3	To calculate elements of Traffic Engineering for efficient planning and control.

CEC504.4	C304.4	To calculate design parameters for Rigid and flexible pavements using IRC codes.
CEC504.5	C304.5	To provide soil stabilization and drainage system for pavement construction.
CEC504.6	C304.6	To calculate the deflection characteristics and to identify failure in rigid and flexible pavement.
CEDLO5012	**C305**	**Building Services & Repairs**
CEDLO5012.1	C305.1	Use the knowledge of utility services in making a building safe and comfortable
CEDLO5012.2	C305.2	Choose appropriate fire safety and Plumbing systems for building construction projects.
CEDLO5012.3	C305.3	Apply the knowledge of electrical services for effective planning of electrical system in buildings.
CEDLO5012.4	C305.4	Examine the cause of deterioration of damaged structure by assessing its structural health.
CEDLO5012.5	C305.5	Choose the suitable material and technique for repairing the concrete structures.
CEDLO5012.6	C305.6	Employ corrosion protection method to improve the life of RCC structure.
CEDLO5017	**C306**	**Advanced Concrete Technology**
CEDLO5017.1	C306.1	To determine the effect of various ingredients of concrete, and summarise the properties of fresh concrete and rheological models.
CEDLO5017.2	C306.2	To examine the various testing methods on concrete
CEDLO5017.3	C306.3	To apply and understand the concept of durability, cracking of concrete and concreting under extreme conditions
CEDLO5017.4	C306.4	To design the concrete mix for field application by different methods
CEDLO5017.5	C306.5	To apply the various properties of special concrete to different site conditions

CEDLO5017.6	C306.6	To determine the quality of concrete and understand the acceptance criteria
CEL501	**C307**	**Theory of Reinforced Concrete Structures**
CEL501.1	C307.1	Evaluate the design parameters of a beam for given condition by using WSM
CEL501.2	C307.2	Evaluate the design parameters of a beam for given condition by using LSM.
CEL501.3	C307.3	Evaluate the design parameters of a Slab for given condition by using LSM.
CEL501.4	C307.4	Evaluate the design parameters of Column for given condition by using LSM.
CEL501.5	C307.5	Evaluate the design parameters of a L & T beam, shear and torsional reinforcement for given condition by using LSM.
CEL501.6	C307.6	Evaluate the design parameters of a footing for given condition by using LSM.
CEL502	**C308**	**Applied Hydraulics**
CEL502.1	C308.1	Calculate the rate of flow ,Chezy's constant and hydraulic jump through open channel flow
CEL502.2	C308.2	Evaluate the Gradually varied flow (G.V.F) and Rapid varied flow (R.V.F) in open channel flow
CEL502.3	C308.3	Evaluate the efficiencies and working of various pumps, turbines and hydraulic machines
CEL502.4	C308.4	Apply impulse momentum priciple to calculate the impact of jet on flat, inclined and curved vanes
CEL503	**C309**	**Geotechnical Engineering-I**
CEL503.1	C309.1	Determine Index properties of soil in accordance with IS 2720.

CEL503.2	C309.2	Determine Plasticity properties of soil in accordance with IS 2720.
CEL503.3	C309.3	Demonstrate soil classification using grain size distribution.
CEL503.4	C309.4	Determine compaction characteristics of soil in accordance to IS 2720.
CEL504	**C310**	**Transportation Engineering**
CEL504.1	C310.1	To determine Penetration grade and Viscosity grade of bitumen.
CEL504.2	C310.2	To determine the Softening point and Ductility value of bitumen.
CEL504.3	C310.3	To determine Impact, Abrasion and Crushing value of aggregate.
CEL504.4	C310.4	To determine the flakiness and elongation of the aggregates.
CEL504.5	C310.5	To determine the Classified volume study and plot speed profile at mid-block section.
CEL505	**C311**	**Professional Communication and Ethics**
CEL505.1	C311.1	Write effective business/ technical documents.
CEL505.2	C311.2	Relate and apply strategies for personal and professional skills to meet the demands of the industry
CEL505.3	C311.3	Apply various techniques to be successful in group discussions, technical presentation and meetings
CEL505.4	C311.4	Deliver successful professional presentations
CEL505.5	C311.5	Develop creative thinking and interpersonal skills
CEL505.6	C311.6	Apply codes of ethical conduct & organizational behaviour

