

B. TECH – ELECTRONICS & COMMUNICATION ENGINEERING

Department Vision

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

Department Mission

1. Educating the students with the state-of-the-art technologies in Electronics and Communication Engineering to meet the ever-growing challenges of the industry.
2. Nurturing 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. Providing 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 Electronics, Electromagnetics and Antennas, Communications, Signal Processing, Networking, Embedded Systems and Semiconductor technology
PSO2:	Should be able to associate the learning from courses related to Microelectronics, Signal Processing, Microcomputers, Electromagnetics and Antennas, Embedded and Communication Systems to arrive at solutions to real world problems

PSO3:	Should have the capability to comprehend the technological advancements in the usage of modern design tools to analyze and design subsystems and processes for a variety of applications.
PSO4:	Should possess the skills to communicate in both oral and written forms, the work already done and the future plans with necessary road maps demonstrating the practices of professional ethics and the concerns for societal and environmental wellbeing.

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 understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in 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 FOR 2016-20 (R16) AUTONOMOUS

Course Outcomes (Cos)

Course Name: ENGLISH		Course code: B16 ENG 1101	Course Year: First year
Items	Academic Year : 2016-17		
CO-1	The overall performance of the students will be enhanced after the course; they will be in a position to make presentations on topics of current interests – politics, famous personalities, science and technology, tourism, work and business environment, with increased public speaking skills.		
CO-2	Students will be able to read, listen, speak and write effectively in both academic and non-academic environment		
CO-3	The students will be updated with certain real life situations, which they can handle when, come face to face.		

Course Name: MATHEMATICS – I		Course code: B16 ENG 1102	Course Year: First year
Items	Academic Year : 2016-17		
CO-1	Find partial derivatives, expand a function of more than one variable in a Taylor series and utilize them for errors and approximations, maxima and minima.		
CO-2	Solve a first order ODE and also find orthogonal trajectories and solve problems related to simple applications		
CO-3	Solve a given higher order ODE, an equation with constant coefficients, a Cauchy's equation or a Legendre's equation.		
CO-4	Utilize knowledge of Fourier series for solving partial differential equations and also in understanding courses like Signals & Systems.		

Course Name: MATHEMATICS – II		Course code: B16 ENG 1103	Course Year: First year
Items	Academic Year : 2016-17		
CO-1	Utilizing the knowledge of matrices for solving linear simultaneous equations, find Eigen values and Eigen vectors and handle quadratic forms.		
CO-2	Utilizing the knowledge of Laplace Transforms to find transforms of important functions that arise in applications and also solve ODE.		
CO-3	Utilizing the knowledge of Laplace Transforms in courses like Net Works, Signals & Systems and Control Systems.		
CO-4	Utilizing the knowledge of difference equations and Z-transforms in understanding courses like Discrete Mathematical Structures and also Signals & Systems.		

Course Name: PHYSICS	Course code: B16 ENG 1105	Course Year: First year
Items	Academic Year : 2016-17	
CO-1	Students learn in depth about the topics of Lasers, fiber optics, quantum mechanical theory and classical theories of thermodynamics and electromagnetism.	
CO-2	Students understand the classical and modern concepts.	

Course Name: ENGINEERING GRAPHICS	Course code: B16 ENG 1107	Course Year: First year
Items	Academic Year : 2016-17	
CO-1	Apply principles of drawing to represent dimensions of an object.	
CO-2	Construct polygons and engineering curves.	
CO-3	Draw projections of points, lines, planes and solids.	
CO-4	Represent sectional views of solids.	
CO-5	Develop the surfaces of regular solids.	
CO-6	Draw the isometric views of solids and combination of solids.	

Course Name: PROFESSIONAL ETHICS AND MORAL VALUES	Course code: B16 ENG 1109	Course Year: First year
Items	Academic Year : 2016-17	
CO-1	By the end of the course student should be able to understand the importance of ethics and values in life and society.	

Course Name: WORKSHOP	Course code: B16 ENG 1113	Course Year: First year
Items	Academic Year : 2016-17	
CO-1	Use various tools to prepare basic carpentry and fitting joints.	
CO-2	Fabricate simple components using tin smithy.	

Course Name: MATHEMATICS – III	Course code: B16 ENG 1201	Course Year: First year
Items	Academic Year : 2016-17	
CO-1	Utilize knowledge of line, sphere etc. in his engineering subjects.	
CO-2	Utilize the knowledge of Beta and Gamma functions and multiple integrals to evaluate the integrals they come across in their applications.	
CO-3	Utilize the knowledge of Fourier Transform in courses like Signals and Systems and in the solution of partial differential equations at a later stage.	

