Course Outcomes (Year 2017-18)

SEM: III **SUB: Engineering Mathematics-III** **SUB CODE: 15MAT31**

CO	After studying this course, students will be able to:
C201.1	Know the use of periodic signals and Fourier series to analyze circuits and system communications.
C201.2	Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and z-transform
C201.3	Employ appropriate numerical methods to solve algebraic and transcendental equations.
C201.4	Apply Green's Theorem, Divergence Theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems.
C201.5	Determine the extremal of functional and solve the simple problems of the calculus of variations.

SEM: III **SUB: Analog Electronic** **SUB CODE: 15EC32**

CO	After studying this course, students will be able to:
C202.1	Explain various BJT/FET parameters, configurations and equivalent circuits.
C202.2	Explain construction and characteristics of JFET and MOSFET.
C202.3	Demonstrate and construct frequency response of BJT and FET amplifiers.
C202.4	Design and apply concept of feedback and oscillator circuits using BJT/FET/Op-amp.
C202.5	Explain and analyze voltage regulator and power amplifier circuits in different modes of operation.

SEM: III **SUB: Digital Electronics** **SUB CODE: 15EC33**

CO	After studying this course, students will be able to:
C203.1	Analyze the combinational circuits, simplification of equations using Karnaugh-map and McClusky Techniques.
C203.2	Describe and design decoders, encoders, digital multiplexers, adders, subtractors, and binary comparators.
C203.3	Explain the operation of latches and flip-flops.
C203.4	Analyze and design registers and counters.
C203.5	Design and develop Mealay and Moore models for digital circuits.

SEM: III **SUB: Network Analysis** **SUB CODE: 15EC34**

CO	After studying this course, students will be able to:
C204.1	Apply knowledge for solving problems related to series, parallel combination, source transformation and shifting.
C204.2	Utilize knowledge of network theorems and electrical laws to reduce circuit complexity.
C204.3	Analyze transient basic electrical circuits and Laplace transformation for different electrical networks.
C204.4	Analyze Resonant circuits.
C204.5	Utilize knowledge for solving two port networks

SEM: III **SUB: Electronic Instrumentation** **SUB CODE: 15EC35**

CO	After studying this course, students will be able to:
C205.1	Acquire the knowledge of Accuracy and precision and explain the functioning of various types analog and digital measuring instruments.
C205.2	Utilize knowledge of quantization, resolution and sensitivity in digital instruments such as frequency meters, tachometers, pH meters and Microprocessor based instruments.
C205.3	Explain Functioning of various types of Oscilloscopes and signal generators.
C205.4	Illustrate different types of transducers in various applications.
C205.5	Model a control system in continuous and discrete time system using state variable techniques.

SEM: III **SUB: Engineering Electromagnetics** **SUB CODE: 15EC36**

CO	After studying this course, students will be able to:
C206.1	Explain basic concepts of Electric Fields and solve the problems in a given co-ordinate system.
C206.2	Illustrate and verify Gauss divergence theorem and concept of potential and current density.
C206.3	Solve the problems related to Laplace's equations and basic concepts of magnetic fields.
C206.4	Solve problems related to stokes theorem and Magnetic forces.
C206.5	Derive Maxwell's equations for varying fields and solve the wave propagation problems for free space and conductors.

SEM: III **SUB: Analog Electronics Lab** **SUB CODE: 15ECL37**

CO	After studying this course, students will be able to:
C207.1	Design and Test rectifiers, clipping circuits, clamping circuits and voltage regulators.
C207.2	Compute the parameters from the characteristics of JFET and MOSFET devices.
C207.3	Design, test and evaluate BJT amplifiers in CE configuration..
C207.4	Design and Test JFET/MOSFET amplifiers and power amplifier.
C207.5	Design and Test various types of oscillators.

SEM: III **SUB: Digital Electronics Lab** **SUB CODE: 15ECL38**

CO	After studying this course, students will be able to:
C208.1	Demonstrate the truth table of various expressions and combinational circuits using logic gates.
C208.3	Construct flip flops, counters and shift registers.
C208.4	Simulate full adder and up/down counters.
C208.5	Simulate adders and counters using IC's.

