

IES COLLEGE OF ENGINEERING , CHITILAPPILLY
DEPARTMENT OF CIVIL ENGINEERING

PROGRAM OUTCOMES

<u>PO NO.</u>	<u>PROGRAM OUTCOMES STATEMENTS</u>
PO 1: Engineering knowledge	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems
PO 2: 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.
PO 3: 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.
PO 4: 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.
PO 5: 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.
PO 6: 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
PO 7: 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.
PO 8: Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9: Individual and team work	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: 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.
PO 11: Project management and finance	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12: Life-long learning	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES

<u>PSO NO</u>	<u>PROGRAM SPECIFIC OUTCOMES STATEMENTS</u>
PSO 1	Graduates shall demonstrate sound knowledge in the aspects of design, analysis and can conduct investigations of Civil Engineering with an emphasis to geotechnical engineering
PSO 2	Graduates will exhibit a broad understanding of environmental, societal, health and structural issues in infrastructural development.
PSO 3	Graduates will be involved in life-long learning and pursue research in the areas of Civil Engineering

PROGRAM EDUCATIONAL OUTCOMES

<u>PEO NO</u>	<u>PROGRAM EDUCATIONAL OBJECTIVES STATEMENTS</u>
PEO1	Enable graduates to be successful in their chosen careers, by applying their continual learning of Computer Science and Engineering in their work and life situations.
PEO2	Comprehend, analyze, design, and create novel products and solutions for the real-life problems.
PEO3	Possess professional and ethical attitude, effective communication skills, team working skills, multi-disciplinary approach, and an ability to relate engineering issues to broader social contexts.
PEO4	Exhibit leadership qualities and progress through life-long learning.

**IES COLLEGE OF ENGINEERING, CHITTILAPPILLY
DEPARTEMENT OF CIVIL ENGINEERING**

COURSE OUTCOMES

SCHEME : 2014

FIRST YEAR

Course Code	Course Outcomes
C101	EN14 101 Engineering Mathematics I
C101.1	Understand Scientific knowledge in Partial differential equations.
C101.2	Understand about the characteristics of infinite series.
C101.3	Solve a general system of linear equations.
C101.4	Understand Fourier series expansion of functions & learn their applications.
C102	EN14 102 ENGINEERING MATHEMATICS II
C102.1	Solve homogenous & non homogenous differential equations with constant coefficients.
C102.2	Understand Laplace transform which has wide application in all engineering courses.
C102.3	Apply the vector calculus in Engineering field
C102.4	Apply the vector related theorems in real life

C103	EN14 103 ENGINEERING PHYSICS
C103.1	Apply the interaction of light with matter through interference & diffraction and knowledge of ultrasonics in non-destructive testing
C103.2	Apply the knowledge of polarization of light in different fields and principles of quantum mechanics to perceive the microscopic processes in electronic devices.
C103.3	Apply the comprehended knowledge about laser and fiber optic communication systems and the working of solid-state lighting devices
C103.4	Analyze the principles behind various superconducting applications and the knowledge of semiconductor devices

C104	EN14 103(P) ENGINEERING PHYSICS LAB
C104.1	Gain about characteristics of different types of electric circuits
C104.2	Understand and use instrumental techniques for intensity pattern analysis
C104.3	Apply the theoretical concepts of laser, numerical aperture and photodetectors
C104.4	Gain about the characteristics of transistor in common emitter configuration

C105	EN14 104 ENGINEERING CHEMISTRY
C105.1	Understand organo metallic reaction and its application
C105.2	Acquire the knowledge about polymer compounds
C105.3	Apply the knowledge of electro chemistry in daily life situation
C105.4	Understand the chemical aspect of water and its purification process

C106	EN14 104(P) ENGINEERING CHEMISTRY LAB.
C106.1	Equip the students with working knowledge of chemical principles,nature and transformation of materials and their applications
C106.2	Develop analytical capabilities of students by doing experiments
C106.3	Develop analytical skill of students by doing experiments with instruments

C107	EN14 105 ENGINEERING MECHANICS
C107.1	Recall Principles and theorems related to rigid body mechanics
C107.2	Analyse Centroid & Moment of Inertia for three dimensional objects
C107.3	Determine the motion of the particles using D'Alembert's Principle
C107.4	Apply the equations of motion for rigid bodies

C108	EN14 106 Basic of Civil and Mechanical Engineering
C108.1	Illustrate the fundamental aspects of civil Engineering.
C108.2	Illustrate the uses of various building materials.
C108.3	Overview about various fields of energy, power plants, machining and manufacturing processes
C108.4	Discuss the fundamental concepts of themodynamics, engines, refrigeration and hydraulic equipments

C109	EN14 107 BASICS OF ELECTRICAL AND ELECTRONICS & COMMUNICATION ENGG.
C109.1	Learn about the basic laws in electrical engineering and the design of three phase circuits
C109.2	Impart knowledge about AC machines and DC machines
C109.3	Impart knowledge about basic electronic and digital systems
C109.4	Give basic ideas about various communication systems

C110	EN14 108 ENGINEERING GRAPHICS
C110.1	Familiarize to use the drafting instruments properly and improve their lettering and dimensioning skills
C110.2	Produce orthographic projection of plane laminas
C110.3	Sketch the projection of solids in various planes
C110.4	Prepare the isometric views of objects and thereby develop their surfaces
C110.5	Develop skill to project the perspective views of any object and also to convert pictorial views to orthographic views
C110.6	Obtain multiview projections and solid models of objects using cad tools

C111	EN14 109 HUMANITIES AND COMMUNICATION SKILLS
C111.1	Identify stages in the development of science and technology through various periods in history
C111.2	Understand the purpose and process of communication
C111.3	Produce different documents that reflects technical communication,descriptions , proposals and reports
C111.4	Develop appropriate social and business ethics

C112	EN14 110(P) MECHANICAL WORKSHOPS
C112.1	Inculcate engineering aptitude, confidence and experience towards technical skills in carpentary & Fitting
C112.2	Train the students mentally and physically for industries like Smithy & foundary
C112.3	Impart knowledge and technical skills on basic manufacturing methods in sheetmetal & welding
C113	EN14 111(P) ELECTRICAL & CIVIL WORKSHOPS
C113.1	Determine the horizontal distance and level difference between stations.
C113.2	Determine the horizontal angle between the stations.
C113.3	Demonstrate the setting out for small buildings, masonry construction, plumbing work and model making.
C113.4	Demonstrate safety measures against electric shocks.
C113.5	Identify the tool used for electrical winding,electrical accessories,wires,cables,batteries and standard symbols.
C113.6	Develop the connection diagrm ,identify the sutable accessories and materials necessary for wiring simple lighting circuit for domestic buildings.

