

B. TECH – ELECTRONICS & COMMUNICATION ENGINEERING

Department Vision

Envision a diverse and stimulating academic research ambience for student community and shaping them into competent professionals in the field of Electronics and Communication Engineering and to cater to the needs of society with a keen sense of environmental consciousness.

Department Mission

1. To Educate the students with the state-of-the-art technologies in Electronics and Communication Engineering to meet the ever-growing challenges of the industry.
2. To Nurture the spirit of innovation and creativity in the faculty and students in order for them to carry out research in collaboration with research organizations and industry.
3. To Provide ethical and value-based education that promotes activities pertaining to societal needs.

Program Educational Objectives (PEOs):

PEO1	Preparing our graduates for successful careers in design, installation, operation and maintenance of electronic systems and processes.
PEO2	Preparing our graduates to have the ability for lifelong learning by pursuing higher education, research and professional development
PEO3	Preparing our graduates to attain leadership roles in industry, academia and research organizations and innovate continuously.
PEO4	Preparing our graduates to develop management skills and become entrepreneurs.
PEO5	Preparing our graduates as ethical, responsible and value based professionals who work continuously for the benefit of the society.

Program Specific Outcomes (PSO's):

PSO1:	Should be able to clearly understand the concepts and applications in the field of networking, Communication systems and VLSI.
PSO2:	Should be able to associate the learning from courses, Embedded Systems and IoT in arriving solutions to real world problems.

Program Outcomes (POs):

Engineering Graduates will be able to:

1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
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.
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.
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 sustain able development.
8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
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.
11	Project management and finance: Demonstrate knowledge and understandingoftheengineeringandmanagementprinciplesandapplythese to one’s own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.
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.

Course outcomes (Cos) of all courses of all programs offered by the institution

Course Outcomes for First Year First Semester Course	
Course Code: B19 BS 1101	
Course Title: Mathematics-I	
CO-1	Solve a given system of linear algebraic equations
CO-2	Determine Eigen values and Eigen vectors of a system represented by a matrix
CO-3	Solve linear ordinary differential equations of first order and first degree.
CO-4	Apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits.
CO-5	Solve linear ordinary differential equations of second order and higher order.
CO-6	Determine Laplace transform and inverse Laplace transform and solve linear ODE.
Course Code: B19BS1102	
Course Title: MATHEMATICS – II	
CO-1	Fit an interpolation formula and perform interpolation for an equally spaced data as well as unequally spaced data.
CO-2	Find a real root of algebraic and transcendental equations, evaluate numerically certain definite integrals & solve a first order ordinary differential equation by Euler and RK methods.
CO-3	Compute partial derivatives, total derivative and Jacobian
CO-4	Find maxima/minima of functions of two variables and evaluate some real definite integrals.
CO-5	Form partial differential equations and solve Lagrange linear equation. Solve linear higher order homogeneous and non-homogeneous PDEs.
CO-6	Find theoretical solution of one-dimensional wave equation and one-dimensional heat equation
Course Code: B19BS1105	
Course Title: APPLIED CHEMISTRY	
CO-1	At the end of the course the students learn the advantages and limitations of plastic materials and their use in design.
CO-2	Fuels which are used commonly and their economics, advantages and limitations are discussed.
CO-3	Students gained Knowledge reasons for corrosion and some methods of corrosion control.
CO-4	Students understands the impurities present in raw water, problems associated with them and how to avoid them.
CO-5	Similarly, students understand liquid crystals and semiconductors. Students can gain the building materials, solar materials, lubricants and energy storage devices.
Course Code: B19CS1102	
Course Title: PROGRAMMING FOR PROBLEM SOLVING USING C	
CO-1	The student will learn about computer systems, computing environments, developing of a computer program and Structure of a C Program
CO-2	The student will learn to use different operators, data types and loops for developing C Programs.
CO-3	The student will able to write programs using Arrays and Strings
CO-4	To design and implement programs to analyze the different pointer applications
CO-5	To decompose a problem into functions and to develop modular reusable code
Course Code: B19EC1101	
Course Title: BASIC ELECTRONICS	
CO-1	Understand the basic concepts of charge carriers in semiconductors, drift and diffusion current