CEM501	C312	Mini Project –2 A
CEM501.1	C312.1	Identify problems based on societal /research needs and formulate a solution strategy.
CEM501.2	C312.2	Apply fundamentals to develop solutions to solve societal problems in a group
CEM501.3	C312.3	Analyze the specific need, formulate the problem and deduce the interdisciplinary approaches, software-based solutions and computer applications.
CEM501.4	C312.4	Develop systematic flow chart, evaluate inter disciplinary practices, devices, available software, estimate and recommend possible solutions.
CEM501.5	C312.5	Draw the proper inferences from available results through theoretical/ experimental/ simulations and assemble physical systems
CEM501.6	C312.6	Create devises or design a computer program or develop computer application
CEC601	C313	Design & Drawing of Steel Structures
CEC601.1	C313.1	Apply the knowledge of Limit State Design philosophy as applied to steel structures using IS 800 code clause
CEC601.2	C313.2	Students will be able to design bolted and welded connections
CEC601.3	C313.3	Students will be able to design design members subjected to axial tension
CEC601.4	C313.4	Students will be able to design compression members, Built-up columns and column bases based on codal provisions.
CEC601.5	C313.5	Students will be able to design members subjected to flexure based on codal provision
CEC601.6	C313.6	Students will be able to design the various parts of a Roof truss by determining loads using relevant codal provisions

CEC602	C314	**Water Resources Engineering**
CEC602.1	C314.1	Calculate the crop water requirement and classify various types of irrigation methods
CEC602.2	C314.2	Calculate the flood discharge and run-off by different methods for the planning and management of water resource projects
CEC602.3	C314.3	Apply knowledge of ground water, well hydraulics and estimate safe yield capacity
CEC602.4	C314.4	Analyze and design of gravity and earthen dams with spillway for sustainable development
CEC602.5	C314.5	Compare and analyze the irrigation channel using Lacey's and Kennedy's theory
CEC602.6	C314.6	Classify various canal structures and suggest remedial measures for water logging
CEC603	**C315**	**Geotechnical Engineering-II**
CEC603.1	C315.1	Calculate consolidation characteristics and settlement for a given soil mass.
CEC603.2	C315.2	Calculate shear strength for a given soil mass.
CEC603.3	C315.3	Calculate factor of safety of a slope subjected to given field conditions.
CEC603.4	C315.4	Calculate lateral earth pressure and other parameters for designing retaining walls.
CEC603.5	C315.5	Calculate load bearing capacity of shallow foundation using analytical and field methods.
CEC603.6	C315.6	Calculate load bearing capacity of pile foundation using analytical and field methods.
CEC604	**C316**	**Environmental Engineering**
CEC604.1	C316.1	Understand the importance of a proper water supply system and identify the characteristics of water.
CEC604.2	C316.2	Apply the necessary knowledge for the design and operation of various units of water treatment plant

CEC604.3	C316.3	Prepare the building water supply and drainage system and calculate annual rainwater harvesting potential.
CEC604.4	C316.4	Identify the different components of sewerage system and calculate the BOD value by using the knowledge of characteristics of sewage
CEC604.5	C316.5	Apply the necessary knowledge for the design and operation of various units of sewage treatment plant
CEC604.6	C316.6	Apply the basic concepts of Air pollution, noise pollution and solid waste calculate the sound level to control its adversity on ambient environment.
CEDLO6013	**C317**	**Construction Equipment & Techniques**
CEDLO6013.1	C317.1	Demonstrate the knowledge of working and application of standard construction equipment's.
CEDLO6013.2	C317.2	Select correct method and construction equipment for underground & underwater tunelling
CEDLO6013.3	C317.3	Compare and use the appropriate conventional and modern methods of formwork based on productivity, reuse, value, ease of erection and dismantling, flexibility offered and overall cost.
CEDLO6013.4	C317.4	Apply the knowledge of pipeline insertion system in locating underground utilities.
CEDLO6013.5	C317.5	Implement the knowledge construction techniques for proper working of power generating structures.
CEDLO6013.6	C317.6	Schedule the techniques involved and the equipments required thereof for construction of various transporting facilities.
CEDLO6014	**C318**	**Urban Infrastructure Planning**
CEDLO6014.1	C318.1	Envisage and plan the various elements required for infrastructure development of a city.
CEDLO6014.2	C318.2	Evaluate technical, social and economic feasibility of transportation projects within cities.
CEDLO6014.3	C318.3	Demonstrate modern tool usage for urban management and governance.

