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

Course Outcome Revised 2016 Syllabus		
FEC101	C101	Applied Mathematics - I
FEC101.1	C101.1	Apply principles of basic operations of Matrices, Rank and echelon form of matrices to solve linear simultaneous equations.
FEC101.2	C101.2	Solve and Analyze Partial derivatives and Apply it in related field of engineering
FEC101.3	C101.3	Apply the concepts of Complex Numbers, Hyperbolic functions and logarithms to solve engineering problems
FEC101.4	C101.4	Apply Numerical Methods and inculcate the habit of mathematical thinking through indeterminate forms and Taylor's series expansion.
FEC102	C102	Applied Physics - I
FEC102.1	C102.1	Draw miller indices using concept of crystallography and Identify crystal structure using X-ray diffraction techniques viz. Laue method, rotating crystal method & powder method.
FEC102.2	C102.2	Determine the output of LED, photoconductor and photovoltaic cell applying concepts of semiconductor physics.
FEC102.3	C102.3	Calculate parameters of superconductor viz. Critical temperature, critical magnetic field and differentiate application of superconductor based on Mesinner effect and Josephson effect
FEC102.4	C102.4	Design acoustic of hall/auditorium using reasons for acoustic defects and Select method for production of ultrasonic waves.

FEC103	C103	Applied Chemistry - I
FEC103.1	C103.1	Analyze the quality of water and suggest methods of treatment.
FEC103.2	C103.2	Illustrate the knowledge of polymers, fabrication methods, conducting polymers in industrial fields.
FEC103.3	C103.3	Apply the knowledge of lubricants, their properties & mechanism to avoid frictional resistance and interpret phase transformations using thermodynamics
FEC103.4	C103.4	Demonstrate knowledge of portland cement.

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	Understand fundamentals of DC circuits and apply knowledge for analyzing network theorems in DC circuits.
FEC105.2	C105.2	Learn the fundamentals and analyze single phase AC circuits.
FEC105.3	C105.3	Learn the basic operation and analyze the performance of single-phase transformer.
FEC105.4	C105.4	Learn the fundamentals and analyze three phase AC circuits and understand the construction, basic operation of DC motors and generators.

FEC106	C106	Environmental Studies
FEC106.1	C106.1	Classify essential resources and control measures for sustainable development.
FEC106.2	C106.2	Illustrate sources and effects of environmental decay.
FEC106.3	C106.3	Select renewable sources of energy and technology essential for sustainable development.
FEC106.4	C106.4	Apply the regulations of Environmental Protection Act and other bodies for perpetuation of environment.

FEL101	C107	Basic Workshop Practice - I
FEL101.1	C107.1	Model different prototypes in the carpentry trade such as Cross cut lap joint, Tee lap joint, Dovetel lap joint.
FEL101.2	C107.2	Model various basic prototypes in the trade of fitting such as Square, Hexagonal and V Male Female joint.
FEL101.3	C107.3	Perform various basic House Wiring techniques while taking care of electrical safety.
FEL101.4	C107.4	Perform various basic domestic plumbing operations such as pipe cutting, threading, fitting etc.

FEC201	C108	Applied Mathematics - II
FEC201.1	C108.1	Apply Euler's , Runge -Kutta method to solve differential equations of second and fourth order and apply Trapezoidal, Simpson's 1/3rd , 3/8th rule to solve definite integrals
FEC201.2	C108.2	Solve differential equations of First order, first degree and engineereing problems representable in the form of linear equations with constant coefficient, Cauchy's /Legendre's homogeneous equation
FEC201.3	C108.3	Apply Beta, Gamma functions and D.U.I.S. to evaluate definite integrals
FEC201.4	C108.4	Apply Double, Triple integration to find area, mass, volume and find length of curve using Rectification method

FEC202	C109	Applied Physics - II
FEC202.1	C109.1	Calculate thickness of thin wire or foil to wedge-shaped thin film, refractive index, wavelength of light /or radius of curvature to Newton's rings in interference application and calculate missing order, grating element wavelength of light using diffraction grating considering parameter viz resolving power of grating
FEC202.2	C109.2	Compare characteristics of images received by photography and holography using concept of LASER
FEC202.3	C109.3	Calculate critical angle, angle of acceptance, V number, number of modes of propagation, numerical aperture of step index fibre
FEC202.4	C109.4	Apply concept of electromagnetism in focussing system and CRO

