



PKM Educational Trust ®

R. R. Institute of Technology

Affiliated to VTU Belgaum and Approved by AICTE, New Delhi, Recognised by Govt. of Karnataka

Accredited by NAAC with 'B+'

Raja Reddy Layout, Chikkabanavara, Bengaluru - 560 090

Department of Electronics & Communication Engineering

Course outcomes (2018 scheme)

I Year

Course Code : 18MAT11 Course Name : CALCULUS AND LINEAR ALGEBRA	
CO	Course Outcome
C101.1	Apply the knowledge of calculus to solve problems related to polar curves and its applications in determining the bentness of a curve.
C101.2	Learn the notion of partial differentiation to calculate rates of change of multivariate functions and solve problems related to composite functions and jacobians.
C101.3	Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing the area and volume.
C101.4	Solve first order linear/nonlinear differential equation analytically using standard methods.
C101.5	Make use of matrix theory for solving system of linear equations and compute eigen values and eigenvectors required for matrix diagonalization process.

Course Code : 18CHE12 Course Name : Engineering Chemistry	
CO	Course Outcome
C102.1	Use of free energy in equilibria, rationalize bulk properties and process using thermodynamic consideration electrochemical energy system.
C102.2	Causes and effects of corrosion of metal and control of corrosion. Modification of surface properties of metal to develop .
C102.3	Production and consumption of energy for industrialization of country and living standards of people. Production and use of electrochemical cells, concentration cells fuel cells, classical batteries and modern batteries .
C102.4	Environmental pollution waste management and water chemistry .
C102.5	Different techniques of instrumental analysis of materials and synthesis , properties and applications of Nano materials .

Course Code : 18CPS13 Course Name : C Programming For Problem Solving	
CO	Course Outcome
C103.1	CO1: Illustrate simple algorithms from the different domains such as mathematics, physics, etc.
C103.2	CO2: Construct a programming solution to the given problem using C
C103.3	CO3: Identify and correct the syntax and logical errors in C programs.
C103.4	CO4: Modularize the given problem using functions and structure.

Course Code : 18ELN14 Course Name : Basic Electronics	
CO	Course Outcome
C104.1	Describe the Operation of diodes, BJT, FET and Operational Amplifiers
C104.2	Design and Explain the Construction of rectifiers, regulators, amplifiers and oscillators
C104.3	describe general operating Principals of SCRs and its applications
C104.4	Explain the working and design of fixed voltage IC regulator using 7805 and Astable oscillator using timer IC 555
C104.5	Explain the Different number system and their conversations and construct simple combinational and sequential logic circuits using Flips -Flops
C104.6	Describe the /basic principle of operation of communication system and mobile phones

Course Code :18ME15 Course Name : ELEMENTS OF MECHANICAL ENGINEERING	
CO	Course Outcome
C105.1	Identify different sources of energy and their conversion process.
C105.2	Explain the working principle of hydraulic turbines, pumps, IC engines and refrigeration
C105.3	Recognize various metal joining processes and power transmission elements.
C105.4	Understand the properties of common engineering materials and their applications in engineering industry.
C105.5	Discuss the working of conventional machine tools, machining processes, tools and accessories and describe the advanced manufacturing systems.

Course Code :18CHEL16 Course Name : ENGINEERING CHEMISTRY LABORATORY	
CO	Course Outcome
C106.1	Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results.
C106.2	Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results.

107	Course Code: - 18CPL17 Course Name: C PROGRAMMING LABORATORY
CO : 1	Write algorithms, flowcharts and program for simple problems
CO : 2	Correct Syntax and logical errors to execute a program
CO : 3	Write iterative and wherever possible recursive programs
CO : 4	Demonstrate use of functions, arrays, strings structures and pointers in problem solving
108	Course Name & Code: - 18EGH18 - TECHNICAL ENGLISH : II
CO : 1	Identify common errors in spoken and written communication
CO : 2	Get familiarised with English vocabulary and language proficiency
CO : 3	Improve nature and style of sensible writing and acquire employment and workplace communication skills

