SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

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

Kaikkurichi, Pudukkottai – 622 303

DEPARTMENT OF ELECTRONICS AND COMMUNICATION 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 electromagnetic waves.
CO3	Demonstrate a strong foundational knowledge in oscillations.
CO4	Establish the knowledge on optics and lasers
CO5	Comprehend the importance of quantum physics
CO6	Comprehend and apply quantum mechanical principles towards the formation of energy bands.

CY3151-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	**A**pply 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 suitable fuels for engineering processes and applications.
CO5	Discuss different forms of energy resources and apply them for suitable applications in energy sectors

CO6	Determine the importance of engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.

GE3151- PROBLEM SOLVING AND PYTHON PROGRAMMING	
Students will be able to	
CO1	Develop algorithmic solutions to simple computational problems
CO2	Develop and execute simple Python programs.
CO3	Write simple Python programs using conditionals and loops for solving problems.
CO4	Describe a Python program into functions.
CO5	Describe compound data using Python lists, tuples, dictionaries etc.
CO6	Explain the importance of Read and write data from/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	Develop 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 data using 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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COURSE OUTCOMES (CO)

GE3172- ENGLISH LABORATORY	
Students will be able to	
CO1	Explain different points of view in a discussion
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 technical texts.
CO2	Identify and report cause and effects in events, industrial processes through technical texts
CO3	**A**nalyze problems in order to arrive at feasible solutions and communicate them in thewritten format.
CO4	Explain the importance of present their ideas and opinions in a planned and logical manner
CO5	Design effective resumes in the context of job search.
CO6	Demonstrate an understanding of job applications and interviews for internship and placements.

MA3251- STATISTICS AND NUMERICAL METHODS	
Students will be able to	
CO1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
CO2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
CO3	Describe the numerical techniques of interpolation in various intervals
CO4	Apply the numerical techniques of differentiation and integration for engineering problems
CO5	Explain the knowledge of 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 techniques with engineering applications.

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COURSE OUTCOMES (CO)

PH3254- PHYSICS FOR ELECTRONICS ENGINEERING	
Students will be able to	
CO1	Know basics of crystallography and its importance for varied materials properties
CO2	Gain knowledge on the electrical and magnetic properties of materials and their applications
CO3	Grasp knowledge on magnetic properties and applications
CO4	Explain clearly of semiconductor physics and functioning of semiconductor devices
CO5	Describe the optical properties of materials and working principles of various optical devices
CO6	Appreciate the importance of nanotechnology and nano devices.

BE3254- ELECTRICAL AND INSTRUMENTATION ENGINEERING	
Students will be able to	
CO1	Explain the operation of three phase power supply systems and power system
CO2	Analyze the working of transformer and to build its mathematical model
CO3	Explain the principles of DC electrical machines
CO4	Explain the operation of AC electrical machines
CO5	Explain the characteristics of the measuring instruments and its errors.
CO6	Explain the working of different types of transducers, storage and display devices

EC3251- CIRCUIT ANALYSIS	
Students will be able to	
CO1	Apply the basic concepts of circuit analysis such as Kirchoff's laws, mesh current and node voltage method for analysis of DC and AC circuits.
CO2	Apply suitable network theorems and analyze AC and DC circuits
CO3	Analyze steady state response of any R, L and C circuits
CO4	Analyze the transient response for any RC, RL and RLC circuits and frequency response of parallel and series resonance circuits.
CO5	Analyze frequency response of parallel and series resonance circuits
CO6	Analyze the coupled circuits and network topologies

GE3252- TAMILS AND TECHNOLOGIES	
Students will be able to	
CO1	Explain about the weaving and pottery technology inTamil Nadu
CO2	Describe about the design and construction technologyin Tamil Nadu

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REGULATION 2021

COURSE OUTCOMES (CO)