	densities.
CO-2	Identify various passive components and understand the concept of KVL and KCL.
CO-3	Understand the structure and operation of various diodes, rectifier circuits.
CO-4	Understand the characteristics of BJT in CE,CB,CC configurations and IC fabrication
CO-5	Understand the concept of number systems, logic gates and flip flops.
Course Code: B19BS1108	
Course Title: APPLIED CHEMISTRY LAB	
CO-1	An understanding of Professional and develop confidence on recent trends.
CO-2	Able to gain technical knowledge of measuring, operating and testing of chemical instruments and equipments
CO-3	Acquire ability to apply real time knowledge of chemistry.
CO-4	Exposed to the real time working environment.
CO-5	Demonstrate the ability to learn Principles, design and conduct experiments.
CO-6	Ability to work on laboratory and multidisciplinary tasks.
Course Code: B19HS1102	
Course Title: ENGLISH LAB	
CO-1	Remember and understand the different aspects of English language proficiency with emphasis on LSRW skills.
CO-2	Apply communication skills through various language learning activities.
CO-3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening comprehension.
CO-4	Exhibit an acceptable etiquette essential in social settings
CO-5	Get awareness on mother tongue influence and neutralize it in order to improve fluency and clarity in spoken English.
Course Code: B19CS1105	
Course Title: PROGRAMMING FOR PROBLEM SOLVING USING C LAB	
CO-1	Gains Knowledge on various concepts of a C language.
CO-2	Able to draw flowcharts and write algorithms.
CO-3	Able design and development of C problem solving skills.
CO-4	Able to design and develop modular programming skills.
CO-5	Able to trace and debug a program
Course Code: B19MC1102	
Course Title: CONSTITUTION OF INDIA	
CO-1	Understand historical background of the constitution making and its importance for building a democratic India.
CO-2	Understand the functioning of three wings of the government ie., executive, legislative and judiciary.
CO-3	Understand the value of the fundamental rights and duties for becoming good citizen of India.
CO-4	Analyze the decentralization of power between central, state and local self-government.
CO-5	Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.
CO-6	1. Know the sources, features and principles of Indian Constitution.
	2. Learn about Union Government, State government and its administration.
	3. Get acquainted with Local administration and Panchayati Raj.
	4. Be aware of basic concepts and developments of Human Rights.
	5. Gain knowledge on roles and functioning of Election Commission

Course Outcomes for First Year Second Semester Course	
Course Code: B19HS1201	
Course Title: ENGLISH	
CO-1	Identify the context, topic, and pieces of specific information by understanding and responding to the social or transactional dialogues spoken by native speakers of English.
CO-2	Apply suitable strategies for skimming and scanning to get the main idea of a text and locate specific information
CO-3	Build confidence and adapt themselves to the social and public discourses, discussions, and presentations

CO-4	Understand and apply the principles of writing to paragraphs, arguments, essays, and formal/informal communication.
CO-5	Construct sentences using proper grammatical structures and correct word forms.
Course Code: B19BS1202	
Course Title: MATHEMATICS-III	
CO-1	Determine Fourier series and half range series of functions.
CO-2	Find different Fourier transforms of non-periodic functions and also use them to evaluate integrals
CO-3	Use the knowledge of Beta and Gamma functions in evaluating improper integrals
CO-4	Evaluate double integrals, simple triple integrals & find areas and volume
CO-5	Find the gradient of a scalar function, divergence and curl of a vector function. Determine scalar potential.
CO-6	Apply Green's, Stokes' and Gauss divergence theorems to solve problems.
Course Code: B19BS1203	
Course Title: APPLIED PHYSICS	
CO-1	Interpret the behaviour of light radiation in interference and diffraction Phenomena and their applications.
CO-2	Explain the properties of dielectric and magnetic materials suitable for engineering applications.
CO-3	Explain the important aspects of semiconductors and electrical conductivity in them.
CO-4	Understand the basics of modern technologies lasers, optical fibres and ultrasonics and their utility in various fields.
CO-5	Demonstrate the synthesis methods and applications of nanomaterials.
Course Code: B19EE1202	
Course Title: BASIC ELECTRICAL ENGINEERING	
CO-1	Able to analyze the various Electrical networks
CO-2	Able to explain the operation of DC generator and analyze the characteristics of DC generator.
CO-3	Able to explain the principle of operation of DC motor and analyze their characteristics. Acquire the skills to analyze the speed control methods of DC motors.
CO-4	Able to explain the operation of single-phase transformer and choose correct rating of a transformer for a specific application.
CO-5	Ability to analyze the performance and speed – torque characteristics of a 3-phase induction motor.
CO-6	Able to explain the operation of special machines
Course Code: B17 CS 1201	
Course Title: COMPUTER PROGRAMMING USING C	
CO-1	Understand the basic terminology used in computer programming.
CO-2	Write, compile and debug programs in C language.
CO-3	Use different data types in a computer program.
CO-4	Design programs involving decision structures, loops and functions.
CO-5	Explain the difference between call by value and call by reference.
CO-6	Understand the dynamics of memory by the use of pointers.
CO-7	Use different data structures and create/update basic data files.
Course Code: B19ME1201	
Course Title: ENGINEERING DRAWING	
CO-1	Apply principles of drawing to Construct polygons and engineering curves
CO-2	Apply principles of drawing to draw the projections of points and lines.
CO-3	Apply principles of drawing to draw the projections of planes