CO : 4	Improve their technical communication skills through technical reading and writing practices
CO : 5	Perform well in campus recruitment, engineering and all other general competitive examinations

Course Code : 18MAT21 Course Name :ADVANCED CALCULUS & NUMERICAL METHODS	
CO	Course Outcome
C201.1	Illustrate the applications of multivariate calculus to understand the solenoidal and irrotational vectors and also exhibit the inter dependence of line, surface and volume integrals.
C201.2	Demonstrate various physical models through higher order differential equations and solve such linear ordinary differential equations.
C201.3	Construct a variety of partial differential equations and solution by exact methods/method of separation of variables.
C201.4	Explain the applications of infinite series and obtain series solution of ordinary differential equations.
C201.5	Apply the knowledge of numerical methods in the modelling of various physical and engineering phenomena.

Course Code : 18PHY22 Course Name : Engineering Physics	
CO	Course Outcome
C202.1	Understand various types of oscillations and their implications, the role of Shock waves in various fields and recognize the elastic properties of materials for engineering applications.
C202.2	Realize the interrelation between time varying electric and magnetic field, the transverse nature of the EM waves and their role in optical fiber communication.
C202.3	Compute Eigen values, Eigen functions, momentum of atomic and subatomic particles using Time independent 1-D Schrodinger's wave equation
C202.4	Apprehend theoretical background of Laser, construction and working of different types of Laser and its application in different fields
C202.5	Understand various electrical and thermal properties of materials like conductors, semiconductors and dielectrics using different theoretical models

Course Code : 18ELE23 Course Name: Basic electrical Engineering	
CO	Course Outcome
C203.1	CO1: Analyse D.C and A.C circuits.
C203.2	CO2: Explain the principle of operation and construction of single phase transformer.
C203.3	CO3: Explain the principle of operation and construction of DC machines and synchronous machines.
C203.4	CO4: Explain the principle of operation and construction of three phase induction motors
C203.5	CO5: Discuss concepts of electrical wiring, circuit protecting devices and earthing.

Course Code : 18 CIV24 Course Name : ELEMENTS OF CIVIL ENGINEERING AND MECHANICS	
CO	Course Outcome
C204.1	Mention the applications of various fields of civil engineering

C204.2	Compute the resultant of given force system subjected to various loads
C204.3	Comprehend the action of forces, moments and other loads on systems of rigid bodies and compute the reactive forces that develop as a result of the external loads
C204.4	Locate the centroid and compute the moment of inertia of regular and built up sections
C204.5	Express the relationship between the motion of bodies and analyze the bodies in motion

Course Code : 18EGDL25 Course Name : Engineering Graphics	
CO	Course Outcome
C205.1	Prepare engineering drawings as per BIS conventions mentioned in the relevant codes.
C205.2	Produce computer generated drawings using CAD software.
C205.3	Use the knowledge of orthographic projections to represent engineering information / concepts and present the same in the form of drawings.
C205.4	Develop isometric drawings of simple objects reading the orthographic projections
C205.5	Convert pictorial and isometric views of simple objects to orthographic views.

Course Code : 18PHYL26 Course Name : Engineering Physics Laboratory	
CO	Course Outcome
C206.1	Apprehend the concepts of interference of light, diffraction of light, Fermi energy and magnetic effect of current
C206.2	Understand the principles of operations of optical fibres and semiconductor devices such as photo diode and NPN transistor using simple circuits.
C206.3	Determine elastic moduli and moment of inertia of given materials with the help of suggested procedures.
C206.4	Recognize the resonance concept and its practical applications
C206.5	Understand the importance of measurement procedure, honest recording and representing the data, reproduction of final results.

