



SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, Affiliated to Anna University, Chennai, India)

Kaikkurichi, Pudukkottai – 622 303

DEPARTMENT OF CIVIL ENGINEERING

REGULATION 2013

COURSE OUTCOMES (CO)

I SEMESTER

HS6151- TECHNICAL ENGLISH-I

Students will be able to

CO1	Apply the collaborative and social aspects of research and writing processes.
CO2	Comprehend that research and writing is a series of tasks, including accessing, retrieving, evaluating, analyzing and synthesizing appropriate data and information from sources that vary in content, format, structure and scope.
CO3	Use appropriate technologies to organize, present and communicate information to address a range of audiences, purposes and genres.
CO4	Design the multidisciplinary settings to manage projects as an individual, as a member or leader after taking the exercises like role-play, group discussion and making presentations.
CO5	Model the life-long learning methods suitable for all the environments committed to professional ethics and responsibilities after inculcating the habit of reading and writing.
CO6	Analyze and identify the root for effective managerial skills through different spoken discourse and excerpts.

MA6151- MATHEMATICS-I

Students will be able to

CO1	Describe a clear idea of matrix algebra pertaining eigen values and eigen vectors in addition dealing with quadratic forms.
CO2	Learn infinite series and their convergence and acquire the knowledge of with limitations.
CO3	Use infinite series approximations for solutions arising in mathematical modeling.
CO4	Explain and characterize phenomena which evolve around circle of curvature and envelope.
CO5	Extend the function of a one variable to several variables. Multivariable functions of real variables arise inevitable in engineering.
CO6	Expose to double and triple integration so that they can handle integrals of higher order which are applied in engineering field.

PH6151- ENGINEERING PHYSICS-I

Students will be able to

CO1	Classify the Bravais lattices and different types of crystal structures and growth technique.
CO2	Demonstrate the properties of elasticity and heat transfer through objects.
CO3	Explain black body radiation, properties of matter waves and Schrodinger wave equations.
CO4	Describe and analyzing the quantum nature of radiation and matter to solve the real time societal and technological problems.
CO5	Illustrate the acoustic requirements, production and application of ultrasonics.
CO6	Examine the characteristics of laser and optical fiber.



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COURSE OUTCOMES (CO)

CY6151- ENGINEERING CHEMISTRY-I

Students will be able to

CO1	Classify the polymers, different polymerization techniques and its uses.
CO2	Describe the laws of thermodynamics, various thermodynamics functions and their significance.
CO3	Explain the photo physical processes and the components of analytical instruments.
CO4	Illustrate the phase diagrams, alloys and heat treatment processes
CO5	Discuss the synthesis, characteristics and the applications of nano materials.
CO6	Create the knowledge of nonmaterial's and their applications in fields like medicinal, electrical, electronic, chemical, etc.

GE6151- COMPUTER PROGRAMMING

Students will be able to

CO1	Explain the basic organization of computers, the number systems and write the pseudo code for algorithms and flow chart.
CO2	Develop 'C' programming fundamentals, looping statements and solve problems.
CO3	Design 'C' programs for arrays and strings.
CO4	Use functions with pass by value and reference, pointers in programs.
CO5	Develop coding in 'C' for structures and unions with storage classes and pre-processor.
CO6	Design and execute C programs for simple applications.

GE6152- ENGINEERING GRAPHICS

Students will be able to

CO1	Construct the conic sections and special curves and outline their practical applications and sketch the orthographic views from pictorial views and models.
CO2	Apply the principles of orthographic projections of points in all quadrants, lines and planes in first quadrant.
CO3	Draw the projections of simple solids like prisms, pyramids, cylinder and cone and obtain the traces of plane figures.
CO4	Design the sectional views of solids like cube, prisms, pyramids, cylinders & cones and Development of its lateral surfaces.
CO5	Apply the principles of isometric projection and perspective projection of simple solids and truncated prisms, pyramids, cone and cylinders.
CO6	Build an engineering component using Paper drawing as well as in CAD.

GE6161- COMPUTER PRACTICES LABORATORY

Students will be able to

CO1	Prepare data using MS-word & Excel to visualize graphs, charts in MS-Excel.
CO2	Outline the given problem using flowchart and to program using Switch case & Control structures.
CO3	Develop the code using decision making & looping statements.
CO4	Apply passing parameters using Arrays & Functions.
CO5	Use structure and Union for a given database and to bring out the importance of Unions over structure.
CO6	Design and implement C programs for simple applications.



