

Semester-III

2EC301

Electronics Devices & Circuits

[3 0 2 4]

Course Outcome:

After successful completion of the course, student will be able to

1. Apply the concept of semiconductor physics and basic electronic devices to design various circuits
2. Analyze and design electronic circuits using BJT
3. Comprehend the operation of MOSFET
4. Design, implement and test basic electronic circuits

2EC302

Signals and Systems

[3 0 0 3]

Course Outcome:

After successful completion of the course, a student will be able to –

1. Classify the signals and evaluate properties of LTI systems
2. Analyze LTI systems in time domain and frequency domain
3. Demonstrate the use of state space model and its realization for LTI continuous and discrete time systems

2EC303

Digital Logic Design

[4 0 0 4]

Course Outcome:

At the end of the course, students will be able to -

- 1.Design and optimize combinational and sequential circuits
- 2.Apply the concept of finite state machines for digital system design
- 3.Design digital systems using Hardware Description Language on reconfigurable devices

2EC304

Network Theory

[3 0 0 3]

Course Outcome:

At the end of the course, students will be able to -

1. Analyze the steady state and transient behaviour of components
2. Apply basic laws to analyze various circuits in time domain as well as frequency domain
3. Synthesize an electrical network from given impedance/admittance function

2EC305

Digital Design Laboratory

[0 0 2 1]

Course Outcome:

At the end of the course, students will be able to -

- 1.Design digital circuits using MSI/LSI logic components
- 2.Implement digital circuits on reconfigurable hardware using HDL

2MA304

Vector Calculus, Complex Variables and Distribution Probability

[3 1 0 4]

Course Outcome:

At the end of the course, students will be able to-

1. comprehend and apply probability distribution and random process in engineering problems
2. apply function of complex variables in engineering field
3. use vector calculus in engineering field

2HS342

Principles of Economics

[2 0 0 2]

Course Outcome:

At the end of the course, students will be able to-

1. interpret the various basic economic principles
2. relate the economic fundamentals with engineering practices
3. infer the macro-economic aspects of engineering projects

Semester-IV

2EC401

Electromagnetics and Wave Propagation

[3 0 0 3]

Course Outcome:

At the end of the course, students will be able to –

1. Apply vector calculus to understand the behavior of static electric, magnetic and electromagnetic fields in standard configurations
2. Develop the electronic systems using fundamental principles and laws of electromagnetism
3. Comprehend the four basic Maxwell's equations for wave propagation and apply them to different EM problems

2EC402

Analog Circuits

[3 0 2 4]

Course Outcome:

At the end of the course, students will be able to

1. Comprehend the fundamentals of op-amp and its basic amplifier configurations
2. Analyse the linear and non-linear applications of operational amplifier
3. Design and Construct various circuits using operational amplifier based ICs

2EC403

Communication Systems

[3 0 2 4]

Course Outcome:

At the end of the course, students will be able to -

1. Comprehend probability & stochastic theories as applied to signals and noise
2. Analyze analog modulation techniques and receiver fundamentals used in analog communication
3. Apply baseband digital encoding & decoding techniques in the storage / transmission of digital signal through wired channel
4. Apply techniques like matched filter, pulse shaping, line encoding and equalizer to mitigate the adverse effects of noise and dispersion

2EC404

Microprocessors and Microcontrollers

[3 0 2 4]

Course Outcome:

At the end of the course, students will be able to –

1. Comprehend the architecture and instruction set of 8086 microprocessor and 8051 microcontroller
2. Demonstrate assembly language programming proficiency
3. Develop interface logic for interconnection of peripheral devices with microprocessor and microcontroller

Course Outcome:

After successful completion of the course, student will be able to

1. interpret and analyze stability and feedback characteristics of linear control system
2. develop an ability to analyze time response of control system
3. infer and simulate frequency response of control system
4. illustrate basics of state space for linear time-invariant control system

Course Outcome:

At the end of the course, students will be able to-

1. interpret the various theories and processes of management
2. relate with different functional areas of management
3. appreciate the role and need of managers in different organisations

SEMESTER V

EC501

Electromagnetics Engineering

[3 0 0 3]

Course Outcome:

After successful completion of the course, the students will be able to

1. apply vector calculus to understand the behavior of static electric, magnetic and electromagnetic fields in standard configurations
2. understand the fundamental principles and laws of electromagnetism to develop and implement better analog and digital electronic system that take into account electromagnetic propagation and radiation effects
3. understand the four basic Maxwell's equations and be able to apply them to different EM problems
4. describe and analyze electromagnetic wave propagation in different mediums including free-space
5. apply the basic knowledge of electricity and magnetism in various courses of higher semester, e. g. Antenna Theory, Microwave Engineering, Fiber Optic Communication, etc