Course Code: 18ELEL27 Course Name:- BASIC ELECTRICAL ENGINEERING LABORATORY	
CO : 1	Identify the common electrical components and measuring instruments used for conducting experiments in the electrical Laboratory.
CO : 2	Compare power factors of lamp.
CO : 3	Determine the Electrical quantities of an electrical circuit and power consumed in a 3 phase load.
CO : 4	Determine earth resistance and understand two way and three way control of lamps

Course Code: 18EGH28 Course Name: TECHNICAL ENGLISH: I	
CO : 1	Use grammatical English and essentials of language skills and identify the nuances of phonetics, intonation and flawless pronunciation
CO : 2	Implement English vocabulary at command and language proficiency
CO : 3	Identify common errors in spoken and written communication

CO : 4	Understand and improve nonverbal communication kinesics
CO : 5	Perform well in campus recruitment, engineering and all other general competitive examinations

II Year

Course Code :18MAT31 Course Name: Transform Calculus, Fourier Series And Numerical Techniques	
CO	Course Outcome
C301.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.
C301.2	Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.
C301.3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.
C301.4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
C301.5	Determine the extremals of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.

Course Code :18EC32 Course Name :NETWORK THEORY	
CO	Course Outcome
C302.1	Determine currents and voltages using source transformation/ source shifting/ mesh/ nodal analysis and reduce given network using star-delta transformation/source transformation/ source shifting.
C302.2	Solve network problems by applying Superposition/ Reciprocity/ Thevenin's/ Norton's/ Maximum Power Transfer/ Millman's Network Theorems and electrical laws to reduce circuit complexities and to arrive at feasible solutions.
C302.3	Calculate current and voltages for the given circuit under transient conditions.
C302.4	Apply Laplace transform to solve the given network.
C302.5	Solve the given network using specified two port network parameter like Z or Y or T or h.
C302.6	Understand the concept of resonance

Course Code :18EC33 Course Name :ELECTRONIC DEVICES	
CO	Course Outcome
C303.1	Understand the principles of semiconductor Physics
C303.2	Understand the principles and characteristics of different types of semiconductor devices
C303.3	Understand the fabrication process of semiconductor devices
C303.4	Utilize the mathematical models of semiconductor junctions and MOS transistors for circuits and systems.

Course Code :18EC34 Course Name :DIGITAL SYSTEM DESIGN	
CO	Course Outcome
C304.1	Explain the concept of combinational and sequential logic circuits.
C304.2	Design the combinational logic circuits.
C304.3	Design the sequential circuits using SR, JK, D, T flip-flops and Mealy & Moore machines
C304.4	Design applications of Combinational & Sequential Circuits.

Course Code :18EC35 Course Name :COMPUTER ORGANIZATION AND ARCHITECTURE	
CO	Course Outcome
C305.1	Explain the basic organization of a computer system.
C305.2	Explain different ways of accessing an input / output device including interrupts.
C305.3	Illustrate the organization of different types of semiconductor and other secondary storage memories.
C305.4	Illustrate simple processor organization based on hardwired control and micro programmed control.

Course Code :18EC36 Course Name : POWER ELECTRONICS AND INSTRUMENTATION	
CO	Course Outcome
C306.1	Build and test circuits using power electronic devices.
C306.2	Analyze and design controlled rectifier, DC to DC converters, DC to AC inverters and SMPS.
C306.3	Define instrument errors.
C306.4	Develop circuits for multirange Ammeters, Voltmeters and Bridges to measure passive component values and frequency.
C306.5	Describe the principle of operation of Digital instruments and PLCs.
C306.6	Use Instrumentation amplifier for measuring physical parameters.

Course Code :18ECL37 Course Name :Electronic Devices And Instrumentation Laboratory	
CO	Course Outcome
C307.1	Understand the characteristics of various electronic devices and measurement of parameters.
C307.2	Design and test simple electronic circuits.
C307.3	Use of circuit simulation software for the implementation and characterization of electronic circuits and devices.

Course Code :18ECL38 Course Name : DIGITAL SYSTEM DESIGN LABORATORY	
CO	Course Outcome
C308.1	Demonstrate the truth table of various expressions and combinational circuits using logic gates.
C308.2	Design various combinational circuits such as adders, subtractors, comparators, multiplexers and demultiplexers.
C308.3	Construct flips-flops, counters and shift registers.
C308.4	Simulate Serial adder and Binary Multiplier.