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COURSE OUTCOMES (CO)

GE6162- ENGINEERING PRACTICES LABORATORY

Students will be able to

CO1	Demonstrate wiring for a simple residential house, identify the ratings of various appliances like Fluorescent tube, incandescent lamp, etc.
CO2	Calculate the different Electrical quantities, measure the energy consumption using single phase energy meter.
CO3	Measure the resistance to earth of an electrical equipment, analyze AC signal parameters using CRO.
CO4	Verify the Truth tables of Logic gates AND, OR, EOR and NOT, generate clock signal using suitable gates.
CO5	Develop soldering in a PCB, measure ripple factor of Half Wave Rectifier and Full Wave Rectifier.
CO6	Provide exposure to the students with hands-on experience on various basic engineering practices in Civil and Mechanical Engineering.

GE6163-PHYSICS AND CHEMISTRY LABORATORY-I

Students will be able to

CO1	To apply the physics principles of Thermal physics and Properties of Matter to evaluate properties of materials.
CO2	Evaluate the wavelength of spectral lines using spectrometer, the wavelength of laser, particle size, acceptance angle of an optical fiber using semiconductor diode laser and the thickness of a thin wire through interference fringes using Air wedge apparatus.
CO3	Appraise the velocity of sound and compressibility of the liquid using ultrasonic interferometer and thermal conductivity for bad conductors using Lee's disc apparatus.
CO4	Determine the DO content in water sample by winkler's method and molecular weight of polymer by Ostwald viscometer.
CO5	Find the strength of an acid using pH meter and conductometer.
CO6	Estimate the amount of weak and strong acids in a mixture by conductometer.

II SEMESTER

HS6251-TECHNICAL ENGLISH-II

Students will be able to

CO1	Speak clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
CO2	Define the impact of the professional engineering solution in societal and environmental contexts with the help of the basic grammar taught to communicate effectively and confidently.
CO3	Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
CO4	Read different genres of texts adopting various reading strategies.
CO5	Listen/view and comprehend different spoken discourses/excerpts in different accents.
CO6	Recognize, understand, and analyze the context within which language, information, and knowledge are produced, managed, organized, and disseminated.



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COURSE OUTCOMES (CO)

PH6251-ENGINEERING PHYSICS - II

Students will be able to

CO1	Illustrate classical and quantum free electron theory and calculate carrier concentration in metals.
CO2	Describe the carrier concentration in semi conductors and identify the p-type and n-type semi conductor using hall effect.
CO3	Illustrate the special material properties such as magnetism.
CO4	Discuss the super conductivity.
CO5	Explain the dielectrics, types of polarization, losses and breakdown
CO6	Discuss the properties, preparation and applications of metallic alloys, SMA, nano materials, NLO, Bio-materials.

MA6251-MATHEMATICS-II

Students will be able to

CO1	Solve ordinary differential equations that model most of the engineering problems.
CO2	Acquaint the concepts of vector calculus-like Gradient, Divergence, Curl, Directional derivative, Irrotational vector and Solenoidal vector.
CO3	Make to appreciate the purpose of using transforms to create new domain in which it is easier to handle the problem that is being investigated.
CO4	Develop an Explaining of the standard techniques of complex variable and mapping so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow of electric current.
CO5	Expose to the concept of Cauchy's integral theorem, Taylor, Laurent expansions and Singular points.
CO6	Use Application of residue theorem to evaluate complex integrals.

CY6251-ENGINEERING CHEMISTRY-II

Students will be able to

CO1	Explain the problems of using hard water in boilers and the methods of treatment of water for boiler use.
CO2	Design the electrochemical cells and to identify the types of corrosion and the methods of preventing.
CO3	Illustrate the methods of harnessing energy from non-conventional energy sources.
CO4	Classify various engineering materials and their importance.
CO5	Relate the significance of solid, liquid and gaseous fuels and to calculate the calorific values of fuels and the requirement of air for combustion in furnaces.
CO6	Analyze issues related to fuels and their synthesis and able to understand working of IC and diesel engines.

GE6251-BASIC CIVIL AND MECHANICAL ENGINEERING

Students will be able to

CO1	Explain the working principles of various power plants and differentiate the pumps and turbines.
CO2	State the functions of IC engine and classify the various types of boilers.
CO3	Apply the principles of vapour absorption and compression systems and Explain the



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COURSE OUTCOMES (CO)

	Operation of air conditioner.
CO4	Summarize the principles of surveying and use various measurements for surveying.
CO5	Discuss about various engineering materials and levelling instruments.
CO6	Classify the types of bridges, foundation, floorings, roofs, plasters and R.C.C structural members and state the purpose of dam.