CO-4	Apply principles of drawing to draw the projections of solids.
CO-5	Apply principles of drawing to represent the object in 3D view through isometric views.
Course Code: B19BS1206	
Course Title: APPLIED PHYSICS LAB	
CO-1	Students get hands on experience in setting up experiments and using the instruments / equipment individually
CO-2	Get introduced to using new / advanced technologies and understand their significance.
Course Code: B19HS1202	
Course Title: COMMUNICATION SKILLS LAB	
CO-1	Learn different aspects of English language proficiency in LSRW skills
CO-2	Apply communication skills through various language learning activities.
CO-3	Draft job application letters.
CO-4	Adopt a professional etiquette in formal settings
CO-5	Improve fluency and clarity in both spoken and written English.
Course Code: B19EE1204	
Course Title: BASIC ELECTRICAL ENGINEERING LAB	
CO-1	Understand ohms law and Kirchhoff's laws
CO-2	To determine the parameters of iron core inductor
CO-3	Predetermine the performance of DC machines and transformers.
CO-4	Make use of DC shunt machines for applications.
CO-5	Evaluate the performance of 1-phase transformer.
CO-6	Perform brake test on 3-phase induction motor.
Course Code: B19EC1201	
Course Title: ELECTRONICS WORKSHOP PRACTICE	
CO-1	Identify electronics components like resistors, capacitors, diodes, transistors etc. Assemble circuits on a breadboard, analyze the performance of the circuits, evaluate the results and confirm the validity of established concepts.
CO-2	Use measuring instruments like the multimeter and equipments such as Function generator, power supply & CRO.
CO-3	Solder and de-solder components on PCB. Understand PCB fabrication process and Fabricate PCBs .
CO-4	Gets familiar with technical softwares & Google documentation tools
CO-5	Gets familiar with electronics boards & PC hardware/software installation
Course Code: B17 CS 1204	
Course Title: C PROGRAMMING LAB	
CO-1	Apply and practice logical ability to solve the problems.
CO-2	Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
CO-3	Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs.
CO-4	Understand and apply the in-built functions and customized functions for solving the problems.
CO-5	Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
CO-6	Document and present the algorithms, flowcharts and programs in form of user manuals.
CO-7	Identification of various computer components, Installation of software
Course Code: B19EC1202	
Course Title: ENGINEERING EXPLORATION PROJECT	
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Course Outcomes for Second Year First Semester Course	
Course Code: B19EC2101	
Course Title: ELECTRONIC DEVICES AND CIRCUITS	
CO-1	Analyze the characteristics and operation of Diode, BJT, JFET and MOSFET.
CO-2	Analyze the biasing circuits of BJT and JFET.
CO-3	Analyze the performance of small signal BJT and FET single stage amplifiers.
CO-4	Apply the gained knowledge in the design of simple Electronic circuits.
Course Code: B19EC2102	
Course Title: SWITCHING THEORY AND LOGIC DESIGN	
CO-1	To convert one number system to another, analyze logic gates and Boolean theorems.
CO-2	To analyze digital circuits using different minimization techniques.
CO-3	To design various combinational and sequential circuits along with applications.
CO-4	To design counters and state machines by applying the knowledge of synchronous and asynchronous sequential circuits.
Course Code: B19EC2103	
Course Title: SIGNALS AND SYSTEMS	
CO-1	Outline the basic concepts of signals and systems
CO-2	Analyze the spectral characteristics of Continuous Time and Discrete Time periodic and aperiodic signals using Fourier analysis.
CO-3	Analyze system properties based on impulse response and Fourier analysis.
CO-4	Apply Laplace- transforms for analyzing Continuous -time signals and systems
CO-5	Apply Z- transforms for analyzing discrete-time signals and systems.
CO-6	Outline the process of sampling and the effects of under sampling.
Course Code: B19EC2104	
Course Title: PROBABILITY THEORY AND RANDOM PROCESSES	
CO-1	Demonstrate the axiomatic formulation of modern probability theory
CO-2	Characterize Probability Models and functions of Random variables based on single and multiple random variables.
CO-3	Evaluate and apply moments and characteristic functions and acquire the concept of inequalities and probabilistic limits
CO-4	Assimilate the concept of Random process and determine covariance and spectral density of stationary random processes.
CO-5	Identify specific applications to Poisson and Gaussian processes, and Analyze the response of random inputs to linear time invariant systems.
Course Code: B19EE2105	
Course Title: NETWORK ANALYSIS	
CO-1	Apply network theorems to solve the DC electrical circuits.
CO-2	Analyze the transient behavior of circuits by applying first and second order Differential equations.
CO-3	Apply network theorems to solve AC circuits and calculate resonance parameters.
CO-4	Calculate two port network parameters for the given network.
CO-5	Determine the network functions for Ladder and General Networks and analyze Stability of electric circuits using Routh's Hurwitz criterion.
Course Code: B19 CS 2108	