Course Code :18KAK28/39/49 Course Name :Aadalitha Kannada	
CO	Course Outcome
C309.1	• ಆಡಳಿತ ಭಾಷೆ ಕನ್ನಡದ ಪರಿಚಯವಾಗುತ್ತದೆ.
C309.2	• ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಕನ್ನಡ ಭಾಷೆಯ ವ್ಯಾಕರಣದ ಬಗ್ಗೆ ಅರಿವು ಮೂಡುತ್ತದೆ.
C309.3	• ಕನ್ನಡ ಭಾಷಾ ರಚನೆಯಲ್ಲಿನ ನಿಯಮಗಳು ಮತ್ತು ಲೇಖನ ಚಿಹ್ನೆಗಳು ಪರಿಚಯಿಸಲ್ಪಡುತ್ತವೆ.
C309.4	• ಸಾಮಾನ್ಯ ಅರ್ಜಿಗಳು, ಸರ್ಕಾರಿ ಮತ್ತು ಅರೆ ಸರ್ಕಾರಿ ಪತ್ರವ್ಯವಹಾರದ ಬಗ್ಗೆ ಅರಿವು ಮೂಡುತ್ತದೆ.
C309.5	• ಭಾಷಾಂತರ ಮತ್ತು ಪ್ರಬಂಧ ರಚನೆ ಬಗ್ಗೆ ಅಸಕ್ತಿ ಮೂಡುತ್ತದೆ.
C309.6	• ಕನ್ನಡ ಭಾಷಾಭ್ಯಾಸ ಮತ್ತು ಸಾಮಾನ್ಯ ಕನ್ನಡ ಹಾಗೂ ಆಡಳಿತ ಕನ್ನಡದ ಪದಗಳು ಪರಿಚಯಿಸಲ್ಪಡುತ್ತವೆ.

Course Code :8KVK28/39/49 Course Name :Vyavaharika Kannada	
CO	Course Outcome
C3010.1	understand Kannada and communicate in Kannada language.

Course Code :18CPC39/49 Course Name :CONSTITUTION OF INDIA, PROFESSIONAL ETHICS AND CYBER LAW (CPC)	
CO	Course Outcome
C3011.1	Have constitutional knowledge and legal literacy.
C3011.2	Understand Engineering and Professional ethics and responsibilities of Engineers.
C3011.3	Understand the the cybercrimes and cyber laws for cyber safety measures.

Course Code :18MATDIP31 Course Name :ADDITIONAL MATHEMATICS – I	
CO	Course Outcome
C3012.1	Apply concepts of complex numbers and vector algebra to analyse the problems arising in related area.
C3012.2	Use derivatives and partial derivatives to calculate rate of change of multivariate functions.
C3012.3	Analyze position, velocity and acceleration in two and three dimensions of vector valued functions.
C3012.4	Learn techniques of integration including the evaluation of double and triple integrals.
C3012.5	Identify and solve first order ordinary differential equations.

Course Code :18MAT41 Course Name: COMPLEX ANALYSIS, PROBABILITY AND STATISTICAL METHODS	
CO	Course Outcome
C401.1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.
C401.2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.
C401.3	Apply discrete and continuous probability distributions in analysing the probability models arising in engineering field.
C401.4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.
C401.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.

Course Code :18EC42 Course Name :ANALOG CIRCUITS	
CO	Course Outcome
C402.1	Understand the characteristics of BJTs and FETs.
C402.2	Design and analyze BJT and FET amplifier circuits.
C402.3	Design sinusoidal and non-sinusoidal oscillators.
C402.4	Understand the functioning of linear ICs.
C402.5	Design of Linear IC based circuits.