GE6253 -ENGINEERING MECHANICS

Students will be able to

CO1	Explain the differential principles apply to solve engineering problems dealing with force.
CO2	Describe equilibrium of rigid bodies in two dimensions & equilibrium of rigid bodies in three dimensions.
CO3	Demonstrate T-section, I-section, angle section, hollow section by using standard formula.
CO4	Explain the differential principles applies to solve engineering problems dealing with velocity and acceleration.
CO5	Illustrate equilibrium analysis of simple system with sliding friction & wedge friction.
CO6	Describe the rolling resistance, translation and rotation of rigid bodies.

GE6262- PHYSICS AND CHEMISTRY LABORATORY - II

Students will be able to

CO1	Appraise the Young's modulus of the beam by uniform and non uniform bending method, the moment of inertia and Rigidity Modulus for thin wire using Torsion Pendulum.
CO2	Use Poiseuille's method for determining the coefficient of viscosity of the liquid
CO3	Estimate the refractive index of spectral lines for determining the dispersive power of a prism circuit.
CO4	Determine the type, amount of alkalinity, hardness in a given water sample.
CO5	Evaluate the amount of copper using EDTA method.
CO6	Examine the potentiometric redox titration and Conductometric precipitation titration.

GE6261- COMPUTER AIDED DRAFTING AND MODELING LABORATORY

Students will be able to

CO1	Explain the study of capability of software for drafting and modeling, draw a title block with necessary text and projection symbol.
CO2	Demonstrate drawing of curve, front view and top view of simple solids.
CO3	Explain drawing of plan of a residential building
CO4	Illustrate drawing of a simple steel truss, sectional view of prism, pyramid, cylinder, cone etc.,
CO5	Describe the isometric projection of simple objects.
CO6	Explain creation of 3-D models of simple objects and obtaining 2-D multi view drawings from 3-D model.



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COURSE OUTCOMES (CO)

III SEMESTER

MA6351- TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

Students will be able to

CO1	Explain about the basic concepts of PDE for solving standard partial differential equations.
CO2	Demonstrates the Fourier series analysis which is central to many applications in engineering.
CO3	Describe the applications of partial differential equations.
CO4	Develop an understanding of the Fourier transform techniques used in wide variety of situations.
CO5	Comprehend the effective mathematical tools for the solutions of partial differential equations that model several physical processes.
CO6	Design Z transform techniques for discrete time systems.

GE6351- ENVIRONMENTAL SCIENCE AND ENGINEERING

Students will be able to

CO1	Implement and discuss about the scientific, technological, economic and political solutions to environmental problems.
CO2	Comprehend the interrelationship between living organism and environment.
CO3	Describe about the importance of environment by assessing its impact on the human world: envision the surrounding environment, its functions and its value.
CO4	Explain the dynamic processes and the features of the earth's interior and surface.
CO5	Discuss about the integrated themes and biodiversity, natural resources.
CO6	Demonstrate the concept of pollution control and waste management.

CE6301 ENGINEERING GEOLOGY

Students will be able to

CO1	Describe the importance of geological knowledge such as earthquake & seismic zones in India.
CO2	Demonstrate the physical properties of minerals such as quartz, feldspar, pyroxene etc.,
CO3	Explain the classification, description, occurrence, engineering properties, distribution and uses of rocks,
CO4	Explain the types of foundations and other related aspects.
CO5	Describe about the structural geology and geophysical methods.
CO6	Illustrate the remote sensing for civil engineering applications.

CE6302 MECHANICS OF SOLIDS

Students will be able to

CO1	Describe the fundamental concepts of stress and strain in mechanics of solids and structures.
CO2	Explain about shear force and bending moment diagram for statically determinate beam with concentrated loads.
CO3	Illustrate the conjugate beam method for computation of slopes and deflection of determinate beams.
CO4	Demonstrate the stresses and deflection in circular solid and hollow shaft.



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COURSE OUTCOMES (CO)

CO5	Describe about 2-D normal and shear stresses on any plane.
CO6	Describe the analysis of plane trusses, method of joints and method of sections.

CE6303 MECHANICS OF FLUIDS

Students will be able to

CO1	Explain about basics of fluids-definition & distinction between solid and fluid.
CO2	Illustrate the fluid kinematics, flow visualization, lines and types of flow
CO3	Demonstrate the laminar flow between parallel plates and circular tubes.
CO4	Explain the boundary layer separation and control, draft in flat plate & lift co-efficient.
CO5	Demonstrate the fundamental dimensions, dimensional homogeneity, Rayleigh's method & Buckingham pi-theorem.
CO6	Explain about the dimensionless parameters, similitude, model studies and distorted models.