FEC203	C110	Applied Chemistry - II
FEC203.1	C110.1	Illustrate types of corrosion & suggest control measures in industries.
FEC203.2	C110.2	Analyze the quality of fuel & calculate the oxygen required for combustion of fuel.
FEC203.3	C110.3	Illustrate composition, properties of alloys & properties & application of composite material.
FEC203.4	C110.4	Illustrate the principles of green chemistry

FEC204	C111	Engineering Graphics
FEC204.1	C111.1	Apply the basic principles of projections in Projection of Lines, Planes and Engineering Curves
FEC204.2	C111.2	Apply the basic principles of projections in Projection of Solids & Section of solids
FEC204.3	C111.3	Visualize the given 3D object and draw Orthographic projections
FEC204.4	C111.4	Draw Isometric view from the given orthographic projections
FEC204.5	C111.5	Draw Orthographic and Isometric Projection using AutoCad

FEC205	C112	Structured Programming Approach
FEC205.1	C112.1	Identify the terminologies in operating system used for computer programming and illustrate the algorithms to support Structure Programming Approach.
FEC205.2	C112.2	Use Variables, derived data types and control structures to write C program.
FEC205.3	C112.3	Implement solutions to the problem using strings and functions.

FEC205.4	C112.4	Use Pointers, Structure-Union and Files for solving complex Computational problem.

FEC206	C113	Communication Skills
FEC206.1	C113.1	Students develop the ability to understand the importance of communication fundamentals
FEC206.2	C113.2	Student apply techniques to improve oral communication & develop their own speaking style
FEC206.3	C113.3	Students acquire the letter writing skills and produce the letters in any given situation
FEC206.4	C113.4	Student learn all the important aspects of reading including skimming, scanning , note making and understand discourse coherence.

FEL201	C114	Basic Workshop Practice - II
FEL201.1	C114.1	Model different prototypes in the carpentry trade such as Cross cut lap joint, Tee lap joint, Dovetail lap joint.
FEL201.2	C114.2	Model various basic prototypes in the trade of fitting such as Square, Hexagonal and V Male Female joint.
FEL201.3	C114.3	Perform various basic Layout drawing; make positive and negative film, and perform PCB etching and drilling, Tinning and soldering operations.
FEL201.4	C114.4	Perform various basic domestic plumbing operations such as pipe cutting, threading, fitting etc.

CEC301	C201	Applied Mathematics - III

CEC301.1	C201.1	Apply Laplace transform to solve ODEs
CEC301.2	C201.2	Apply the concept of Fourier Series for expansion of periodic function.
CEC301.3	C201.3	Apply the concepts of Analytic functions, Harmonic functions, Orthogonal Trajectories, Bilinear Transformation and Conformal mapping and Evaluate the Contour Integral.
CEC301.4	C201.4	Solve Partial Differential Equation numerically and analytically.

CEC302	C202	Surveying -I
CEC302.1	C202.1	Apply the principles of surveying and field procedures to conduct the various surveys related to Civil Engineering.
CEC302.2	C202.2	Calculate the area of plot using bearing, WCB & RB
CEC302.3	C202.3	Apply the principles of levelling & Contouring in profile levelling for road projects, tunneling, laying of sewer line etc.
CEC302.4	C202.4	Implement the concepts of plane table surveying, computation of area and volume by using various surveying instruments on field
CEC302.5	C202.5	Demonstrate the concept of theodolite survey, its principles for various applications in civil engineering fields
CEC302.6	C202.6	Employ different methods of tacheometric surveying and apply knowledge of total station and other EDM on field.