EC502

Integrated Circuits and Applications

[3 0 2 4]

Course Outcomes:

After successful completion of the course, the students will be able to

1. learn the fundamentals of op-amp and its basic amplifier configurations
2. learn the practical op-amp parameters and later to use those to modify practical op-amp amplifier configurations
3. analyze and design the op-amp for linear and non-linear application

4. analyze and design the op-amp for filter application
5. learn and analyze op-amp based ICs and its applications to construct the basic blocks of Analog signal processing

EC503

Microprocessor and Computer Architecture

[3 0 0 3]

Course Outcomes:

After successful completion of the course, the students will be able to

1. understand the basic architecture and operation of 8086 Microprocessor
2. apply the basic knowledge of processor and memory to evaluate overall performance of computer
3. analyze the architectural and operational behaviour of hypothetical reduced instruction set Computing (RISC) processor
4. apply the concept of cache memory, virtual memory and address translation between different memories to understand the hierarchical memory organization and peripheral interfacing

EC504

Modern Measurement and Instrumentation

[2 0 0 2]

Course Outcomes:

After successful completion of the course, the students will be able to

1. understand the measurement errors in instruments
2. analyze various ac and dc bridges and study their applications
3. understand the fundamental operation of various measuring instruments
4. understand the construction and principle operation of various transducers and sensors
5. learn the recent developments in measurement

EC505

Digital Communication

[3 0 2 4]

Course Outcome:

After successful completion of the course, the students will be able to

1. understand the process of converting the baseband signal into a passband signal using digital modulation techniques
2. understand the spread spectrum modulation principles
3. understand various performance parameters of practical communication systems like satellite and mobile communication
4. understand the principles of information theory and error control coding
5. analyze and evaluate the actual digital communication system

EC506

Digital Signal Processing

[3 0 2 4]

Course Outcome:

After successful completion of the course, the students will be able to

1. understand the process of converting the continuous-time signal into digital signal, process it and convert back to continuous-time signal
2. apply the tools like DFT and z-transform to analyze and design the digital LTI systems
3. apply the digital filter structures and DSP processor knowledge to implement the actual digital LTI systems and evaluate the effect of finite word-length effects
4. understand the multirate DSP fundamentals
5. evaluate various applications of DSP techniques in the fields of signal processing and communications

Course Outcome:

After successful completion of the course, the students will be able to

1. understand basic architecture of Microprocessor and Microcontroller
2. write programs and interface different peripherals
3. develop hardware module for specific application

Course Outcome:

After successful completion of the course, students will be able to

1. practice acquired knowledge within the chosen area of technology for project development
2. identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach
3. reproduce, improve and refine technical aspects for engineering projects
4. work as an individual or in a team in development of technical projects
5. communicate and report effectively project related activities and findings

Course Outcome:

After successful completion of the course, the students will be able to

1. know the recent technological developments in industries/R & D organizations
2. understand advanced topic related to concerned engineering discipline
3. correlate the fundamentals with the contemporary application areas

SEMESTER VI

EC601

Digital System Design

[3 0 2 4]

Course Outcomes:

After successful completion of the course, the students will be able to

1. learn the fundamentals of digital system design using the concept of digital circuit along with various system problems that arise in digital system design
2. design the finite state machines to control complex systems, along with the design concept of data path and control path design
3. design Asynchronous Systems; to solve races and essential hazards in the asynchronous system
4. learn architecture of various reconfigurable devices
5. implement digital system using Hardware Description Language and the synthesis tool

EC602

Antenna and Wave Propagation

[3 0 2 4]

Course Outcome:

After successful completion of the course, the students will be able to

1. to understand and apply the basic concepts of antennas like gain, beamwidth, directivity, radiation pattern, etc
2. to understand the principle of operation of various antennas and their design
3. design antennas for various practical applications to meet given specifications

Course Outcome:

After successful completion of the course, the students will be able to

1. understand the propagation of light signal through optical fibres and analyse performance degradation due to signal distortion
2. investigate performance of different types of light sources and detectors, transmitters and receivers
3. estimate coupling of power to optical fibers from different sources and losses due to connectorization, splicing and misalignments
4. design a point-to-point fiber optic link
5. apply measurement techniques for measurement of various optical parameters

EC6E1 Department Elective – I**Course Outcome :**

Upon completion of this course, students will be able to:

1. understand the basics of VLSI design and IC fabrication
2. analyze the VLSI circuits working under different load and bias conditions
3. evaluate the performance parameters of digital VLSI circuits
4. design various combinational, sequential and dynamic logic circuits using CMOS
5. simulate and optimize various VLSI circuits and layouts of the same

Course Outcome:

After successful completion of the course, the students will be able to

1. understand background of the traditional software engineering approach for Embedded Systems
2. apply modular-based software design
3. apply Model-driven Architecture (MDA) approach to software development
4. understand and apply different languages for modeling and performing transformations from an abstract model
5. design real-life applications of model-driven engineering in different areas of Embedded Systems

Course Outcome:

1. After successful completion of the course, the students will be able to
2. understand and characterize random processes
3. apply statistics of random variables and random processes in detection and estimation of random signals
4. analyze performance of communication systems using various detection/estimation schemes

EC641

Telecom Networks

[3 0 0 3]

Course Outcome:

After successful completion of the course, the students will be able to

1. learn basic concepts of telecom network and tele-traffic theory
2. understand transmission aspects of digital signal over telecom network, problems and solutions
3. design and analyze signaling and switching techniques
4. interpret various telecom standards

EC6E2 Department Elective – II

EC612

Analog Integrated Circuit Design

[3 0 0 3]

Course Outcome:

Upon completion of this course, students will be able to

1. understand different design parameters for Analog CMOS Design
2. design of Operational amplifier for various applications as per the user specifications
3. apply different Design steps for Analog IC Circuits
4. analyze modeling of CMOS Device

EC622

Modern Processor Architecture

[3 0 0 3]

Course Outcome:

After successful completion of the course, the students will be able to

1. understand the pipelined and Superscalar architecture
2. apply the basic knowledge and calculate the overall performance
3. understand Advanced register and instruction data flow techniques and execution of multiple threads
4. analyze micro and multicore architecture

EC632

Error Control Coding

[3 0 0 3]

Course Outcome:

Upon completion of this course, students will be able to

1. apply information theory and linear algebra in error control coding
2. understand various error control encoding and decoding techniques
3. analyze the performance of error control codes

EC733

Wireless Communications

[3 0 0 3]

Course Outcome:

After successful completion of the course, student will be able to

1. understand wireless channels and identify suitable statistical models for fading channels
2. understand cellular network design concepts and apply them in designing of cellular network

3. analyze modulation techniques for wireless communication
4. learn concepts of equalization, diversity combining and apply them in wireless network
5. understand 2G and 3G cellular communication standards

EC605

Mini Project-II

[0 0 2 1]

Course Outcome:

After successful completion of the course, students will be able to

1. practice acquired knowledge within the chosen area of technology for project development
2. identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach
3. reproduce, improve and refine technical aspects for engineering projects
4. work as an individual or in a team in development of technical projects
5. communicate and report effectively project related activities and findings

Institute Elective

EC001

Satellite Communication

[3 0 0 3]

Course Outcome:

After successful completion of the course, the students will be able to

1. understand principle, operation and working of various sub systems of satellite
2. apply communication techniques for satellite applications
3. learn about various earth stations
4. understand role of satellite in various applications

EC002

Embedded Systems

[3 0 0 3]

Course Outcomes:

After successful completion of the course, the students will be able to

1. understand the structure of an embedded systems, their characteristics, design requirements and applications
2. ability to identify the tools and techniques for embedded system hardware design
3. ability to identify tools and techniques for software of embedded system
4. understand operation of Real Time Operating System
5. understand Device Drivers and their role in Embedded System design

EC003

Wireless Sensor Network

[3 0 0 3]

Course Outcomes:

After successful completion of the course, the students will be able to

1. understand Wireless Sensor Networks concepts, principles and applications
2. understand communication protocols and standards utilized in Wireless Sensor Networks
3. analyze protocols used in various types of Wireless Sensor Networks
4. identify appropriate techniques, standards and tools for Wireless Sensor Network hardware design
5. identify appropriate techniques, standards and tools for Wireless Sensor Network software design

Course Outcome:

After successful completion of the course, the students will be able to

1. understand the propagation of light signal through optical fibres and analyse performance degradation due to signal distortion
2. learn to estimate effect of signal distortion
3. understand the working principles, structures and characteristics/performance of LED, laser diode and optical detector/receiver
4. design a point-to-point fiber optic link and estimate power budget

Course Outcome:

After successful completion of the course, the students will be able to

1. demonstrate integrated knowledge and growth in the major areas of the program
2. bring together major aspects of the academic disciplines related to the said major program

SEMESTER - VII

EC701

Data Communication and Networking

[3 0 2 4]

Course Outcome:

After successful completion of the course, the students will be able to

1. understand the concept of communication protocols and standards
2. acquire the knowledge of Networking of computers
3. understand different layers of OSI model and learn the importance of each layer
4. learn different wired and wireless networks and their applications

EC702

Embedded Systems

[3 0 2 4]

Course Outcome:

After successful completion of the course, the students will be able to:

1. understand the general structure of an embedded systems, their design requirements and applications
2. design embedded system hardware and software programs to control embedded system
3. test hardware and software of embedded system
4. Learn Real Time Operating System and write Device Drivers
5. Understand and apply bus protocols for design of embedded system

Course outcome:

After successful completion of the course, the students will be able to

1. understand the important and unique engineering issues, design challenges, etc. at RF and microwave frequencies
2. apply the knowledge of electromagnetic theory to understand the wave propagation in transmission lines and waveguides
3. use Smith charts to solve various microwave related problems
4. learn microwave network theory and the use of scattering matrix
5. describe and analyze the microwave components, such as waveguide Tees, couplers, isolator, circulator, matching devices, etc.
6. understand the structure, working principle and applications of solid state microwave active devices, microwave sources, etc.
7. handle microwave equipment and make measurements

Course Outcome:

After successful completion of the course, the students will be able to

1. understand the need of testing also able to identify the different characteristics of verification, validation, testing and diagnosis in context of electronic circuits
2. effectively use the different verification tools and methods
3. analyse the various fault models
4. effectively use the automatic test equipment and automatic test pattern generator.
5. add DFT and BIST techniques in given electronic design

EC723

Multimedia Systems

[3 0 0 3]

Course Outcome:

After successful completion of the course, the students will be able to:

1. learn the fundamental of Multimedia systems and types of media systems
2. learn and analyse compression techniques, transform for compression and analyse various compression standard for Text, Image and Video
3. analyse various hardware, software and buses used in multimedia systems
4. understand and evaluate different protocols of multimedia communication networking and their applications
5. investigate Multimedia Content Management and Retrieval techniques

EC642

Satellite Communication

[3 0 0 3]

Course Outcome:

After successful completion of the course, the students will be able to

1. understand principle, operation and working of various sub systems of satellite as well as the earth station
2. analyze and design satellite link
3. apply communication techniques for satellite applications
4. learn advanced techniques and regulatory aspects of satellite communication
5. understand role of satellite in various applications

Course Outcome:

After successful completion of the course, the students will be able to

1. understand the concepts of Wireless Sensor Networks
2. understand and analyze the various wireless standards and protocols
3. understand and apply the various MAC, Routing, Transport Layer protocols
4. understand and evaluate the need of operating system in WSN

Course Outcome:

After successful completion of the course, the students will be able to

1. understand the various components of IC Design Objectives
2. analyze effect of Technology Scaling and Interconnect network.
3. design power generators and power distribution network for IC
4. analyze / Evaluate Noise analysis for IC
5. describe and use techniques for High Speed and Low Power Design

Course Outcomes:

After successful completion of the course, the students will be able to

1. understand the fundamentals of HVS, image formation process and color image processing
2. analyze and evaluate various spatial domain and frequency domain methods for image enhancement, filtering and mathematical operations
3. evaluate various denoising, restoration and morphological algorithms
4. apply and analyze various segmentation algorithms and object recognition algorithm for different of applications

EC734

RF Communication Circuits

[3 0 0 3]

Course Outcome:

After successful completion of the course, the students will be able to

1. understand the behavior of active and passive components at RF frequencies
2. apply the theory of electromagnetic to understand the concept of impedance matching
3. analyze microwave circuits and devices using scattering parameters
4. design basic RF circuits and evaluate RF transceiver architectures

EC744

Broadband Network

[3 0 0 3]

Course Outcome:

After successful completion of the course, the students will be able to

1. understand the importance of broadband networking services and technologies
2. describe and compare the different broadband network access techniques
3. apply concepts of OFDM, MIMO to wireless network
4. understand convergence of wireless networks

Course Outcome:

After successful completion of the course, student will be able to

1. practice acquired knowledge within the chosen area of technology for project development
2. identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach
3. reproduce, improve and refine technical aspects for engineering projects
4. work as an individual or in a team in development of technical projects
5. report project related activities effectively to peers and mentors

Course Outcome:

After successful completion of the course, the students will be able to

1. explore the preferred field of specialization and develop analytical / hardware / software / experimental / observation skills
2. manage the technical content and work
3. prepare and present technical report

SEMESTER – VIII

EC801

Major Project

[0 0 30 24]

Course Outcome:

After successful completion of the course, student will be able to

1. use various tools and techniques to study existing systems
2. critically analyse existing systems, thereby select and justify parameters to be improved
3. start and manipulate proposed engineering solution as per industry / research / societal need
4. achieve precision in uses of the tools related to their experiments/fabrication
5. reorganize and refine various components of technology to optimize the resources at large
6. appraise the potential of technology for scalability and wide spectrum of applications
7. report project related activities effectively to peers, mentors and society
8. follow and value health, safety and ethical practices during project