CE6304 SURVEYING-I

Students will be able to

CO1	Explain the basic principles, equipment and accessories for ranging and chaining methods.
CO2	Describe the compass surveying to measure angles, bearings & methods of plane table surveying.
CO3	Illustrate about the curvature and refraction, sources of error in leveling and reciprocal levelling.
CO4	Demonstrate the longitudinal and cross sectional plotting and contouring methods.
CO5	Explain the horizontal and vertical angle determination by using theodolite.
CO6	Describe the temporary and permanent adjustment of theodolite.

CE6311 SURVEY PRACTICAL I

Students will be able to

CO1	Explain the basics of chaining and its accessories, aligning & ranging.
CO2	Illustrate the chain and compass traversing.
CO3	Demonstrate the plane table methods like radiation, intersection, traversing and resection.
CO4	Explain basic concepts of levels, leveling staff, fly level and dumpy level.
CO5	Describe the check leveling, Longitudinal & Cross section.
CO6	Explain contouring and study of theodolite.

CE6312 COMPUTER AIDED BUILDING DRAWING

Students will be able to

CO1	Explain the principles of planning ,orientation and complete joinery details.
CO2	Illustrate the building with load bearing walls.
CO3	Explain the building with sloping roof.
CO4	Describe the reinforced cement concrete structures.
CO5	Demonstrate about industrial building north light roof structure.



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COURSE OUTCOMES (CO)

CO6	Explain about the building information modeling.
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IV SEMESTER

MA6459 NUMERICAL METHODS

Students will be able to

CO1	Explain the basic concepts and techniques for solving algebraic and transcendental equations.
CO2	Demonstrate the numerical techniques of interpolation and error approximations in various intervals in real life situations
CO3	Illustrate the numerical techniques of differentiation and integration for engineering problems
CO4	Describe the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
CO5	Explain the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
CO6	Illustrate dimensional Laplace's and Poisson's equation problems on rectangular domain

CE6401 CONSTRUCTION MATERIALS

Students will be able to

CO1	Explain about the selection of material and tests on stone and building materials.
CO2	Demonstrate the preparation and manufacturing processes of lime mortar, cement.
CO3	Describe about the flow, compaction factor & properties of hardened concrete.
CO4	Explain the basic concepts of panels of laminates, steels, aluminum and other metallic materials.
CO5	Describe about the basics of fiber, glass reinforced plastic, clay product, refractoriness and composite materials.
CO6	Illustrate the applications of laminar composites and fiber textiles.

CE6402 STRENGTH OF MATERIALS

Students will be able to

CO1	Explain about the strain energy and strain energy density.
CO2	Demonstrate the propped cantilever, fixed beams, fixed end moment and reactions.
CO3	Describe the Euler's theory of long columns, critical loads for prismatic columns with different end conditions.
CO4	Determination of principal stresses and principal planes.
CO5	Describe the unsymmetrical bending of beams and also symmetrical and unsymmetrical sections.
CO6	Solve the shear centre of curved beams using Winkler batch formula.

CE6403 APPLIED HYDRAULIC ENGINEERING

Students will be able to

CO1	Explain the basic concepts & differences between pipe flow and open channel flow.
CO2	Describe the dynamics equations of gradually varied and spatially varied flows.
CO3	Illustrate the basic applications of energy equation & RVF.



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COURSE OUTCOMES (CO)

CO4	Demonstrate the impact of jet on vanes, turbines & classification of turbines.
CO5	Describe the minimum speed to start the pump & cavitations in pumps.
CO6	Explain the basics of flow separation conditions, air vessels, indicator diagrams and its variations.

CE6404 SURVEYING II

Students will be able to

CO1	Describe the horizontal & vertical control methods.
CO2	Illustrate the sources, precautions, corrections and classification of errors .
CO3	Explain about the electro optical system and its working principle and sources of error .
CO4	Describe basic concepts of space, control and user segments of GPS.
CO5	Demonstrate the route survey for highway, railway and waterways.
CO6	Describe the fundamentals of photogrammetric and remote sensing.

CE6405 SOIL MECHANICS

Students will be able to

CO1	Explain the index properties of soil, BIS classification system & soil compaction.
CO2	Describe the basic concepts of soil water, static pressure in water & effective stress concept in soil.
CO3	Illustrate the stress distribution, soil media & Boussinsq theory.
CO4	Demonstrate the shear strength of cohesive & cohesion less soil.
CO5	Explain the slope failure mechanisms types and solve infinite & finite slopes.
CO6	Describe the friction circle method, stability number & slope protection measures.