CEC303	C203	Strength of Materials
CEC303.1	C203.1	Determine stress, strain, principal stresses and strains
CEC303.2	C203.2	Analyse statically determinate beams and draw Shear Force Diagrams and Bending Moment Diagrams
CEC303.3	C203.3	Analyse the structural behaviour of flexural members under simple bending and also analyse strain energy in beams under impact loading.
CEC303.4	C203.4	Analyse the flexural members for its structural behaviour under shear and torsion.
CEC303.5	C203.5	Analyse the structural behaviour of flexural members under eccentric loading, analyse problems on chimneys, retaining walls etc and also analyse behaviour of columns under different loading.
CEC303.6	C203.6	Determine principal planes and stresses graphically and analytically and also determine deformation of thin cylinders and spherical shells under internal pressure

CEC304	C204	Engineering Geology
CEC304.1	C204.1	To apply the knowledge of geology to explain major geological processes such as landforms created by geological agents & application of building stones
CEC304.2	C204.2	To apply knowledge of several mineral constituents & rock structures for safe, stable and economic design of any civil engineering structure.
CEC304.3	C204.3	Explain various geological structures like folds, faults, joints, unconformity, their origin and apply, understand laws of stratification.

CEC304.4	C204.4	To employ methods of surface and subsurface investigation, advantages and disadvantages caused due to geological conditions during the construction of dam
CEC304.5	C204.5	To employ methods of surface and subsurface investigation, advantages and disadvantages caused due to geological conditions during the construction of tunnel & to understand the ground water features
CEC304.6	C204.6	To understand several geological disasters & their control measures
CEC305	C205	Fluid Mechanics - I
CEC305.1	C205.1	Outline the properties of fluids and principles of fluid mechanics and solve problems related to it
CEC305.2	C205.2	Interpret different forms of pressure measurement and Calculate Hydrostatic Force and its Location for a given geometry and orientation of plane surface.
CEC305.3	C205.3	Compute force of buoyancy on a partially or fully submerged body and Analyse the stability of a floating body.
CEC305.4	C205.4	Distinguish velocity potential function and stream function and solve for velocity and acceleration of a fluid at a given location in a fluid flow.
CEC305.5	C205.5	Apply the knowledge of bernoulli's theorem to compute the pipe flow parameters.
CEC305.6	C205.6	Calculate velocity and rate of flow using flow measuring devices.
CEC401	C206	Applied Mathematics - IV

CEC401.1	C206.1	Apply matrix theory to solve system of equations and eigen values, eigen vectors and their applications
CEC401.2	C206.2	Apply the concept of probabilility distribution and Sampling theory to Engineering problems
CEC401.3	C206.3	Apply the concepts of Correlation, Regression and optimize NLPP using various optimization techniques.
CEC401.4	C206.4	Apply principles vector differentiation and integral calculus to engineering problems
CEC402	C206	Surveying - II
CEC402.1	C206.1	Apply the knowledge of tachometric surveying for various applications in civil engineering fields.
CEC402.2	C206.2	Use the knowledge of setting out various types of curves by linear and angular methods for civil engineering projects
CEC402.3	C206.3	Apply the concepts of vertical curve setting methods for road projects
CEC402.4	C206.4	Compute setting out data from survey and design information and implement on site.
CEC402.5	C206.5	Operate Total Station & GPS for desired accuracy in surveying
CEC402.6	C206.6	Understand and establish survey control of determined accuracy using GPS, GIS and remote sensing.
CEC403	C207	Structural Analysis - I
CEC403.1	C207.1	To analyse statically determinate portal frames and to draw AFD, SFD and BMD
CEC403.2	C207.2	To analyse a statically determinate structure and to evaluate deflection parameters using geometrical methods.

CEC403.3	C207.3	To analyse a statically determinate structure and to evaluate deflection parameters using energy principle.
CEC403.4	C207.4	To analyse a statically determinate structure under the influence of moving loads
CEC403.5	C207.5	To analyse cables, suspension bridges and three hinged stiffening girders.
CEC403.6	C207.6	To analyse columns and struts subjected to eccentric loading and to evaluate a section under unsymmetrical bending and shear centre.

CEC404	C209	Building Design & Drawing
CEC404.1	C209.1	To employ principles of planning, D.C Rules and building bye-laws for preparing drawing of various residential buildings.
CEC404.2	C209.2	To sketch one-point and two-point perspective drawings of various structures and objects.
CEC404.3	C209.3	To employ principles of planning, D.C Rules and building bye-laws for preparing drawing of various public buildings.
CEC404.4	C209.4	To sketch various components of building.