SEM: IV **SUB: Engineering Mathematics – IV** **SUB CODE: 15MAT41**

CO	After studying this course, students will be able to:
C209.1	Use appropriate single step and multi-step numerical methods to solve first and second order ordinary differential equations arising in flow data design problems.
C209.2	Explain the idea of analyticity, potential fields residues and poles of complex potentials in field theory and electromagnetic theory.
C209.3	Employ Bessel's functions and Legendre's polynomials for tackling problems arising in continuum mechanics, hydrodynamics and heat conduction.
C209.4	Describe random variables and probability distributions using rigorous statistical methods to analyze problems associated with optimization of digital circuits, information, coding theory and stability analysis of systems.
C209.5	Apply the knowledge of joint probability distributions and Markov chains in attempting engineering problems for feasible random events

SEM: IV **SUB: Microprocessor** **SUB CODE: 15EC42**

CO	At the end of the course students will be able to:
C210.1	Explain the History of evaluation of Microprocessors, Architecture of 8086, CISC & RISC, Von-Neumann & Harvard CPU architecture.
C210.2	Using 8086 instruction set., develop 8086 assembly language programs.
C210.3	Develop 8086 modular programs using interrupt concepts, procedures & macros.
C210.4	Design system using memory chips & peripheral chips for 8086 microprocessor.
C210.5	Use INT21h DOS interrupt function calls to handle key board & display.

SEM: IV **SUB: Control Systems** **SUB CODE: 15EC43**

CO	At the end of the course, the students will be able to
C211.1	Develop the mathematical model of mechanical and electrical systems .
C211.2	Understand time domain specifications for first and second order systems.
C211.3	Determine the stability of a system in the time domain using Routz Hurwitz criteria and root locus technique.
C211.4	Determine the stability of a system in the frequency domain using Nyquist and bode plots.
C211.5	Model a control system in continuous and discrete time system using state variable techniques.

SEM: IV **SUB: Signals and Systems** **SUB CODE: 15EC44**

CO	At the end of the course, students will be able to:
C212.1	Classify signals and systems .
C212.2	Determine performance of a system in time-domain.
C212.3	Determine frequency components of a given arbitrary periodic analog and discrete signal using Fourier methods.
C212.4	Determine frequency components of a given arbitrary aperiodic analog and discrete signal using Fourier methods and sampling of analog signals.
C212.5	Determine stability of a system using Z-Transforms.

SEM: IV **SUB: Principles of Communication Systems** **SUB CODE: 15EC45**

CO	At the end of the course, students will be able to:
C213.1	Determine the performance of analog modulation schemes in time and frequency domains.
C213.2	Determine the performance of systems for generation and detection of AM and FM signals.
C213.3	Characterize various types of noises and analysis of random variables and processes.
C213.4	Determine the performance of AM and FM system in the presence of noise.
C213.5	Understand the characteristics of pulse amplitude modulation, pulse position modula tion and pulse code modulation systems.

SEM: IV **SUB: Linear Integrated Circuits** **SUB CODE: 15EC46**

CO	After studying this course, students will be able to:
C214.1	Analyze and design Op-Amp circuit parameters and DC amplifiers.
C214.2	Design Op-Amp based AC Amplifiers.
C214.3	Develop circuits for Op-Amp based Voltage / Current Sources & Sinks, Current, Instrumentation and Precision Amplifiers.
C214.4	Develop circuits for Op-Amp based linear and non-linear circuits and Analyze first & Second Order active filters and Voltage Regulators.
C214.5	Outline applications of linear ICs in PLL, Timer and data converters .

SEM: IV **SUB: Microprocessor Lab** **SUB CODE: 15ESL47**

CO	After studying this course, students will be able to:
C215.1	Program a microprocessor to perform arithmetic, logical and data transfer applications.
C215.2	Understand assembler directives, DOS Interrupts, branch and loop operations.
C215.3	Interface a microprocessor to various devices for simple applications.
C215.4	Effectively utilize microprocessor peripherals.
C215.5	Utilize procedures and macros for modular programming.