Course Code : 18EC43 Course Name :CONTROL SYSTEMS	
CO	Course Outcome
C403.1	Develop the mathematical model of mechanical and electrical systems.
C403.2	Develop transfer function for a given control system using block diagram reduction techniques and signal flow graph method.
C403.3	Determine the time domain specifications for first and second order systems.
C403.4	Determine the stability of a system in the time domain using Routh-Hurwitz criterion and Root-locus technique.
C403.5	Determine the stability of a system in the frequency domain using Nyquist and bode plots.

Course Code :18EC44 Course Name :ENGINEERING STATISTICS and LINEAR ALGEBRA	
CO	Course Outcome
C404.1	Identify and associate Random Variables and Random Processes in Communication events.
C404.2	Analyze and model the Random events in typical communication events to extract quantitative statistical parameters.
C404.3	Analyze and model typical signal sets in terms of a basis function set of Amplitude, phase and frequency.
C404.4	Demonstrate by way of simulation or emulation the ease of analysis employing basis functions, statistical representation and Eigen values.

Course Code :18EC45 Course Name :SIGNALS AND SYSTEMS	
CO	Course Outcome
C405.1	Analyze the different types of signals and systems.
C405.2	Determine the linearity, causality, time-invariance and stability properties of continuous and discrete time systems.
C405.3	Represent continuous and discrete systems in time and frequency domain using different transforms Test whether the system is stable.

Course Code :18EC46 Course Name :MICROCONTROLLER	
CO	Course Outcome
C406.1	Explain the difference between Microprocessors & Microcontrollers, Architecture of 8051 Microcontroller, Interfacing of 8051 to external memory and Instruction set of 8051.
C406.2	Write 8051 Assembly level programs using 8051 instruction set.
C406.3	Explain the Interrupt system, operation of Timers/Counters and Serial port of 8051.
C406.4	Write 8051 Assembly language program to generate timings and waveforms using 8051 timers, to send & receive serial data using 8051 serial port and to generate an external interrupt using a switch.
C406.5	Write 8051 Assembly language programs to generate square wave on 8051 I/O port pin using interrupt and C Programme to send & receive serial data using 8051 serial port.
C406.6	Interface simple switches, simple LEDs, ADC 0804, LCD and Stepper Motor to 8051 using 8051 I/O ports.

Course Code :18ECL47 Course Name :MICROCONTROLLER LABORATORY	
CO	Course Outcome
C407.1	Write Assembly language programs in 8051 for solving simple problems that manipulate input data using different instructions of 8051.
C407.2	Interface different input and output devices to 8051 and control them using Assembly language programs.
C407.3	Interface the serial devices to 8051 and do the serial transfer using C programming.

Course Code :18ECL48 Course Name :ANALOG CIRCUITS LABORATORY	
CO	Course Outcome
C408.1	Design analog circuits using BJT/FETs and evaluate their performance characteristics.
C408.2	Design analog circuits using OPAMPs for different applications
C408.3	Simulate and analyze analog circuits that uses ICs for different electronic applications.

Course Code :18MATDIP41 Course Name :ADDITIONAL MATHEMATICS – II	
CO	Course Outcome
C409.1	Solve systems of linear equations using matrix algebra.
C409.2	Apply the knowledge of numerical methods in modelling and solving engineering problems.
C409.3	Make use of analytical methods to solve higher order differential equations.
C409.4	Classify partial differential equations and solve them by exact methods.
C409.5	Apply elementary probability theory and solve related problems.

III YEAR

Course Code :18ES51 Course Name: TECHNOLOGICAL INNOVATION MANAGEMENT AND ENTREPRENEURSHIP	
CO	Course Outcome
C501.1	Understand the fundamental concepts of Management and Entrepreneurship and opportunities in order to setup a business
C501.2	Describe the functions of Managers, Entrepreneurs and their social responsibilities
C501.3	Understand the components in developing a business plan
C501.4	Awareness about various sources of funding and institutions supporting entrepreneurs

Course Code :18EC52 Course Name :DIGITAL SIGNAL PROCESSING	
CO	Course Outcome
C502.1	Determine response of LTI systems using time domain and DFT techniques.
C502.2	Compute DFT of real and complex discrete time signals.
C502.3	Computation of DFT using FFT algorithms and linear filtering approach.
C502.4	Design and realize FIR and IIR digital filters
C502.5	Understand the DSP processor architecture.

