**Tab 1**

**Department of Electronics and Communications Engineering**

**BACHELOR OF TECHNOLOGY (B.Tech.)**

**(4 Year Undergraduate Degree Program)**

**IN**

**ELECTRONICS AND COMMUNICATION ENGINEERING**

**[w. e. f. 2023-2024]**

**Program Learning Outcomes (PLOs)**

PLO1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, Science, and mathematics

PLO2: an ability to acquire and apply new knowledge as needed, Using appropriate learning strategies

PLO3: An ability to acquire leadership qualities and learn the Art of working together as a team by the various activities.

PLO4: An ability to get motivated by involving themselves in Research and development activities in the various labs such as Device modeling , embedded systems and sensor networks

PLO5:An ability to be ready with industry standard by exposing Them to the latest technologies such as microelectronics, Embedded systems and sensor networks

PLO6: An ability to get involved in community based and inter professional projects which induce them to serve the society.

| **ELECTROMAGNETIC FIELD THEORY** | |
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| **Course Code: 20EC0201** |  |
| **Credits:3** |  |
| **L T P : 3 1 0** | Course Category: Core |
| **Prerequisite: NIL** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Relate the fundamentals of vector, coordinate system to electromagnetic concepts CLO2: Analyze the characteristics of Electrostatic field

CLO3: Interpret the concepts of Electric field in material space and solve the boundary conditions CLO4: Explain the concepts and characteristics of Magneto Static field in material space and solve boundary conditions.

CLO5: Determine the significance of time varying fields

| **FUNDAMENTALS OF ELECTRONICS DEVICES** | |
| --- | --- |
| **Course Code: 20EC0203** |  |
| **Credits:3** |  |
| **L T P : 3 0 0** | Course Category: Core |
| **Prerequisite: NIL** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Explain the structure and working operation of basic electronic devices. CLO2: Design and analyze amplifiers.

CLO3: Analyze frequency response of BJT and MOSFET amplifiers

CLO4: Design and analyze feedback amplifiers and oscillator principles.

CLO5: Design and analyze power amplifiers and supply circuits

| **DIGITAL SYSTEMS** | |
| --- | --- |
| **Course Code: 20EC0205** |  |
| **Credits:3** |  |
| **L T P : 3 0 0** | Course Category: Core |
| **Prerequisite: NIL** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Use Boolean algebra and simplification procedures relevant to digital logic. CLO2: Design various combinational digital circuits using logic gates. CLO3:Analyse and design synchronous sequential circuits.

CLO4: Analyse and design asynchronous sequential circuits. .

CLO5: Build logic gates and use programmable devices

| **SIGNALS AND SYSTEMS** | |
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| **Course Code: 19EC0207** |  |
| **Credits:3** |  |
| **L T P : 3 0 0** | Course Category: Core |
| **Prerequisite: 19MA0102** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Determine if a given system is linear/causal/stable

CLO2: Determine the frequency components present in a deterministic signal CLO3: Characterize continuous LTI systems in the time domain and frequency domain CLO4: Characterize continuous LTI systems in the time domain and frequency domain CLO5: Compute the output of an LTI system in the time and frequency domains

| **ELECTRONICS DEVICES LAB** | |
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| **Course Code: 19EC0221** |  |
| **Credits:2** |  |
| **L T P : 0 0 2** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Characteristics of PN Junction Diode and Zener diode.

CLO2: Design and Testing of BJT and MOSFET amplifiers.

| **DIGITAL SYSTEM LAB** | |
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| **Course Code: 19EC 0223** |  |
| **Credits:2** |  |
| **L T P : 0 0 2** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Implement simplified combinational circuits using basic logic gates CLO2: Implement combinational circuits using MSI devices

CLO3: Implement sequential circuits like registers and counters

| **ELECTRONIC CIRCUITS** | |
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| **Course Code: 20EC0204** |  |
| **Credits:3** |  |
| **L T P : 3 1 0** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Acquire knowledge of Working principles, characteristics and applications of BJT and FET.