CO3	Discuss about the manufacturing technology in Tamil Nadu
CO4	Illustrate the agriculture and irrigation technology inTamil Nadu
CO5	Define the growth of science in Tamil.
CO6	Learn the contribution of the Tamils to Indian culture

EC3271- CIRCUITS ANALYSIS LABORATORY	
Students will be able to	
CO1	Identify the basic devices and its configurations
CO2	Analyze the resistive circuits with different sources
CO3	Design RL and RC circuits
CO4	Verify Thevinin & Norton theorem KVL & KCL, and Super Position Theorems
CO5	Explain the response of RLC circuit with different inputs
CO6	Obtain the resonance for different configurations of RLC

GE3271- ENGINEERING PRACTICES LABORATORY	
Students will be able to	
CO1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbingwork
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 processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipment
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

GE3272- COMMUNICATION LABORATORY	
Students will be able to	
CO1	Speak effectively in group discussions held informal/semi formal contexts
CO2	Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions
CO3	Write emails, letters and effective job applications
CO4	Write critical reports to convey data and information with clarity and precision
CO5	Give appropriate instructions and recommendations for safe execution of tasks
CO6	Respond intelligently and seek clarification and understand completely

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REGULATION 2021

COURSE OUTCOMES (CO)

III SEMESTER	
MA3355- RANDOM PROCESSES AND LINEAR ALGEBRA	
Students will be able to	
CO1	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
CO2	Demonstrate accurate and efficient use of advanced algebraic techniques.
CO3	Apply the concept to random processes in engineering disciplines
CO4	Explain the fundamental concepts of probability with thorough knowledge of standard distributions that can describe certain real-life phenomenon
CO5	Explain the basic concepts of one and two dimensional random variables andapply them to modeling engineering problems
CO6	Apply of one and two dimensional random variables to modeling in engineering problems

CS3353- C PROGRAMMING AND DATA STRUCTURES	
Students will be able to	
CO1	Develop C programs for any real world/technical application
CO2	Apply advanced features of C in solving problems
CO3	Write functions to implement linear and non–linear data structure operations
CO4	Suggest and use appropriate linear/non–linear data structure operations for solving given problem
CO5	Appropriately use sort and search algorithms for a given application
CO6	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.

EC3354- SIGNALS AND SYSTEMS	
Students will be able to	
CO1	Determine if a given system is linear/causal/stable
CO2	Determine the frequency components present in a continuous time signal .
CO3	Characterize continuous LTI systems in the time domain and frequency domain
CO4	Characterize discrete LTI systems in the time domain and frequency domain
CO5	Analyze discrete time signals and system in the Fourier and Z transform domain
CO6	Compute the output of an LT I system in the time and frequency domains

EC3353- ELECTRONIC DEVICES AND CIRCUITS	
Students will be able to	
CO1	Explain the Structure and working operation of basic electronic devices
CO2	Design and analyze amplifiers.
CO3	Analyze frequency response of BJT and MOSFET amplifiers

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REGULATION 2021

COURSE OUTCOMES (CO)

CO4	Design and analyze feedback amplifiers and oscillator principles.
CO5	Design power amplifiers and supply circuits
CO6	Analyze power amplifiers and supply circuits

EC3351- CONTROLSYSTEMS	
Students will be able to	
CO1	Compute the transfer unction of different physical systems.
CO2	Analyse the time domain specification and calculate the steady state error
CO3	Illustrate the frequency response characteristics of open loop and closed loop system response
CO4	Analyse the stability using Routh and root locus techniques
CO5	Illustrate the state space model of a physical system
CO6	Discuss the concepts of sampled data control system

EC3352- DIGITAL SYSTEMS DESIGN	
Students will be able to	
CO1	Explain the Boolean algebra and simplification procedures relevant to digital logic..
CO2	Design various combinational digital circuits using logic gates
CO3	Analyze and design synchronous sequential circuits
CO4	Analyze asynchronous sequential circuits
CO5	Design asynchronous sequential circuits
CO6	Build logic gates and use programmable devices

EC3361- ELECTRONIC DEVICES AND CIRCUITS LABORATORY	
Students will be able to	
CO1	Characteristics of PN Junction Diode and Zener diode
CO2	Design an Testing of BJT and MOSFET amplifiers.
CO3	Verify the operation of power amplifiers**.**
CO4	Design of Zener diode Regulator
CO5	Determine Frequency response of CE and CS amplifiers
CO6	Design and Testing of BJT and MOSFET amplifiers..