IES COLLEGE OF ENGINEERING, CHITTILAPPILLY
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COURSE OUTCOMES

SCHEME : 2014

SECOND YEAR

Course Code	Course Outcomes
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C201	EN14 301 ENGINEERING MATHEMATICSIII
C201.1	Understand the basic theory of functions of complex variable and conformal mapping
C201.2	Solve the problems using complex integration and discuss about Taylor and Laurant's series.
C201.3	Understand the basic ideas of vector space
C201.4	Know Fourier transform which has wide application in all Engineering courses

C202	EN14 302 COMPUTER PROGRAMMING IN C
C202.1	Explain the basic concepts of computer and information technology
C202.2	Explain the basic elements and input output functions of C
C202.3	Develop programs using arrays and functions
C202.4	Develop programs using structures,pointers and files

C203	CE14 303 MECHANICS OF SOLIDS
C203.1	Analyse stresses and strains generated in material due to external loads and strain energy concepts.
C203.2	Sketch shear force and bending moment diagram for different types of beams.
C203.3	Analyse the state of stress at a point and solve for the principal stresses , understanding of stresses in cylinders and torsion concept.
C203.4	Familiarize column buckling and calculate critical load of columns and deflection of statically determinate beams.

C204	CE14 304 BUILDING TECHNOLOGY I
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C204.1	Study the general Requirements of Construction Materials
C204.2	Understand in detail about concrete and its properties
C204.3	Understand the different stages of building construction
C204.4	Explain the functional planning of buildings and detailed drawing

C205	CE14 305 SURVEYING I
C205.1	Explain in detail about chain and compass surveying.
C205.2	Determine the level of the given plot.
C205.3	Analyze the area and volume of given plot.
C205.4	Explain about curves.

C206	CE14 306 ENGINEERING GEOLOGY
C206.1	Know the relevance of geology in Civil Engineering, Subdivisions of Geology
C206.2	Analyze Properties of Minerals its composition
C206.3	Understand hydrogeology- occurrence of groundwater
C206.4	Understand geoinformatics,remote sensing

C207	CE14 307 (P) SURVEYING LAB I
C207.1	Understand conventional surveying
C207.2	undertake survey using level
C207.3	Undertake survey using theodolite

C208	CE14 308 (P) MATERIALS TESTING LAB I
C208.1	Understand the various properties of cements and aggregates.
C208.2	Analyse the different properties of concrete to specific quality of concrete
C208.3	Understand the various properties of building materials.

C209	EN14 401 ENGINEERING MATHEMATICS IV
C209.1	Understand discrete and continuous random variables and its probability distributions
C209.2	Apply various test concerning null and alternate hypothesis
C209.3	Solve special functions using power series
C209.4	Solve different partial differential equations

C210	EN14 402 ENVIRONMENT SCIENCE
C210.1	Explain basic concept of environmental science.
C210.2	Understand ecosystems and biodiversity.
C210.3	Analyze the environmental pollution.
C210.4	Express the knowledge about environment and sustainable development

C212	CE14 404 STRUCTURAL ANALYSIS I
C212.1	Familiarize displacement response of statically determinate structural systems
C212.2	Analyse statically indeterminate structures.
C212.3	Analyse structures subjected to moving loads.
C212.4	Analyse cables, suspension bridges and arches.

C213	CE14 405 ENGINEERING ECONOMICS & PRINCIPLES OF MANAGEMENT
C213.1	Evaluate economic theories, cost concepts and pricing policies
C213.2	Apply suitable technique in decision making in engineering economic problem
C213.3	Analyse management theories and practices
C213.4	Prepare simple financial statement of a company for measuring performance of business firm

C214	CE14 406 SURVEYING II
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C214.1	Understand the concept of tacheometric surveying and hydrographic surveying.
C214.2	Summarize the principle of triangulation.
C214.3	Explain the concept of field astronomy and photogrammetry.
C214.4	understand the advanced concept of surveying using modern trending methods in surveying.
C215	CE14 407 (D) CIVIL ENGINEERING DRAWING I
C215.1	Make the students aware about basic principles of building drawing
C215.2	Make the students to know basic commands of popular drafting packages
C215.3	Make the students to draw plan, elevation and section of buildings

C215	CS14 407 (P) DATA STRUCTURE LAB
C215.1	Study various data structure such as stacks, queues data structures using linked lists.
C215.2	Students can compare various kinds of searching and sorting techniques
C215.3	Students will acquire program development skills of trees, graph .

C216	CE14 408 (P) SURVEYING LAB II
C216.1	Determine the horizontal angle using theodolite
C216.2	Determine the tacheometric constants
C216.3	Demonstrate the working of total station.

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COURSE OUTCOMES

SCHEME : 2014

THIRD YEAR

Course Code	Course Outcomes
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C301	CE14 601 STRUCTURAL DESIGN I
C301.1	Apply the fundamental concepts of working stress method
C301.2	Design of singly and doubly reinforced beam sections using Limit State Method
C301.3	Design of simply supported, cantilever and continuous RCC beam
C301.4	Design stairs, columns and to draw the reinforcement details

C302	CE14 502 BUILDING TECHNOLOGY II
C302.1	Understand about framed construction
C302.2	Understand the importance of fire safety and its precautions
C302.3	Explain the necessity of natural and artificial ventilation and its control, besides the criteria for lighting and acoustics.
C302.4	Explain basic concepts in functional requirements of building and building services

C303	CE14 503 TRANSPORTATION ENGINEERING I
C303.1	Know role of transportation in society, pavement surface characteristics
C303.2	Describe road intersections and traffic control devices
C303.3	Design flexible and rigid pavements
C303.4	Understand aircraft characteristics and their influence on planning of airports.

