Department of Electronics & Communication Engineering
Academic Year: 2021-22

YEAR: II **SEMESTER: I** **REGULATION: R18**

Course Name: Electronic Devices and Circuits Course Code: EC301PC

CO1	**Understand** and know the characteristics of various components and their applications.
CO2	**Analyze** the Bipolar Junction Transistor characteristics and the biasing techniques
CO3	**Analyze** the Field Effect Transistor characteristics and its application
CO4	**Design** and analyze the small signal BJT Amplifiers
CO5	**Design** and analyze the small size FET Amplifiers

Course Name: Network Analysis & Transmission Lines Course Code: EC302PC

CO1	**Recall** basic electrical, magnetic circuit concept, Resonance and define various electrical parameters.
CO2	**Simplify** voltage-current relationships with locus diagrams, basic-cut set, tie-set matrices.
CO3	**Analyze** the steady state and the transient states in the electrical circuits by using time domain method.
CO4	**Determine** the various parameters such as Z, Y, ABCD & h parameters of the two port network and design different types of attenuators.
CO5	Discuss & Derive the parameters of Transmission lines.
CO6	**Design** of impedance matching of Transmission lines using different methods.

Course Name: Digital System Design Course Code: EC303PC

CO1	**Classify** different number systems and realize Boolean function using Logic gates.
CO2	**Minimize** the Boolean function using postulates of Boolean Algebra.
CO3	**Design** and Analyze Combinational circuits and verify the functionality.
CO4	**Design** and Analyze Sequential circuits and Finite State Machines.
CO5	**Construct** the logic gates using diodes and transistors.

Course Name: Signals & Systems Course Code: EC304PC

CO1	**Interpret** any signal in terms of complete sets of orthogonal functions and understands the principles of basic signals.
CO2	**Sketch** Fourier spectrum by using Fourier series and Fourier transforms.
CO3	**Describe** sampling theorem to reconstruct signal from its samples.
CO4	**Design** a distortion less LTI system and derive filter characteristics of a system.
CO5	**Test** Parsevals theorem and explain the concepts convolution, correlation in time domain and frequency domain.
CO6	**Analyze** Laplace Transforms, Fourier Transforms and Z-Transforms**.**

Course Name: Probability Theory and Stochastic Processes **Course Code: EC305ES**

CO1	**Explain** simple probabilities using an appropriate sample space
CO2	**Express** simple probabilities and expectations from probability density functions
CO3	**Determine** the temporal characteristics of random signals
CO4	**Determine** the concepts of spectral characteristics of a random process
C05	**Understand** the concepts of noise in communication systems

Course Name: Constitution of India **Course Code: MC309**

CO1	**Understand** the concept of Indian Constitution.
CO2	**Outline** the fundamental rights and Fundamental Duties
CO3	**Analyze** the Directive Principles of State Policy
CO4	**Analyze** the distribution of powers between of Union and States
CO5	**Able** to know the Emergency Provision of Indian Constitution.

Course Name: Electronic Devices & Circuits Lab **Course Code: EC306PC**

CO1	**Identify &** utilize various electronic components and devices with their specifications to implement and verify the outputs of hardware circuits.
CO2	**Construct and Analyze** the characteristics of PN junction diode, Zener diode and Silicon**.**
CO3	**Implement** the rectifier circuits with and without filter and voltage regulator.
CO4	**Analyze** the characteristics and calculate the parameters of transistors like BJT, FET and UJT.
CO5	**Design** the various Amplifiers like Common Emitter, Common Base, Common Source and Implement them using hardware and also observe their frequency response.

Course Name: Basic Simulation Lab **Course Code: EC308ES**

CO1	**Generate** and perform operations on various types of signals (impulse, step, square..etc).
CO2	**Perform** convolution and correlation between signals.
CO3	**Analyze** time and frequency response for a given LTI system.
CO4	**Verify** the sampling theorem and stability of a system.
CO5	**Analyze** signal characteristics in frequency domain by Fourier transform method.

Course Name: Digital System Design Lab **Course Code: EC307PC**

CO1	**Realize** and implementation of Boolean functions using digital logic IC's
CO2	**Implementation** of different combination logic circuits using IC's
CO3	**Realize** and implementation of Asynchronous & Synchronous counters using flip-flop IC's
CO4	**Design** a finite state machine of Sequence detector.