Course Code :18EC53 Course Name :PRINCIPLES OF COMMUNICATION SYSTEMS	
CO	Course Outcome
C503.1	Analyze and compute performance of AM and FM modulation in the presence of noise at the receiver.
C503.2	Analyze and compute performance of digital formatting processes with quantization noise.
C503.3	Multiplex digitally formatted signals at Transmitter and demultiplex the signals and reconstruct digitally formatted signals at the receiver.
C503.4	Design/Demonstrate the use of digital formatting in Multiplexers, Vocoders and Video transmission.

Course Code :18EC54 Course Name :INFORMATION THEORY and CODING	
CO	Course Outcome
C504.1	Explain concept of Dependent & Independent Source, measure of information, Entropy, Rate of Information and Order of a source
C504.2	Represent the information using Shannon Encoding, Shannon Fano, Prefix and Huffman Encoding Algorithms
C504.3	Model the continuous and discrete communication channels using input, output and joint probabilities
C504.4	Determine a codeword comprising of the check bits computed using Linear Block codes, cyclic codes & convolutional codes

C504.5	Design the encoding and decoding circuits for Linear Block codes, cyclic codes, convolutional codes, BCH and Golay codes.
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Course Code :18EC55 Course Name :ELECTROMAGNETIC WAVES	
CO	Course Outcome
C505.1	Evaluate problems on electrostatic force, electric field due to point, linear, volume charges by applying conventional methods and charge in a volume.
C505.2	Apply Gauss law to evaluate Electric fields due to different charge distributions and Volume Charge distribution by using Divergence Theorem.
C505.3	Determine potential and energy with respect to point charge and capacitance using Laplace equation and Apply Biot-Savart's and Ampere's laws for evaluating Magnetic field for different current configurations
C505.4	Calculate magnetic force, potential energy and Magnetization with respect to magnetic materials and voltage induced in electric circuits.
C505.5	Apply Maxwell's equations for time varying fields, EM waves in free space and conductors and Evaluate power associated with EM waves using Poynting theorem

Course Code :18EC56 Course Name :Verilog HDL	
CO	Course Outcome
C506.1	Write Verilog programs in gate, dataflow (RTL), behavioural and switch modelling levels of Abstraction.
C506.2	Design and verify the functionality of digital circuit/system using test benches.
C506.3	Identify the suitable Abstraction level for a particular digital design.
C506.4	Write the programs more effectively using Verilog tasks, functions and directives.
C506.5	Perform timing and delay Simulation
C506.6	Interpret the various constructs in logic synthesis.

Course Code :18ECL57 Course Name :DIGITAL SIGNAL PROCESSING LABORATORY	
CO	Course Outcome
C507.1	Understand the concepts of analog to digital conversion of signals and frequency domain sampling of signals.
C507.2	Modelling of discrete time signals and systems and verification of its properties and results.
C507.3	Implementation of discrete computations using DSP processor and verify the results.
C507.4	Realize the digital filters using a simulation tool and analyze the response of the filter for an audio signal.

Course Code : 18ECL58 Course Name : HDL LABORATORY	
CO	Course Outcome
C508.1	Write the Verilog/VHDL programs to simulate Combinational circuits in Dataflow, Behavioural and Gate level Abstractions.
C508.2	Describe sequential circuits like flip flops and counters in Behavioural description and obtain simulation waveforms.
C508.3	Synthesize Combinational and Sequential circuits on programmable ICs and test the hardware.
C508.4	Interface the hardware to the programmable chips and obtain the required output

Course Code : 18CIV59 Course Name : ENVIRONMENTAL STUDIES	
CO	Course Outcome

C509.1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale
C509.2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
C509.3	Demonstrate ecology knowledge of a complex relationship between biotic and a biotic components.
C509.4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.