C304	CE14 504 STRUCTURAL ANALYSIS II
C304.1	Identify the structures by using Slope deflection and moment distribution methods
C304.2	Analyse the structures using force method
C304.3	Analyse the sagging and hogging moments of multi-storied frames
C304.4	Identify the plastic deformations of beams and portal frames

C305	CE14 505 GEOTECHNICAL ENGINEERING I
C305.1	Determine the basic properties of soil .
C305.2	Analyze the shear strength and permability of soil.
C305.3	Discribe consolidation and compaction.
C305.4	Explain earth pressure theory and slope stability.

C306	CE14 506 OPEN CHANNEL HYDRAULICS & HYDRAULIC MACHINERY
C306.1	Analyze characteristics of open channel flow.
C306.2	Recall the characteristics of gradually varied flow.
C306.3	Understand the flow characteristics in an open channel.
C306.4	Apply the fundamental theories of fluid mechanics for the analysis of hydraulic machines and impact of jets.

C307	CE14 507 (D) CIVIL ENGINEERING DRAWING II
C307.1	Draw the plan of residential building as per KBR rule.
C307.2	Prepare the plan and elivation of public buildings as per KBR rule.
C307.3	Draw the Septic tanks and soak pit detailed.
C307.4	Draw site plan and service plans of buildings.

C308	CE14 508 (P) FLUID MECHANICS LAB
C308.1	Determine the coefficient of discharge of venturimeter, orificemeter and notches.
C308.2	Verify Bernoulli's theorem and determine Manning's coefficient, friction factor and time of emptying.
C308.3	Conduct performance test of pumps and turbines.

C309	CE14 601 STRUCTURAL DESIGN II
C309.1	Assess of plastic analysis of beams and frames
C309.2	Design tension members using the IS specifications
C309.3	Design columns and beams under axial loads using IS specifications
C309.4	Assess loads on truss and design purlins

C310	CE14 602 TRANSPORTATION ENGINEERING II
C310.1	Explain the requirements and functions of the components of a railway track
C310.2	Comprehend construction and maintenance of structures coming under railways and tunnelling.
C310.3	Summarize about harbor and docks.
C310.4	Understand the basic principle of economic analysis of project.

C311	CE14 603 HYDROLOGY & IRRIGATION ENGINEERING
C311.1	Understand the concept of hydrology and precipitation abstractions.
C311.2	Explain different types of irrigation headworks.
C311.3	Compute the design parameters for the construction of canals.
C311.4	Estimate the peak discharge for flood and hydrograph analysis.

C312	CE14 604 STRUCTURAL ANALYSIS III
C312.1	Analyse structures using flexibility method.
C312.2	Analyse structures using stiffness method.
C312.3	Analyse structures using direct stiffness method.
C312.4	Understand the basic concepts of structural dynamics.

C313	CE14 605 GEOTECHNICAL ENGINEERING II
C313.1	Prepare the soil investigation report and the stress distribution in the soil
C313.2	Calculate the bearing capacity of soil for shallow footing.
C313.3	Calculate the settlement of soil for shallow footing.
C313.4	Understand the different types of foundations like raft and pile foundation

C314	CE14 606 COMPUTATIONAL METHODS AND OPERATIONS RESEARCH
C314.1	Develop computer algorithm for finding solution of algebraic and transcendental equations
C314.2	Understand basic idea of interpolation and eigen value
C314.3	Develop computer algorithm for numerical integration and ordinary differential equations
C314.4	Understand basic concept of linear programming problem

C315	CE14 607 (P) GEOTECHNICAL ENGINEERING LAB
C315.1	Compute the index properties of soils and co-efficient of permeability
C315.2	Compute the Shear strength parameters and compaction characteristics of soil in the laboratory
C315.3	Determine field density,coefficient of permeability and settlement of soil
C316	CE14 608 (P) MATERIALS TESTING LAB II
C316.1	Demonstrate experiments to determine properties of steel.
C316.2	Perform experiments to determine properties of concrete.
C316.3	Compute the compressive strength of concrete and metal

IES COLLEGE OF ENGINEERING, CHITTILAPPILLY
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COURSE OUTCOMES

SCHEME : 2014

FOURTH YEAR

Course Code	Course Outcomes
C401	CE14 601 STRUCTURAL DESIGN III
C401.1	Assess of plastic analysis of beams and frames
C401.2	Design tension members using the IS specifications
C401.3	Design columns and beams under axial loads using IS specifications
C401.4	Assess loads on truss and design purlins
C402	CE14 602 DESIGN OF HYDRAULIC STRUCTURES
C402.1	Familiarise different design methods for gravity dams.
C402.2	Design of hydraulic structures like surplus weir , direct sluice and tank sluice.
C402.3	Design and draw canal regulator cum road bridge, trapezoidal notch fall and siphon well drop
C402.4	Design and draw aqueduct and syphon aqueduct (Type II)
C403	CE14 703 ENVIRONMENTAL ENGINEERING I
C403.1	Understand essentials of water supply engineering
C403.2	Provide knowledge about Sources of water.
C403.3	Analyze Treatment of water
C403.4	Understand Water supply schemes
C404	CE14 704 CONCRETE TECHNOLOGY
C404.1	Identify the functional role of ingredients of concrete
C404.2	Analyze the ordinary and control concretes, replacement of cement and their specific applications
C404.3	Understand the mix design philosophy and various non- destructive tests
C404.4	Apply fundamental knowledge in the fresh and hardened properties of concrete

C405	CE14 705 SOIL EXPLORATION, TESTING AND EVALUATION
C405.1	Understand to choose the type of exploration for different type of works and be able to prepare soil investigation report
C405.2	Conduct the laboratory test for different types of soil
C405.3	Understand the different field test conducted for different types of soil
C405.4	Conduct the laboratory test and field test on rock samples

C406	CE14 706 (P) COMPUTER APPLICATIONS LAB
C406.1	Familiarize surveying & geotechnical softwares
C406.2	Work with structural engineering and water resources application softwares.
C406.3	Study about road-railway systems

C407	CE14 707 (P) ENVIRONMENTAL ENGINEERING LAB
C407.1	Analyse biological characteristics of water.
C407.2	Analyse the physical and chemical characteristics of water sample .
C407.3	Analyse the waste water sample.