CEC405	C210	Building Material & Construction Technology
CEC405.1	C210.1	To understand properties of various building materials & determine their application
CEC405.2	C210.2	Explain & interpret manufacturing process of basic construction materials & DPC
CEC405.3	C210.3	To identify & understand properties of ingredients of concrete & effects of admixtures
CEC405.4	C210.4	To understand & interpret manufacturing process of glass & timber

CEC405.5	C210.5	To apply the concepts of concrete mixes design and understand the concept of RMC
CEC405.6	C210.6	To understand various types of masonry construction & finishes, formwork & flooring,roofing systems
CEC406	C211	Fluid Mechanics - II
CEC406.1	C211.1	To apply fundamentals of major and minor losses in pipes, flow through series and parallel pipes,syphon and branched pipes and power transmission thorugh pipes and nozzles
CEC406.2	C211.2	To interpret laminar flow through circular pipe, parallel pates (stationary and moving).
CEC406.3	C211.3	To examine rough and smooth boundaries for a turbulent flow.
CEC406.4	C211.4	To examine forces of drag and lift on submerged bodies and forces due to formation boundary layer on the surface of the body
CEC406.5	C211.5	To examine impulse momentum principle(pipe bends), moment of momentum equation(lawn sprinklers) and forces exerted on different plates both fixed and stationary
CEC406.6	C211.6	To assess dimensional analysis of fluid and application of different model laws

CEC501	C301	Structural Analysis - II
CEC501.1	C301.1	To determine static and kinematic indeterminacy of a structure and to distinguish between linear and non linear behaviour of materials
CEC501.2	C301.2	To analyse the behaviour of various statically determinate structures using different methods
CEC501.3	C301.3	To analyse the behaviour of various statically indeterminate structures using various flexibility methods and by stiffness matrix methods (Displacement Method)
CEC501.4	C301.4	To analyse the behaviour of various statically indeterminate structures using various stiffness methods (Slope Deflection Method).
CEC501.5	C301.5	To analyse indeterminate structure by stiffness methods (Moment Distribution Method)
CEC501.6	C301.6	To determine plastic hinge, plastic moment carrying capacity, shape factor and collapse load for single and multiple span beams

CEC502	C302	Geotechnical Engineering - I
CEC502.1	C302.1	To calculate different properties of soil by making use of fundamental definition and relationships.
CEC502.2	C302.2	To understand clay minerology and calculate plasticity characteristics of soil using laboratory data.
CEC502.3	C302.3	To classify soil type & group using Indian soil classification system.
CEC502.4	C302.4	To calculate permeability & seepage of soil using laboratory and field data.
CEC502.5	C302.5	To calculate total and effective stress of a soil sample.
CEC502.6	C302.6	To calculate compactive characteristics of a soil sample using standard & modified proctor test.

CEC503	C303	Applied Hydraulics
CEC503.1	C303.1	Calculate the momentum principle for pipe bends and sprinkler problems.
CEC503.2	C303.2	Solve problems on dimensional analysis of fluid for different model laws.
CEC503.3	C303.3	Calculate and explain the impact of jet on stationary, moving, hinged and series of plates.
CEC503.4	C303.4	Calculate the efficiencies and explain the working of various types of hydraulic turbines.

CEC503.5	C303.5	Analyze the centrifugal pump by incorporating velocity triangle diagrams.
CEC503.6	C303.6	Solve problems on open channel flows considering uniform and non-uniform flow conditions.
CEC504	C304	Environmental Engineering - I
CEC504.1	C304.1	Identify the need of planned water supply and analyze the characteristics of drinking water .
CEC504.2	C304.2	Calculate the parameters for units of water treatment plant and summarize their mechanism of working in water treatment
CEC504.3	C304.3	Apply the knowledge of water softening methods and the chemistry of disinfection for water treatment
CEC504.4	C304.4	Identify the building water supply system along with the classification of fixtures and fittings
CEC504.5	C304.5	Apply the knowledge of the need of Rainwater Harvesting and compute the water collected for a building
CEC504.6	C304.6	Utilize the knowledge of air pollution, noise pollution and thermal pollution and calculate the noise levels.
CEC505	C305	Transportation Engineering - I
CEC505.1	C305.1	To understand the planning of highway and calculate the geometric parameters essential for highway construction
CEC505.2	C305.2	To calculate the Traffic Volume Study for the design of the Highway
CEC505.3	C305.3	To examine various materials required for pavement construction as per IRC specifications