Course Name: CHEMISTRY	Course code: B16 ENG 1203	Course Year: First year
Items	Academic Year : 2016-17	

CO-1	Students learn in-depth about the topics of desalination of sea water, CNG, LPG Biogas, Semiconductors, Liquid crystals, Conducting polymers, fiber reinforced plastics, building materials.
CO-2	Students understand the basic and advanced applied concepts.
CO-3	Students learn to interrelate the theory and with the relevant experiment.
CO-4	Students learn experimental techniques and understand the theory about experiments.

Course Name: COMPUTER PROGRAMMING USING C & NUMERICAL METHODS		Course code: B16 ENG 1205	Course Year: First year
Items	Academic Year : 2016-17		
CO-1	Student can understand basic terminology used in C programming. 2. 3. 4. 5.		
CO-2	Student can write programs by applying elementary algorithms to solve problems in C language.		
CO-3	Student can write, compile and debug programs in C language.		
CO-4	Student can Write programs to solve numerical methods.		
CO-5	Student can be familiar with finite precision computation.		

Course Name: HISTORY OF SCIENCE AND TECHNOLOGY		Course code: B16 ENG 1207	Course Year: First year
Items	Academic Year : 2016-17		
CO-1	By the end of this course the students should be able to understand the contribution of Scientific and Technological developments for the benefit of society at large.		

Course Name: ELECTRONIC DEVICES AND CIRCUITS		Course code: B16 EC 1208	Course Year: First year
Items	Academic Year : 2016-17		
CO-1	Understand the physical structure, principles of operation, electrical characteristics and circuit models of diodes, BJTs and FETs.		
CO-2	Use this knowledge to analyse and design basic electronic application circuits.		
CO-3	Extend the understanding of how electronic circuits and their functions fit into larger electronic systems.		

Course Name: CIRCUIT THEORY		Course code: B16 EE 1208	Course Year: First year
Items	Academic Year : 2016-17		

CO-1	Able to develop an understanding of the basic fundamental electrical laws, elements of electric Networks and learn the techniques to measure voltage and current.
CO-2	Develops the ability to apply circuit theorems to DC and AC circuits.
CO-3	Able to analyse the coupled & three phase circuits.

Course Name: METALLURGY AND MATERIALS ENGINEERING	Course code: B16 ME 1208	Course Year: First year
Items	Academic Year : 2016-17	
CO-1	Understand crystalline solids and their atomic structures.	
CO-2	Suggest and recommend necessary engineering materials for specific applications keeping in view of the cost, design, reliability, life, working conditions and properties of the products.	
CO-3	Understand different phase transformations in Iron-Iron Carbide diagram and distinguish between steels and cast irons.	
CO-4	Select different materials for tools and components based on functional requirements.	
CO-5	Use composite materials for different engineering applications like aerospace, automobile, ship building industry, sports item etc.	

Course Name: ENGLISH LANGUAGE LAB	Course code: B16 ENG 1213	Course Year: First year
Items	Academic Year : 2016-17	
CO-1	Students will be sensitized towards recognition of English sound pattern.	
CO-2	The fluency in speech will be enhanced.	

Course Name: MATHEMATICS – IV	Course code: B16 ENG 2101	Course Year: Second year
Items	Academic Year : 2017-18	
CO-1	Apply the concepts of Gradient, Divergence, Curl, Directional derivative, solenoidal and Irrotational fields	
CO-2	Determine scalar potential, circulation and work done.	
CO-3	Evaluate integrals using Green's, Stokes' and Divergence theorems.	
CO-4	Obtain the solution of 1-D wave equation and 1-D heat equation.	
CO-5	Determine the zeroes and poles of functions and residues at poles.	
CO-6	Evaluate certain real definite integrals that arise in applications by the use of Residue theorem.	

Course Name: CIRCUIT ANALYSIS& SYNTHESIS	Course code: B16 EE 2104	Course Year: Second year
Items	Academic Year : 2017-18	

CO-1	Students will learn circuit conventions and analyze DC circuits using various techniques like mesh analysis, nodal analysis and theorems.
CO-2	Students will learn the significance of energy storing elements (Inductance & Capacitance) in circuits and analyse transient and steady state responses.
CO-3	Students will learn the concepts of single and three-phase balanced circuits and analyze sinusoidal steady-state using phasor concept.
CO-4	Student will learn the concept of network functions and analyze poles, zeros and time domain behavior from pole-zero plots.
CO-5	Student will learn the concept of positive real functions and test whether the given network function is Hurwitz and positive real or not.