Course Title: DATA STRUCTURES	
CO-1	Apply advanced data structure strategies for exploring complex data structures and implement data structures like stacks, queues
CO-2	Implement & perform operations on dynamic linear data structures like linked lists
CO-3	Apply different operations on trees and graphs.
CO-4	Implement & analyze various searching & sorting algorithms
Course Code: B19EC2105	
Course Title: ELECTRONIC DEVICES & CIRCUITS - LAB (WITH SIMULATION)	
CO-1	Apply the concepts of different electronic devices to verify their characteristics and measure the important parameters.
CO-2	Analyze the performance of rectifier circuits with and without filters.
CO-3	Analyze the performance of BJT and FET amplifier circuits.
CO-4	Simulation and Design of small electronic circuits using BJT and FET
Course Code: B19EC2106	
Course Title: SWITCHING THEORY AND LOGIC DESIGN - LAB (WITH SIMULATION)	
CO-1	Analyze and design basic combinational logic circuits using Digital IC's and HDL Programming.
CO-2	Implement basic sequential logic circuits using Digital IC's and HDL Programming.
Course Code: B19MC2102	
Course Title: ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE	
CO-1	Understand the concept of Traditional knowledge and its importance.
CO-2	Know the need and importance of protecting traditional knowledge.
CO-3	Know the various enactments related to the protection of traditional knowledge.
CO-4	Understand the concepts of Intellectual property to protect the traditional knowledge .

Course Outcomes for Second Year Second Semester Course	
Course Code: B19EC2201	
Course Title: ELECTRONIC CIRCUIT ANALYSIS	
CO-1	Outline the concepts of multistage amplifiers, feedback amplifiers, power amplifiers, tuned amplifiers, operational amplifiers and oscillators.
CO-2	Apply the concepts in the realization of practical circuits
CO-3	Analyze and design practical electronic circuits using amplifiers, oscillators and Operational amplifiers.
Course Code: B19EC2202	
Course Title: ELECTROMAGNETIC WAVES & TRANSMISSION LINES	
CO-1	Illustrate the behaviour of static electric and magnetic fields in different media for different charge and current distributions.
CO-2	Apply Maxwell's equations to describe the behaviour of time varying electromagnetic fields.
CO-3	Apply Maxwell's equations to describe the EM wave propagation in free space and across different media.
CO-4	Compute different transmission line and waveguide parameters.
Course Code: B19EC2203	
Course Title: ANALOG COMMUNICATIONS	
CO-1	Differentiate various Analog modulation and demodulation schemes
CO-2	Analyze the concepts of analog modulation techniques in time and frequency domains
CO-3	Identify the functional blocks of transmitters and receivers.
CO-4	Analyze and compare the performance of various analog modulation techniques in the presence of noise.
CO-5	Differentiate various Pulse modulation and demodulation techniques.

Course Code: B19EC2204	
Course Title: COMPUTER ARCHITECTURE AND ORGANIZATION	
CO-1	Analyze how computers represent and manipulates data.
CO-2	Develop the general architecture design of a digital computer.
CO-3	Acquiring the knowledge of designing microprograms for few basic instructions
CO-4	Develop independent learning skills to interface main memory & I/O.
Course Code: B19CS2209	
Course Title: OOPS THROUGH JAVA	
CO-1	Apply object-oriented programming principles and various java programming constructs and develop java programs.
CO-2	Apply the concepts of Inheritance, Polymorphism and String handling methods in developing java programs
CO-3	Apply the concepts like interfaces, packages, exception handling and multithreading in programming to develop error free programs
CO-4	Develop the GUI applications for the end users using applets with event handling.
Course Code: B19HS2201	
Course Title: MANAGEMENT AND ORGANIZATIONAL BEHAVIOUR	
CO-1	Explain management functions and principles.
CO-2	Will be able to describe the concepts of functional management that is HRM and Marketing functions.
CO-3	Will be able to get discuss about vision, mission, goal, objective and a strategy based on which the corporate planning depends.
CO-4	The learner is able to recognize strategically contemporary management practices and describe corporate planning process.
CO-5	The learner can discuss about individual behavior and motivational theories.
CO-6	The student can explain about ways in managing conflicts and stress.
Course Code: B19EC2205	
Course Title: ELECTRONIC CIRCUIT ANALYSIS LAB (WITH SIMULATION)	
CO-1	Apply the concepts of amplifier analysis to verify their characteristics and measure the important parameters.
CO-2	Analyze the performance of power amplifiers.
CO-3	Analyze the frequency response and characteristics of operational amplifiers.
CO-4	Simulation and Design of different amplifiers and oscillator circuits.
Course Code: B19EC2206	
Course Title: ANALOG COMMUNICATIONS - LAB (WITH SIMULATION)	
CO-1	Design and implement modulation and demodulation circuits for amplitude modulation and frequency modulation techniques.
CO-2	Design second order active filters for various frequency bands.
CO-3	Construct the circuit and study the characteristics of different transmitter and receiver circuits such as Harmonic generator, RF Amplifier, pre-emphasis and deemphasis.