SEM: IV **SUB: Linear ICs And Communication Lab** **SUB CODE: 15ECL48**

CO	After studying this course, students will be able to:
C216.1	Gain hands-on experience in building analog systems for a given specification using the basic building blocks.
C216.2	Gain hands-on experience in AM and FM techniques, frequency synthesis.
C216.3	Gain hands-on experience in pulse and flat top sampling techniques.
C216.4	Design and analyze the performance of instrumentation amplifier, LPF, HPF, DAC, Oscillators, Adders and Integrators using linear IC.
C216.5	Understand the applications of Linear IC for addition, integration and 555 timer operation to generate signals/pulses.

SEM: V **SUB: Management and Entrepreneurship Development** **SUB CODE: 15ES51**

CO	After studying this course, students will be able to:
C301.1	Explain different components of Management., importance and purpose of Planning and Decision making.
C301.2	Apply the concepts of Organization and Staffing, analyze the different techniques of Directing and Controlling.
C301.3	Apply the knowledge of Entrepreneurship to start Small Scale Industry.
C301.4	Identify the Government policies and facilities provided by supporting agencies to Small Scale Industries.
C301.5	Develop skills in project preparation and documentation.

SEM: V **SUB: Digital Signal Processing** **SUB CODE: 15EC52**

CO	After studying this course, students will be able to:
C302.1	Define DSP and compute DFT and IDFT of various signals using its properties.
C302.2	Apply the knowledge of DFT to find the computational complexity and convolution for long duration sequence.
C302.3	Apply fast and efficient algorithms for computing DFT and IDFT of a given sequence.
C302.4	Design and Analyze the structures of IIR filters.
C302.5	Design and Analyze the structures of FIR filters.

SEM: V **SUB: Verilog HDL** **SUB CODE: 15EC53**

CO	After studying this course, students will be able to:
C303.1	Write Verilog programs in gate, dataflow (RTL), behavioral and switch modeling levels of Abstraction.
C303.2	Write simple programs in VHDL in different styles.
C303.3	Design and verify the functionality of digital circuit/system using test benches.
C303.4	Identify the suitable Abstraction level for a particular digital design.
C303.5	Write the programs more effectively using Verilog tasks and directives. Perform timing and delay Simulation.

SEM: V **SUB: Information Theory and Coding** **SUB CODE: 15EC54**

CO	After studying this course, students will be able to:
C304.1	Explain measure of information for dependent, Independent sequences and model for information source using Markov method.
C304.2	Design source coding techniques for discrete & continues memory/memory less channels.
C304.3	Implement different Error Control Coding techniques.
C304.4	Implement different error detection & controlling methods.
C304.5	Design and Implement different Convolutionasl codes and their use in error contolling.

SEM: V **SUB: Operating Systems** **SUB CODE: 15EC553**

CO	After studying this course, students will be able to:
C305.1	Explain fundamental operating system abstraction and types.
C305.2	Analyze processes, threads and different scheduling schemes.
C305.3	Classify memory management techniques.
C305.4	Categorize file management systems.
C305.5	Outline the process involved in Inter-process communication.

SEM: V **SUB: OOP' using C++** **SUB CODE: 15EC56**

CO	After studying this course, students will be able to:
C306.1	Explain the fundamentals of C++.
C306.2	Explain the various data types & operation in C++.
C306.3	Construct the programs using the function in C++.
C306.4	Discuss the iostream classes and operator overloading in C++.
C306.5	Construct the programs using CLASS structure.

SEM: V **SUB: DSP Lab** **SUB CODE: 15ECL57**

CO	After studying this course, students will be able to:
C307.1	Develop the MATLAB and C programming skills.
C307.2	Program in MATLAB to perform different type of signal processing.
C307.3	Program in C using DSP hardware kit to perform different type of signal processing.
C307.4	Design and analyze the performance of IIR filters using MATLAB.
C307.5	Design and analyze the performance of FIR filters using MATLAB.