CEC505.4	C305.4	To calculate design parameters for flexible pavement
CEC505.5	C305.5	To calculate design parameters for rigid pavement
CEC505.6	C305.6	To understand the construction of different types of roads and calculate the functional and structural evaluation using empirical theories
CEDLO5062	C307	Advance Concrete Technology
CEDLO5062.1	C307.1	To understand & apply the various materials and properties of concrete
CEDLO5062.2	C307.2	To understand & apply the various types of special concrete
CEDLO5062.3	C307.3	To design concrete mix using principals by different methods (IS/ACI/DOE)
CEDLO5062.4	C307.4	To understand & apply concept of Fibre Reinforced Concrete wrt materials, properties & behaviour
CEDLO5062.5	C307.5	To understand & apply different non destructive procedures for testing concrete
CEDLO5062.6	C307.6	To apply the concept of durability to concrete structures.
CEDLO5063	C308	Building Services & Repairs
CEDLO5063.1	C308.1	Use the knowledge of utility services in making a building safe and comfortable
CEDLO5063.2	C308.2	Investigate the drawbacks of an installed mechanical, engineering & plumbing service lines.
CEDLO5063.3	C308.3	Choose appropriate fire safety systems & integrate the same into building construction projects.
CEDLO5063.4	C308.4	Examine the cause of deterioration of damaged structure by assessing its structural health.
CEDLO5063.5	C308.5	Choose the correct material and technique for repairing the concrete structures.
CEDLO5063.6	C308.6	Employ the methods of steel protection in the field.

CEC507	C310	Business & Communication Ethics
CEC507.1	C310.1	Develop the interpersonal skills to progress professionally by building stronger relationships
CEC507.2	C310.2	Design a technical document using precise language, suitable vocabulary and apt style
CEC507.3	C310.3	Apply the techniques to participate in Group Discussions, Interviews and resume writing for self recruitment.
CEC507.4	C310.4	Display competence required for professional career growth

CEC601	C311	Geotechnical Engineering - II
CEC601.1	C311.1	Calculate consolidation characteristics and settlement for a given soil mass.
CEC601.2	C311.2	Calculate shear strength for a given soil mass.
CEC601.3	C311.3	Calculate factor of safety of a slope subjected to different conditions.
CEC601.4	C311.4	Calculate lateral earth pressure and other parameters for designing retaining walls.
CEC601.5	C311.5	Calculate load bearing capacity of shallow foundation using analytical and field methods.
CEC601.6	C311.6	Calculate load bearing capacity of pile foundation using analytical and field methods.

CEC602	C312	Design & Drawing of Steel Structure
CEC602.1	C312.1	To explain the Limit State Design philosophy as applied to steel structures & limit state approach to design

CEC602.2	C312.2	To predict behavior and design members subjected to axial tension & their connections
CEC602.3	C312.3	To Predict the behavior and design members subjected to axial compression, column bases and their connection.
CEC602.4	C312.4	To Predict the behavior and design members subjected to bending, shear and their connection & welded plate girder
CEC602.5	C312.5	To design connections simple (bolted & welded) & beam to beam /column
CEC602.6	C312.6	To design & Calculate loading for a truss and design the complete truss
CEC603	C313	Transportation Engineering - II
CEC603.1	C313.1	Identify various components of permanent way and their relating properties and functions.
CEC603.2	C313.2	Calculate the elements of railway track and turnoouts based on geometrics.
CEC603.3	C313.3	Employ knowledge of aircraft characteristics, airport obstruction, airport marking, layout and air traffic control for airport planning.
CEC603.4	C313.4	Determine the dimensions of runway and taxiway and will be able to interpret the runway orientation using Wind Rose Diagram.
CEC603.5	C313.5	Identify various components of water transportation systems.
CEC603.6	C313.6	Utilize the knowledge of bridge engineering, types of bridges and loadings for design of bridge.
CEC604	C314	Environmental Engineering - II

