SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, Affiliated to Anna University, Chennai, India)
Kaikkurichi, Pudukkottai – 622 303

DEPARTMENT OF CIVIL ENGINEERING

REGULATION 2021

COURSE OUTCOMES (CO)

I SEMESTER

HS3152 PROFESSIONAL ENGLISH - I	
Students will be able to	
CO1	Use appropriate words in a professional context.
CO2	Explain the basic grammatic structures and use them in right context.
CO3	Describe the denotative and connotative meanings of technical texts
CO4	Summarize about the definitions, descriptions, narrations and essays on various topics
CO5	Apply language effectively in professional contexts
CO6	Discuss the importance of read and write complex texts, summaries, articles, blogs, definitions, essays and user manuals.

MA3151 MATRICES AND CALCULUS	
Students will be able to	
CO1	Use the matrix algebra methods for solving practical problems.
CO2	Apply differential calculus tools in solving various application problems.
CO3	Describe the partial differential equations with initial and Lagrange's method by using certain techniques with engineering applications.
CO4	Carry out the differentiation to solve maxima and minima problems.
CO5	Explain different methods of integration in solving practical problems.
CO6	Determine multiple integral ideas in solving areas, volumes and other practical problems.

PH3151 ENGINEERING PHYSICS	
Students will be able to	
CO1	Acknowledge the importance of mechanics.
CO2	Express their knowledge in electromagneticwaves.
CO3	Demonstrate a strong foundational knowledge inoscillations.
CO4	Establish a strong foundational knowledge infibre optics and laser.
CO5	Comprehend the importance of quantum physics.
CO6	Comprehend and apply quantum mechanicalprinciples towards the formation of energy bands.

CY8151 ENGINEERING CHEMISTRY	
Students will be able to	
CO1	Describe the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.
CO2	Apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.
CO3	Use the knowledge of phase rule and composites for material selection requirements.
CO4	Explain the recommend suitable fuels for engineering processes and applications
CO5	Discuss the different forms of energy resources and apply them for suitable applications in energy sectors.
CO6	Determine theimportance of engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.

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GE3151 PROBLEM SOLVING AND PYTHON PROGRAMMING	
Students will be able to	
CO1	Develop algorithmic solutions to simplecomputational problems.
CO2	Design and execute simple Python programs.
CO3	Write simple Python programs using conditionalsand loops for solving problems.
CO4	Describe a Python program into functions.
CO5	Discuss compound data using Python lists, tuples,dictionaries etc.
CO6	Explain the importance of Read and write datafrom/to files in Python programs.

GE3152 HERITAGE OF TAMILS	
Students will be able to	
CO1	Discuss the Tamil language and literature.
CO2	Explain about the modern-art sculpture.
CO3	Illustrate the folk and martial arts.
CO4	Describe the Thinai concepts of Tamil.
CO5	Summarize the contribution of Tamil in Indianculture.
CO6	Define the role of siddha medicine.

GE3171 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY	
Students will be able to	
CO1	Develop algorithmic solutions to simple computational problems
CO2	Design and execute simple Python programs.
CO3	Implement programs in Python using conditionals and loops for solving problems.
CO4	Describe functions to decompose a Python program.
CO5	Explain compound datausing Python data structures.
CO6	Utilize Python packages in developing software applications.

BS3171 PHYSICS AND CHEMISTRY LABORATORY	
Students will be able to	
CO1	Explain the functioning of various physics laboratory equipment
CO2	Use graphical models to analyze laboratory data.
CO3	Apply mathematical models as a medium for quantitative reasoning and describing physicalreality.
CO4	Describe products and processes and explain their uses and purposes clearly and accurately C Access, process and analyze scientific information.
CO5	Solve problems individually and collaboratively.
CO6	Determine the amount of metal ions through volumetric and spectroscopic techniques.

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GE3172 ENGLISH LABORATORY	
Students will be able to	
CO1	Describe and comprehend general as well as complex academic information.
CO2	Explain different points of view in a discussion.
CO3	Explain formal and informal communicative contexts.
CO4	Describe products and processes and explain their uses and purposes clearly and accurately.
CO5	Express their opinions effectively in both formal and informal discussions.
CO6	Use language efficiently in expressing their opinions via various media.