SEM: V **SUB: HDL Lab** **SUB CODE: 15ECL58**

CO	After studying this course, students will be able to:
C308.1	Develop Verilog and VHDL programming skills. - L1,L2,L3,L4
C308.2	Design and Demonstrate on FPGA/CPLD function of Combinational logic circuits programs for different modeling styles in Verilog. - L1,L2,L3,L4
C308.3	Design and Demonstrate on FPGA/CPLD function of Sequential l logic circuits programs for different modeling styles in Verilog. - L1,L2,L3,L4
C308.4	Design and Demonstrate on FPGA/CPLD function of external peripherals interface programs for different modeling styles in Verilog. - L1,L2,L3,L4

SEM: VI **SUB: Digital Communication** **SUB CODE: 15EC61**

CO	After studying this course, students will be able to:
C309.1	Explain Hilbert Transform,pre-envelopes and representation of band pass signal to equivalent low pass signal and different types of line codes with their power spectral densities.
C309.2	Ability to represent a finite set of energy signals using orthonormal basis functions through the Gram Schmidth procedure and calculate unknown phase of noise in received signal.
C309.3	Illustrate the concepts of ISI, Correlative coding, eye pattern and adaptive equalization for data transmission.
C309.4	Explain the concepts of various digital modulation techniques with their paobability error calculation.
C309.5	Explain different spread spectrum modulation techniques.

SEM: VI **SUB: ARM controllers and Embeded systems** **SUB CODE: 15EC62**

CO	After studying this course, students will be able to:
C310.1	Illustrate Microprocessor based system and 8086 CPU architectures.
C310.2	Explain the instruction set of 8086 microprocessor.
C310.3	Outline the concepts of interrupts in 8086 microprocessor.
C310.4	Explain interfacing of 8086 with display device keyboard and stepper motor.
C310.5	Illustrate 8086 based multiprocessing system with 8087 Numeric co processor.
C310.6	Classify system bus structure for 8086 microprocessor.
C310.7	Compare 80386, 80486 and Pentium Processor.

SEM: VI **SUB: VLSI Design** **SUB CODE: 15EC63**

CO	After studying this course, students will be able to:
C311.1	Explain the MOSFET characteristics and different types of design metods.
C311.2	Design and analyse various CMOS and BiCMOS circuits.
C311.3	Describe scaling,design processes of an ALU subsystem and adder enhancement techniques.
C311.4	Illustrate CMOS subsystem design processes and FPGA based systems..
C311.5	Explain system timing considerations,testing and verifications principles

SEM: VI **SUB: Computer Communicatin Networks** **SUB CODE: 15EC64**

CO	After studying this course, students will be able to:
C312.1	Explain the concept of OSI model,types of networks and Data link layer services,algorithms.
C312.2	Describe different types of media access control and wired LAN's Ethernet protocol IEEE802.
C312.3	Explain about different architectural comparision in wireless LAN and network layer services.
C312.4	Design the type of network layer protocols and write Unicast,Multicast routing algorithms.
C312.5	Explain about transport layer services and design different types of protocol algorithms.

SEM: VI **SUB: Digital Switiching Systems** **SUB CODE: 15EC65**

CO	After studying this course, students will be able to:
C313.1	Explain the development and network steucture telecommunications.
C313.2	Understand evolution of switching systemand analyse building blocks of digital switching system.
C313.3	Analyze the telecommunication trafficand switching network.
C313.4	Explian space and time switching networks and software architecture required for DSS.
C313.5	Analyse generic switch H/W and S/W architecture and maintenance of digital switching system.

SEM: VI **SUB: DSD Using Verilog** **SUB CODE: 15EC662**

CO	After studying this course, students will be able to:
C314.a.1	Design of modern digital system model for combinational and sequential circuits.
C314.a.2	Compare various memories of digital system and its functionalities.
C314.a.3	Analyze different digital system fabrication processes.
C314.a.4	Build digital systems by interfacing various I/O devices.
C314.a.5	Illustrate various design methodologies for digital systems. L1,L2

SEM: VI **SUB: Embeded Controller Lab** **SUB CODE: 15ECL67**

CO	After studying this course, students will be able to:
C315.1	Understand the instruction set of 32 bit microcontroller ARM Cortex M3, and the software tool required for programming in Assembly and C language.
C315.2	Develop assembly language programs using ARM Cortex M3 for different applications
C315.3	Interface external devices and I/O with ARM Cortex M3.
C315.4	Develop C language programs and library functions for embedded system applications

SEM: VI **SUB: Computer Networks Lab** **SUB CODE: 15ECL68**

CO	After studying this course, students will be able to:
C316.1	Choose suitable tools to model network and understand the protocols at various OSI reference lavels.
C316.2	Design a suitable network and simulate using a network simulator tool.
C316.3	Analyze the networking concepts and protocols using C/C++ Programming.
C316.4	Model the networks for different configurations and analyze the results.