CEC604.1	C314.1	Identify the need of sewerage system and solve problems on the sewer size and velocity of flow
CEC604.2	C314.2	Analyze the characteristics of sewage and categorize the different treatment units in a sewage treatment plant
CEC604.3	C314.3	Develop the secondary treatment units and describe the concept of constructed wetland, septic tank and soak pit
CEC604.4	C314.4	Prepare the oxygen Sag Curve based on the concept of self-purification of streams and identify the various tertiary and grey water treatment methods
CEC604.5	C314.5	Apply the knowledge of sludge characteristics to identify its processing methods
CEC604.6	C314.6	Apply the knowledge of the generation, storage, collection , treatment and disposal of municipal solid waste, hazardous waste, E- Waste and Plastic waste

CEC605	C315	Water Resource Engineering - I
CEC605.1	C315.1	Describe national water policy and classify various types of irrigation projects.
CEC605.2	C315.2	Explain various types of irrigation methods and effective use of water resources.
CEC605.3	C315.3	Calculate the crop water requirement.
CEC605.4	C315.4	Sketch the hydrograph and calculate the runoff for a given catchment area.
CEC605.5	C315.5	Calculate the safe yield and ground water potential for steady and unsteady state conditions for confined and unconfined aquifer.
CEC605.6	C315.6	Calculate the capacity of a reservoir for different purposes

CEDLO6061	C316	Advanced Construction Equipments
CEDLO6061.1	C316.1	Demonstrate the knowledge of working and application of standard construction equipment's.
CEDLO6061.2	C316.2	Select correct method and construction equipment for underground & underwater tunelling
CEDLO6061.3	C316.3	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.
CEDLO6061.4	C316.4	Apply the knowledge of pipeline insertion system in locating underground utilities.
CEDLO6061.5	C316.5	Implement the knowledge construction techniques for proper working of power generating structures.
CEDLO6061.6	C316.6	Schedule the techniques involved and the equipments required thereof for construction of various transporting facilities.

CEC607	C320	Software Application in Civil Engineering
CEC607.1	C320.1	To understand and apply MS-Excel for providing problems to field solutions.
CEC607.2	C320.2	To employ use of AutoCAD & Revit for design a structure.
CEC607.3	C320.3	To employ use of MS-Project for schedulling a construction project.
CEC607.4	C320.4	To employ various open source software for solving various civil engineering related problems.

CEC701	C401	Quantity Surveying Estimation & Valuation
CEC701.1	C401.1	To calculate approximate estimates by using Plinth Area Method.

CEC701.2	C401.2	To prepare the detailed estimate of a construction project by using Long Wall-Short Wall and Centre Line method.
CEC701.3	C401.3	To prepare the Rate Analysis for construction activities as per Indian Standard (IS 1200-1964) and DSR.
CEC701.4	C401.4	To prepare Bar Bending Schedule of structural members as per Indian Standard (IS 1200-1964).
CEC701.5	C401.5	To compute volume of earthwork for roads and canals by using different methods.
CEC701.6	C401.6	To analyse the value of any Land and Building using different methods.

CEC702	C402	Theory of Reinforced & Prestressed Concrete
CEC702.1	C402.1	Explain the working stress method (WSM), apply stress block concepts to solve basic problems & Analyse basic RCC beam & column problems by WSM
CEC702.2	C402.2	Evaluate the design parameters of a beam for given condition by using LSM.
CEC702.3	C402.3	Evaluate the design parameters of a slab for given condition by using LSM.
CEC702.4	C402.4	Evaluate the design parameters of a column for given condition by using LSM.
CEC702.5	C402.5	Evaluate the design parameters of a L & T beam, shear and torsional reinforcement for given condition by using LSM.
CEC702.6	C402.6	Evaluate the design parameters of a footing for given condition by using LSM.

CEC703	C403	Water Resource Engineering - II
CEC703.1	C403.1	Examine the stability of gravity dams
CEC703.2	C403.2	Examine the stability of earth and rockfill dams
CEC703.3	C403.3	Design diffenrent types of spillways and energy dessipators
CEC703.4	C403.4	Design irrigation channels using the concept of Kennedys and Lace's theory
CEC703.5	C403.5	Employ the knowledge of Canal Head works & Canal Distribution System.
CEC703.6	C403.6	Illustrate the knowledge of different types of canal structures in the field.