C408	CE14 708 (P) PROJECT
C408.1	Apply the fundamental knowledge of Civil Engineering in developing products or solutions or society
C408.2	Analyse a current topic of professional interest and present it before an audience
C408.3	Identify an engineering problem, analyse it and propose a work plan to solve it.

C409	CE14 801 ENVIRONMENTAL ENGINEERING II
C409.1	Understand sewage, storm Sewage, sewers and sewer appurtenances
C409.2	Understand characteristics of sewage and various treatment methods for wastewater
C409.3	Explain Sewage disposal and House drainage
C409.4	Explain Solid and Gaseous waste management

C410	CE14 802 QUANTITY SURVEYING & VALUATION
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C410.1	Understand preparation of detailed estimate for buildings
C410.2	Provide knowledge about Preparation of bar bending schedule.
C410.3	Analyze of rate for various items of civil engineering works.
C410.4	Understand the Valuation of landed properties
C411	CE14 803 CONSTRUCTION ENGINEERING & MANAGEMENT
C411.1	Understand Network Techniques, Use of CPM and PERT for planning and Codification approach.
C411.2	Explain Construction methods and equipment and Construction disputes and settlement.
C411.3	Compute Construction cost and budget.
C411.4	Understand Safety in construction and Concept of ethics.
C412	CE14 804 (A) ADVANCED STRUCTURAL DESIGN II
C412.1	Familiarize design aspects of shell roofs.
C412.2	Understand design aspects of folded plates.
C412.3	Familiarize different structural systems.
C412.4	Familiarize analysis & design aspects of pre-stressed concrete structures.
C413	CE14 804 (C) SURFACE HYDROLOGY AND WATER POWER
C413.1	Explain the measurement and estimation of abstraction from precipitation.
C413.2	Understand the concept of hydrographs.
C413.3	Compute the peak discharge using various distribution methods.
C413.4	Summarise the concept of water power and elements of hydro power schemes.

C414	CE14 805 (D) GROUND IMPROVEMENT TECHNIQUES
C414.1	Analyze different ground improvement techniques
C414.2	Understand soil improvement by adding materials.
C414.3	Discribe ground improvemet methods by using geosynthetics.
C414.4	Explain soil improvement using reinforcing elements

C415	CE14 805 (E) ENVIRONMENTAL POLLUTION CONTROL ENGINEERING
C415.1	Describe about water pollution and its remedial measures.
C415.2	Explain air pollution and its control methods.
C415.3	Analyze land and sound pollution.
C415.4	Apply the knowledge of environmental impact assessment in different area.
C416	CE14 806 (P) SEMINAR
C416.1	Identify a current engineering topic and do literature survey
C416.2	Improve oral and written communication skills
C416.3	Distinguish differing forms of knowledge and academic disciplinary approaches
C417	CE14 807 (P) PROJECT
C417.1	Think innovatively on the development of components, products, processes or technologies in the engineering field
C417.2	Apply knowledge gained in solving real life engineering problems
C417.3	Demonstrate a sound technical knowledge of the selected project topic
C418	CE14 808 VIVA VOCE
C418.1	Demonstrate knowledge in program domain
C418.2	Apply the principles and phenomena, and their applications in solving engineering problems
C418.3	Exhibit professional etiquette suitable for career progression

IES COLLEGE OF ENGINEERING, CHITILAPPILLY
DEPARTMENT OF CIVIL ENGINEERING
COURSE OUTCOMES

SCHEME :2015

FIRST YEAR

Course Code	Course Outcomes
C101	MA101 CALCULUS
C101.1	Identify the nature of infinite series and their convergence
C101.2	Understand the ideas of curves and surfaces
C101.3	Understand the concept of partial derivatives, maxima & minima functions of two variables
C101.4	Apply calculus of vector valued functions in physical applications
C101.5	Apply the concept of multiple integrals to find the area & volume
C101.6	Apply vector calculus in engineering field
C102	PH100 ENGINEERING PHYSICS
C102.1	Compute the quantitative aspects of waves and oscillations in engineering systems
C102.2	Apply the interaction of light with matter through interference and diffraction
C102.3	Apply the knowledge of polarization of light in different fields, and the principles behind various superconducting applications.
C102.4	Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics
C102.5	Apply the knowledge of ultrasonics in non-destructive testing and use the principles of acoustics
C102.6	Apply the comprehended knowledge about laser, solid-state lighting devices and fiber optic communication systems

C103	BE110 ENGINEERING GRAPHICS
C103.1	Understand the fundamental engineering standards
C103.2	Draw the orthographic projection of objects by visualising them in different quadrants
C103.3	Prepare the pictorial drawings using the principles of isometric projections
C103.4	Understand the concept of cad software and multiview projections
C103.5	Sketch the sectional views of different objects and their surfaces
C103.6	Understand the concept of solid to solid penetration

C104	BE101-01 INTRODUCTION TO CIVIL ENGINEERING
C104.1	Understand the importance of civil Engineering in the infrastructural development of the society
C104.2	Illustrate the types, uses and properties of building materials like stone and bricks
C104.3	Acquire knowledge of building materials like cement and aggregates.
C104.4	Explain the different types of stone and brick masonry
C104.5	Illustrate the types, uses and properties of building materials like timber and steel
C104.6	Understand types of materials used for flooring and roofing