II SEMESTER

HS3252 PROFESSIONAL ENGLISH - II	
Students will be able to	
CO1	Compare and contrast products and ideas in technicaltexts.
CO2	Identify and report cause and effects in events, industrial processes through technical texts.
CO3	Analyse problems in order to arrive at feasible solutionsand communicate them in the written format.
CO4	Explain the importance of present their ideas andopinions in a planned and logical manner.
CO5	Design effective resumes in the context of job search.
CO6	Demonstrate an understanding of job applications andinterviews for internship and placements.

MA3251 STATISTICS AND NUMERICAL METHODS	
Students will be able to	
CO1	Apply the concept of testing of hypothesis for small andlarge samples in real life problems.
CO2	Apply the basic concepts of classifications of design ofexperiments in the field of agriculture.
CO3	Describe the numerical techniquesof interpolation in various intervals.
CO4	Apply the numerical techniques of differentiation andintegration for engineering problems.
CO5	Explain various techniques and methods for solving first and second order ordinary differential equations.
CO6	Describe the partial and ordinary differential equations with initial and boundary conditions by using certain techniqueswith engineering applications.

PH3201- PHYSICS FOR CIVIL ENGINEERING	
Students will be able to	
CO1	Describe the heat transfer through different materials, thermal performance of building and thermal insulation.
CO2	Explain the ventilation and air conditioning of buildings
CO3	Illustrate the concepts of sound absorption, noise insulation and lighting designs

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COURSE OUTCOMES (CO)

CO4	Explain the processing and applications of composites, metallic glasses, shape memory alloys and ceramics
CO5	Describe the awareness on natural disasters such as earth quake and cyclone.
CO6	Describe the awareness on natural disasters such as fire and safety measures.

BE3252- BASIC ELECTRICAL AND ELECTRONICS INSTRUMENTATION ENGINEERING	
Students will be able to	
CO1	Describe the electric circuit parameters for simple problems
CO2	Explain the working principle and applications of electrical machines
CO3	Illustrate the characteristics of analog electronic devices
CO4	Explain the basic concepts of digital electronics
CO5	Explain the operating principles of measuring instruments
CO6	Describe the functional elements and working of measuring instruments

GE3251 ENGINEERING GRAPHICS	
Students will be able to	
CO1	Use BIS conventions and specifications for engineering drawing.
CO2	Construct the conic curves, involutes and cycloid.
CO3	Solve practical problems involving projection of lines.
CO4	Draw the orthographic, isometric and perspective projections of simple solids.
CO5	Draw the development of simple solids.
CO6	Draw engineering curves

GE3252 TAMILS AND TECHNOLOGIES	
Students will be able to	
CO1	Explain about the weaving and pottery technology inTamilnadu.
CO2	Describe about the design and construction technologyin Tamilnadu.
CO3	Discuss about the manufacturing technology in Tamilnadu.
CO4	Illustrate the agriculture and irrigation technology inTamilnadu.
CO5	Define the growth of science in Tamil.
CO6	Learn the contribution of the Tamils to Indian culture.

GE3271 ENGINEERING PRACTICESLABORATORY	
Students will be able to	
CO1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan;
CO2	Explain various joints in wood materials used in commonhousehold wood work.
CO3	Design various wire electrical joints in common householdelectrical wire work.
CO4	Weld various joints in steel plates using arc welding work; Machine various simple processeslike turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments.
CO5	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.
CO6	Design a tray out of metal sheet using sheet metal work.

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COURSE OUTCOMES (CO)

BE3272- BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING LABORATORY	
Students will be able to	
CO1	Explain the Ohm's law and Kirchhoff's Law and to measure three phase power
CO2	Describe the load characteristics of electrical machines
CO3	Illustrate the characteristics of basic electronic devices
CO4	Explain the Characteristics of BJT, SCR and MOSFET
CO5	Design and analysis of Half wave and Full Wave rectifiers
CO6	Describe the LVDT to measure displacement

GE3272 COMMUNICATION LABORATORY	
Students will be able to	
CO1	Speak effectively in group discussions held in formal/semi formal contexts.
CO2	Discuss, analyse and present concepts and problems fromvarious perspectives to arrive at suitable solutions.
CO3	Write emails, letters and effective job applications.
CO4	Write critical reports to convey data and information withclarity and precision.
CO5	Give appropriate instructions and recommendations forsafe execution of tasks.
CO6	Discuss the safety issues about electrical devices.