CEDLO6014.4	C318.4	Envisage and plan environmentally safe and disaster resilient infrastructure.
CEL601	**C319**	**Design & Drawing of Steel Structures**
CEL601.1	C319.1	Calculate dead, live and wind loads on the structure.
CEL601.2	C319.2	Analyze the structure by analytical/graphical method
CEL601.3	C319.3	Use steel table for selecting appropriate section
CEL601.4	C319.4	Design the members for various load combinations
CEL601.5	C319.5	Design the bolted and welded connection
CEL601.6	C319.6	Read and Prepare the detailed fabrication drawing and design report
CEL602	**C320**	**Water Resources Engineering**
CEL602.1	C320.1	Calculate the crop water requirement and classify various types of irrigation methods
CEL602.2	C320.2	Calculate the flood discharge and run-off by different methods for the planning and management of water resource projects
CEL602.3	C320.3	Apply knowledge of ground water, well hydraulics and estimate safe yield capacity
CEL602.4	C320.4	Analyze and design of gravity and earthen dams with spillway for sustainable development
CEL602.5	C320.5	Compare and analyze the irrigation channel using Lacey's and Kennedy's theory
CEL602.6	C320.6	Classify various canal structures and suggest remedial measures for water logging

CEL603	C321	**Geotechnical Engineering-II**
CEL603.1	C321.1	Determine consolidation parameters such as coefficient of compressibility, coefficient of volume change, coefficient of consolidation using oedometer.
CEL603.2	C321.2	Determine cohesion and angle of shearing resistance for given soil using laboratory methods.
CEL603.3	C321.3	Determine the CBR value of soil for pavement design using CBR machine.
CEL603.4	C321.4	Calculate stress distribution in soils due to vertically applied load.
CEL604	**C322**	**Environmental Engineering**
CEL604.1	C322.1	Analyse the characteristics of water sample and solid waste
CEL604.2	C322.2	Analyse the characteristics of sewage sample
CEL604.3	C322.3	Compare the BOD and COD of sewage sample
CEL604.4	C322.4	Inspect the levels of noise and interpret the results and also determine the air quality
CEL605	**C323**	**Skill Based Lab Course-III**
CEL605.1	C323.1	To analyze RCC framed structure using E-Tabs.
CEL605.2	C323.2	To analyze Steel Structure using E-Tabs.
CEL605.3	C323.3	To prepare spreadsheet for Concrete Mix Design using MS-Excel.
CEL605.4	C323.4	To prepare spreadsheet for RCC structural member design using MS-Excel.

CEM601	C324	Mini Project – 2 B
CEM601.1	C324.1	Identify problems based on societal /research needs and formulate a solution strategy.
CEM601.2	C324.2	Apply fundamentals to develop solutions to solve societal problems in a group
CEM601.3	C324.3	Analyze the specific need, formulate the problem and deduce the interdisciplinary approaches, software-based solutions and computer applications.
CEM601.4	C324.4	Develop systematic flow chart, evaluate inter disciplinary practices, devices, available software, estimate and recommend possible solutions.
CEM601.5	C324.5	Draw the proper inferences from available results through theoretical/ experimental/ simulations and assemble physical systems
CEM601.6	C324.6	Create devises or design a computer program or develop computer application
CEC701	C401	**Design & Drawing of Reinforced Concrete Structures**
CEC701.1	C401.1	Design of dog legged and open well type staircase using limit state method.
CEC701.2	C401.2	Design cantilever and counter fort type retaining wall using limit state method.
CEC701.3	C401.3	Design components of building such as slab, column, beam,footing using relevant IS codes.
CEC701.4	C401.4	Design water tank using working stress method.
CEC701.5	C401.5	Calculate design forces by using seismic coefficient method
CEC701.6	C401.6	Determination of Stresses in prestress concrete member
CEC702	C402	**Quantity Survey, Estimation and Valuation**
CEC702.1	C402.1	To prepare an approximate estimate by using Plinth Area Method.