Course Name: ELECTRICAL TECHNOLOGY	Course code: B16 EE 2105	Course Year: Second year
Items	Academic Year : 2017-18	
CO-1	Classify the parts of DC Machines, Transformers, Three Phase Induction motors & Three Phase Synchronous machines.	
CO-2	Interpret the operation and working principle of DC Machines, Transformers, Three Phase Induction motors, Three Phase Synchronous machines.	
CO-3	Develop performance characteristics of various machines.	
CO-4	Construct experiments on various machines.	
CO-5	Analyze the application of electrical machines in various fields of engineering.	

Course Name: ANALOG ELECTRONIC CIRCUITS	Course code: B16 EC 2101	Course Year: Second year
Items	Academic Year : 2017-18	
CO-1	Know the equivalent circuit of multistage amplifier and its analysis.	
CO-2	Identify the different feedback topologies and analyze them.	
CO-3	Explain the principle of oscillator and design different types of sinusoidal oscillators.	
CO-4	Define the difference between voltage and power amplifiers and design different classes.	
CO-5	Know that Tuned amplifiers amplify a narrow band of frequencies and will also be able to analyze them.	
CO-6	Identify that Op-amp not amplifies but also perform different operations and analyze some applications.	

Course Name: ELEMENTARY DATA STRUCTURES	Course code: B16 CS 2104	Course Year: Second year
Items	Academic Year : 2017-18	
CO-1	Be able to write programs and class libraries given a specification.	
CO-2	Implement various data structures.	
CO-3	Implement and analyse various sorting algorithms.	
CO-4	Understand abstract data types and how they are implemented in C.	

Course Name: PROBABILITY THEORY & RANDOM PROCESSES	Course code: B16 EC 2102	Course Year: Second year
Items	Academic Year : 2017-18	
CO-1	Understand 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 understand the concept of Inequalities and probabilistic limits.	
CO-4	Understand the concept of Random process and determine covariance and spectral density of stationary random processes.	
CO-5	Demonstrate the specific applications to Poisson and Gaussian process and representation of low pass and band pass noise models.	
CO-6	Analyze the response of random inputs to linear time invariant systems.	

Course Name: NETWORKS AND MACHINES LAB	Course code: B16 EE 2107	Course Year: Second year
Items	Academic Year : 2017-18	
CO-1	Students will gain the skill to make and experiment with practical electric circuits.	
CO-2	Students will be able to measure voltage, current, power in practical electric circuits.	
CO-3	Students will know the significance of various theorems and their applications.	
CO-4	Students will be able to model devices for circuit analysis.	
CO-5	Students will be able to assess the behavior of different electrical machines.	
CO-6	Students will be able to predetermine the efficiency and regulation of different machines.	

Course Name: ELECTRONIC DEVICES & CIRCUITS LAB	Course code: B16 EC 2105	Course Year: Second year
Items	Academic Year : 2017-18	
CO-1	To understand the role of basic electronic devices like ordinary Pn diodes, Zener diodes, LEDs, BJTS and JFETs in achieving various functionalities like rectification, voltage regulation, amplification, switching action etc. in various electronic circuits.	
CO-2	To construct and simulate different electronic circuits using Multisim.	
CO-3	To have the hardware skills and software skills required in the design of electronic systems for various applications.	

Course Name: ENGLISH PROFICIENCY	Course code: B16 ENG 2104	Course Year: Second year
Items	Academic Year : 2017-18	
CO-1	Students enhance their vocabulary and use it in the relevant contexts.	

CO-2	They improve speaking skills.
CO-3	They learn and practice the skills of composition writing.
CO-4	They enhance their reading and understanding of different texts.
CO-5	They enrich their communication both in formal and informal contexts.
CO-6	They strengthen their confidence in presentation skills.

Course Name: INDUSTRY ORIENTED TRAINING	Course code: B16 ENG 2106	Course Year: Second year
Items	Academic Year : 2017-18	
CO-1	Application using implementation of Data structures.	
CO-2	Application using implementation of Linear and nonlinear Data structures in view of industry.	
CO-3	Applications using Object Oriented Concepts in view of industry.	

Course Name: SWITCHING THEORY AND LOGIC DESIGN	Course code: B16 EC 2201	Course Year: Second year
Items	Academic Year : 2017-18	
CO-1	Able to understand various basic number system conversion and simplification of Boolean expressions.	
CO-2	Design and analyze combinational and sequential circuits using logic gates, latches and flip-flops.	
CO-3	Analyze and design Finite State Machines.	
CO-4	Analyze and design Asynchronous Machines.	