CEDLO7042	C405	Solid Waste Management
CEDLO7042.1	C405.1	To understand the functional elements of Solid waste management system
CEDLO7042.2	C405.2	To calculate the characteristics of Municipal solid waste for a given composition
CEDLO7042.3	C405.3	To identify the waste generation, collection, storage and transportation system for the municipal solid waste.
CEDLO7042.4	C405.4	To understand the bio-logical, chemical, physical and thermal conversion technologies
CEDLO7042.5	C405.5	To understand the reduction, recovery, recycle and disposal methodologies of Municipal solid waste
CEDLO7042.6	C405.6	To understand the generation, minimization, recycling and disposal processes for Industrial, Hazardous, Electronic and Biomedical waste

CEDLO7043	C406	Pavement Subgrade & Materials
CEDLO7043.1	C406.1	Classify the soil suitability in the field using HRB classification System
CEDLO7043.2	C406.2	Estimate the modulus of subgrade reaction, CBR value and Modulus of elasticity of a soil sample
CEDLO7043.3	C406.3	Calculate resilient deformation, resilient strain, resilient modulus for given soil condition
CEDLO7043.4	C406.4	Calculate physical properties of aggregate in accordance to IS standards
CEDLO7043.5	C406.5	Calculate properties of bitumen in accordance to IS standards
CEDLO7043.6	C406.6	Calculate the parameters essential for bituminous mix design

ILO7013	C412	Management Information System
ILO7013.1	C412.1	Identify the impact of information systems on an organization
ILO7013.2	C412.2	Use tools and technologies to access database information for improving business performance and decision making
ILO7013.3	C412.3	Design an IT infrastructure for MIS

ILO7013.4	C412.4	Identify the Transaction Processing, Functional Area Information and ERP system for enterprise-wide knowledge management
ILO7016	C415	Cyber Security and Laws
ILO7016.1	C415.1	Illustrate the concept of cybercrime, cyber-frauds, cybercriminal types with their motives and relate legal issues with respect to cybercrime.
ILO7016.2	C415.2	Analyze and discriminate cyberattack types with tools used for attacks.
ILO7016.3	C415.3	Identify the security challenges presented by mobile devices and infer measures for protecting the same.
ILO7016.4	C415.4	Discover and apply different aspects of cyber law and Information Security Standards compliance.
ILO7017	C416	Disaster Management & Mitigation Measures
ILO7017.1	C416.1	Identify the effects of Disasters by understanding the scenario of disasters in India
ILO7017.2	C416.2	Compare Manmade and Natural disasters and their extent and possible effects on the economy
ILO7017.3	C416.3	Categorize the Government Policies, acts and administration based on the level of Disaster
ILO7017.4	C416.4	Employ the knowledge of Institutional Framework for Disaster Management in India
ILO7017.5	C416.5	Apply the knowledge of Financing and Relief Measures

ILO7017.6	C416.6	Utilize the of Preventive and Mitigation Measures to act during the disasters

ILO7018	C417	Energy Audit and Management
ILO7018.1	C417.1	Compare the present state of energy security and its importance to achieve sustainability
ILO7018.2	C417.2	Explore the basic principles and methodologies adopted in energy audit of an utility
ILO7018.3	C417.3	Evaluate the energy performance of electrical installations and identify the energy saving opportunities
ILO7018.4	C417.4	Evaluate the energy performance of some common thermal installations and identify the energy saving opportunities
ILO7018.5	C417.5	Analyse the data collected during performance evaluation and recommend energy saving measures

CEP705	C419	Project Part -I
CEP705.1	C419.1	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.
CEP705.2	C419.2	Implement the methodology with modern tools and provide sustainable solution with effective utilization of the resources available.
CEP705.3	C419.3	Analyze and compare the results with the standard results.

CEP705.4	C419.4	Work as an individual and contribute as a team member with effective management skills to achieve a common objective.
CEP705.5	C419.5	Write and present their work effectively with ethical values.
CEP705.6	C419.6	Engage themselves in area of their interest applying the knowledge gained and explore new technical trends.