Course Outcomes for Third Year First Semester Course	
Course Code: B19 EC 3101	
Course Title: Linear ICs & Pulse Circuits	
CO-1	Analyze passive RC circuits, clippers, and clamper circuits.
CO-2	Design different multivibrators for various applications

CO-3	Design/analyze fundamental circuits based on op-amps
CO-4	Design and analyze of various active filters, oscillators
CO-5	Design and analyze of various applications using IC 555 timer, IC565 PLL.
Course Code: B19 EC 3102	
Course Title:Digital Communications	
CO-1	Understand the basic concepts of sampling and digital communication systems.
CO-2	Understand the concept of binary and M-Ary modulation techniques.
CO-3	Apply the knowledge of signals & systems and evaluate the performance of various filters in the presence of noise.
CO-4	Understanding the concept of probability of error & by applying the knowledge of basic digital modulation techniques to evaluate their optimal performance.
CO-5	Analyze the error performance of two digital modulation techniques and understand the concept of spread spectrum communication system
Course Code:B19 EC 3103	
Course Title: Antennas & Propagation	
CO-1	Understand Radiation mechanism and functions of antennas identify antenna parameters and derive expressions for antenna parameters.
CO-2	Analyze and design wire and aperture antennas for different applications.
CO-3	Analyze and design Antenna arrays.
CO-4	Capable of performing various antenna measurements and come up with conclusions about antenna parameters and performance.
CO-5	Identify characteristics of radio wave propagation and be able to design different types of communication links for different frequency bands.
Course Code:B19 EC 3104	
Course Title:Control Systems	
CO-1	Students will be able to represent mathematical models of systems using block diagrams & Signal Flow Graphs and derive their transfer functions.
CO-2	Students will be able to analyze systems in time domain for transient and steady-state behavior.
CO-3	Students will learn the concept of stability and use RH criterion and Root locus methods for stability analysis.
CO-4	Students will learn to obtain frequency response plots of systems and use them for system analysis and stability assessment
CO-5	Students will be able to analyze the system with multi input and multi output
Course Code:B19 EC 3105	
Course Title:Electronic Measurements & Instrumentation	
CO-1	Evaluate basics of measurement systems, principle of basic meter
CO-2	Evaluate how a signal can be generated using different types of meters.
CO-3	Investigate a signal / waveform with different oscillators.

CO-4	Use bridges of many types and measure appropriate parameters.
CO-5	Design different transducers for measurement of different parameters.
Course Code: B19 EC 3106	
Course Title:Data Communications & Computer Networks (DCCN) (PE-I)	
CO-1	Explain the overview of Data communication principles.
CO-2	Explain the concepts of layered architecture of the OSI model and TCP/IP model, and the concepts of switching and multiplexing techniques.
CO-3	Analyze flow control, error control and access control issues.
CO-4	Analyze the operation of different network devices, routing, congestion control algorithms, IP protocol and IP addressing.
CO-5	Analyze the performance of transport layer and application layer protocols
Course Code: B19 EC 3107	
Course Title:Digital System Design using HDL (PE-I)	
CO-1	Describe and test digital logic circuits in data flow description, structural description, behavioral description and advanced constructs using VHDL.
CO-2	Describe and test digital logic circuits in data flow description, structural description, behavioral description and advanced constructs using both Verilog.
CO-3	Design complex sequential state machines that work.
CO-4	To Apply the overall knowledge of digital circuit design to testing of digital circuits.
Course Code: B19 EC 3108	
Course Title:Soft Computing Techniques (PE-I)	
CO-1	Differentiate between Soft Computing and hard computing
CO-2	Understand and apply Artificial Neural Networks, Fuzzy Logic, and Genetic algorithms for different applications
CO-3	Understand various applications of soft computing.
Course Code: B19 EC 3109 (PE-I)	
Course Title:Operating systems	
CO-1	Describe various generations of Operating System and functions of Operating System, System calls
CO-2	Describe the concept of process, threads and analyze various CPU Scheduling Algorithms and IPC
CO-3	Illustrate memory management strategies
CO-4	Illustrate deadlocks, files and Secondary-Storage Structure
CO-5	Summarize Security and Protection Mechanism in Operating Systems. Understand the Operating System like UNIX/Linux and Windows
Course Code: B19 EC 3110	
Course Title:Digital Communications Lab - (with Simulation)	
CO-1	Design, implement and verify the theoretical concepts of sampling practically.
CO-2	Analyze and implement analog to digital converters like PCM, DM.