Course Name: ELECTRO MAGNETIC FIELD THEORY & TRANSMISSION LINES	Course code: B16 EC 2202	Course Year: Second year
Items	Academic Year : 2017-18	
CO-1	Ability to apply the knowledge of mathematics, Science and engineering to the Analysis and design of systems involving electric and magnetic fields as well as Electromagnetic Waves.	
CO-2	Ability to identify, formulate and solve engineering problems in the area of electric and Magnetic fields and waves.	
CO-3	Ability to use Maxwell's equations to solve electromagnetic field problems.	
CO-4	Ability to apply the knowledge of electromagnetic fields in practical transmission lines and waveguides.	

Course Name: PULSE AND DIGITAL CIRCUITS		Course code: B16 EC 2203	Course Year: Second year
Items	Academic Year : 2017-18		
CO-1	Understand the applications of integrator, differentiator, clippers and clamper circuits.		
CO-2	Design different multivibrators for various applications.		
CO-3	Design different time base generators.		
CO-4	Analyze synchronization techniques for sweep circuits.		
CO-5	Understand different logic families & realize logic gates using diodes and transistors.		

Course Name: ANALOG COMMUNICATIONS		Course code: B16 EC 2204	Course Year: Second year
Items	Academic Year : 2017-18		
CO-1	Understand the need for modulation and learn about the basic elements of communication system.		
CO-2	Understand the concepts of Analog Modulation and Demodulation techniques.		
CO-3	Evaluate various parameters of analog modulated waveform in Time and Frequency domain.		
CO-4	Analyze and compare the performance of various analog modulation techniques in the presence of noise.		
CO-5	Analyze different characteristics of transmitters.		
CO-6	Analyze different characteristics of receivers.		

Course Name: SIGNALS AND SYSTEMS		Course code: B16 EC 2205	Course Year: Second year
Items	Academic Year : 2017-18		
CO-1	Understand 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	Classify systems based on their properties and determine the response of LTI systems using convolution and also understand the concept of correlation between signals.		
CO-5	Apply Z- transforms for analyzing discrete-time signals and systems		
CO-6	Understand the process of sampling and the effects of under sampling.		

Course Name: ENVIRONMENTAL STUDIES	Course code: B16 ENG 2201	Course Year: Second year
Items	Academic Year : 2017-18	
CO-1	Get awareness among the students about the nature and natural ecosystems.	
CO-2	Learn sustainable utilization of natural resources like water, land, minerals, air.	
CO-3	Learn resource pollution and over exploitation of land, water, air and catastrophic (events) impacts of climate change, global warming, ozone layer depletion, marine, radioactive pollution etc to inculcate the students about environmental awareness and safe transfer of our mother earth and its natural resources to the next generation.	
CO-4	Safe guard against industrial accidents particularly nuclear accidents.	
CO-5	Learn Constitutional provisions for the protection of natural resources.	

Course Name: ANALOG COMMUNICATION LAB	Course code: B16 EC 2207	Course Year: Second year
Items	Academic Year : 2017-18	
CO-1	Design and implement modulation and demodulation circuits for amplitude modulation technique.	
CO-2	Design and implement modulation and demodulation circuits for frequency modulation technique.	
CO-3	Design second order passive and active filters for various frequency bands.	
CO-4	Construct the circuit and study the characteristics of different transmitter and receiver circuits such as Harmonic generator, RF Amplifier, IF Amplifier, pre-emphasis and de-emphasis.	

Course Name: ANALOG ELECTRONIC CIRCUITS LAB WITH SIMULATION	Course code: B16 EC 2208	Course Year: Second year
Items	Academic Year : 2017-18	
CO-1	Acquire a basic knowledge on simple applications of operational amplifier.	
CO-2	Observe the amplitude and frequency responses of negative feedback amplifier and two stage RC coupled amplifier.	
CO-3	Design and test sinusoidal oscillators.	
CO-4	Design and test a power amplifier.	
CO-5	Design, construct, and take measurement of the analog electronic circuits to compare experimental results in the laboratory with theoretical analysis.	
CO-6	Use Multisim to test their electronic design.	

Course Name: INDUSTRY ORIENTED TRAINING	Course code: B16 ENG 2204	Course Year: Second year
Items	Academic Year : 2017-18	
CO-1	Application using implementation of core JAVA concepts.	
CO-2	Application using implementation of AWT, Applets.	
CO-3	Applications using Networking concepts in view of industry.	

Course Name: LINEAR ICS AND APPLICATIONS	Course code: B16 EC 3101	Course Year: Third year
Items	Academic Year : 2018-19	
CO-1	Understand the terminal characteristics of op-amps and design/analyze fundamental circuits based on op-amps.	
CO-2	Analyze the effect of feedback on the performance of op-amp.	
CO-3	Design and analyze of non-linear circuits and active filters.	
CO-4	Design and Analyze of various applications using IC 565 and IC 555.	
CO-5	Understand the operation of Analog to Digital and Digital to Analog Converters	

Course Name: PRINCIPLES OF ECONOMICS AND MANAGEMENT	Course code: B16 ENG 3101	Course Year: Third year
Items	Academic Year : 2018-19	
CO-1	Students will be able to gain empirical knowledge and understand the complete frame work of business.	
CO-2	To analyse the concepts pertaining to economic decision making.	
CO-3	To analyse the concepts of Managerial decision making.	
CO-4	To inculcate the spirit of Entrepreneurship and gain knowledge for setting up an enterprise.	

