ELECTRONICS AND COMMUNICATIONS ENGINEERING (R20)	
	1 year - 1 semester
COURSE OUTCOME	**COMMUNICATIVE ENGLISH**
CO1	At the end of the module, the learners will be able to • understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
CO2	ask and answer general questions on familiar topics and introduce oneself/others • employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
CO3	employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
CO4	recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
CO5	form sentences using proper grammatical structures and correct word forms
COURSE OUTCOME	**MATHEMATICS-I**
CO1`	At the end of the course, the student will be able to • utilize mean value theorems to real life problems (L3)
CO2	solve the differential equations related to various engineering fields (L3)
CO3	familiarize with functions of several variables which is useful in optimization (L3)
CO4	apply double integration techniques in evaluating areas bounded by region (L3)
CO5	learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems(L5)
COURSE OUTCOME	**APPLIED CHEMISTRY**
CO1	Analyze the different types of composite plastic materials and interpretthe mechanism of conduction in conducting polymers.
CO2	Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion.
CO3	Synthesize nanomaterials for modern advances of engineering technology. • Summarize the preparation of semiconductors; analyze the applications of liquid crystals and superconductors.
CO4	Analyze the principles of different analytical instruments and their applications. • Design models for energy by different naturalsources.
CO5	Obtain the knowledge of computational chemistry and molecular machines
COURSE OUTCOME	**PROGRAMMING FOR PROBLEM SOLVING USING C**
CO1	To write algorithms and to draw flowcharts for solving problems
CO2	To convert flowcharts/algorithms to C Programs, compile and debug programs
CO3	To use different operators, data types and write programs that use two-way/ multi-way selection
CO4	To select the best loop construct for a given problem

CO5	To design and implement programs to analyze the different pointer applications
COURSE OUTCOME	**ENGINEERING DRAWING**
CO1	The student will learn how to visualize 2D & 3D objects.
COURSE OUTCOME	**PROGRAMMING FOR PROBLEM SOLVING USING C LAB**
CO1	Apply the principles of C language in problem solving.•
CO2	To design flowcharts, algorithms and knowing how to debug programs.
CO3	To design & develop of C programs using arrays, strings pointers & functions.
CO4	To design & develop of C programs using arrays, strings pointers & functions.
COURSE OUTCOME	APPLIED CHEMISTRY LAB
CO1	The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.
	1 year - 2 semester
COURSE OUTCOME	**MATHEMATICS-II**
CO1	develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
CO2	solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3)
CO3	evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5)
CO4	apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)
CO5	apply numerical integral techniques to different Engineering problems (L3)
COURSE OUTCOME	**APPLIED PHYSICS**
CO1	Explain the need of coherent sources and the conditions for sustained interference (L2). Identify the applications of interference in engineering (L3). Analyze the differences between interference and diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary refracted light and extraordinary refracted rays by their states of polarization (L2)
CO2	Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers (L1). Explain the working principle of optical fibers (L2). Classify optical fibers based on refractive index profile and mode of propagation (L2). Identify the applications of optical fibers in medical, communication and other fields (L2). Apply the fiber optic concepts in various fields (L3).