CEC702.2	C402.2	To prepare the detailed estimate of a construction project by using Long Wall-Short Wall and Centre Line method.
CEC702.3	C402.3	To prepare the Rate Analysis for construction activities as per Indian Standard (IS 1200-1964) and DSR.
CEC702.4	C402.4	To prepare Bar Bending Schedule of structural members as per Indian Standard (IS 1200-1964).
CEC702.5	C402.5	To compute volume of earthwork for roads and canals by using different methods.
CEC702.6	C402.6	To analyze the valuation of any Land and Building using different methods.
CEDLO7011	**C403**	**Pre-stressed Concrete**
CEDLO7011.1	C403.1	To relate the advantages of Prestressed Concrete to Reinforced concrete and illustrate the prestressing systems used.
CEDLO7011.2	C403.2	To calculate the resultant stresses in Prestressed and Post-tensioned concrete members using the Stress concept, P-line Concept, and Load balancing Method.
CEDLO7011.3	C403.3	To calculate the losses in Prestressing Steel used in Prestressed and Post-tensioned Concrete members.
CEDLO7011.4	C403.4	To calculate short-term and long-term deflection in Prestressed Concrete Beams.
CEDLO7011.5	C403.5	To calculate the Shear and Flexural Reinforcement required in Prestressed and Post Tensioned Beams.
CEDLO7011.6	C403.6	To calculate Safe Cable Zone and Effective Prestressing Force.
CEDLO7013	**C404**	**Appraisal and Implementation of Infra Projects**
CEDLO7013.1	C404.1	To classify projects and describe the stages of project formulation.
CEDLO7013.2	C404.2	To prepare detailed project report of any construction project

CEDLO7013.3	C404.3	To predict market demand of any construction project by using different methods.
CEDLO7013.4	C404.4	To select construction project based financial and economic aspects of the entity.
CEDLO7013.5	C404.5	To identify various sources of finance and select appropriate source for project implementation.
CEDLO7013.6	C404.6	To select appropriate method for project implementation.
CEDLO7021	**C405**	**Foundation Analysis and Design**
CEDLO7021.1	C405.1	Estimate vertical stress condition in soils.
CEDLO7021.2	C405.2	Calculate the safe allowable bearing capacity of shallow foundation under different soil conditions.
CEDLO7021.3	C405.3	Calculate the load carrying capacity of pile foundation under different soil conditions
CEDLO7021.4	C405.4	Calculate design parameters of floating and well foundation under different soil condition.
CEDLO7021.5	C405.5	Calculate design parameters of Braced cuts & Sheet piles
CEDLO7021.6	C405.6	Calculate design parameters of different components of machine foundation.
CEDLO7022	**C406**	**Solid and Hazardous Waste Management**
CEDLO7022.1	C406.1	Solve the numericals related to properties and composition of solid waste
CEDLO7022.2	C406.2	Classify the seggregation and transportation methods of solid waste
CEDLO7022.3	C406.3	Compare the thermal,biological and chemical waste processing techniques
CEDLO7022.4	C406.4	Utilize necessary knowledge and concepts of landfill for disposal.
CEDLO7022.5	C406.5	Prepare the process of hazardous waste management using its safe handling and disposal methods
CEDLO7022.6	C406.6	Prepare the waste management process required for assorted solid waste

ILO7013	**C407**	**Management Information Systems**
ILO7013.1	C407.1	Identify the impact of information systems on an organization
ILO7013.2	C407.2	Use tools and technologies to access database information for improving business performance and decision making
ILO7013.3	C407.3	Identify the threats to information systems and apply security controls for IS
ILO7013.4	C407.4	Identify use of social computing for business-shopping, Marketing, Operational and Analytic CRM, E-business and E-commerce.
ILO7013.5	C407.5	Use technologies that underlie pervasive computing, providing examples of how businesses can utilize each one.
ILO7013.6	C407.6	Identify the Transaction Processing, Functional Area Information and ERP system for enterprise-wide knowledge management
ILO7017	**C408**	**Disaster Management and Mitigation Measures**
ILO7017.1	C408.1	Identify the effects of Disasters by understanding the scenario of disasters in India
ILO7017.2	C408.2	Compare Manmade and Natural disasters and their extent and possible effects on the economy
ILO7017.3	C408.3	Categorize the Government Policies, acts and administration based on the level of Disaster
ILO7017.4	C408.4	Employ the knowledge of Institutional Framework for Disaster Management in India
ILO7017.5	C408.5	Apply the knowledge of Financing and Relief Measures
ILO7017.6	C408.6	Utilize the of Preventive and Mitigation Measures to act during the disasters