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YEAR: III **SEMESTER: I** **REGULATION: R18**

Course Name: Microprocessors and Microcontrollers **Course Code: EC501PC**

CO1	**Understand** the internal architecture and organization of 8086
CO2	**Develop** assembly language programming to design mp/mc controller based systems
CO3	**Convey** the knowledge of 8051 microcontroller applications and its real time control
CO4	**Understand** the interfacing of ARM and architecture and organization of ARM
CO5	**Understand** the CORTEX & advanced OAMP processor architectures and its functionalities

Course Name: Data Communications & Networks **Course Code: EC502PC**

CO1	**Discuss** the basics of Internet and compare ISO-OSI &amp: TCP/IP reference models.
CO2	**Apply** knowledge of Computer Network Concepts to solve problems in Error Control & Access control mechanism
CO3	**Analyze** different Routing Techniques.
CO4	**Explain** different UDP and TCP protocols.
CO5	**Know** the Functioning of various Application layer Protocols.

Course Name: Control Systems **Course Code: EC503PC**

CO1	**Illustrate** types, modeling and feedback characteristics of control system.
CO2	**Evaluate** the representation of control system through transfer function, block diagram and signal flow graph techniques.
CO3	**Explain** time response analysis of different ordered systems.
CO4	**Define** the concept of stability and Construct the Bode Plot, Nyquist Plot and Polar Plot for stability of the system.
CO5	**Modeling** of linear time invariant systems using state space representations

Course Name: Business Economics & Financial Analysis **Course Code: SM504MS**

CO1	**Understand** the various Forms of Business
CO2	**Learn** the concept of Economics and Understand the importance of Economics in Business.
CO3	**Understand** The Demand, Supply, Production, Cost, Market Structure, Pricing concepts.
CO4	**Understand** the process of Accounting and learn to prepare the Accounting Statements
CO5	**Analyze** the firm's financial position by comparing the Financial Statements of a Company.

Course Name: Electronic Measurement & Instrumentation Course Code: EC513PE

CO1	**Define** the fundamental concepts of measurement & principles of instrumentation.
CO2	**Analyze** the various signal generators to measure electrical parameters.
CO3	**Understand** the internal structure and operation of different types of oscilloscope.
CO4	**Analyze** the various types of transducers to measure physical parameters.
C05	**Understand** the working principle of various bridges & measuring instruments.

Course Name: Microprocessors and Microcontrollers Lab Course Code: EC505PC

CO1	**Classify** and Analyze the instruction set of 8086
CO2	**Develop** the assembly programs in 8086. It helps to design a complete microprocessor based systems
CO3	**Develop** the interfacing of microprocessor with I/O devices
CO4	**Classify** and Analyze the instruction set in 8051.
CO5	**Develop** the assembly programs in 8051, It helps to design a complete microcontroller based systems

Course Name: Data Communications & Networks Lab Course Code: EC506PC

CO1	**Understand** & Explain the concept of Data Communication & Networks, layered architecture and applications.
CO2	**Analyze and** Setup protocol designing issues for communication networks
CO3	**Evaluate** data communication link considering elementary concepts of data link layer protocols for error detection and correction
CO4	**Apply** various network layer techniques for designing subnets & super nets & analyze packet flow on basis of routing protocols
CO5	**Understand** and design application layer protocols & internet applications such as network security, email & DNS.

Course Name: Advanced Communication Skills Lab Course Code: EN508HS

CO1	**Develops** confidence to use relevant vocabulary, using apt kinesics or body language in communication.
CO2	**Infer** the meaning of the text easily through comprehension techniques like, skimming, scanning and effective reading through proper vocabulary
CO3	**Analyze** the writing skills through letters, reports and resume writing from the text and use for all professional settings.
CO4	**Gather** ideas, information and organize them relevantly in making presentations.
CO5	**Self assured** to organize and deliver discussions, presentations and strategies to face the interviews effectively.