CO3	Describe the dual nature of matter (L1). Explain the significance of wave function (L2). Identify the role of Schrodinger's time independent wave equation in studying particle in one- dimensional infinite potential well (L3). Identify the role of classical and quantum free electron theory in the study of electrical conductivity (L3). Classify the energy bands of solids (L2).
CO4	Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius-Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2). Explain the applications of dielectric and magnetic materials (L2). Apply the concept of magnetism to magnetic devices (L3)
CO5	Outline the properties of charge carriers in semiconductors (L2). Identify the type of semiconductor using Hall effect (L2). Identify applications of semiconductors in electronic devices (L2). Classify superconductors based on Meissner's effect (L2). Explain Meissner's effect, BCS theory & Josephson effect in superconductors (L2).
COURSE OUTCOME	**OBJECT ORIENTED PROGRAMMING THROUGH JAVA**
CO1	Show competence in the use of the Java programming language in the development of small to medium- sized application programs that demonstrate professionally acceptable coding and performancestandard
CO2	• Illustrate the basic principles of the object-orientedprogramming
CO3	• Demonstrate an introductory understanding ofgraphical user interfaces, multithreaded programming, and event-drivenprogramming.
COURSE OUTCOME	**NETWORK ANALYSIS**
CO1	gain the knowledge on basic networkelements.
CO2	• will analyze the RLC circuits behaviorindetailed.
CO3	• analyze the performance of periodicwaveforms.
CO4	• gain the knowledge in characteristics of two port network parameters (Z,Y,ABCD,h&g).
CO5	analyze the filter design concepts in realworldapplications
COURSE OUTCOME	**BASIC ELECTRICAL ENGINEERING**
CO1	Able to explain the operation of DC generator and analyze the characteristics of DC generator.
CO2	• Able to explain the principle of operation of DC motor and analyze theircharacteristics. Acquire the skills to analyze the starting and speed control methods ofDCmotors.
CO3	• Ability to analyze the performance and speed – torque characteristics of a3- phase induction motor and understand starting methods of 3-phaseinductionmotor.
CO4	• Able to explain the operation ofSynchronousMachines
CO5	Capability to understand the operation of variousspecialmachines
COURSE OUTCOME	**BASIC ELECTRICAL ENGINEERING LAB**
CO1	Determine and predetermine the performance of DC machinesandtransformers.

CO2	• Control the DC shunt machines.
CO3	• Compute the performance of1-phasetransformer.
CO4	• Perform tests on 3-phase induction motor and alternator to determinetheirperformance characteristics
	II Year - I Semester
COURSE OUTCOME	**ELECTRONIC DEVICES AND CIRCUITS**
c01	Applythebasicconceptsofsemiconductorphysics
c02	Understandthe formationofp-njunctionandhowitcanbeusedasapnjunctionas diodeindifferentmodes ofoperation.
c03	Knowtheconstruction,workingprincipleofrectifierswithandwithoutfilterswi threlevant expressions andnecessarycomparisons.
c04	Understandtheconstruction,principleofoperationoftransistors,BJTandFETwit hthe irV-Icharacteristicsindifferentconfigurati
COURSE OUTCOME	**SWITCHING THEORYAND LOGIC DESIGN**
c01	Classify different number systems and apply to generatevariouscodes.
c02	Use the concept of Boolean algebra in minimization ofswitchingfunctions
c03	• Design different types of combinationallogiccircuits.
c04	Apply knowledge of flip-flops in designing of Registersandcounters
COURSE OUTCOME	**SIGNALS AND SYSTEMS**
c01	Differentiate the various classifications ofsignals and systems
c02	• Analyze the frequency domain representation ofsignals using Fourier concepts
c03	Classify the systems based on their properties and determine the response ofLTISystems
c04	• Know the sampling process and various types ofsampling techniques.
COURSE OUTCOME	**RANDOM VARIABLES AND STOCHASTIC PROCESSES**
c01	Mathematically modelther and omphenomena and solve simple probabilistic problems
c02	• Identify different types of random variables and compute statistical averages of the serandom variables.
c03	Characterize the random processes in the time and frequency domains
c04	• Analyze the LTI systems with random input
COURSE OUTCOME	**MATHEMATICS-III**
c01	Interpret the physical meaning of different operators such as gradient, curland divergence (L5)
c02	Estimate the work done against a field, circulation and fluxusing vector calculus (L5)
c03	Apply the Laplace transform for solving differential equations (L3)
c04	Find or compute the Fourier series of periodic signals (L3)
c05	Knowandbeable to apply integral expressions for the forwards and inverse Fourier transform to arrange of non-periodic wave forms (L