CLO2: Acquire knowledge of Frequency response characteristics of BJT and FET amplifiers CLO3: Analyze the performance of small signal BJT and FET amplifiers - single stage and multi stage amplifiers

CLO4: Apply the knowledge gained in the design of Electronic circuits

| **ANALOG INTEGRATED CIRCUITS** | |
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| **Course Code: 20EC0206** |  |
| **Credits:3** |  |
| **L T P : 3 1 0** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1 : Design linear and nonlinear applications of OP – AMPS

CLO2 : Design applications using analog multiplier and PLL

CLO3 : Design ADC and DAC using OP – AMPS

CLO4 : Generate waveforms using OP – AMP Circuits

CLO5 : Analyze special function ICs

| **TRANSMISSION LINES AND WAVEGUIDES** | |
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| **Course Code: 19EC0208** |  |
| **Credits:3** |  |
| **L T P : 3 1 0** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Analyze the various types of transmission lines and to discuss the losses associated. CLO2: Understand impedance transformation and matching.

CLO3: Use smith chart in problem solving

CLO4: Apply knowledge on filter theories and waveguide theories are imparted.

| **COMMUNICATION THEORY** | |
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| **Course Code: 19EC0210** |  |
| **Credits:3** |  |
| **L T P : 3 1 0** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Gain knowledge in amplitude modulation techniques

CLO2: Gain knowledge in frequency modulation techniques

CLO3: Understand the concepts of Noise to the design of communication systems CLO4: Gain knowledge in Information theory

| **ELECTRONIC CIRCUITS LAB** | |
| --- | --- |
| **Course Code: 19EC0222** |  |
| **Credits:2** |  |
| **L T P : 0 0 2** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Design and Testing of BJT and MOSFET amplifiers.

CLO2: Acquire knowledge of Frequency response characteristics of BJT and FET amplifiers CLO3: Analyze the performance of small signal BJT and FET amplifiers - single stage and multi stage amplifiers

CLO4: Apply the knowledge gained in the design of Electronic circuits

| **COMMUNICATION LAB** | |
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| **Course Code: 19EC0224** |  |
| **Credits:2** |  |
| **L T P : 0 0 2** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Design AM, FM & Digital Modulators for specific applications. CLO2: Compute the sampling frequency for digital modulation.

CLO3: Simulate & validate the various functional modules of Communication system. CLO4: Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes.

CLO5: Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise pe1rformance of Communication system

| **CONTROL SYSTEMS** | |
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| **Course Code: 20EC0303** |  |
| **Credits:3** |  |
| **L T P : 3 1 0** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Compute the transfer function of different physical systems.

CLO2: Analyse the time domain specification and calculate the steady state error. CLO3: Illustrate the frequency response characteristics of open loop and closed loop system response.

CLO4: Analyse the stability using Routh and root locus techniques.

CLO5: Illustrate the state space model of a physical system and discuss the concepts of sampled data control system.

| **DIGITAL COMMUNICATION** | |
| --- | --- |
| **Course Code: 20EC0304** |  |
| **Credits:3** |  |
| **L T P : 3 1 0** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Gain knowledge in digital modulation techniques

CLO2: Gain knowledge in sampling and quantization

CLO3: Understand the concept of Spread Spectrum techniques in Communication system

| **ANTENNA AND WAVE PROPAGATION** | |
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| **Course Code: 19EC0305** |  |
| **Credits:3** |  |
| **L T P : 3 1 0** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Explain the various types of antennas and wave propagation.

CLO2: Design and analyze wire and aperture antennas.

CLO3: Design and analyze antenna arrays.

CLO4: Analyze the antenna arrays, aperture antennas and special antennas such as frequency independent and broad band

| **HARDWARE PROGRAMMING** | |
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| **Course Code: 20EC0307** | Continuous Evaluation: 40 Marks |
| **Credits:3** | End Semester Examination: 60 Marks |
| **L T P : 3 1 0** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1:Design and implement programs on 8086 microprocessor.

CLO2: Design I/O circuits.

CLO3: Design Memory Interfacing circuits.

CLO4: Design and implement 8051 microcontroller based systems.

| **MICROPROCESSOR LAB** | |
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| **Course Code: 19EC0321** |  |
| **Credits: 2** |  |
| **L T P : 0 0 3** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Ability to develop assembly language program for microprocessors and microcontrollers. CLO2: Ability to comprehend the architectural and pipelining concepts for Microprocessors. CLO3: Ability to interface peripherals, sensors and actuators and in embedded systems.