Course Name: COMPUTER ARCHITECTURE AND ORGANIZATION	Course code: B16 EC3102	Course Year: Third year
Items	Academic Year : 2018-19	
CO-1	Understand how computers represent and manipulates data.	
CO-2	Develop the general architecture design of a digital computer.	
CO-3	Learn the art of Microprogramming.	
CO-4	Develop independent learning skills to interface main memory & I/O.	

Course Name: ANTENNAS AND PROPAGATION	Course code: B16 EC 3103	Course Year: Third year
Items	Academic Year : 2018-19	
CO-1	Understand Radiation mechanism and functions of antennas, identify antenna Parameters derive expressions for antenna parameters.	
CO-2	Analyze and design wire and aperture antennas for different applications.	
CO-3	Analyze and design (or synthesize) 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 Name: CONTROL SYSTEMS	Course code: B16 EE 3103	Course Year: Third year
Items	Academic Year : 2018-19	
CO-1	Students will be able to model electrical and mechanical physical systems by applying laws of physics.	
CO-2	Students will be able to represent mathematical models of systems using block diagrams & Signal Flow Graphs and derive their transfer functions.	
CO-3	Students will be able to analyze systems in time domain for transient and steady-state behaviour.	
CO-4	Students will learn the concept of stability and use RH criterion and Root locus methods for stability analysis.	
CO-5	Students will learn to obtain frequency response plots of systems and use them for system analysis and stability assessment.	

Course Name: ELECTRONIC MEASUREMENTS AND INSTRUMENTATION	Course code: B16 EC 3104	Course Year: Third year
Items	Academic Year : 2018-19	
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 Name: LINEAR INTEGRATED CIRCUITS & PULSE CIRCUITS LAB WITH SIMULATION	Course code: B16 EC 3106	Course Year: Third year
Items	Academic Year : 2018-19	
CO-1	Design and conduct experiments on RC low pass and high pass circuits.	
CO-2	Observe operation of UJT Sweep Generator.	
CO-3	Design and test different types of Multi vibrators	
CO-4	Acquire a basic knowledge on simple applications of operational amplifier.	
CO-5	Design, construct Schmitt trigger using operational amplifier.	
CO-6	Use Multisim to test their electronic designs.	

Course Name: DIGITAL INTEGRATED CIRCUITS & HARDWARE DESCRIPTIVE LANGUAGE	Course code: B16 EC 3107	Course Year: Third year
Items	Academic Year : 2018-19	

CO-1	Synthesize, simulate and implement a digital design in a configurable digital circuit with computer supported aid tools and digital trainer kit.
CO-2	Acquire Knowledge of analysis and synthesis of combinational and sequential circuits with simulators and digital trainer kits.
CO-3	Build high level programming (HDL programming) skills for digital circuits.
CO-4	Adapt digital circuits to electronics and telecommunication field.

Course Name: VERBAL & QUANTITATIVE APTITUDE – I	Course code: B16 ENG 3102	Course Year: Third year
Items	Academic Year : 2018-19	
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.	

Course Name: BASIC CODING	Course code: B16ENG3103	Course Year: Third year
Items	Academic Year : 2018-19	
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.	
CO-6	Differentiate OSI Model Vs. TCP/IP suite.	

Course Name: MICROWAVE ENGINEERING	Course code: B16 EC 3201	Course Year: Third year
Items	Academic Year : 2018-19	
CO-1	Explain the working principle of different passive waveguide components used at microwave frequencies.	
CO-2	Understand the conceptual and operational characteristics of different microwave signal generators and amplifiers.	
CO-3	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.	

CO-4	Understand different fabrication techniques involving Microwave integrated circuits.
CO-5	Understand and implement different experimental procedures involving measurement of microwave parameters.

Course Name: MICROPROCESSORS AND ITS APPLICATIONS	Course code: B16 EC 3202	Course Year: Third year
Items	Academic Year : 2018-19	
CO-1	Understand and analyze architecture of the 8085 and 8086 microprocessors.	
CO-2	Be familiar with the 8085 and 8086 Assembly Language Programming.	
CO-3	Learn about Hardware and software requirements in interfacing and designing microprocessor based products for practical applications.	