CO-3	Comprehend the design, application and practical implementation of various Digital Modulation techniques.
CO-4	Analyze digital modulation techniques using MATLAB tools.
Course Code: B19 EC 3111	
Course Title:Linear Integrated Circuits & Pulse Circuits - Lab (with Simulation)	
CO-1	Design and test different types of Multivibrators
CO-2	Design, construct Schmitt trigger using operational amplifier
CO-3	Observe the operation of clippers and clippers
CO-4	Use Multisim to test their electronic designs
Course Code:B19 MC 3101	
Course Title:Employability Skills-I	
CO-1	Detect grammatical errors in the text/sentences and rectify them while answering their competitive/ company specific tests and frame grammatically correct sentences while writing.
CO-2	Answer questions on synonyms, antonyms and other vocabulary based exercises while attempting CAT, GRE, GATE and other related tests.
CO-3	Use their logical thinking ability and solve questions related to analogy, syllogisms and other reasoning based exercises.
CO-4	Choose the appropriate word/s/phrases suitable to the given context in order to make the sentence/paragraph coherent.
CO-5	Apply soft skills in the work place and build better personal and professional relationships making informed decisions.
Part-B: Quantitative Aptitude-I	
CO-1	The students will be able to perform well in calculating on number problems and various units of ratio concepts
CO-2	Accurate solving problems on time and distance and units related solutions
CO-3	The students will become adept in solving problems related to profit and loss, in specific, quantitative ability
CO-4	The students will present themselves well in the recruitment process using analytical and logical skills which he or she developed during the course as they are very important for any person to be placed in the industry
CO-5	The students will learn to apply Logical thinking to the problems of syllogisms and be able to effectively attempt competitive examinations like CAT, GRE, GATE for further studies
Course Code:B19 MC 3102	
Course Title:Basic Coding	
CO-1	Know about Control Structures, Loop Structures and branching in programming
CO-2	Know about various searching and sorting methods.
CO-3	Know about Functions, Recursions and Storage Classes
CO-4	Know about Structures and Unions.
CO-5	Know different Operating System concepts. 6.

CO-6	Differentiate OSI Model Vs. TCP/IP suite.
Course Outcomes for Third Year Second Semester Course	
Course Code: B19 EC 3201	
Course Title: Microprocessors & Microcontrollers	
CO-1	Illustrate architecture of the 8085 microprocessor.
CO-2	Develop 8085 Microprocessor Assembly Language Programs.
CO-3	Illustrate architecture of the 8086 microprocessor.
CO-4	Develop 8086 Microprocessor Assembly Language Programs..
CO-5	Describe the functional block of 8051 microcontroller and Implement Assembly Language Programs
Course Code: B19 EC 3202	
Course Title: Digital Signal Processing	
CO-1	Describe the DSP fundamental theory and components, Develop an understanding of DSP advantages, limitations and fundamental tradeoffs. Carry-out LTI system analysis using convolution & Z-transform
CO-2	Carryout data analysis & spectrum analysis using FFT
CO-3	Design of IIR digital filters to meet specifications
CO-4	Design of FIR digital filters to meet specifications
CO-5	Knows multi-rate signal processing aspects & DSP applications
Course Code: B19 EC 3203	
Course Title: VLSI Design	
CO-1	Analyze the Electrical properties and Fabrication processes of MOS circuits.
CO-2	Design the layouts of various MOS circuits by applying the concept of design rules.
CO-3	Interpret the basic MOS circuit concepts, static and dynamic CMOS logic designs and the impact of scaling on MOS circuits.
CO-4	Analyze various testing methods of digital circuits and the basic concepts of FPGA.
Course Code: B19 EC 3204	
Course Title: Information Theory and Coding (PE-II)	
CO-1	Appreciate the mathematical concept of information (uncertainty) via probability, compute the entropy of a source & Outline the need of source coding & variable length codes.
CO-2	Device source codes using Shannon-Fano & Huffman algorithms, calculate the efficiency of a code
CO-3	Compute mutual entropy of a channel, understand the concept of channel capacity, State Shannon's noisy channel coding theorem which creates the field of channel coding, compute channel capacity of BSC & AWGN channels, define characteristics of an ideal communication system.
CO-4	Realize the need & benefits of channel coding, Outline Linear block codes structure, theory & use syndrome technique for decoding for linear block codes, Study cyclic codes (BCH, RS and CRC) structure, theory, implementation & decoding of cyclic codes, differentiate source coding and channel coding & learn applications of coding
CO-5	Study Convolutional codes representation, generation & decoding of convolutional codes using Viterbi

	algorithm, get acquainted with concatenated codes to increase coding gain & Trellis Coded Modulation (TCM), Know modern codes & pursue modern wireless communications & information security courses.
Course Code: B19 EC 3205	
Course Title: Digital IC Design (PE-II)	
CO-1	Interpret the concepts of MOS Design.
CO-2	Analyze different Combinational and Sequential MOS Circuits.
CO-3	Design and develop the Digital Integrated Circuits for different Applications.
CO-4	Analyze the Concepts of Semiconductor Memories, Flash Memory, RAM array organization.
Course Code: B19 EC 3206	
Course Title: DSP Processors and Architectures (PE-II)	
CO-1	Apply DFT and FFT algorithms for DSP application
CO-2	Apply the number format, dynamic range and various sources of errors in DSP system.
CO-3	Understand the limitations and capabilities of TMS Processor.
CO-4	Enhance the applications of DSP Processors by interface with different devices.
CO-5	Implement different applications on DSP Processors.
Course Code: B19 EC 3207	
Course Title: Data Base Management Systems (PE-II)	
CO-1	Describe fundamental concepts a relational database
CO-2	Create, maintain and manipulate a relational database using SQL
CO-3	Apply Conceptual and Logical database design
CO-4	Apply normalization for database design
CO-5	Illustrate Storage management and Transaction management techniques.
Course Code: B19 EC 3208	
Course Title: Micro Processors & Micro Controllers Lab	
CO-1	Develop 8085 assembly language programs on data transfer, arithmetic and logical operations
CO-2	Develop 8086 assembly language programs using data transfer, arithmetic and logical instructions
CO-3	Develop 8051 assembly language programs on data transfer, arithmetic and logical operations
Course Code: B19 EC 3209	
Course Title: DSP - Lab	
CO-1	Make use of MATLAB simulation tool for performing various operations on discrete signals.
CO-2	Make use of MATLAB simulation tool to verify different DSP algorithms.