III SEMESTER	
MA3351 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	
Students will be able to	
CO1	Explain the given standard partial differential equations.
CO2	Explain the differential equations using Fourier series analysis which plays a vital role in engineering applications.
CO3	Describe the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
CO4	Explain the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
CO5	Illustrate the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.
CO6	Describe about an effective mathematical tools for the solutions of partial differential equations by using Inverse-Z transform techniques for discrete time systems.

ME3351-ENGINEERING MECHANICS	
Students will be able to	
CO1	Illustrate the vectorial and scalar representation of forces and moments.
CO2	Explain about the rigid body in equilibrium.
CO3	Explain about the properties of distributed forces.
CO4	Determine the friction and their effects by the laws of friction
CO5	Describe about the dynamic forces exerted in rigid body.
CO6	Describe about the kinetic energy of particle.

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CE3301 FLUID MECHANICS	
Students will be able to	
CO1	Demonstrate the difference between solid and fluid, its properties and behaviour in static conditions.
CO2	Describe the conservation laws applicable to fluids and its application through fluid kinematics and dynamics.
CO3	Illustrate the relationship among the parameters involved in the given fluid phenomenon and to predict the performance of prototypes by model studies.
CO4	Describe the losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel.
CO5	Explain the concept of boundary layer and its application
CO6	Explain the drag force excreted by the fluid on the flat solid surface.

CE3302 CONSTRUCTION MATERIALS AND TECHNOLOGY	
Students will be able to	
CO1	Identify the good quality brick, stone and blocks for construction.
CO2	Recognize the market forms of timber, steel, aluminum and applications of various composite materials.
CO3	Identify the best construction and service practices such as thermal insulations and air conditioning of the building.
CO4	Explain the various equipments for construction works conditioning of building.
CO5	Explain the construction planning and scheduling techniques.
CO6	Explain the network modelling and time analysis.

CE3303 WATER SUPPLY AND WASTEWATER ENGINEERING	
Students will be able to	
CO1	Illustrate the various components of water supply scheme and design of intake structure and conveyance system for water transmission
CO2	Explain the characteristics and composition of sewage, ability to estimate sewage generation and design sewer system including sewage pumping stations
CO3	Explain the process of conventional treatment and design of water and wastewater treatment system and selection of treatment process and biological treatment process
CO4	Design and evaluate water distribution system and water supply in buildings and explain the self-purification of streams and sludge and sewage disposal methods.
CO5	Explain and design the various advanced treatment system.
CO6	Describe the recent advances in water and wastewater treatment process and explain of sewage

CE3351 SURVEYING AND LEVELLING	
Students will be able to	
CO1	Explain about the various surveying and its principles.
CO2	Describe the different levels of terrain and ground features.
CO3	Explain the Theodolite Surveying for complex surveying operations.
CO4	Explain the procedure for establishing horizontal and vertical control.
CO5	Illustrate the modern surveying instruments.

CO6	Explain the field procedure and application of GPS.

CE3361 SURVEYING AND LEVELLING LABORATORY	
Students will be able to	
CO1	Describe the usage of basic surveying instruments like chain/tape, compass and levelling instruments
CO2	Explain the levelling instrument used for surveying operations
CO3	Explain about the theodolite for various surveying operations
CO4	Explain about the usage of survey in social infrastructures
CO5	Describe the planimetric maps
CO6	Illustrate the distance and difference in elevation between two inaccessible points

CE3311 WATER AND WASTEWATER ANALYSIS LABORATORY	
Students will be able to	
CO1	Explain the pollutant concentration in water and wastewater
CO2	Illustrate the proper sample for analysis
CO3	Describe the sample preservation methods
CO4	Describe the field oriented testing of water, wastewater
CO5	Explain the performance of coliform analysis
CO6	Explain the performance of pathogenic and non-pathogenic analysis

GE3361 PROFESSIONAL DEVELOPMENT	
Students will be able to	
CO1	Use of MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements
CO2	Apply MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding
CO3	Prepare MS EXCEL to visualize data for ease of understanding
CO4	Load MS EXCEL to visualize data for ease of understanding
CO5	Explain MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs
CO6	Operate MS PowerPoint to interlinking other elements, and using media objects.