COURSE OUTCOME	**OOPS THROUGH JAVA LAB**
c01	: At the end of the course, students will be able to
COURSE OUTCOME	**PYTHON LAB (SKILL ORIENTED COURSE)**
c01	: Know comprehensions, generators in python.CO2: Know exception handling inpython
c02	Understand various data types like lists, tuples, strings etc
c03	Know the usage of various pre-defined functions on the above data types
	II Year - II Semester
COURSE OUTCOME	**ELECTRONIC CIRCUIT ANALYSIS**
c01	Design and analysis ofsmall signal high frequency transistor amplifier using BJT and FET
c02	Design and analysis of multistage amplifiers using BJT and FET and Differential amplifier using BJT.
c03	Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stability concept.
c04	Know the classification of the power and tuned amplifiers and their analysis with performance comparison
COURSE OUTCOME	**DIGITAL IC DESIGN**
c01	• Understand the structure of commercially available digital integrated circuit families.
c02	Learn the IEEE Standard 1076 Hardware Description Language (VHDL)
c03	Model complex digital systems at several levels of abstractions, behavioral, structural, and rapid system prototyping
c04	Analyze and design basic digital circuits with combinatorial and sequential logic circuits using VHDL
COURSE OUTCOME	**ANALOG COMMUNICATIONS**
c01	Differentiate various Analog modulation and demodulation schemes and their spectral characteristics
c02	Analyze noise characteristics of various analog modulation methods
c03	Analyze various functional blocks of radiotransmitters and receivers
c04	Design simple analog systems for various modulation techniques
COURSE OUTCOME	**LINEAR CONTROL SYSTEMS**
c01	course introduces the concepts of feedback and its advantages to various control systems
c02	The performance metrics to design the control system intime-domain and frequency domain are introduced
c03	• Controlsystems for various applications can be designed using time-domain and frequency domain analysis.
c04	In addition to the conventional approach, the state space approach for the analysis of control systems is also introduced
COURSE OUTCOME	**MANAGEMENT AND ORGANISATIONAL BEHAVIOUR**
c01	• After completion of the Course the student will acquire the knowledge on management

c02	• Will familiarize with the concepts of functional management that is HR Mand Marketing
c03	• The learnerisable to think in strategically through contemporary management practices.
c04	• The learnerisable to think in strategically through contemporary management practices.
COURSE OUTCOME	**SOFT SKILLS (SKILL ORIENTED COURSE)**
c01	Use language fluently, accurately and appropriately indebates and group discussions
c02	Use their skills of listening comprehension to communicate effectively incross-cultural
c03	CO3 Learn and use new vocabulary.
	III Year – I Semester
COURSE OUTCOME	**ANALOG ICS AND APPLICATIONS**
co1	Describe the Op-Amp and internal Circuitry: 555 Timer, PLL
co2	2. Discuss the Applications of Operational amplifier: 555 Timer, PLL
co3	3. Design the Active filters using Operational Amplifier
co4	4. Use the Op-Amp in A to D & D to A Converters
COURSE OUTCOME	**ELECTROMAGNETIC WAVES AND TRANSMISSION LINES**
c01	1. Determine E and H using various laws and applications of electric & magnetic fields
c02	2. Apply the Maxwell equations to analyze the time varying behavior of EM waves
c03	3. Gain the knowledge in uniform plane wave concept and characteristics of uniform
COURSE OUTCOME	**DIGITAL COMMUNICATIONS**
c01	alyze the performance of a Digital Communication System for probability of error and
c02	2. Analyze various source coding techniques.
c03	3. Compute and analyze Block codes, cyclic codes and convolution codes.
COURSE OUTCOME	ANTENNA AND WAVE PROPAGATION
c01	1. Identify basic antenna parameters.
c02	Design and analyze wire antennas, loop antennas, reflector antennas, lens antennas, horn antennas and micro-strip antennas
c03	5. Analyze antenna measurements to assess antenna's performance
COURSE OUTCOME	**COMPUTER ARCHITECTURE & ORGANIZATION**
c01	1. Students can understand the architecture of modern computer.
c02	2. They can analyze the Performance of a computer using performance equation
c03	3. Understanding of different instruction types.
c04	4. Students can calculate the effective address of an operand by addressing modes
	III Year – II Semester