CS3362- C PROGRAMMING AND DATA STRUCTURES LABORATORY	
Students will be able to	
CO1	Use different constructs of C and develop applications
CO2	Write functions to implement linear and non-linear data structure operations
CO3	Suggest and use the appropriate linear / non-linear data structure operations for a given

	problem
CO4	Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval
CO5	Implement Sorting and searching algorithms for a given application
CO6	Implement searching algorithms for a given application

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

IV SEMESTER	
EC3452- ELECTROMAGNETIC FIELDS	
Students will be able to	
CO1	Relate the fundamentals of vector, coordinate system to electromagnetic concepts
CO2	Analyze the characteristics of Electrostatic field
CO3	Interpret the concepts of Electric field in material space and solve the boundary conditions
CO4	Explain the concepts and characteristics of Magneto Static field in material space and solve boundary conditions
CO5	Determine the significance of time varying fields
CO6	Determine the characteristics impedance ,wavelength, intrinsic impedence, group velocity and phase velocity of plane waves.

EC3401- NETWORKS AND SECURITY	
Students will be able to	
CO1	Explain the Network Models, layers and functions
CO2	Categorize and classify the routing protocols
CO3	List the functions of the transport and application layer
CO4	Evaluate and choose the network security mechanisms

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COURSE OUTCOMES (CO)

CO5	Discuss the hardware security attacks and countermeasures
CO6	Discuss the Protocols and email Security

EC3451- LINEAR INTEGRATED CIRCUITS	
Students will be able to	
CO1	Describe the characteristics of operational amplifiers
CO2	Design linear and nonlinear applications of OP – AMPS
CO3	Design applications using analog multiplier and PLL
CO4	Design ADC and DAC using OP – AMPS
CO5	Generate waveforms using OP – AMP Circuits.
CO6	Explain the applications of special function ICs

EC3492- DIGITAL SIGNAL PROCESSING	
Students will be able to	
CO1	Apply DFT for the analysis of digital signals and systems
CO2	Design IIR filters
CO3	Design FIR filters
CO4	Characterize the effects of finite precision representation on digital filters
CO5	Explain the architecture of DSP Processors
CO6	Design multirate filters and apply adaptive filters appropriately in communication systems

EC3491- COMMUNICATION SYSTEMS	
Students will be able to	
CO1	Gain knowledge in amplitude modulation techniques.
CO2	Explain the concepts of Random Process to the design of communication systems
CO3	Gain knowledge in digital techniques
CO4	Gain knowledge in sampling and quantization
CO5	Explain the importance of demodulation techniques
CO6	Implement the control coding schemes in communication systems

GE3451- ENVIRONMENTAL SCIENCES AND SUSTAINABILITY	
Students will be able to	
CO1	Explain the functions of environment, ecosystems and biodiversity and their conservation
CO2	Identify the causes, effects of environmentalpollution and natural disasters and contribute to the preventive measures in the society
CO3	Identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations
CO4	Explain the different goals of sustainabledevelopment and apply them for suitable

	technological advancement and societal development
CO5	**D**emonstrate the knowledge of sustainability practices and identify green materials and energy cycles.
CO6	Demonstrate the knowledge of sustainability practices and identify green materials, energycycles and the role of sustainable urbanization

EC3461- COMMUNICATION SYSTEMS LABORATORY	
Students will be able to	
CO1	Design AM, FM & Digital Modulators for specific applications.
CO2	Compute the sampling frequency for digital modulation
CO3	Simulate & validate the various functional modules of Communication system.
CO4	Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes..
CO5	Apply various channel coding schemes in Communication system.
CO6	Demonstrate their capabilities towards theimprovement of the noise performance of Communication system