SEM: VII **SUB: Computer Communication Networks** **SUB CODE: 10EC71**

CO	After studying this course, students will be able to:
C401.1	Develop the mathematical model of mechanical and electrical systems .
C401.2	Understand time domain specifications for first and second order systems.
C401.3	Determine the stability of a system in the time domain using Routz Hurwitz criteria and root locus technique.
C401.4	Determine the stability of a system in the frequency domain using Nyquist and bode plots.
C401.5	Model a control system in continuous and discrete time system using state variable techniques.

SEM: VII **SUB: Optical Fiber Communication** **SUB CODE: 10EC72**

CO	After studying this course, students will be able to:
C402.1	Explain basics of optical fiber link and understand its advantages and disadvantages.
C402.2	Discuss and analyze signal transmission characteristics in optical fiber.
C402.3	Explain and analyze the working of optical sources and detectors.
C402.4	Measure the performance of couplers, connectors and multiplexers used in fiber communication.
C402.5	Discuss the optical receivers with various noise contributors in receiver.
C402.6	Analyze and design analog and digital optical links.
C402.7	Explain the concepts of SONET and SDH optical network.
C402.8	Describe the concepts of Optical Amplifiers and WDM networks.

SEM: VII **SUB: Power Electronics** **SUB CODE: 10EC73**

CO	After studying this course, students will be able to:
C403.1	Understanding various power semiconductors devices, their control characteristics, peripheral effects.- and applications.
C403.2	Explain operation of various power transistors and turn on methods.
C403.3	Discuss operation of SCR, its characteristics & various turn on & turn off methods.
C403.4	Analyze various controlled rectifiers.
C403.5	Compare various methods of AC voltage controllers and their applications.
C403.6	Analysis of various methods of DC to DC and DC to AC converters.

SEM: VII **SUB: Embedded System Design** **SUB CODE: 10EC74**

CO	After studying this course, students will be able to:
C404.1	Explain philosophy, design and development process for Embedded system design.
C404.2	Outline the Hardware, instruction set and storage elements of microprocessor based Embedded system design.
C404.3	Explain the memories and memory sub system used for embedded systems.
C404.4	Illustrate the Embedded system design development methodology life cycles.
C404.5	Explain the concepts of Real time operating systems used for embedded system design.
C404.6	Outline the performance analysis and optimization techniques used for embedded system design.

SEM: VII **SUB:DSP Algorithms and Architecture** **SUB CODE: 10EC751**

CO	After studying this course, students will be able to:
C405.1	Explain fundamentals of DSP.
C405.2	Explain Architecture of DSP processor.
C405.3	Explain addressing modes of DSP processor.
C405.4	Construct programs to run on DSP based system.
C405.5	Demostrate Q notations.
C405.6	Design real time FIR and IIR filters.
C405.7	Design memory system .
C405.8	Explain different applications of DSP processor.

SEM: VII **SUB: Real Time Systems** **SUB CODE: 10EC762**

CO	After studying this course, students will be able to:
C406B.1	Classify between hard and soft real time systems.
C406B.2	Demonstrate the concept of computer control for real time applications.
C406B.3	Identify the hardware requirements for real time systems.
C406B.4	Outline languages for real time applications.
C406B.5	Explain basics of operating systems application for real time systems.
C406B.6	Illustrate design and development methodologies for real time systems.

SEM: VII **SUB: Image Processing** **SUB CODE: 10EC763**

CO	After studying this course, students will be able to:
C406C2.1	Explain basics of digital image processing.
C406C2.2	Compare the different types of image transformations.
C406C2.3	Analyze the image enhancement using different domains and filters.
C406C2.4	Illustrate different types of noise models.
C406C2.5	Explain different color models in image processing.