Course Name: DIGITAL COMMUNICATION	Course code: B16 EC 3203	Course Year: Third year
Items	Academic Year : 2018-19	
CO-1	Understand concept of different modulation techniques.	
CO-2	Understand the effect of noise in various digital communication systems and learn about optimum detection.	
CO-3	Compare performance of two basic digital modulation techniques.	
CO-4	Analyze performance of spread spectrum communication system.	

Course Name: RADAR &NAVIGATION	Course code: B16 EC 3204	Course Year: Third year
Items	Academic Year : 2018-19	
CO-1	Able to understand the basic working principles of various Radars.	
CO-2	Apply various mathematical equations to measure the Range and angle information of the targets from the radar.	
CO-3	Analyze and design of radar signals, MTI, Pulse Doppler radar and various tracking Radars.	
CO-4	Analyze various Radar systems, advantages, limitations and their applications.	
CO-5	Analyze various Navigational Aids like LORAN, DECCA, OMEGA, TACAN, VOR.	

Course Name: INFORMATION THEORY AND CODING	Course code: B16 EC 3205	Course Year: Third year
Items	Academic Year : 2018-19	
CO-1	Appreciate the mathematical concept of information (uncertainty) via probability & compute the entropy of a source.	
CO-2	Understand the need of source coding & variable length codes.	
CO-3	Device source codes using Shannon-Fano & Huffman algorithms, calculate the efficiency of a code.	

CO-4	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-5	Realize the need & benefits of channel coding, Understand 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.
CO-6	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), Ungerboeck trellis codes for bandwidth efficiency.
CO-7	Differentiate source coding and channel coding & learn applications of coding.
CO-8	Know modern codes & pursue modern wireless communications & information security courses.

Course Name: OBJECT ORIENTED PROGRAMMING	Course code: B16 CS 3210	Course Year: Third year
Items	Academic Year : 2018-19	
CO-1	Students will be able to handle I/O streams and Run time errors.	
CO-2	Students will be able to construct applications and Identify where data structures are appearing in them	

Course Name: WEB TECHNOLOGIES	Course code: B16 CS 3211	Course Year: Third year
Items	Academic Year : 2018-19	
CO-1	They will able to write html, JavaScript, CSS codes.	
CO-2	They will have clear understanding of hierarchy of objects in HTML and XML.	
CO-3	Finally they can create good, effective and customized websites	

Course Name: SOFTWARE ENGINEERING	Course code: B16 CS 3212	Course Year: Third year
Items	Academic Year : 2018-19	
CO-1	To Remember the basic concepts of software Engineering.	
CO-2	To use various process development models	
CO-3	To apply various techniques for gathering and analyzing requirements.	
CO-4	To gain the knowledge of Software Architecture views.	
CO-5	To estimate the cost and Schedule of Projects by using various estimation models.	
CO-6	To apply various testing strategies to test the software systems.	

Course Name: DIGITAL SIGNAL PROCESSING		Course code: B16 EC 3206	Course Year: Third year
Items	Academic Year : 2018-19		
CO-1	Describe the DSP fundamental theory and components, Develop an understanding of DSP advantages, limitations and fundamental trade-offs.		
CO-2	Carry-out LTI system analysis using convolution & Z-transform.		
CO-3	Carryout data analysis & spectrum analysis using FFT.		
CO-4	Design IIR & FIR digital filters to meet specifications		
CO-5	Knows multi-rate SP aspects, filter banks & applications		
CO-6	Tackle numerical & practical issues in DSP implementation		
CO-7	Apply DSP techniques to real world problems in information processing, filtering, communications, detection & estimation, Relate & translate DSP theory to applications, Ready to take advanced DSP courses & pursue research.		
CO-8	Illustrate and implement real-time DSP principles using MATLAB & DSP Processors, Ready to work in DSP industry.		

Course Name: EMBEDDED SYSYTEMS & MICROCONTROLLERS		Course code: B16 EC 3207	Course Year: Third year
Items	Academic Year : 2018-19		
CO-1	Ability to understand the concepts related to RTOS and its Inter Task communication Methods.		
CO-2	Ability to understand various design issues of RTOS.		
CO-3	Understand about embedded software development tools.		
CO-4	Understand the basic architecture of 8051 micro controller and instruction set.		

Course Name: MICRO ELECTRONICS		Course code: B16 EC 3208	Course Year: Third year
Items	Academic Year : 2018-19		
CO-1	Be familiar with MOSFET basics and Fabrication process.		
CO-2	Understand and analyze Digital CMOS circuits and other digital logic families		

Course Name: TELECOMMUNICATION SWITCHING SYSTEMS		Course code: B16 EC 3209	Course Year: Third year
Items	Academic Year : 2018-19		
CO-1	Evaluate the time and space parameters of a switched signal.		
CO-2	Establish the digital signal path in time and space, between two terminals.		
CO-3	Evaluate the inherent facilities within the system to test some digital switch functions.		
CO-4	Investigate the traffic capacity of the system.		
CO-5	Able to understand different data rate and applications of ISDN.		