Course Code :18EC61		Course Name: DIGITAL COMMUNICATION
CO	Course Outcome	
C601.1	Associate and apply the concepts of Bandpass sampling to well specified signals and channels.	
C601.2	Analyze and compute performance parameters and transfer rates for low pass and bandpass symbol under ideal and corrupted non band limited channels.	
C601.3	Test and validate symbol processing and performance parameters at the receiver under ideal and corrupted bandlimited channels.	
C601.4	Demonstrate that bandpass signals subjected to corruption and distortion in a bandlimited channel can be processed at the receiver to meet specified performance criteria.	

Course Code :18EC62		Course Name :EMBEDDED SYSTEMS
CO	Course Outcome	
C602.1	Describe the architectural features and instructions of 32 bit microcontroller ARM Cortex M3.	
C602.2	Apply the knowledge gained for Programming ARM Cortex M3 for different applications.	
C602.3	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.	
C602.4	Develop the hardware software co-design and firmware design approaches.	
C602.5	Explain the need of real time operating system for embedded system applications.	

Course Code :18EC63		Course Name :MICROWAVE and ANTENNAS
CO	Course Outcome	
C603.1	Describe the use and advantages of microwave transmission	
C603.2	Analyze various parameters related to microwave transmission lines and waveguides	
C603.3	Identify microwave devices for several applications	
C603.4	Analyze various antenna parameters necessary for building a RF system	
C603.5	Recommend various antenna configurations according to the applications.	

Course Code : 18EC 646		Course Name : PYTHON APPLICATION PROGRAMMING
CO	Course Outcome	
C604.1	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.	
C604.2	Demonstrate proficiency in handling Strings and File Systems.	
C604.3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.	
C604.4	Interpret the concepts of Object-Oriented Programming as used in Python.	
C604.5	Implement exemplary applications related to Network Programming, Web Services and Databases in Python.	

Course Code :18CS651		Course Name :MOBILE APPLICATION DEVELOPMENT	
CO	Course Outcome		
C605.1	Create, test and debug Android application by setting up Android development environment		
C605.2	• Implement adaptive, responsive user interfaces that work across a wide range of devices.		
C605.3	• Infer long running tasks and background work in Android applications		
C605.4	• Demonstrate methods in storing, sharing and retrieving data in Android applications		
C605.5	• Analyze performance of android applications and understand the role of permissions and security		
C605.6	• Describe the steps involved in publishing Android application to share with the world		

Course Code : 18ECL66		Course Name : EMBEDDED SYSTEMS LAB	
CO	Course Outcome		
C606.1	Understand the instruction set of 32 bit microcontroller ARM Cortex M3, and the software tool required for programming in Assembly and C language.		
C606.2	Develop assembly language programs using ARM Cortex M3 for different applications.		
C606.3	Interface external devices and I/O with ARM Cortex M3.		
C606.4	Develop C language programs and library functions for embedded system applications.		

Course Code : 18ECL67		Course Name : COMMUNICATION LAB	
CO	Course Outcome		
C607.1	Determine the characteristics and response of microwave waveguide.		
C607.2	Determine the characteristics of microstrip antennas and devices and compute the parameters associated with it.		
C607.3	Design and test the digital and analog modulation circuits and display the waveforms.		
C607.4	Simulate the digital modulation systems and compare the error performance of basic digital modulation schemes.		

IV YEAR

Course Code : 18EC71		Course Name: COMPUTER NETWORKS	
CO	Course Outcome		
C701.1	Understand the concepts of networking thoroughly		
C701.2	Identify the protocols and services of different layers.		
C701.3	Distinguish the basic network configurations and standards associated with each network.		
C701.4	Analyze a simple network and measurement of its parameters.		