C105	BE103 INTRODUCTION TO SUSTAINABLE ENGINEERING
C105.1	Explain issues in areas of sustainability
C105.2	understand the different types of environmental pollutions and their sustainable solutions.
C105.3	Gain knowledge of the life cycle analysis and environment impact assesment
C105.4	Understand the concept of green buildings and the materials selected and its usage
C105.5	Understand the basic concept of energy sources and how it is derived from oceans- the importance of geothermal energy
C105.6	Establish a clear understandingof the role and impact of the various aspects of engineering

C106	EE100 BASICS OF ELECTRICAL ENGINEERING
C106.1	Solve simple DC electric circuits using fundamental concepts and circuit laws.
C106.2	Describe the fundamentals of AC circuits and magnetic circuits.
C106.3	Solve single and three phase AC circuits in steady state using the fundamental laws of electrical engineering.
C106.4	Familiarize basic concepts of electrical power system.
C106.5	Explain the basic concept of DC machines, AC machines and transformer.
C106.6	Describe the basic concepts of electrical system design.

C107	PH110 ENGINEERING PHYSICS LAB
C107.1	Understand different types of oscillations and resonant electrical circuits
C107.2	Use instrumental techniques for intensity pattern analysis
C107.3	Apply the theoretical concepts of laser, numerical aperture and photodetectors

C108	CE110 CIVIL ENGINEERING WORKSHOP
C108.1	Recognize different devices and tools used for civil engineering measurements
C108.2	Explain the use of various tools and devices for various field measurements
C108.3	Demonstrate the steps involved in basic civil engineering activities like plot measurements, setting out operations, evaluating the natural profile of the land, plumbing and undertaking simple construction work

C109	EE110 ELECTRICAL ENGINEERING WORKSHOP
C109.1	Demonstrate safety measures against electric shocks.
C109.2	Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols.
C109.3	Familiarize basic concepts of wiring simple lighting circuits for domestic buildings.

C110	MA102 DIFFERENTIAL EQUATIONS
C110.1	Solve homogeneous differential equations with constant co-efficients.
C110.2	Solve non- homogenous differential equations with constant co-efficients
C110.3	Understand Fourier series expansion of functions & their applications
C110.4	Solve partial differential equations
C110.5	Solve wave equations in engineering field.
C110.6	Solve physical situations using Heat equation.

C111	CY100 ENGINEERING CHEMISTRY
C111.1	Understand various Spectroscopic techniques like UV,IR and NMR and its application in various Engineering fields.
C111.2	Apply the basic concepts of Electrochemistry to its application in various Engineering fields.
C111.3	Apply the knowledge of analytical method for studying the thermal properties of various compounds and different techniques of separation.
C111.4	Understand and apply the knowledge of polymers in Engineerig,also Nano materials.
C111.5	Understand the chemistry of fuels and lubricants which are very useful to apply in the Engineering fields.
C111.6	Study various types of water treatment methods to develop skills for treating waste water.

C112	BE100 ENGINEERING MECHANICS
C112.1	Recall Principles and theorems related to rigid body mechanics
C112.2	Analyse types of supports, uniformly distributed and varying loads
C112.3	Comprehend Centroid & Moment of Inertia of various shapes
C112.4	Determine the friction of ladder, wedges and connected bodies
C112.5	Understand the combined motion of rotation and translation, instantaneous centre, D -Alemberts principle
C112.6	Solve problems involving rigid bodies and simple harmonic motion

C113	BE102 DESIGN & ENGINEERING
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C113.1	Explore different elements involved in good designs in day to day life.
C113.2	Sketch the optimum design from various alternatives.
C113.3	Translate innovative designs in different segments to prototypes
C113.4	Analyse Engineering designs covering function, cost, environmental sensitivity, safety factors and any other factors
C113.5	Differentiate the product oriented and user oriented aspects that make the design, concurrent, value and reverse engineering concepts
C113.6	Explore areas of modular design,Internet of things,Marketing tools, Intellectual property rights.

C114	ME100 BASICS OF MECHANICAL ENGINEERING
C114.1	Elaborate fundamental concepts of thermodynamics and various thermodynamic cycles.
C114.2	Discuss the basic working of IC engines and hydraulic equipments.
C114.3	Describe the working of refrigeration and air conditioning systems.
C114.4	Interpret the various power transmission system in automobiles.
C114.5	Outline the various engineering materials and its manufacturing processes.
C114.6	Discuss the various machine tools used in mechanical engineering.

C115	EC100 BASICS OF ELECTRONICS ENGINEERING
C115.1	Describe the basicelectronics &electromechanical components.
C115.2	Outline the principles & characteritics of diodes and transistors.
C115.3	Implement of diodes & transistors for application level circuits.
C115.4	Infer the fundamental concepts of digital Ics,electronic instrumentation systems &op-amps.
C115.5	Explain the principles of Radio communication &Satllite communication.
C115.6	Develop fundamental idea about basic communication &entertainment system.

C116	CY110 ENGINEERING CHEMISTRY LAB
C116.1	Practice Quantitative Chemical analysis for experimental skills and application in various analyses.
C116.2	Develop our knowledge for the application of Spectroscopic techniques in NMR spectra
C116.3	Understand Social,Economical and Environmental problems

C117	ME110 MECHANICAL ENGINEERING WORKSHOP
C117.1	Identify Basic Mechanical workshop operations in accordance with the material and objects
C117.2	Apply appropriate Tools and Instruments with respect to the mechanical workshop
C117.3	Apply appropriate safety measures with respect to the mechanical workshop trades

C118	EC110 ELECTRONICS ENGINEERING WORKSHOP
C118.1	Identify the active and passive electronic components.
C118.2	Develop skills on hands-on assembling, testing, dismantling and fabrication by making use of electronic components.
C118.3	Implementation of diodes & transistors for application level circuits in PCB and bread board

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COURSE OUTCOMES

SECOND YEAR

SCHEME : 2015

Course Code	Course Outcomes
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C201	MA201 LINEAR ALGEBRA AND COMPLEX ANALYSIS
C201.1	Understand the basic theory of functions of a complex variable.
C201.2	Understand the basic theory of conformal transformations
C201.3	Solve the problems using complex integration
C201.4	Evaluate the value of integrals using Residue theorem
C201.5	Apply the methods of solving system of linear equations.
C201.6	Apply the concept of diagonalization and orthogonal transformation in Engineering.