Course Name: DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES		Course code: B16 EC 3210	Course Year: Third year
Items	Academic Year : 2018-19		
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	Implement application programs on a DSP processor.		
CO-4	Implement various DSP algorithms on TMS processors.		
CO-5	Implement FFT algorithms on TMS320C54XXDSP algorithm.		

Course Name: DSP LABORATORY		Course code: B16 EC 3211	Course Year: Third year
Items	Academic Year : 2018-19		
CO-1	Able to write the MATLAB coding for basic mathematical operations to complex operations like FFT.		
CO-2	Able to Design and Analyze LTI systems& Digital Filters.		
CO-3	Understand the image processing techniques		

Course Name: MICROPROCESSORS AND MICROCONTROLLERS LAB		Course code: B16 EC 3212	Course Year: Third year
Items	Academic Year : 2018-19		
CO-1	The objective of this course is to become familiar with the instruction set of Intel microprocessors and microcontroller and also to familiarize with Assembly language programming. The accompanying lab is designed to provide practical hands-on experience with microprocessor software applications and interfacing techniques.		

Course Name: VERBAL & QUANTITATIVE APTITUDE – II		Course code: B16ENG3202	Course Year: Third year
Items	Academic Year : 2018-19		
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.

Course Name: MINI PROJECT		Course code: B16 EC 3213	Course Year: Third year
Items	Academic Year : 2018-19		
CO-1	Achieve practical knowledge within his chosen area of technology for project development.		
CO-2	Identify, analyze, formulate and handle electronics & communications projects with a systematic and comprehensive approach.		
CO-3	Contribute as an individual or as member of team in development of technical projects.		
CO-4	Develop effective communication skills for presentation of project related activities.		

Course Name: ADVANCED CODING		Course code: B16 ENG 3204	Course Year: Third year
Items	Academic Year : 2018-19		
CO-1	Acquire coding knowledge on essential of modular programming.		
CO-2	Acquire Programming knowledge on linked lists.		
CO-3	Acquire coding knowledge on ADT.		
CO-4	Acquire knowledge on time complexities of different methods.		
CO-5	Acquire Programming skill on Java libraries and Collections.		

Course Name: DIGITAL IMAGE PROCESSING		Course code: B16EC4101	Course Year: Fourth year
Items	Academic Year : 2019-20		
CO-1	Discuss digital image fundamentals.		
CO-2	Apply image enhancement and restoration techniques.		
CO-3	Use image compression techniques.		
CO-4	Represent features of color images.		
CO-5	Use image segmentation techniques.		

Course Name: VLSI DESIGN		Course code: B16EC4102	Course Year: Fourth year
Items	Academic Year : 2019-20		

CO-1	Apply the Concept of design rules during the layout of a circuit. Model and simulate digital.
CO-2	VLSI systems using hardware design language.
CO-3	Synthesize digital VLSI systems from register-transfer or higher level descriptions.
CO-4	Understand current trends in semiconductor technology, and how it impacts scaling and performance.

Course Name: FIBER OPTIC COMMUNICATIONS		Course code: B16EC4103	Course Year: Fourth year
Items	Academic Year : 2019-20		
CO-1	Choose necessary components required in modern optical communications systems.		
CO-2	Design and build optical fiber experiments in the laboratory, and learn how to calculate electromagnetic modes in waveguides, the amount of light lost going through an optical system, dispersion of optical fibers.		
CO-3	Use different types of photo detectors and optical test equipment to analyze optical fiber and light wave systems.		
CO-4	Choose the optical cables for better communication with minimum losses.		
CO-5	Design, build, and demonstrate optical fiber experiments in the laboratory.		

Course Name: MICROWAVE ENGINEERING AND OPTICAL COMMUNICATION LAB		Course code: B16EC4104	Course Year: Fourth year
Items	Academic Year : 2019-20		
CO-1	Make use of microwave equipment.		
CO-2	Able to understand microwave measurements.		
CO-3	Measure performance of simple microwave circuits and devices.		
CO-4	Analyze the radiation patterns of antennas.		
CO-5	Assess the performance of optical devices.		