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YEAR: IV **SEMESTER: I** **REGULATION: R18**

Course Name: Microwave and Optical Communications **Course Code: EC701PC**

CO1	**Discuss** the various microwave tubes and their performance characteristics.
CO2	**Describe** and understand the principles of solid-state devices.
CO3	**Distinguish** between the different types of waveguide and ferrite components.
CO4	**Understand** the utility of S-Parameters in microwave component design and learn the measurement procedure of various microwave parameters.
CO5	**Analyze** the mechanism of light propagation through optical fibers.

Course Name: Digital Image Processing **Course Code: EC713PE**

CO1	**Understand** the working of various medical instruments and critical care equipment
CO2	**Know** the imaging techniques including CT,PET, SPECT and MRI used in diagnosis of various medical
CO3	**Understand** the working of various medical instruments and critical care equipment
CO4	**Know** the imaging techniques including CT,PET, SPECT and MRI used in diagnosis of various medical
CO5	**Understand** the working of various medical instruments and critical care equipment

Course Name: Biomedical Instrumentation **Course Code: EC721PE**

CO1	**Understand** bio systems and medical systems from an engineering perspective
CO2	**Identify** the techniques to acquire record and primarily understand physiological activity of the human body through cell potential, ECG, EEG, BP and blood flow measurement and EMG
CO3	**Understand** the working of various medical instruments and critical care equipment
CO4	**Know** the imaging techniques including CT,PET, SPECT and MRI used in diagnosis of various medical conditions.
CO5	**Understand** bio systems and medical systems from an engineering perspective

Course Name: Python Program **Course Code: CS702OE**

CO1	**Learn** Syntax and Semantics and create Functions in Python.
CO2	**Handle** Strings and Files in Python.
CO3	**Understand** Lists, Dictionaries and Regular expressions in Python.
CO4	**Implement** Object Oriented Programming concepts in Python.
CO5	**Build** Web Services and introduction to Network and Database Programming in Python.

Course Name: Professional Practice, Law & Ethics **Course Code: SM702MS**

CO1	**Understanding** basic purpose of profession, professional ethics and various moral and social issues.
CO2	**Awareness** of professional rights and responsibilities of a Engineer, safety and risk benefit analysis of a Engineer
CO3	**Acquiring** knowledge of various roles of Engineer In applying ethical principles at various professional levels
CO4	**Professional** Ethical values and contemporary issues
CO5	**Excelling** in competitive and challenging environment to contribute to industrial growth.

Course Name: Microwave and Optical Communications Lab **Course Code: EC703PC**

CO1	**Discuss** the various microwave generators and their performance characteristics.
CO2	**Measure** scattering parameters of various microwave components using microwave bench.
CO3	**Determine** electrical parameters of various microwave components using microwave bench.
CO4	**Demonstrate** the different types of optical light sources.
CO5	**Analyze** the various losses of optical fibers.

Course Name: Industrial Oriented Mini Project/ Summer Internship Course Code: EC704PC

CO1	**Design** identifies basic requirements for an application and proposes a effective solution
CO2	**Build** knowledge through practical assignments and learn the various design methods for solving problem
CO3	**Develop** skill to build design techniques for various problem analysis
CO4	**Summarize** the fundamental concepts and techniques used in mini project
CO5	**Make** up project enables the students to understand the business process

Course Name: Seminar **Course Code: EC705PC**

CO1	**Spell** for basic concepts of science and technology
CO2	**Contrast** the understanding perspective of techniques applicable to their domain
CO3	**Construct** the solutions upon their own knowledge
CO4	**Improve** their presentation and communication skills
CO5	**Make** up them to pursue their placements and higher studies

Course Name: Project Stage - I **Course Code: EC706PC**

CO1	**Analyze** new problems, identify and define the appropriate requirements for its solutions.
CO2	**Understand** the impact of engineering students.
CO3	**Understand** team work to complete a common goal.