CE6411 STRENGTH OF MATERIALS LABORATORY

Students will be able to

CO1	Explain the test on mild steel rod & compression test on wood.
CO2	Illustrate the double shear test on metal & torsion test on mild steel rod.
CO3	Demonstrate the impact test on metal specimen & hardness test on metals.
CO4	Describe the deflection test on metal beam & compression test on helical spring.
CO5	Explain the deflection test on carriage spring.
CO6	Illustrate about the various types of test on cement.

CE6412 HYDRAULIC ENGINEERING LABORATORY

Students will be able to

CO1	Explain about the flow measurement like calibration of rotometer & flow through venturi & orifice meter.
CO2	Demonstrate the flow through variable duct area, orifice, mouth piece & notches.
CO3	Illustrate the losses in pipes like determination of friction co efficient in pipes.
CO4	Describe the characteristics of centrifugal pumps, gear pumps, submersible pumps & reciprocating pump.
CO5	Explain the characteristics of Pelton wheel turbine, Francis turbine and Kaplan turbine.
CO6	Demonstrate the metacentric height.



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COURSE OUTCOMES (CO) CE6413 SURVEY PRACTICAL II

Students will be able to

CO1	Explain the basics of theodolites their setting and their adjustments.
CO2	Demonstrate the measurements of horizontal angle by reiteration, repetition and vertical angles.
CO3	Illustrate about the theodolite survey traverse, find height and distances of land and single plane method.
CO4	Describe the tachometry tangential and stadia system.
CO5	Explain the setting out works, foundation marking, simple & transition curve.
CO6	Demonstrate the field observation for calculation of azimuth & field work using total station.

V SEMESTER

CE6501 STRUCTURAL ANALYSIS I

Students will be able to

CO1	Explain the Degree of static & kinematic indeterminacies for plane frames.
CO2	Demonstrate the influence lines for reactions in statically determinate structures.
CO3	Illustrate about the arches as structural forms, examples of arch structures and types of arches.
CO4	Analyse the continuous beams and rigid frames with & without sway.
CO5	Solve the distribution factor, carryover of moments, stiffness & carryover factor using moment distribution method
CO6	Analyse the continuous beams, plane rigid frame with & without sway.

CE6502 FOUNDATION ENGINEERING

Students will be able to

CO1	Explain about the site investigation, selection of foundation & methods of exploration.
CO2	Illustrate the location & depth of foundation & bearing capacity of shallow foundation on homogeneous deposits.
CO3	Demonstrate the types of footings & contact pressure distribution
CO4	Describe the types of pile & their functions & factors influencing the selection of pile.
CO5	Explain the plastic equilibrium of soils in active & passive states.
CO6	Illustrate the earth pressure on retaining walls of simple configurations & Culmann graphical method.

CE6503 ENVIRONMENTAL ENGINEERING I

Students will be able to

CO1	Explain about the public water supply system and also planning objectives & design period of water supply system.
CO2	Demonstrate about the water supply, intake structures and their functions & conduits for water.
CO3	Illustrate the water treatment unit operations, processes, principles, functions and design of chemical feeding.
CO4	Explain the principles & functions of aeration and also removal of manganese & iron.
CO5	Describe the requirements of water distribution system, and their functions & drawings.



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COURSE OUTCOMES (CO)

CO6	Explain the principles & design of water supply in buildings, house service connection, fixtures & fittings.
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CE6504 HIGHWAY ENGINEERING

Students will be able to

CO1	Explain about the significance of highway planning, model limitations towards sustainability.
CO2	Illustrate about the cross sectional elements, sight distances, horizontal curves, super elevation & transition curves.
CO3	Demonstrate the design principles of flexible & rigid pavements.
CO4	Explain about the highway construction materials, properties, testing methods & CBR test for subgrade.
CO5	Describe the pavement distress in flexible and rigid pavements & pavement management system.
CO6	Illustrate about the skid resistance, structural evaluation & evaluation by deflection measurements.

CE6505 DESIGN OF REINFORCED CONCRETE ELEMENTS

Students will be able to

CO1	Describe the basic concepts of elastic method, ultimate load method & limit state method.
CO2	Analysis & design of singly & doubly reinforced rectangular and flanged beams.
CO3	Illustrate the behaviour of RC members in bond & anchorage.
CO4	Explain the types of columns, braced and unbraced columns & design of short rectangular and circular columns for axial, uniaxial and bi axial bending.
CO5	Demonstrate the design of wall footing.
CO6	Design of axially and eccentrically loaded rectangular pad & sloped footings.