CEL701	C409	**Design & Drawing of Reinforced Concrete Structures**
CEL701.1	C409.1	Design of dog legged and open well type staircase using limit state method.
CEL701.2	C409.2	Design cantilever and counter fort type retaining wall using limit state method.
CEL701.3	C409.3	Design components of building such as slab, column, beam,footing using relevant IS codes.
CEL701.4	C409.4	Design water tank using working stress method.
CEL701.5	C409.5	Calculate design forces by using seismic coefficient method
CEL701.6	C409.6	Determination of Stresses in prestress concrete member
CEL702	C410	**Quantity Survey, Estimation and Valuation**
CEL702.1	C410.1	To prepare an approximate estimate by using Plinth Area Method.
CEL702.2	C410.2	To prepare the detailed estimate of a construction project by using Long Wall-Short Wall and Centre Line method.
CEL702.3	C410.3	To prepare the Rate Analysis for construction activities as per Indian Standard (IS 1200-1964) and DSR.
CEL702.4	C410.4	To prepare Bar Bending Schedule of structural members as per Indian Standard (IS 1200-1964).
CEL702.5	C410.5	To compute volume of earthwork for roads and canals by using different methods.
CEL702.6	C410.6	To analyze the valuation of any Land and Building using different methods.
CEP701	C411	**Major Project - 1**

CEP701.1	C411.1	Explore beyond the curriculum to identify problem of society, industrial or research needs; investigate the problem through in-depth literature survey and propose appropriate solution to solve the problem.
CEP701.2	C411.2	Implement the methodology with modern tools and provide sustainable solution with effective utilization of the resources available.
CEP701.3	C411.3	Analyze and compare the results with the standard results.
CEP701.4	C411.4	Work as an individual and contribute as a team member with effective management skills to achieve a common objective.
CEP701.5	C411.5	Write and present their work effectively with ethical values.
CEP701.6	C411.6	Engage themselves in area of their interest applying the knowledge gained and explore new technical trends.
CEC801	**C412**	**Construction Management**
CEC801.1	C412.1	To understand and apply the principles and functions of Construction Management.
CEC801.2	C412.2	To develop a Work Break Down Structure and Bar charts for the construction project.
CEC801.3	C412.3	To identify schedule time required for completion of project by using CPM & PERT techniques.
CEC801.4	C412.4	To Apply Resource allocation method for the construction project.
CEC801.5	C412.5	To understand project monitoring process and optimize the Time-Cost trade-off.
CEC801.6	C412.6	To understand and apply Safety Measures, Quality aspects of construction work and legislation (Labour).
CEDLO8011	**C413**	**Bridge Engineering**
CEDLO8011.1	C413.1	Choose the suitable type of bridge according to site condition

CEDLO8011.2	C413.2	Analyse loads on decks slab and girders and design the Steel bridges, lattice girder bridge and balance cantilever bridges by IRC and IRS loading conditions
CEDLO8011.3	C413.3	Analyse RCC slab bridge, trussed girders, Prestressed Concrete Bridges, Steel bridges, lattice girder bridge and balance cantilever bridges
CEDLO8011.4	C413.4	To explain the various methods for the erection of the bridge girders.
CEDLO8011.5	C413.5	Choose different foundations, Piers and Abutments based on their Suitability.
CEDLO8011.6	C413.6	Choose different methods of erection for construction of bridge superstructure and repair techniques of existing bridges.
CEDLO8015	**C414**	**Industrial Waste Treatment**
CEDLO8015.1	C414.1	to interpret various quality standards, characteristics, toxicity of industrial wastewater, effects on stream and also calculate the BOD of wastewater.
CEDLO8015.2	C414.2	to illustrate quality standards of stream and effluent and also calculate Oxygen deficit using Streeter Phelps Equation.
CEDLO8015.3	C414.3	to illustrate techniques of waste minimization and methods to treat Industrial Wastewater.
CEDLO8015.4	C414.4	to illustrate techniques of waste minimization and treatment of Industrial wastewater.
CEDLO8015.5	C414.5	to interpret the manufacturing process of industries and the treatment of wastewater.
CEDLO8015.6	C414.6	to illustrate the framework for the remediation of industrial wastewater through environmental impact assessment, environmental audit, and common effluent treatment plant.
CEDLO8021	**C415**	**Repairs, Rehabilitation and Retrofitting of Structures**
CEDLO8021.1	C415.1	Understand the need of repairs and use its concept in R.C.C Structures