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YEAR: II **SEMESTER: II** **REGULATION:R18**

Course Name: Laplace Transforms, Numerical Methods & Complex Variables Course Code: MA401BS

CO1	**Apply** the Laplace transforms techniques for solving ODE's
CO2	**Evaluate** the real roots of algebraic and transcendental equations by different numerical methods and Estimate the value for the given data using interpolation methods
CO3	**Find** the numerical solutions for a given ODE's and use suitable method to find the numerical integration
CO4	**Analyze** complex functions with reference to their analyticity using Cauchy's Riemann equations
CO5	**Find** the Taylor's and Laurent's series expansion of complex functions and integrating using Cauchy's integral and residue theorems

Course Name: Electromagnetic Fields and Waves Course Code: EC402PC

CO1	**Discuss** the generation of electric and magnetic fields.
CO2	**Distinguish** between static and time-varying fields, establish the corresponding sets of Maxwell's Equations and Boundary Conditions.
CO3	**Analyze** the Wave Equations for good conductors, good dielectrics and evaluate the Uniform Plane Wave Characteristics for several practical media of interest.
CO4	**Describe** the mode characteristics of rectangular waveguides.

Course Name: Analog and Digital Communications Course Code: EC403PC

CO1	**Analyze** system requirements of analog and digital communication systems.
CO2	**Understand** the generation, detection of various analog and digital modulation techniques.
CO3	**Acquire** knowledge of each block in AM, FM transmitters and receivers.
CO4	**Understand** the concepts of Pulse Code modulation techniques.
CO5	**Understand** the concepts of digital modulation techniques and baseband transmission.

Course Name: Linear IC Applications Course Code: EC404PC

CO1	**Understand** the basic Concepts of Integrated Circuits and Operational Amplifier.
CO2	**Design** OP-AMP Circuits for different Applications.
CO3	**Design** and analyze the filters and oscillators using OP-AMP.
CO4	**Discuss** Various Applications of Special Functions of IC's such as 555, Voltage Regulator and PLL Operations
CO5	**Analyze** Various types of ADC and DCA.

Course Name: Electronic Circuit Analysis **Course Code: EC405PC**

CO1	**Extract** the equivalent models for BJT & JFET at low & high frequencies so as to analyze any electronic circuit
CO2	**Differentiate** between the positive & negative feedback concepts as applied to various electronic circuits.
CO3	**Design**, construct & amp; analyze oscillator circuits to generate audio & radio frequency sinusoidal signals.
CO4	**Realize** different types of power amplifiers for practical applications as per the specifications.
C05	**Analyze** various non-sinusoidal signals using different multivibrators for various electronic applications . Apply time base generator circuits which is used in applications like CRO & TV

Course Name: Analog and Digital Communications Lab **Course Code: EC406PC**

CO1	**Analyze** the different types of continuous modulation and demodulation techniques (Amplitude, DSB, SSB and Frequency)..
CO2	**Verify** Frequency Division Multiplexing with De-multiplexing Technique.
CO3	**Evaluate** the characteristics of PAM, PWM and PPM.
CO4	**Analyze** how a continuous signal is converted to digital signal.
CO5	**Demonstrate** various digital modulation schemes (FSK, BPSK, DPSK and QPSK).

Course Name: IC Applications Lab **Course Code: EC407PC**

CO1	**Design** different applications using IC741.
CO2	**Analyze** different three terminal voltage Regulators and Design voltage regulator using IC 723.
CO3	**Design** Multi-vibrators using IC 555.
CO4	**Design** PLL circuits using IC565.
C05	**Design** different applications using IC741.

Course Name: Electronic Circuit Analysis Lab **Course Code: EC408PC**

CO1	**Comprehend** the fundamentals of multistage amplifiers, feedback amplifiers and oscillatory circuits
CO2	**Analyze** the circuit design process and simulate the common emitter amplifier, common collector amplifier and common source amplifier
CO3	**Discriminate** the design and simulate various oscillator circuits
CO4	**Create** the design and simulate the cascade, class A power amplifier circuits and single tuned voltage amplifiers
CO5	**To know** the working of transistorized multivibrator circuits.

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YEAR: III **SEMESTER: II** **REGULATION: R18**

Course Name: Antennas and Propagation Course Code: EC601PC

CO1	**To recall** different parameters of an antenna.
CO2	**To explain** the broadside and end fire antenna arrays.
CO3	**To illustrate** the design considerations of UHF,VHF and Microwave Antenna
CO4	**To compare** characteristics of radio wave propagation.