Course Code : 18EC72		Course Name : VLSI DESIGN	
CO	Course Outcome		
C702.1	Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and technology scaling.		
C702.2	Draw the basic gates using the stick and layout diagrams with the knowledge of physical design aspects.		
C702.3	Demonstrate ability to design Combinational, sequential and dynamic logic circuits as per the requirements		
C702.4	Interpret Memory elements along with timing considerations		
C702.5	Interpret testing and testability issues in VLSI Design		

Course Code : 18EC733 Course Name : DIGITAL IMAGEPROCESSING	
CO	Course Outcome
C703.1	Understand image formation and the role human visual system plays in perception of gray and color image data.
C703.2	Apply image processing techniques in both the spatial and frequency (Fourier) domains.
C703.3	Design and evaluate image analysis techniques
C703.4	Conduct independent study and analysis of Image Enhancement and restoration techniques.

Course Code : 18EC741 Course Name : IoT & WIRELESS SENSOR NETWORKS	
CO	Course Outcome
C704.1	Understand choice and application of IoT & M2M communication protocols.
C704.2	Describe Cloud computing and design principles of IoT.
C704.3	Awareness of MQTT clients, MQTT server and its programming.
C704.4	Develop an architecture and its communication protocols of of WSNs.

Course Code : 18EE754 Course Name : ELECTRICAL ENERGY CONSERVATION AND AUDITING	
CO	Course Outcome
C705.1	Analyze about energy scenario nationwide and worldwide , also outline Energy Conservation Act and its features.
C705.2	Discuss load management techniques and energy efficiency.
C705.3	Understand the need of energy audit and energy audit methodology.
C705.4	Understand various pillars of electricity market design. • Conduct energy audit of electrical systems and buildings.
C705.5	Show an understanding of demand side management and energy conservation.

Course Code : 18ME753 Course Name : INDUSTRIAL SAFETY	
CO	Course Outcome
C706.1	Understand the basic safety terms and international standards.
C706.2	Identify the hazards and risk analysis around the work environment and industries.
C706.3	Use the safe measures while performing work in and around the work area of the available laboratories. Able to recognize the sign boards and its application
C706.4	Recognise the types of fires extinguishers and to demonstrate the portable extinguishers used for different classes of fires.
C706.5	Report the case studies by sharing experience of the employees working in housekeeping, laboratories like workshops, electrical labs, machine shops, electronics and computer laboratories.
C706.6	Recognise the chemical and electrical hazards for its prevention and control.

Course Code : 18ECL76 Course Name : COMPUTER NETWORKS LAB	
CO	Course Outcome
C707.1	Use the network simulator for learning and practice of networking algorithms.
C707.2	Illustrate the operations of network protocols and algorithms using C programming.
C707.3	Simulate the network with different configurations to measure the performance parameters.
C707.4	Implement the data link and routing protocols using C programming.

Course Code : 18ECL77 Course Name : VLSI LAB	
CO	Course Outcome
C708.1	Design and simulate combinational and sequential digital circuits using Verilog HDL
C708.2	Understand the Synthesis process of digital circuits using EDA tool.
C708.3	Perform ASIC design flow and understand the process of synthesis, synthesis constraints and evaluating the synthesis reports to obtain optimum gate level net list
C708.4	Design and simulate basic CMOS circuits like inverter, common source amplifier and differential amplifiers.
C708.5	Perform RTL-GDSII flow and understand the stages in ASIC design.

Course Code : 18EC81 Course Name WIRELESS AND CELLULAR COMMUNICATION	
CO	Course Outcome
C801.1	Explain concepts of propagation mechanisms like Reflection, Diffraction, Scattering in wireless channels.
C801.2	Develop a scheme for idle mode, call set up, call progress handling and call tear down in a GSM cellular network.
C801.3	Develop a scheme for idle mode, call set up, call progress handling and call tear down in a CDMA cellular network.
C801.4	Understand the Basic operations of Air interface in a LTE 4G system.

Course Code : 18EC821 Course Name :Network Security	
CO	Course Outcome
C802.1	Explain network security services and mechanisms and explain security concepts
C802.2	Understand the concept of transport level security and secure socket layer
C802.3	Explain security concepts in internet protocol security.
C802.4	Explain intruders, intrusion detection and malicious software