CE6506 CONSTRUCTION TECHNIQUES, EQUIPMENT AND PRACTIC

Students will be able to

CO1	Describe about the compaction, curing & finishing & tesing of fresh & hardened concrete..
CO2	Illustrate the specifications, details & sequence of activities and construction co-ordination.
CO3	Explain the techniques of box jacking, pipe jacking and also under water construction of diaphragm walls and basement.
CO4	Demonstrate the launching girders, bridge deck & off shore platforms.
CO5	Describe the selection of equipment for earth work & earth moving operations
CO6	Illustrate about the equipments used for foundation and pile driving and also equipments used for compaction, batching, mixing & concreting.

GE6563 COMMUNICATION SKILLS- LABORATORY BASED

Students will be able to

CO1	Explain listening and note taking & listening to telephonic conversations.
CO2	Describe conversation practice, interview, group discussion and introducing oneself and others.



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COURSE OUTCOMES (CO)

CO3	Illustrate different genres of text like literature, media & technical.
CO4	Demonstrate blogs, tweets, online resume and e-mails and SMS & online texting.
CO5	Explain idioms and phrases, proverbs, collocations, chunks of language.
CO6	Illustrate sentence structures, subject verb agreement, pronoun and antecedent agreement.

CE6511 SOIL MECHANICS LABORATORY

Students will be able to

CO1	Determine the index properties of soils like, specific gravity of soil solids and sieve analysis.
CO2	Illustrate the liquid limit, plastic limit, shrinkage limit and differential free swell tests.
CO3	Describe insitu density and compaction characteristics like field density test.
CO4	Demonstrate the moisture content density relationship using standard proctor compaction test.
CO5	Explain engineering properties like permeability and one dimensional consolidation test.
CO6	Illustrate triaxial compression test in cohesion less soil & California bearing ratio test.

CE6512 SURVEY CAMP

Students will be able to

CO1	Describe the chaining like length & area calculation.
CO2	Illustrate the ranging like direct and indirect ranging.
CO3	Demonstrate the leveling like fly and check leveling.
CO4	Explain about the contouring like grid & radial contouring.
CO5	Describe the triangulation.
CO6	Explain the trilateration and rectangulation.

VI SEMESTER

CE6601 DESIGN OF REINFORCED CONCRETE & BRICK MASONRY STRUCTURES

Students will be able to

CO1	Design of cantilever & counterfort retaining walls.
CO2	Design of rectangular & circular water tanks both below & above ground level.
CO3	Design of staircases, flat slabs & principle of design of mat foundation.
CO4	Describe the characteristics of yield line , collapse load & plastic moment.
CO5	Demonstrate the classification of walls, lateral supports, stability & effective height of wall & columns.
CO6	Describe the effective length of walls, design loads, load dispersion & permissible stresses.

CE6602 STRUCTURAL ANALYSIS II

Students will be able to

CO1	Explain about the equilibrium, compatibility, determinate & indeterminate structures.
CO2	Analysis of continuous beam & co ordinate transformations.
CO3	Explain the discretisation of structures, displacement functions of truss & beam element.
CO4	Illustrate the statically indeterminate axial problems & pure bending in beam.
CO5	Analyse the space trusses using method of tension coefficients.
CO6	Explain the beams in curved plan, suspension cables, suspension bridges with two & three hinged stiffening girders.



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COURSE OUTCOMES (CO)

CE6603 DESIGN OF STEEL STRUCTURES

Students will be able to

CO1	Explain the properties of steel, structural steel sections & limit state design concepts.
CO2	Describe the types of sections & net area, net effective area for angle and Tee in tension.
CO3	Illustrate the types of compression members, theory of columns & basis of current codal provisions for compression member design.
CO4	Design the laterally supported and unsupported beams and built up beams.
CO5	Demonstrate the roof trusses & roof side coverings.
CO6	Design the purlin & element of truss, end bearing & design of gantry girder.

CE6604 RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING

Students will be able to

CO1	Describe about the significance of road, rail, air and water transports.
CO2	Demonstrate the earthwork, stabilization of track on poor soil & tunneling methods, drainage & ventilation.
CO3	Illustrate the air transport characteristics, classification & planning.
CO4	Explain the runway design, orientation, wind rose diagram & runway length.
CO5	Describe the harbour, port, satellite port, docks, waves & tides.
CO6	Demonstrate piers, break waters, wharves, jetties, quays and spring fenders.