CEDLO8021.2	C415.2	Examine the cause of deterioration of damaged structures by assesing its structural health
CEDLO8021.3	C415.3	Choose the correct material and technique for repairing the concrete structures
CEDLO8021.4	C415.4	Examine the structure and suggest suitable rehabilitation & retrofitting methods
CEDLO8021.5	C415.5	Apply the knowledge to repair steel structures
CEDLO8021.6	C415.6	Examine the structures damaged by earthquake and suggest repair and maintainence method
CEDLO8023	**C416**	**Transportation System Engineering**
CEDLO8023.1	C416.1	To illustrate various elements of the transportation system in the country, NUTP, and the Environmental Impact of a transportation project.
CEDLO8023.2	C416.2	To calculate the dimensions of the Runway, Taxiway, and Aprons and illustrate the parameters of Airport planning.
CEDLO8023.3	C416.3	To illustrate Aircraft movement control aids and aspects of planning for Helicopters
CEDLO8023.4	C416.4	To calculate geometric parameters of a Railway System and explain the aspects of Modern Train.
CEDLO8023.5	C416.5	To illustrate different components of Water Transport.
CEDLO8023.6	C416.6	To calculate hydrological parameters of a bridge and explain the elements of it.
ILO8011	**C417**	**Project Management**
ILO8011.1	C417.1	Apply selection criteria and select an appropriate project from different options
ILO8011.2	C417.2	Write work break down structure for a project and develop a schedule based on it
ILO8011.3	C417.3	Identify opportunities and threats to the project and decide an approach to deal with them strategically

ILO8011.4	C417.4	Use Earned value technique and determine & predict status of the project
ILO8011.5	C417.5	Capture lessons learned during project phases and document them for future reference
ILO8019	**C418**	**Environmental Management**
ILO8019.1	C418.1	Apply the knowledge of Environment Management and sustainable development
ILO8019.2	C418.2	Identify Global Environmental Concerns and Hazards.
ILO8019.3	C418.3	Employ the Concept of Ecology and interdependence between ecosystem and living organisms
ILO8019.4	C418.4	Utilize the knowledge of Scope of Environment Management and Corporate Env Responsibility
ILO8019.5	C418.5	Present the process of EMS Certification and ISO-14000
ILO8019.6	C418.6	Interpret Environment related legislations and acts
CEL801	**C419**	**Construction Management**
CEL801.1	C419.1	To understand and apply the principles and functions of Construction Management.
CEL801.2	C419.2	To develop a Work Break Down Structure and Bar charts for the construction project.
CEL801.3	C419.3	To identify schedule time required for completion of project by using CPM & PERT techniques.
CEL801.4	C419.4	To Apply Resource allocation method for the construction project.
CEL801.5	C419.5	To understand project monitoring process and optimize the Time-Cost trade-off.
CEL801.6	C419.6	To understand and apply Safety Measures, Quality aspects of construction work and legislation (Labour).

CEP802	**C420**	**Major Project - 2**
CEP802.1	C420.1	Explore beyond the curriculum to identify problem of society, industrial or research needs; investigate the problem through in-depth literature survey and propose appropriate solution to solve the problem.
CEP802.2	C420.2	Implement the methodology with modern tools and provide sustainable solution with effective utilization of the resources available.
CEP802.3	C420.3	Analyze and compare the results with the standard results.
CEP802.4	C420.4	Work as an individual and contribute as a team member with effective management skills to achieve a common objective.
CEP802.5	C420.5	Write and present their work effectively with ethical values.
CEP802.6	C420.6	Engage themselves in area of their interest applying the knowledge gained and explore new technical trends.

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