CLO4: Ability to design microprocessor / microcontroller based system. CLO5: Ability to design , develop and trouble shoot microcontroller based system.

| **DIGITAL COMMUNICATION LAB** | |
| --- | --- |
| **Course Code: 19EC0323** |  |
| **Credits: 2** |  |
| **L T P : 0 0 3** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Ability to experimentally analyze the performance of various kinds of signaling used in communication systems and their bandwidth requirement.

CLO2: They gets hands on experience on system construction and performance evaluation CLO3: Ability to study issues from communication links and channels, and their equalization techniques

| **RF AND MICROWAVE ENGINEERING** | |
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| **Course Code: 19EC0302** |  |
| **Credits: 3** |  |
| **L T P : 3 0 0** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Explain the active & passive microwave devices & components used in Microwave communication systems.

CLO2: Analyze the multi- port RF networks and RF transistor amplifiers. CLO3: Generate Microwave signals and design microwave amplifiers.

CLO4: Measure and analyze Microwave signal and parameters.

**OPTICAL FIBER COMMUNICATION**

| **Course Code: 19EC0304** |  |
| --- | --- |
| **Credits: 3** |  |
| **L T P : 3 0 0** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Realize basic elements in optical fibers, different modes and configurations. CLO2: Analyze the transmission characteristics associated with dispersion and polarization techniques.

CLO3: Design optical sources and detectors with their use in optical communication system.

CLO4: Construct fiber optic receiver systems, measurements and coupling techniques. CLO5: Design optical communication systems and its networks.

| **VLSI TECHNOLOGY AND DESIGN** | |
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| **Course Code: 19EC0306** |  |
| **Credits: 3** |  |
| **L T P : 3 1 0** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Realize the concepts of digital building blocks using MOS transistor. CLO2: Design combinational MOS circuits and power strategies.

CLO3: Design and construct Sequential Circuits and Timing systems. CLO4: Design arithmetic building blocks and memory subsystems.

CLO5: Apply and implement FPGA design flow and testing.

| **MICROWAVE AND OPTICAL COMMUNICATION LAB** | |
| --- | --- |
| **Course Code: 19EC0322** |  |
| **Credits: 2** |  |
| **L T P : 0 0 2** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Analyze the performance of simple optical link.

CLO2: Test microwave and optical components.

CLO3: Analyse the mode characteristics of fiber

CLO4: Analyse the radiation of pattern of antenna

| **VLSI DESIGN LAB** | |
| --- | --- |
| **Course Code: 19EC0324** |  |
| **Credits: 2** |  |
| **L T P : 0 0 2** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Write HDL code for basic as well as advanced digital integrated circuit CLO2: Synthesize Place and Route the digital IPs

CLO3: Design, Simulate and Extract the layouts of Digital & Analog IC Blocks using EDA tools

**DATA COMMUNICATION NETWORK**

| **Course Code: 19EC0401** |  |
| --- | --- |
| **Credits: 3** |  |
| **L T P : 3 0 0** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Explain the Network Models, layers and functions.

CLO2: Categorize and classify the routing protocols.

CLO3: List the functions of the transport and application layer.

CLO4: Evaluate and choose the network security mechanisms.

CLO5:Discuss the hardware security attacks and countermeasures

| **WIRELESS COMMUNICATION** | |
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| **Course Code: 20EC0403** |  |
| **Credits: 3** |  |
| **L T P : 3 0 0** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Characterize a wireless channel and evolve the system design specifications CLO2: Design a cellular system based on resource availability and traffic demands CLO3: Identify suitable signaling and multipath mitigation techniques for the wireless channel and system under consideration.

CLO4: Understand the Digital modulation techniques for Wireless Communication CLO5: Design the Wireless Channel for WLAN and Bluetooth.

| **NETWORK SIMULATION LAB** | |
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| **Course Code: 19EC0421** |  |
| **Credits: 2** |  |
| **L T P : 0 0 2** | Course Category: Core |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES**

CLO1: Physical implementation of Networks using simulation tools CLO2: Implement the various protocols.

CLO3: Analyse the performance of the protocols in different layers. CLO4: Analyze various routing algorithms