CO-3	Make use of MATLAB simulation tool to perform various operations on an Image
Course Code: B19 EC 3210	
Course Title: VLSI - Lab	
CO-1	Analyze and program synthesizable codes in Verilog/VHDL.
CO-2	Design schematics and layouts using CMOS logic and verify their functionality including parasitic using Cadence/Mentor Graphics CAD tools.
Course Code: B19 MC 3201	
Course Title: Employability Skills-II	
Part-A: Verbal and Soft Skills-II	
CO-1	Construct coherent, cohesive and unambiguous verbal expressions in both oral and written discourses.
CO-2	Analyze the given data/text and find out the correct responses to the questions asked based on the reading exercises; identify relationships or patterns within groups of words or sentences
CO-3	Write paragraphs on a particular topic, essays (issues and arguments), e mails, summaries of group discussions, reports, make notes, statement of purpose(for admission into foreign universities), letters of recommendation(for professional and educational purposes).
CO-4	Converse with ease during interactive sessions/seminars in their classrooms, compete in literary activities like elocution, debates etc., raise doubts in class, participate in JAM sessions/versant tests with confidence and convey oral information in a professional manner.
CO-5	Participate in group discussions/group activities, exhibit team spirit, use language effectively according to the situation, respond to their interviewer/employer with a positive mind, tailor make answers to the questions asked during their technical/personal interviews, exhibit skills required for the different kinds of interviews (stress, technical, HR) that they would face during the course of their recruitment process.
Part-B: Quantitative Aptitude-II	
CO-1	The students will be able to perform well in calculating different types of data interpretation problems.
CO-2	The students will perform efficaciously on analytical and logical problems using various methods.
CO-3	Students will find the angle measurements of clock problems with the knowledge of calendars and clock.
CO-4	The students will skilfully solve the puzzle problems like arrangement of different positions.
CO-5	The students will become good at solving the problems of lines, triangulars, volume of cone, cylinder and so on.
Course Code: B19 MC 3203	
Course Title: Advanced Coding	
CO-1	Able to solve problems using java collection framework and I/o classes.
CO-2	Able to develop multithreaded applications with synchronization.
CO-3	Able to develop applets for web applications
CO-4	Able to design GUI based applications



SRKR ENGINEERING COLLEGE::BHIMAVARAM

Department Of Electronics and Communication Engineering

R19

IV/IV B.TECH

I-SEMESTER

COURSE OUTCOMES

Program Name: B.Tech (Electronics and Communication Engineering)

Course Name: (Microwave Engineering)

COURSE	COURSE OUTCOMES	
Microwave Engineering B19EC4101	1	Describe and Explain the working principle of different passive waveguide components used at microwave frequencies.
	2	Apply the properties of scattering matrix for solving the scattering matrix of different passive microwave components for both ideal and practical considerations and analyze their operation.
	3	Aware of conceptual and operational characteristics of different microwave Tube circuits (generators).
	4	Describe and Explain the operational characteristics of different microwave solid state devices.
	5	Demonstrate and implement different experimental procedures involving measurement of microwave parameters.

Course Name: (Internet of Things)

COURSE	COURSE OUTCOMES	
Internet of Things B19EC4102	1	Get familiarity with architecture and communication protocols of IoT.
	2	Understand IoT sensors and technological challenges faced by IoT devices, with a focus on wireless, energy, power, and sensing modules.
	3	Explore and learn about Python with the help of Raspberry Pi for preparing projects designed for IoT.
	4	Analyze data from physical devices through the cloud using data analytics.

Course Name: (Digital Image Processing)

COURSE	COURSE OUTCOMES	
Digital Image Processing B19EC4103	1	Explain the basic elements and applications of image processing.
	2	Analyze image sampling and quantization requirements and implications.
	3	Design and implement two dimensional spatial and frequency filters for image enhancement.
	4	Model and Demonstrate the image restoration problem in both time and frequency domains.
	5	Explain the image segmentation and image compression problem.

Professional Elective-III:

Course Name: (Fiber Optic Communication)

COURSE	COURSE OUTCOMES	
Fiber Optic Communication B19EC4104	1	Summarize the basic concepts of optical communication and demonstrate its components.
	2	Apply basic concepts of optical communication components and systems.
	3	Gain the knowledge of different sources of light as well as detectors and their comparative study.
	4	Analyze concepts of optical communication systems for the basic design of optical communication links.