COURSE OUTCOME	MICROPROCESSOR AND MICROCONTROLLERS
CO1	Understand the architecture of microprocessor/ microcontroller and their operation.
CO2	Demonstrate programming skills in assembly language for processors and Controllers.
CO3	Analyze various interfacing techniques and apply them for the design of processor / Controller based systems.
COURSE OUTCOME	**VLSI DESIGN**
CO1	Demonstrate a clear understanding of CMOS fabrication flow and technology scaling.
CO2	Apply the design Rules and draw layout of a given logic circuit.
CO3	Design basic building blocks in Analog IC design.
CO4	Analyze the behavior of amplifier circuits with various loads.
CO5	Design various CMOS logic circuits for design of Combinational logic circuits.
CO6	Design MOSFET based logic circuits using various logic styles like static and dynamic CMOS.
CO7	Design various applications using FPGA.
COURSE OUTCOME	**DIGITAL SIGNAL PROCESSING**
CO1	1. Apply the difference equations concept in the analysis of Discrete time systems
CO2	2. Use the FFT algorithm for solving the DFT of a given signal
CO3	3. Design a Digital filter (FIR&IIR) from the given specifications
CO4	4. Realize the FIR and IIR structures from the designed digital filter.
CO5	5. Use the Multirate Processing concepts in various applications (eg: Design of phase shifters, Interfacing of digital systems
CO6	6. Apply the signal processing concepts on DSP Processor.
COURSE OUTCOME	**MICROWAVE ENGINEERING**
CO1	1. Design different modes in waveguide structures
CO2	2. Calculate S-matrix for various waveguide components and splitting the microwave energy in a desired direction
CO3	3. Distinguish between Microwave tubes and Solid State Devices, calculation of efficiency of devices.
CO4	4. Measure various microwave parameters using a Microwave test bench
COURSE OUTCOME	**ARM BASED/ AURDINO BASED PROGRAMMING**
CO1	1. Comprehend Microcontroller-Transducers Interface techniques
CO2	2. Establish Serial Communication link with Arduino
CO3	3. Analyze basics of SPI interface.
CO4	4. Interface Stepper Motor with Arduino
CO5	5. Analyze Accelerometer interface techniques
	IV Year – I Semester
COURSE OUTCOME	**OPTICAL COMMUNICATION**
CO1	1. Choose necessary components required in modern optical communications systems .

CO2	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.
CO3	3. Use different types of photo detectors and optical test equipment to analyze optical fiber and light wave systems.
CO4	4. Choose the optical cables for better communication with minimum losses
CO5	5. Design, build, and demonstrate optical fiber experiments in the laboratory.
COURSE OUTCOME	**SATELLITE COMMUNICATION**
CO1	1. Understand the concepts, applications and subsystems of Satellite communications.
CO2	2. Derive the expression for G/T ratio and to solve some analytical problems on satellite link design.
CO3	3. Understand the various types of multiple access techniques and architecture of earth
CO4	station design.
CO5	4. Understand the concepts of GPS and its architecture.
COURSE OUTCOME	**PATTERN RECOGNITION & MACHINE LEARNING**
CO1	1. Study the parametric and linear models for classification
CO2	2. Design neural network and SVM for classification
CO3	3. Develop machine independent and unsupervised learning techniques.
COURSE OUTCOME	**ELECTRONIC MEASUREMENTS AND INSTRUMENTATION**
CO1	1. Select the instrument to be used based on the requirements.
CO2	2. Understand and analyze different signal generators and analyzers.
CO3	3. Understand the design of oscilloscopes for different applications.
CO4	4. Design different transducers for measurement of different parameters.