CEC801	C420	Design & Drawing of Reinforced Concrete Structure
CEC801.1	C420.1	Design of dog legged and open well type staircase using limit state method.
CEC801.2	C420.2	Design different types of cantilever and counter fort type retaining wall using limit state method.
CEC801.3	C420.3	Design different components of building such as slab, column, beam,footing using relevant IS codes.
CEC801.4	C420.4	Design various types of water tank using working stress method.
CEC801.5	C420.5	Study the concept of earthquake engineering and calculate design forces by using seismic coefficient method
CEC801.6	C420.6	Apply basic principals of Prestress Concrete to analyse the Members

CEC802	C421	Construction Management
CEC802.1	C421.1	To apply the principles and functions of Construction Management for organisational structure.

CEC802.2	C421.2	To develop a Work Break Down Structure and Bar-Charts for various construction activities.
CEC802.3	C421.3	To calculte time required for completion of project by using CPM & PERT techniques.
CEC802.4	C421.4	To analyze various resources by using Resource allocation and Resource smoothening method.
CEC802.5	C421.5	To calculate optimum Time-Cost trade-off for construction project.
CEC802.6	C421.6	To illustrate safety Measures, Quality aspects and legislation related to construction work

CEDLO8032	C423	Industrial Waste Treatment
CEDLO8032.1	C423.1	Utilize the knowledge of the characteristics and effects of industrial wastes and discuss its sampling and analysis
CEDLO8032.2	C423.2	Solve the the numericals based on the concept of oxygen sag curve and Streeter Phelps Equation
CEDLO8032.3	C423.3	Select the aerobic and anaerobic biological treatment methods and summarize its modifications along with methods of dewatering and disposal of sludge.
CEDLO8032.4	C423.4	Employ the knowledge of manufacturing process , volume , characteristics and effect of raw and treated effluent and treatment methods adopted in industries.
CEDLO8032.5	C423.5	Make use of knowledge of Environment Impact Assessment (EIA) and Environmental Audit and discuss acts pertaining to industrial wastes/effluents

CEDLO8032.6	C423.6	Identify the need, operation and maintenance problems and economical aspects of Common Effluent Treatment Plant (CETP)

CEDLO8034	C425	Bridge Engineering & Design
CEDLO8034.1	C425.1	To classify different types of bridges on the basis of various conditions
CEDLO8034.2	C425.2	To calculate and understand the load distribution according to the IRC codes for the design of RC Culvert and longitudinal girder
CEDLO8034.3	C425.3	To calculate the load distribution for I-girder, pre-stressed concrete deck slab and Steel lattice girder for railways
CEDLO8034.4	C425.4	To implement the methods of construction for the different types of foundation, piers and abutments
CEDLO8034.5	C425.5	To illustrate various types of bearings and suitable conditions for their construction
CEDLO8034.6	C425.6	To illustrate various types of methods for the erection of bridge girders

ILO8021	C429	Project Management
ILO8021.1	C429.1	Apply selection criteria and select an appropriate project from different options

ILO8021.2	C429.2	Write work break down structure for a project and develop a schedule based on it
ILO8021.3	C429.3	Identify opportunities and threats to the project and decide an approach to deal with them strategically
ILO8021.4	C429.4	Use Earned value technique and determine & predict status of the project
ILO8021.5	C429.5	Capture lessons learned during project phases and document them for future reference

ILO8029	C437	Environmental Management
ILO8029.1	C437.1	Make use of knowledge of Environment Management for sustainable development
ILO8029.2	C437.2	Identify the Environmental Concerns for the specific hazard
ILO8029.3	C437.3	Apply the Concept of Ecology to know the interdependence between ecosystem and living organisms
ILO8029.4	C437.4	Apply the concept of Corporate Env Responsibility for Environmental Quality Management
ILO8029.5	C437.5	Categorize the ISO-14000 standards and understand the procedure of EMS Certification
ILO8029.6	C437.6	Utilize the knowledge of Environmental legislations for sustainable development

CEP806	C438	Project Part -II
CEP806.1	C438.1	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.

CEP806.2	C438.2	Implement the methodology with modern tools and provide sustainable solution with effective utilization of the resources available.
CEP806.3	C438.3	Analyze and compare the results with the standard results.
CEP806.4	C438.4	Work as an individual and contribute as a team member with effective management skills to achieve a common objective.
CEP806.5	C438.5	Write and present their work effectively with ethical values.
CEP806.6	C438.6	Engage themselves in area of their interest applying the knowledge gained and explore new technical trends.

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