SEM: VII **SUB: VLSI Lab** **SUB CODE: 10ECL77**

CO	After studying this course, students will be able to:
C407.1	Explain VLSI design methodologies.
C407.2	Develop Verilog Codes for the basic and universal gates, combinational / sequential circuits such as Flip Flops, counters, data converter (SAR ADC) and their Test Bench for verification.
C407.3	Design the schematic and Layout, verification of the DC, Transient Analysis, DRC, ERC, LVS, RC Extraction and back annotation for the inverter, differential amplifier, common source and drain amplifiers, and data converters.

SEM: VII **SUB: Power Electronics Lab** **SUB CODE: 10ECL78**

CO	After studying this course, students will be able to:
C408.1	Test various power semiconductor devices.
C408.2	Analyze various controlled rectifier.
C408.3	Test various commutation circuits.
C408.4	Analyze series and parallel inverter.
C408.5	Examine AC voltage controllers.
C408.6	Test speed control circuit for different motors.
C408.7	Construct simulation programs using multisim.

SEM: VIII **SUB: Wireless Communication** **SUB CODE: 10EC81**

CO	After studying this course, students will be able to:
C409.1	Explain different generations of wireless cellular networks.
C409.2	Understand common cellular network components.
C409.3	Analyze wireless network architecture and operations.
C409.4	Compare GSM, TDMA and CDMA technologies.
C409.5	Compare different wireless modulation techniques.
C409.6	Distinguish different wireless LAN 802.11x technologies.

SEM: VIII **SUB: Digital Switching Systems** **SUB CODE: 10EC82**

CO	After studying this course, students will be able to:
C410.1	Explain structure of National telecommunication network.
C410.2	Define different types of digital switching systems.
C410.3	Illustrate mathematical model equations for different telecommunication systems.
C410.4	Design different stages telecommunication networks.
C410.5	Explain space and time switching networks.
C410.6	Explain different software architectures required for digital switching systems.
C410.7	Explain the concept of generic program, switching system maintenance and software quality improvement in DSS.

SEM: VIII **SUB: Network Security** **SUB CODE: 10EC832**

CO	After studying this course, students will be able to:
C411C1.1	Explain the OSI Security Architecture & Network security model.
C411C1.2	Design & Analyze the different encryption & Decryption algorithms.
C411C1.3	Explain the Digital signature mechanism & related protocols.
C411C1.4	Illustrate various web security consideration.
C411C1.5	Explain various network security mechanisms.

SEM: VIII **SUB: High Performance Computing Networks** **SUB CODE: 10EC834**

CO	After studying this course, students will be able to:
C411C2.1	Explain various communication networks.
C411C2.2	Illustrate various network services and networks architectures.
C411C2.3	Analyze Internet, TCP/IP network and circuit switching networks.
C411C2.4	Analyze ATM networks.
C411C2.5	Design and analyze various wireless networks and control of networks.
C411C2.6	Illustrate optical networks in communication systems.

SEM: VIII **SUB: Multi media Communication** **SUB CODE: 10EC841**

CO	After studying this course, students will be able to:
C412E1.1	Describe the concepts of Multimedia information representation.
C412E1.2	Explain the various multimedia information representations.
C412E1.3	Describe different multimedia data in digital formats and data compression principles.
C412E1.4	Explain LANs.Summarize LAN protocols.Describe multisite LAN interconnection technologies.
C412E1.5	Explain cell formats and switching principle of broadband ATM networks.
C412E1.6	Explain Internet networking components and protocols.
C412E1.7	Explain different transport protocols.

SEM: VIII **SUB: Real Time Operating Systems** **SUB CODE: 10EC842**

CO	After studying this course, students will be able to:
C412E2.1	Explain the development of real time and embedded system.
C412E2.2	Classify different processing and resource handling mechanism.
C412E2.3	Demonstrate the concept of I/O resources and memory management for real time systems.
C412E2.4	Illustrate the concept of multi-resource services and soft real time services.
C412E2.5	Compare software, firmware and debugging components in real time applications.
C412E2.6	Illustrate performance tuning for real time application.
C412E2.7	Summarize design for real time operating systems.