C201	CE201 MECHANICS OF SOLIDS
C202.1	Compute stresses and strains generated in material due to external loads.
C202.2	Understand elongation of bars and to study temperature effects and strain energy concepts.
C202.3	Sketch shear force and bending moment diagram for different types of beams.
C202.4	Understand simple bending theory , moment of resistance and shear stress in beams.
C202.5	Understand principal stresses and torsion concept.
C202.6	Understand column buckling and ability to calculate critical load of columns and deflection of statically determinate beams.

C203	CE203 FLUID MECHANICS
C203.1	Understand the basic properties of the fluid, fluid statics
C203.2	Apply the basic knowledge of kinematics of fluid flow.
C203.3	Gain the knowledge of the applicability of fluid dynamics in addressing problems in hydraulics
C203.4	Develop the skill for applying the fluid statics, kinematics and dynamics of fluid flow concepts for solving civil engineering problems.
C203.5	Apply a basic knowledge of Viscous flow and laminar flow
C203.6	Apply the knowledge of fluids in static, kinematic and dynamic equilibrium, in real life problems .

C204	CE205 ENGINEERING GEOLOGY
C204.1	Explain the relevance of engineering geology in civil engineering
C204.2	Understand the significance of sub surface water, problems created in construction and methods to control sub surface waters.
C204.3	Understand the physical and chemical composition of minerals and fundamentals of earthquakes in relation to internal structure of earth.
C204.4	Identify common rock forming minerals and common rocks based on their physical properties.
C204.5	Identify the attitude of geological structures and instruments used, deformation structures and their engineering significance
C204.6	Distinguish various natural hazards and its mitigation methods.

C205	CE207 SURVEYING
C205.1	Familiarize the linear and angular methods of surveying.
C205.2	Explain different methods of levelling.
C205.3	Compute the area and volume of earth work for various survey.
C205.4	Comprehend the concept of triangulation.
C205.5	Compute the most probable value and normal equations.
C205.6	Explain the parts and working of total station.

C206	HS210 LIFE SKILLS
C206.1	Develop communication competence in prospective engineers
C206.2	Apply appropriate thinking and problem solving techniques
C206.3	Analyze team dynamics & effectiveness
C206.4	Instil human values and ethical behaviour in engineers
C206.5	Demonstrate leadership qualities and best practices

C207	CE231 CIVIL ENGINEERING DRAFTING LAB
C207.1	introduce the fundamentals of Civil Engineering drawing.
C207.2	understand the principles of planning
C207.3	learn drafting of buildings and impart knowledge on drafting software such as AutoCAD

C208	CE233 SURVEYING LAB
C208.1	Understand conventional surveying methods and the relative elevations of different points on the earth's surface.
C208.2	Compute angles in horizontal and vertical plane
C208.3	Compute area and height by total station and handheld GPS

C209	MA202 PROBABILITY DISTRIBUTIONS, TRANSFORMS AND NUMERICAL METHODS
C209.1	Apply the concept of discrete random variables and probability distributions
C209.2	Apply the concept of continuous random variables and probability distributions
C209.3	Solve Engineering problems using Fourier transforms
C209.4	Apply Laplace transform in Engineering problems
C209.5	Apply Numerical methods in various Engineering problems
C209.6	Solve various Engineering problems using Numerical integration.

C210	CE202 STRUCTURAL ANALYSIS I
C210.1	Study the displacement response of statically determinate structural systems using energy methods.
C210.2	Determine deflection in beams, frames & pin jointed trusses using unit load method and strain energy method.
C210.3	Analyse statically indeterminate structures using strain energy method and method of consistent deformation.
C210.4	Analyse structures subjected to moving loads and influence lines.
C210.5	Analyse cables and suspension bridges.
C210.6	Analyse arches subjected to both static and moving loads.

C211	CE204 CONSTRUCTION TECHNOLOGY
C211.1	Recall the properties of different construction materials.
C211.2	Understand the mix proportioning, manufacturing and properties of concrete.
C211.3	Classify different types of foundations and masonry.
C211.4	Identify the different building components and finishing works.
C211.5	Summarize the vertical transportation facilities and different aspects of tall buildings.
C211.6	Explain the building failures, foundation failures and retrofitting techniques.

C212	CE206 FLUID MECHANICS II
C212.1	Apply the fundamental theories of fluid mechanics for the analysis of hydraulic machines and impact of jets.
C212.2	Provide knowledge about working of centrifugal pumps.
C212.3	Analyze characteristics of open channel flow.
C212.4	Understand the flow characteristics in an open channel.
C212.5	Recall the characteristics of gradually varied flow.
C212.6	Understand the concepts of dimensional analysis and model analysis.

C213	CE208 GEOTECHNICAL ENGINEERING I
C213.1	Correlate about the basic terms related soil.
C213.2	Classify the given soil by using index properties of soil.

C213.3	Understand different methods of determination of permeability of soil
C213.4	Analyze the shear strength of different soil
C213.5	Express the knowledge about consolidation of soil.
C213.6	Analyze the stability of slopes.
C214	HS200 BUSINESS ECONOMICS
C214.1	Utilize Marginal analysis for decision making
C214.2	Apply economic tools and techniques in market mechanism
C214.3	Analyse the profitability of the firm, economy operation and determination of price under various market situation.
C214.4	Gain knowledge about monetary theory, interest rate and emerging concept like bitcoins
C214.5	Use investment decision based on capital budgeting method in alignment with macro economic and micro economic theories
C214.6	Identify elementary accounting concepts used for preparing balance sheet and various concept regarding sources of financing

C215	CE232 MATERIALS TESTING LAB I
C215.1	Understand the testing of materials when subjected to tension and shear
C215.2	Describe the testing of materials when subjected to bending, impact and torsion
C215.3	Demonstrate the test to find the hardness of materials, verification of Clerk Maxwells theorem

C216	CE234 FLUID MECHANICS LAB
C216.1	Determine the coefficient of discharge of venturimeter, orificemeter and notches.
C216.2	Verify Bernoulli's theorem and determine Manning's coefficient, friction factor and time of emptying.
C216.3	Conduct performance test of pumps and turbines.