Course Name: DIGITAL COMMUNICATION LAB		Course code: B16EC4105	Course Year: Fourth year
Items	Academic Year : 2019-20		
CO-1	Be able to understand basic theories of Digital communication system in practical.		
CO-2	Be able to design and implement different modulation and demodulation techniques.		
CO-3	Be able to Perform the time and frequency domain analysis of the signals in a digital communication system.		
CO-4	Develop the skill to analyze and implement analogue to digital converters like PCM, DM.		
CO-5	Have the ability to design pass band digital modulation systems and techniques with desired specifications		

Course Name: PROJECT PHASE-I	Course code: B16EC4106	Course Year: Fourth year
Items	Academic Year : 2019-20	
CO-1	Identify a current problem through literature/field/case studies and define the background objectives and methodology for solving the same.	
CO-2	Write report and present it effectively.	

Course Name: CELLULAR AND MOBILE COMMUNICATIONS	Course code: B16EC4201	Course Year: Fourth year
Items	Academic Year : 2019-20	
CO-1	Students are able to understand the fundamentals of mobile communication systems.	
CO-2	Students are able to identify the problems and there remedies in wireless mobile communications.	
CO-3	Students are able to analyze multiuser systems with the help of different multiplexing techniques.	
CO-4	Students are able to understand the basics of GSM mobile communication standard, its architecture.	
CO-5	Students are able to understand the various mobile propagation channel models and path loss models.	

Course Name: COMPUTER NETWORKS	Course code: B16EC4202	Course Year: Fourth year
Items	Academic Year : 2019-20	
CO-1	Explain basic computer network principles and layers of the OSI model and TCP/IP.	
CO-2	Explain the concepts of transmission media, switching and multiplexing techniques.	
CO-3	Explain and analyse the error control and flow control methods.	
CO-4	Explain different multiple access control protocols and IEEE standards for LANs and MANs.	
CO-5	Identify the different types of connecting devices and explain the basic concepts of congestion control algorithms and internetworking.	
CO-6	Explain TCP and UDP header formats.	

Course Name: INTERNET OF THINGS (IOT)	Course code: B16EC4203	Course Year: Fourth year
Items	Academic Year : 2019-20	
CO-1	Interpret the vision of IoT from a global context.	
CO-2	Determine the Iot Architecture and application perspective	
CO-3	Identifying and describing different kinds of Internet-connected product concepts.	
CO-4	Analyzing, designing, and developing prototypes models of Internet-connected products using various tools.	

CO-5	Understanding the challenges and applying right techniques for user-interaction with connected-objects.
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Course Name: DIGITAL SYSTEM DESIGN THROUGH HDL	Course code: B16EC4204	Course Year: Fourth year
Items	Academic Year : 2019-20	
CO-1	To understand and design complex digital systems at several level of abstractions.	
CO-2	To create circuits that realizes specified digital functions.	
CO-3	To identify logic and technology-specific parameters to control the functionality.	
CO-4	To design and model complex digital system.	
CO-5	To verify several digital circuits using different techniques.	

Course Name: BIO MEDICAL SIGNAL PROCESSING	Course code: B16EC4205	Course Year: Fourth year
Items	Academic Year : 2019-20	
CO-1	Possess the basic mathematical skills necessary to analyse ECG and EEG signals.	
CO-2	Possess the basic scientific skills necessary to analyse ECG and EEG signals.	
CO-3	Possess the basic computational skills necessary to analyse ECG and EEG signals.	
CO-4	Apply classical and modern filtering and compression techniques for ECG and EEG signals.	
CO-5	Develop an understanding on basics of ECG and EEG feature extraction.	

Course Name: SATELLITE COMMUNICATION	Course code: B16EC4206	Course Year: Fourth year
Items	Academic Year : 2019-20	
CO-1	Choose necessary components required in modern satellite communications systems.	
CO-2	Design and build space segment, depending upon the requirement.	
CO-3	Design link margin for various applications.	
CO-4	Choose the correct multiple access technique for better communication with minimum losses.	
CO-5	Design, build, and demonstrate satellite communication link in the laboratory.	

Course Name: DIGITAL TV	Course code: B16EC4207	Course Year: Fourth year
Items	Academic Year : 2019-20	
CO-1	Choose necessary components required in modern digital TV systems.	

CO-2	Design a TV transport system.
CO-3	Design necessary formats for various applications.
CO-4	Choose the correct compression format of available.
CO-5	Design, build, and demonstrate digital TV transmission in the laboratory.

Course Name: PROJECT PHASE-II	Course code: B16EC4208	Course Year: Fourth year
Items	Academic Year : 2019-20	
CO-1	Identify a current problem through literature/field/case studies and define the background objectives and methodology for solving the same.	
CO-2	Analyze, design and develop a technology/ process.	
CO-3	Implement and evaluate the technology at the laboratory level.	
CO-4	Write report and present it effectively.	