CE6605 ENVIRONMENTAL ENGINEERING II

Students will be able to

CO1	Explain about the planning for sewerage system like sources of water generation, effects & estimation of sanitary sewage flow.
CO2	Illustrate the hydraulics of flow in sewers, objectives, design Period & design of sanitary & storm sewers.
CO3	Demonstrate the selection of treatment process, principles, functions, design & drawing of unit primary treatment sewage.
CO4	Describe the selection of treatment methods, principles, functions, design & drawing of units of secondary treatment sewage.
CO5	Explain the standards for disposal, methods, dilution & self purification of surface water bodies.
CO6	Describe the sludge digestion, bio gas recovery, sludge conditioning & dewatering.

CE6002 CONCRETE TECHNOLOGY

Students will be able to

CO1	Explain the different types, chemical composition & properties of cement.
CO2	Demonstrate the accelerators, retarders, plasticizers, super plasticizers, water proofers, chemical & mineral admixtures.
CO3	Describe the principles of mix proportioning, properties of concrete related to mix design & physical properties of materials required for mix design.
CO4	Illustrate the workability, slump test, compaction factor test, segregation & bleeding of fresh concrete.
CO5	Explain the light weight & high strength concrete.
CO6	Describe the special concrete like shotcrete, polymer concrete & high performance concrete.



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REGULATION 2013

COURSE OUTCOMES (CO)

CE6611 ENVIRONMENTAL ENGINEERING LABORATORY

Students will be able to

CO1	Find out the ammonia nitrogen in water, coagulation & precipitation process for treating waste water.
CO2	Describe the suspended, volatile, fixed & settleable solids in waste water.
CO3	Explain about the B.O.D & C.O.D test.
CO4	Demonstrate the nitrate & phosphate in waste water.
CO5	Explain about the calcium, potassium and sodium.
CO6	Illustrate the heavy metal determination like chromium

CE6612 CONCRETE AND HIGHWAY ENGINEERING LABORATORY

Students will be able to

CO1	Describe the test on fresh concrete like slump cone, flow table, compaction factor test & Vee bee test.
CO2	Demonstrate the compressive strength of cube & cylinder and flexure & modulus of rigidity of hardened concrete.
CO3	Illustrate the specific gravity, grading, crushing strength, abrasion & impact value test on aggregate.
CO4	Describe the penetration, softening point, ductility, flash & fire points test on bitumen.
CO5	Explain the binder content on bituminous mixes.
CO6	Illustrate the Marshall stability, flow values and density of bituminous mixes.

VII SEMESTER

CE6701 STRUCTURAL DYNAMICS AND EARTHQUAKE ENGINEERING

Students will be able to

CO1	Explain & differentiate the static & dynamic loading, degree of freedom & idealization of structure as single degree of freedom system.
CO2	Describe two degree of freedom system, mode of vibrations, and formulation of equation of motion of multi degree of freedom system.
CO3	Demonstrate the elements of engineering seismology, causes of earthquake & plate tectonic theory.
CO4	Explain effect of earthquake on different types of structures & behaviour of reinforced cement concrete elements.
CO5	Illustrate the causes of damage, planning considerations & earthquake resistant design of masonry structures.
CO6	Describe the reinforced concrete buildings, lateral load analysis, design & detailing.

CE6702 PRESTRESSED CONCRETE STRUCTURES

Students will be able to

CO1	Describe the basic concepts, advantages, materials required, system & methods of prestressing.
CO2	Explain basic assumptions for calculating flexural stresses & permissible stress in steel & concrete.
CO3	Demonstrate the factors influencing deflections & short term deflections of uncracked



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COURSE OUTCOMES (CO)

	members.
CO4	Analyse & design of composite beams & methods of achieving continuity in continuous beams.
CO5	Design of tension & compression members.
CO6	Illustrate the methods of achieving partial prestressing, merits & demerits of partial prestressing.

CE6703 WATER RESOURCES AND IRRIGATION ENGINEERING

Students will be able to

CO1	Describe the water resources survey & water resources of India & Tamilnadu.
CO2	Explain the economics of water resources planning & national water policy.
CO3	Demonstrate the irrigation engineering needs, merits & demerits.
CO4	Illustrate the different types of impounding structures.
CO5	Describe the lift irrigation, tank irrigation & well irrigation.
CO6	Illustrate the surface, sub surface & micro irrigation, merits demerits & irrigation scheduling.