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COURSE OUTCOMES

THIRD YEAR

SCHEME : 2015

Course Code	Course Outcomes
C301	CE301 DESIGN OF CONCRETE STRUCTURES I
C301.1	Apply the concepts of limit state methods
C301.2	Design for shear reinforcement
C301.3	Design Singly Reinforced beams
C301.4	Design one-way slab
C301.5	Design Two- way slabs
C301.6	Design of dog legged stair and columns
C302	CE303 STRUCTURAL ANALYSIS II
C302.1	Analyse the structures using force method
C302.2	Identify the problems using slope deflection method
C302.3	Comprehend the structure forces using moment distribution method
C302.4	Analyse the problems using Kani's method
C302.5	Define the concepts related to beams curved in plan
C302.6	Explain the basics of plastic theory
C303	CE305 GEOTECHNICAL ENGINEERING II
C303.1	Understand about stress distribution under different loading condition.
C303.2	Explain earth pressure theory.
C303.3	Analyze the bearing capacity of foundation.
C303.4	Compare design concept of different type of foundation

C303.5	Express the deep knowledge of pile foundation.
C303.6	Describe different site investigation methods.

C304	CE307 GEOMATICS
C304.1	Understand the methods for balancing a traverse.
C304.2	Compute the parameters for setting out of a curve.
C304.3	Summarize the working of global position system.
C304.4	Explain about the advanced surveying methods using GPS.
C304.5	Apply the process remote sensing in various engineering problems.
C304.6	Explain about geospatial data acquisition and its processes.

C305	CE309 WATER RESOURCES ENGINEERING
C305.1	Determine precipitation over a catchment.
C305.2	Develop hydrograph based on the rainfall data.
C305.3	Calculation of water requirement for different Irrigation system.
C305.4	Understand the method to calculate stream flow measurement across weir.
C305.5	Describe basic concept of Reservoir planning
C305.6	Compare the design of different types of well.

C306	CE371 ENVIRONMENT AND POLLUTION
C306.1	Understand the the various types of environmental and industrial pollution, related diseases and their causes.
C306.2	Understand the various type of air pollution and its effects and type.
C306.3	Understand the various type of Water Pollution, related disease and water quality standard.
C306.4	Describe the solid waste management composition and characteristics
C306.5	Understand the land pollution and its effects and measures.
C306.6	Describe the noise pollution and its effects and control measures.

C307	CE341 DESIGN PROJECT
C307.1	Understand the engineering aspects of design with reference to simple products
C307.2	Think innovatively about different technologies used in engineering field
C307.3	Develop the add value to products and solve technical problems

C308	CE331 MATERIALS TESTING LAB II
C308.1	Determine basic physical properties of cement and aggregate
C308.2	Analyse workability of concrete
C308.3	Compute the compressive strength of concrete and brick

C309	CE333 GEOTECHNICAL ENGINEERING LAB
C309.1	Compute the index properties of soils and co-efficient of permeability
C309.2	Compute the Shear strength parameters and compaction characteristics of soil in the laboratory
C309.3	Determine field density,coefficient of permeability and settlement of soil

C310	CE302 DESIGN OF HYDRAULIC STRUCTURES
C310.1	Explain the causes of failure of weirs on permeable soils.
C310.2	Design the canals through alluvial soils.
C310.3	Design the minor irrigation structures such as regulators, cross drainage works canal falls.
C310.4	Illustrate the stability analysis of gravity dam.
C310.5	Summarize the causes of failure of different types of dams and their design criteria.

C311	CE304 DESIGN OF CONCRETE STRUCTURES II
C311.1	Design eccentrically loaded and slender columns
C311.2	Design of foundations.
C311.3	Design of cantilever retaining wall
C311.4	Design circular slabs and domes
C311.5	Design rectangular and circular water tanks
C311.6	Study the prestressed concrete fundamentals

C312	CE306 COMPUTER PROGRAMMING AND COMPUTATIONAL TECHNIQUES
C312.1	Describe basics of c++ , different data types ,operators and conditional statements
C312.2	Discuss various looping statements and arrys in c++
C312.3	Identify function definition and its usage
C312.4	Use the concept of structures
C312.5	Compare various numerical methods
C312.6	Discuss solution for linear algebraic equation

C313	CE308 TRANSPORTATION ENGINEERING I
C313.1	Understand transportation engineering, design controls and criteria
C313.2	Provide knowledge about sight distance, stopping distance.
C313.3	Know highway materials design and construction
C313.4	Understand the types and causes of failures in flexible and rigid pavement
C313.5	Describe traffic control devices, aircraft characteristics.
C313.6	Understand runway orientation, geometric design

C314	HS300 PRINCIPLES OF MANAGEMENT
C314.1	Identify the relevance of management concept
C314.2	Evaluate management theories and practices
C314.3	Plan decision for organisation
C314.4	Analyze major internal features of a business system and environment in which it operates
C314.5	Design staffing function
C314.6	Analyze both quantitative and qualitative information to isolate issues and formulate best control method

C315	CE362 GROUND IMPROVEMENT TECHNIQUES
C315.1	Understand classification and potential development of ground improvement techniques
C315.2	Analyse different grouting materials and its application.
C315.3	Understand different types of admixtures
C315.4	Analyse different applications of ground improvement techniques
C315.5	Understand about purpose of compaction
C315.6	Understand about the dewatering for explosion

C316	CE374 AIR QUALITY MANAGEMENT
C316.1	Understand the various forms and sources of air pollutants.
C316.2	Explain the effects of air pollutants.
C316.3	Recall dispersion of air pollutants based on atmospheric stability.
C316.4	Understand Gaussian plume model.
C316.5	Understand the various methods that can be adopted for collection of pollutants.
C316.6	Explain the various techniques that can be adopted for controlling air pollutants.