IV SEMESTER

CE3401 APPLIED HYDRAULICS ENGINEERING	
Students will be able to	
CO1	Describe the basics of open channel flow, its classification and analysis of uniform flow in steady state conditions with specific energy concept and its application
CO2	Explain the steady gradually varied flow, water surface profiles and its length calculation using direct and standard step methods with change in water surface profiles due to change in grades.
CO3	Describe the relationship among the sequent depths of steady rapidly varied flow and estimating energy loss in hydraulic jump with exposure to positive and negative surges.
CO4	Design and explain the working principle of turbines

CO5	Illustrate about the pumps and explain their working principle with characteristic curves.
CO6	Design centrifugal and reciprocating pumps.

CE3402 STRENGTH OF MATERIALS	
Students will be able to	
CO1	Explain the concepts of stress and strain, principal stresses and principal planes.
CO2	Describe the Shear force and bending moment in beams and explain concept of theory of simple bending.
CO3	Explain the deflection of beams by different methods and selection of method for determining slope or deflection.
CO4	Analyze propped cantilever, fixed beams and continuous beams for external loadings and support settlements.
CO5	Describe the stresses due to Unsymmetrical bending of beams & locate the shear center,
CO6	Illustrate the various theories of failure

CE3403 CONCRETE TECHNOLOGY	
Students will be able to	
CO1	Explain the requirements of cement, aggregates and water for concrete
CO2	Describe suitable admixtures for enhancing the properties of concrete
CO3	Design concrete mixes as per IS method of mix design
CO4	Determine the properties of concrete at fresh and hardened state.
CO5	Describe the importance of special concretes for specific requirements.
CO6	Describe the importance and usage of high performance concretes

CE3404 SOIL MECHANICS	
Students will be able to	
CO1	Identify the various types of soils and its properties, formulate and solve engineering Problems
CO2	Describe the flow through soil medium and its impact of engineering solution
CO3	Explain the basic concept of stress distribution in loaded soil medium and soil settlement due to consolidation
CO4	Illustrate the shear strength of soils and its impact of engineering solutions to the loaded soil medium and also will be aware of contemporary issues on shear strength of soils.
CO5	Design finite slopes component and process as per needs and specifications.
CO6	Design infinite slopes component and process as per needs and specifications.

CE3405 HIGHWAY AND RAILWAY ENGINEERING	
Students will be able to	
CO1	Describe the highway according to the principles and standards adopted in various institutions in India.
CO2	Describe the geometric features of road network and components of pavement.
CO3	Explain the highway materials and construction practice methods and know its properties

	and able to perform pavement evaluation and management.
CO4	Illustrate the methods of route alignment and design elements in railway planning and constructions
CO5	Explain the construction techniques and maintenance of track laying and railway stations
CO6	Explain about the layouts of railway stations and its development

GE3451 ENVIRONMENTAL SCIENCES AND SUSTAINABILITY	
Students will be able to	
CO1	Explain the importance of environment, need for public awareness and types of biodiversity
CO2	Describe about environmental pollution, environmental protection and environmental protection acts.
CO3	Summarize renewable sources of energy
CO4	Discover sustainability concept, needs and challenges
CO5	Discuss about material life cycle assessment, energy cycles and carbon cycle
CO6	Explain about Zero waste and R concept

CE3411 HYDRAULIC ENGINEERING LABORATORY	
Students will be able to	
CO1	Explain the Bernoulli equation for calibration of flow measuring devices.
CO2	Illustrate the friction factor in pipes and compare with Moody diagram
CO3	Determine the performance characteristics of rotodynamic pumps.
CO4	Determine the performance characteristics of positive displacement pumps.
CO5	Explain about the performance characteristics of turbines.
CO6	Determine the metacentric height of floating bodies

CE3412 MATERIALS TESTING LABORATORY	
Students will be able to	
CO1	Explain the mechanical properties of steel
CO2	Describe the physical properties of cement
CO3	Explain the physical properties of fine and coarse aggregate.
CO4	Describe the workability and compressive strength of concrete.
CO5	Determine the compressive strength of brick
CO6	Determine the compressive strength of wood.

CE3413 SOIL MECHANICS LABORATORY	
Students will be able to	
CO1	Determine the index properties of soils
CO2	Determine the insitu density and compaction characteristics.
CO3	Illustrate the engineering properties and consolidation of soils.
CO4	Determine the compressibility and permeability of soils.
CO5	Explain the shear strength and triaxial test of soils.
CO6	Describe the various tests on Geosynthetics.