CE6713 ESTIMATION AND QUANTITY SURVEYING

Students will be able to

CO1	Explain about the calculation of quantities of brickwork, RCC, PCC, plastering, white washing & colour washing.
CO2	Demonstrate about the estimation of septic tank, soak pit, sanitary & water supply installation.
CO3	Estimate the rates, specifications, sources & preparation of detailed & general specifications.
CO4	Illustrate the basics of value engineering, capitalized value & depreciation.
CO5	Explain the principles for report preparation & report on estimate of residential building.
CO6	Describe about the roads, water supply & sanitary installation.

CE6007 HOUSING PLANNING AND MANAGEMENT

Students will be able to

CO1	Describe the basics concepts of house, home, house hold, apartments & multi storey building.
CO2	Demonstrate the basic concepts, contents, & standards for housing programming.
CO3	Illustrate the formulation of housing projects, land use & soil stability analysis.
CO4	Explain new construction techniques, cost effective modern materials & methods of construction.
CO5	Describe the evaluation of housing projects for sustainable principle.
CO6	Illustrate public private partnership projects & viability gap funding.

CE6011 AIR POLLUTION MANAGEMENT

Students will be able to

CO1	Describe about the air pollutants, particulates & gaseous pollutants.
CO2	Demonstrate about the elements of atmosphere, meteorological factors & wind roses.
CO3	Illustrate the basic concepts of control, principles & design of control measures.
CO4	Explain air quality standards, air quality monitoring & preventive measures.



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COURSE OUTCOMES (CO)

CO5	Describe about the sources of noise pollution.
CO6	Demonstrate the effects, assessment, standards, control methods & prevention of noise pollution.

CE6711 COMPUTER AIDED DESIGN AND DRAFTING LABORATORY

Students will be able to

CO1	Design & drawing of RCC cantilever & counter fort type retaining walls with reinforcement details.
CO2	Design of solid slab & RCC Tee beam bridges for IRC loading & reinforcement details.
CO3	Design & drafting of circular & rectangular water tank.
CO4	Design of plate girder bridges & truss girder bridges.
CO5	Design of detailed drawings including connections.
CO6	Design of hemispherical bottomed steel tank.

CE6712 DESIGN PROJECT

Students will be able to

CO1	Explain about the experience in designing various design problems related to Civil Engineering.
CO2	Demonstrate the basic concepts of building design philosophies
CO3	Illustrate the concept of codal provisions
CO4	Demonstrate about the guidelines used for design procedure
CO5	Describe about the creativity and presentation skills
CO6	Explain the knowledge about the various planning and designing of softwares

VIII SEMESTER

MG6851- PRINCIPLES OF MANAGEMENT

Students will be able to

CO1	Describe about the types of business organization, sole proprietorship, partnership, company-public & private sector enterprises.
CO2	Demonstrate the nature & purpose of planning, types & objective of planning.
CO3	Illustrate the nature & purpose, formal & informal organization.
CO4	Explain the foundations of individual & group behaviour, job satisfaction & job enrichment.
CO5	Describe the system & process of controlling, budgetary & non budgetary control techniques.
CO6	Illustrate about productivity problems & management.

CE6016 - PREFABRICATED STRUCTURES

Students will be able to

CO1	Describe about the basic need for prefabrication, principles, materials & modular coordination.
CO2	Explain the behaviour of structural components & large panel construction.
CO3	Demonstrate disuniting of structures & design of cross section based on efficiency of material used.
CO4	Illustrate the joints for different structural connections, dimensions & detailing.



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COURSE OUTCOMES (CO)

CO5	Explain progressive collapse & codal provisions.
CO6	Describe the equivalent design load for considering abnormal effects such as earthquake & cyclones etc.,

CE6021- REPAIR & REHABILITATION OF STRUCTURES

Students will be able to

CO1	Describe the Maintenance, Repair & rehabilitation, facets of maintenance & importance of maintenance.
CO2	Explain the quality assurance for concrete, strength, durability & thermal properties of concrete.
CO3	Demonstrate the Special concrete like polymer concrete, sulphur infiltrated concrete & fiber reinforced concrete.
CO4	Illustrate the techniques for repair & protection methods.
CO5	Explain the strengthening of structural elements & repair of structures.
CO6	Describe the demolition techniques & case studies.

CE6811 PROJECT WORK

Students will be able to

CO1	Explain about the practical problems and find solution by formulating proper methodology.
CO2	Describe the solution by formulating proper methodology.
CO3	Demonstrate the importance of codal provisions
CO4	Illustrate the problem solving techniques in civil engineering
CO5	Explain the technical and presentation skills
CO6	Describe the solution for practical problems