C317	CE332 TRANSPORTATION ENGINEERING LAB
C317.1	Determine the properties of coarse aggregate.
C317.2	Analyze the properties of bitumen.
C317.3	Demonstrate the California bearing ratio test

C318	CE334 COMPUTER AIDED CIVIL ENGINEERING LAB
C318.1	Obtain the abilities/skills of drawing in the field of Civil Engineering
C318.2	Analyze Civil Engineering structures using Structural Analysis & Design Software such as STADD.
C318.3	Familiarize the skills for the use of Project Management Software such as PRIMAVERA.

C319	CE352 COMPREHENSIVE EXAM
C319.1	Discuss the fundamental aspects of any engineering problem/situation.
C319.2	Identify the solution for real life while dealing with engineering aspects.
C319.3	Exhibit professional etiquette suitable for career progression

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COURSE OUTCOMES

SCHEME : 2015

FOURTH YEAR

Course Code	Course Outcomes
C401	CE401 DESIGN OF STEEL STRUCTURES
C401.1	Design of bolted and welded connections
C401.2	Design of tension members and beams
C401.3	Design of columns under axial loads
C401.4	Design of beams and plate girders
C401.5	Assess loads on truss and design purlins
C401.6	Design of structural components using timber
C402	CE403 STRUCTURAL ANALYSIS III
C402.1	Analyse multi-storeyed frames for vertical and horizontal loads.
C402.2	Understand the basic concepts and definitions of matrix analysis of structures
C402.3	Analyse structures using flexibility method.
C402.4	Analyse structures using stiffness method.
C402.5	Analyse structures using direct stiffness method.
C402.6	Understand the basic concepts of structural dynamics.

C403	CE405 ENVIRONMENTAL ENGINEERING I
C403.1	Analyze quantification of water demand through population forecasting.
C403.2	Understand physical, chemical and biological properties of water.
C403.3	Design and classify sedimentation tank.
C403.4	Design of filtration tank.
C403.5	Understand disinfection methods and treatment of water.
C403.6	Illustrate layout of water distribution network

C404	CE407 TRANSPORTATION ENGINEERING II
C404.1	Understand the requirements and functions of each component of a railway track.
C404.2	Illustrate the geometric design of a railway track.
C404.3	Compute the parameters for design of a turnout.
C404.4	Comprehend about the maintenance works in a railway track.
C404.5	Explain different methods for tunneling.
C404.6	Summarize about harbor and docks.

C405	CE409 QUANTITY SURVEYING AND VALUATION
C405.1	Understand about different types of Estimates and specifications
C405.2	Prepare rates for various items of work
C405.3	Estimate of RCC structures & preparation of bar-bending schedule
C405.4	Discuss about Valuation and Depreciation

C406	CE467 HIGHWAY PAVEMENT DESIGN
C406.1	Recall the structure of highway pavements, design concepts and material properties
C406.2	Analyze the flexible pavements
C406.3	Study the theoretical approaches for flexible pavement design
C406.4	Analyze the rigid pavements
C406.5	Study the Joints in cement concrete pavements
C406.6	Understand the concepts of pavement evaluation

C407	CE451 SEMINAR & PROJECT PRELIMINARY
C407.1	Analyse a current topic of professional interest and present it before an audience
C407.2	Identify an engineering problem, analyse it and propose a work plan to solve it.
C407.3	Undertake problem identification, formulation and solution

C408	CE431 ENVIRONMENTAL ENGINEERING LAB
C408.1	Evaluate biological characteristics of water.
C408.2	Analyse the physical and chemical characteristics of water sample .
C408.3	Analyse the waste water sample.

C409	CE402 ENVIRONMENTAL ENGINEERING II
C409.1	Explain wastewater-Sources and flow rates
C409.2	Understand about Sewage characteristics
C409.3	Analyse about Treatment of sewage
C409.4	Analyse about Secondary treatment methods
C409.5	Design of septic tank
C409.6	Understand about Sludge treatment and disposal

C410	CE404 CIVIL ENGINEERING PROJECT MANAGEMENT
C410.1	Plan and schedule a construction project.
C410.2	Understand the various resource levelling methods,schedules and codification approach.
C410.3	Familiarise the legal procedures in construction contracts and methods to solve it.
C410.4	Understand the need of ethical considerations in construction and Project management information system
C410.5	Familiarise the safety practices and procedures.
C410.6	Familiar with TQM and similar concepts related to quality

C411	CE474 MUNICIPAL SOLID WASTE MANAGEMENT
C411.1	Explain msw with respect to its physical properties, and associated critical considerations in view of emerging technologies.
C411.2	Understand different types of MSW and the MSW handling and storing methods.
C411.3	Select the appropriate method for solid waste collection, transportation, and redistribution.
C411.4	Understand the processing of solid waste.
C411.5	Describe methods of disposal of hazardous solid waste.
C411.6	Understand the different methods to utilize the Municipal Solid Waste.

C412	BT362 SUSTAINABLE ENERGY PROCESS
C412.1	Brief global and indian energy sources and energy conservations
C412.2	Explore the applications of solar energy
C412.3	Explore the applications of wind energy
C412.4	Avail basic understanding about conversion of biomass to energy
C412.5	Develop basic understanding of ocean energy resources
C412.6	Develop basic understanding of fuel cells and storage

C413	CS492 PROJECT
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C413.1	Think innovatively on the development of components, products, processes or technologies in the engineering field
C413.2	Apply knowledge gained in solving real life engineering problems
C413.3	Demonstrate a sound technical knowledge of the selected project topic