EC3462- LINEAR INTEGRATED CIRCUITS LABORATORY	
Students will be able to	
CO1	Analyze various types of feedback amplifiers
CO2	Design oscillators, tuned amplifiers, wave-shaping circuits and multivibrators
CO3	Design and simulate feedback amplifiers, oscillators, tuned amplifiers, wave- shaping circuits and multivibrators, filters using SPICE Tool
CO4	Design amplifiers, oscillators, D-A converters using operational amplifiers
CO5	Design filters using operational amplifiers
CO6	To perform an experiment on frequency response of amplifiers

V SEMESTER	
EC3501- WIRELESS COMMUNICATION	
Students will be able to	
CO1	Explain the Concept And Design Of A Cellular System
CO2	Analyze Mobile Radio Propagation And Various Digital Modulation Techniques.
CO3	Describe the Concepts Of Multiple Access Techniques And Wireless Networks
CO4	Characterize a wireless channel and evolve the system design specifications
CO5	Design a cellular system based on resource availability and traffic demands
CO6	Explain the Wireless Channel equalization like Zero-Forcing Equalizer and Adaptive Equalizer

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COURSE OUTCOMES (CO)

EC3552-VLSI AND CHIP DESIGN	
Students will be able to	
CO1	Discuss in depth knowledge of MOS technology
CO2	Analyze the Combinational Logic Control
CO3	Design Sequential Logic Circuits and Clocking State
CO4	Explain Memory architecture and building blocks
CO5	Explain Memory architecture and building blocks
CO6	Discuss the ASIC Design Process and Testing.

EC3551-TRANSMISSION LINES AND RF SYSTEMS	
Students will be able to	
CO1	Explain the characteristics of transmission lines and its losses
CO2	Calculate the standing wave ratio and input impedance in high frequency transmission lines
CO3	Analyze high , power and impedance measurements
CO4	Analyze impedance matching by stubs using Smith Charts
CO5	Analyze the characteristics of TE and TM waves
CO6	Design a RF transceiver system for wireless communication

CEC352 --SATELLITE COMMUNICATION	
Students will be able to	
CO1	Analyze the different types of satellites
CO2	Describe the orbital determination and launching methods.
CO3	Analyze the earth segment and space segment
CO4	Analyze the satellite Link design
CO5	Learn the Comparison of Multiple access methods
CO6	Design various satellite applications

CEC345-OPTICAL COMMUNICATION & NETWORKS	
Students will be able to	
CO1	Realize Basic Elements In Optical Fibers, Different Modes And Configurations.
CO2	Describe Dispersion And Polarization Techniques.
CO3	Design Optical Sources And Detectors With Their Use In Optical Communication System.
CO4	Construct Fiber Optic Receiver Systems, Measurements And Techniques.
CO5	Analyze Optical Communication Systems And Its Networks.
CO6	Describe the Transmission Characteristics and its application

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CEC364 -WIRELESS BROAD BAND NETWORKS	
Students will be able to	
CO1	Design and implement the various protocols in wireless networks.
CO2	Analyze the architecture of 3G network standards
CO3	Describe the difference of LTE-A network design from 4G standard.
CO4	Design the interconnecting network functionalities by layer level functions.
CO5	Explore the current generation (5G) network architecture.
CO6	Learn the emerging techniques in 5G network.

EC3561- VLSI LABORATORY	
Students will be able to	
CO1	Write HDL code for basic as well as advanced digital integrated circuit
CO2	Import the logic modules into FPGA Boards
CO3	Synthesize Place and Route the digital Ips
CO4	Design, Simulate and Extract the layouts
CO5	Analyze and Test ,Verification of IC design
CO6	Analyze Analog IC Blocks using EDA tools

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