Course Name: Digital Signal Processing Course Code: EC602PC

CO1	**Distinguish** between Continuous and Discrete time signals and systems
CO2	**Evaluate** the Z-Transforms for discrete time signals and system functions
CO3	**Apply** mathematical tool such as DTFT, DFT, FFT algorithms in processing of digital signals
CO4	**Design** and **Construct** IIR,FIR filters to meet specific magnitude and phase requirements
CO5	**Compare** the tradeoffs between normal and multi rate DSP techniques and can explore the finite length word effects.

Course Name: VLSI Design Course Code: EC603PC

CO1	**Acquire** qualitative knowledge about the fabrication steps involved in the design of integrated circuits with different fabrication approaches.
CO2	**Draw** the transistor layout of any logic circuits which helps to understand and estimate parasitic of logic circuits.
CO3	**Design** the sub-system blocks required to build the complex data-path systems and also analyze the approaches for design of various PLDs.
CO4	**Understand** concept of fault models and testing to improve the testability of system.

Course Name: Object Oriented Programming through Java Course Code: EC611PE

CO1	**Understand** the concept of OOP as well as the purpose and usage principles ofinheritance, polymorphism, encapsulation and method overloading.
CO2	**Identify** classes, objects, members of a class and the relationships among themneeded for a specific problem.
CO3	**Create** Java application programs using sound OOP practices and proper program structuring.
CO4	**Develop** programs using the Java Collection API as well as the Java standardclass library.
CO5	**Develop** the skills to apply java programming in problem solving

Course Name: Environmental Science **Course Code: MC609**

CO1	**Importance** of ecological balance for sustainable development.
CO2	**Impacts** of developmental activities and mitigation measures
CO3	**Understanding** the environmental policies and regulations
CO4	**Develop** technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

Course Name: Digital Signal Processing Lab **Course Code: EC604PC**

CO1	**Use** simulation tool for signal processing applications
CO2	**Design** IIR filters on signals
CO3	**Apply** DTFT/ DFT/ FFT on signals
CO4	**Design** FIR filters on signals

Course Name: e – CAD Lab **Course Code: EC605P**

CO1	**Understand** the concepts of Verilog HDL for the realization of logic gates.
CO2	**Design** of various combinational and sequential logic circuits using Verilog HDL.
CO3	**Draw** the layout, physical verification of digital logic circuits.
CO4	**Understand** and estimate the timing, parasitic of logic circuits.

Course Name: Scripting Languages Lab **Course Code: EC606PC**

CO1	**Understand** the application of Ruby scripting language.
CO2	**Choose** the scripting language to develop files & list concept.
CO3	**Use** Ruby &amp: TCI scripting languages to develop simple Programs
CO4	**Apply** the concept of arrays and strings while developing the programs.
CO5	**Make** use of Perl language to implement simple programs, manipulating functions &

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YEAR: IV **SEMESTER: II** **REGULATION: R18**

Course Name: Wireless & Sensor Networks **Course Code: EC813PE**

CO1	**Analyze** various architectures of wireless sensor networks
CO2	**Understand** design issues and challenges in wireless sensor networks
CO3	**Compare** the performance of various routing and MAC protocols
CO4	**Classify** various data gathering and data dissemination methods
CO5	**Explain** gateway concepts and communication between wireless sensor networks and internet

Course Name: Low Power VLSI Design **Course Code: EC823PE**

CO1	**Understand** the knowledge about the need of low power circuit design methods.
CO2	**Acquire** the knowledge of different architectural approaches to achieve low power designs.
CO3	**Analyze** and design the low voltage low power sub-system blocks required to build the data-path systems.
CO4	**Understand** the methods for the design of low voltage low power memories.

Course Name: Database Management Systems **Course Code: EC722PE**

CO1	**Understand** the basic fundamentals of DBMS, database designs & normal forms.
CO2	**Apply** the basics of Structured Query Language (SQL) for constructing queries.
CO3	**Discuss** the different database designs and relational models for processing.
CO4	**Acquire** knowledge on database storage structures and database access techniques.

Course Name: Project Stage-II **Course Code: EC801PC**

CO1	**Analyze** new problems, identify and define the appropriate requirements for its solutions.
CO2	**Understand** the impact of engineering students.
CO3	**Understand** team work to complete a common goal.