Course Name: (Analog IC Design)

COURSE	COURSE OUTCOMES	
Analog IC Design B19EC4105	1	Outline the concepts of MOS Devices, MOS device characteristics, MOS device modeling, CMOS amplifiers, Open-Loop Comparators, and different types of oscillators.
	2	Analyze Analog CMOS sub circuits and Complex Analog Circuits.
	3	Design Analog CMOS sub circuits, CMOS amplifiers, CMOS op-amps and Complex Analog Circuits.
	4	Extend the analog circuit design to different applications.

Course Name: (Speech Processing)

COURSE	COURSE OUTCOMES	
Speech Processing B19EC4106	1	Describe the fundamentals of speech signals & speech models and can able to analyze & extract speech parameters using time & frequency methods.
	2	Perform Pitch detection and Formant analysis.
	3	Compress speech using waveform coding techniques and able to understand STFT & do Spectrogram analysis.
	4	Obtain LPC speech parameters & compress speech.
	5	Explain Cepstral analysis of speech, and can build speech applications.

Course Name: (Radar Engineering)

COURSE	COURSE OUTCOMES	
Radar Engineering B19EC4107	1	Apply various mathematical equations to measure the Range and angle information of the targets from the radar.
	2	Able to understand the basic working principles of various Radars.
	3	Analyze and design of radar signals, MTI, Pulse Doppler radar and Delay line cancellers.
	4	Analyze various tracking Radars, advantages, limitations and their applications.
	5	Analyze the applications of various Radars in Navigational Aids like ECM, ECCM, Direction Finders, Sense Finders, VOR, Aircraft Homing, ILS, Radio Altimeter, Hyperbolic Navigation system.

Course Name: (Microwave & Optical Communication Engineering Lab)

COURSE	COURSE OUTCOMES	
Microwave & Optical Communication Engineering Lab B19EC4108	1	Identify the different microwave components equipment's and their uses.
	2	Measure microwave parameters like guide wavelength, frequency, attenuation, VSWR and modes of reflex klystron
	3	Measure performance of simple microwave circuits and devices.
	4	Analyze the radiation patterns of antennas.
	5	Assess the performance of optical devices.

Course Name :(IOT Lab)

COURSE	COURSE OUTCOMES	
IOT Lab B19EC4109	1	Able to acquire knowledge on interfacing different sensors and communication modules with the System on Chip Modules.
	2	Able to connect SOC devices with the cloud for accessing and analyzing the data.

Course Name: (Project Work-I)

COURSE	COURSE OUTCOMES	
Project Work-I B19EC4110	1	Identify a current problem through literature/field/case studies
	2	Identify the background objectives and methodology for solving the same.
	3	Design a technology/ process for solving the problem.

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Professional Elective-IV:

Course Name: (Cellular & Mobile Communication)

COURSE	COURSE OUTCOMES	
Cellular & Mobile Communication B19EC4201	1	Apply the fundamentals of mobile communication systems, cellular concepts and Handoff; calculate the amount of interference, frequency reuse distance and capacity of a cellular system.
	2	Demonstrate an ability to explain multiple access techniques for Wireless Communication.
	3	Understand the basics of GSM mobile communication standard, its architecture.
	4	Apply knowledge of reflection, diffraction and scattering to calculate link budget using path loss models.

Course Name: (Satellite Communications)

COURSE	COURSE OUTCOMES	
Satellite Communications B19EC4202	1	Choose necessary components required in modern satellite communications systems.
	2	Design and build space segment, depending upon the requirement.
	3	Design link margin for various applications.
	4	Choose the correct multiple access technique for better communication with Minimum.

Course Name: (Low Power VLSI Design)

COURSE	COURSE OUTCOMES	
Low Power VLSI Design B19EC4203	1	Understand the concepts of Low-Power Design Approaches.
	2	Design and analysis of Low-Voltage Low-Power Circuits.
	3	Extend the Low Power Design to Different Applications.
	4	Understand the Low-Voltage Low-Power Memories and Basics of DRAM.

Course Name: (Biomedical Signal Processing)

COURSE	COURSE OUTCOMES	
Biomedical Signal Processing B19EC4204	1	Possess the basic mathematical skills necessary to analyze ECG and EEG signals.
	2	Possess the basic scientific skills necessary to analyze ECG and EEG signals.
	3	Possess the basic computational skills necessary to analyze ECG and EEG signals.
	4	Apply classical and modern filtering and compression techniques for ECG and EEG Signals.
	5	Develop thorough understanding on basics of ECG and EEG feature extraction.

PROJECT WORK - II

Course Name: (PROJECT WORK - II)

COURSE	COURSE OUTCOMES	
PROJECT WORK - II B19EC4205	1	Develop a technology/ process for solving the problem.
	2	Evaluate that technology/ process at the laboratory level.