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|---|----------|-------------------------------------|-----|--|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | | | C04 | Ability to analyse the system stability using various concepts in linear control theory | 3 | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | 3 | |
| | | | C05 | Acquired knowledge about Network Synthesis | 3 | 2 | 2 | 1 | - | - | - | - | - | - | - | - | - | 1 | 3 |
| 3 | 70123306 | Entrepreneurship Venture | C01 | | | | | | | | | | | | | | | | |
| | | | C02 | | | | | | | | | | | | | | | | |
| | | | C03 | | | | | | | | | | | | | | | | |
| | | | C04 | | | | | | | | | | | | | | | | |
| | | | C05 | | | | | | | | | | | | | | | | |
| | | | C06 | | | | | | | | | | | | | | | | |
| 3 | 70123307 | Electronic Devices and Circuits Lab | C01 | Analyze basic wave shaping circuits | 3 | - | - | - | 2 | - | - | - | - | - | - | - | - | 2 | - |
| | | | C02 | Study and understand characteristics of JFET and MOSFET | 3 | 2 | - | - | 2 | - | - | - | - | - | - | - | - | 2 | - |
| | | | C03 | Investigate the performance of BJT and JFET amplifier circuits | 3 | 2 | - | - | 2 | - | - | - | - | - | - | - | - | 2 | - |
| | | | C04 | Understand the working principle and analyze the performance of feedback amplifier | 3 | 2 | - | - | 2 | - | - | - | - | - | - | - | - | 2 | - |
| | | | C05 | Understand the working of LC oscillator | 3 | - | - | - | 2 | - | - | - | - | - | - | - | - | 2 | - |
| 3 | 70123308 | Electronic Measurements Lab | C01 | relate static and dynamic characteristics of measuring systems | 2 | 2 | - | - | - | - | - | - | 3 | - | - | - | 1 | - | 1 |
| | | | C02 | identify various electronics measuring instruments | 2 | 2 | - | - | - | - | - | - | 3 | - | - | - | 1 | - | 1 |
| | | | C03 | get hands-on transducers and sensors working | 2 | 2 | - | - | - | - | - | - | 3 | - | - | - | 1 | - | 1 |
| | | | C04 | utilize Lab view capacity for basic measuring system design (voltmeter, temperature measurement etc.) | 2 | - | 1 | 2 | 1 | - | - | - | 1 | - | - | - | 1 | 1 | 1 |
| | | | C05 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | C06 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 3 | 70123309 | Foundation of Ethics | C01 | | | | | | | | | | | | | | | | |
| | | | C02 | | | | | | | | | | | | | | | | |
| | | | C03 | | | | | | | | | | | | | | | | |
| | | | C04 | | | | | | | | | | | | | | | | |
| | | | C05 | | | | | | | | | | | | | | | | |
| | | | C06 | | | | | | | | | | | | | | | | |
| 3 | 70123310 | Introduction to Indian Philosophy | C01 | | | | | | | | | | | | | | | | |
| | | | C02 | | | | | | | | | | | | | | | | |
| | | | C03 | | | | | | | | | | | | | | | | |
| | | | C04 | | | | | | | | | | | | | | | | |
| | | | C05 | | | | | | | | | | | | | | | | |
| | | | C06 | | | | | | | | | | | | | | | | |
| 4 | 70123401 | Control Systems | C01 | Develop mathematical models for various systems. | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 2 | -- | |
| | | | C02 | Perform transient analysis of systems in the time domain | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 2 | -- | |
| | | | C03 | Understand the conditions for absolute stability of closed loop systems. | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 2 | -- | |
| | | | C04 | Perform relative stability analysis in the time and frequency domain. | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 2 | -- | |
| | | | C05 | Discuss the need of compensation and the effects of different types of compensation | 3 | 3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| 4 | 70123402 | Electromagnetic Field Theory | C01 | Formulate vector calculus expressions to understand the behaviour of static electric and magnetic fields in a standard configuration. | 3 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| | | | C02 | Derive expressions for electric and magnetic fields according to their force effect. | 3 | 2 | -- | 2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| | | | C03 | Determine the electric field from the stationary charge distribution and magnetic fields from steady current distributions. | 3 | 2 | -- | 1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| | | | C04 | Demonstrate Maxwell's equations and explain their physical meanings and illustrate the application of Maxwell's equations to analyze electromagnetic fields generated by given dynamic charge and current distributions. | 2 | 2 | -- | 2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| | | | C05 | Discuss the propagation, reflection and transmission of plane waves. | 2 | 1 | -- | 1 | - | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| 4 | 70123403 | Analog Circuit Design | C01 | Understand the characteristics and functionality of the Operational Amplifier. | 3 | 3 | 1 | - | 1 | - | - | - | 1 | 2 | - | 3 | - | 3 | |
| | | | C02 | Design circuits with op-amps for different applications. | 3 | 2 | 1 | - | 1 | - | - | - | 2 | 1 | - | 3 | - | 3 | |
| | | | C03 | Interface multiple op-amps to get desired application. | 3 | 3 | 1 | - | 1 | - | - | - | 2 | 2 | - | 3 | - | 3 | |
| | | | C04 | Understand and apply the knowledge of functioning of IC555. | 3 | 2 | 1 | - | 1 | - | - | - | 2 | 1 | - | 2 | - | 3 | |
| | | | C05 | Understand and apply the knowledge of functioning of IC555. | 3 | 3 | 1 | - | 1 | - | - | - | 2 | 1 | - | 2 | - | 3 | |
| | | | C06 | | | | | | | | | | | | | | | | |
| 4 | 70123405 | Principles of Communication | C01 | Understand the Need of modulation, modulation processes and different amplitude modulation schemes analog communication | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 3 | -- | |
| | | | C02 | Analyze generation and detection of FM signal and comparison between amplitude and angle modulation schemes. | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 3 | -- | |
| | | | C03 | Sample analog signal and recover original signal without any distortion. | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 3 | -- | |
| | | | C04 | Differentiate between different pulse modulation and demodulation techniques and signal multiplexing for various applications | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 3 | -- | |
| | | | C05 | Understand different sources and types of noise in communication system and how noise affects communication using different parameters. | 3 | 3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3 | -- |
| 4 | 70123407 | Analog Circuit Design Lab | C01 | Identify the op amp configuration based on specifications. | 3 | 2 | - | - | - | - | - | - | - | - | - | - | - | 1 | 3 |
| | | | C02 | Design circuit using IC 741 for specific application. | 2 | 2 | 2 | - | - | - | - | - | 3 | - | - | - | - | 1 | 3 |
| | | | C03 | Mount and test designed op amp based circuit. | 3 | 2 | 2 | - | - | 2 | - | - | 3 | - | - | - | - | 1 | 3 |
| | | | C04 | Understand the significance of theoretical result also observe and verify the results | 3 | 1 | - | - | - | - | - | - | - | - | - | - | 2 | 1 | 3 |
| 4 | 70123408 | Control Systems Lab | C01 | Use Matlab and Simulink to develop mathematical Models of systems | 3 | 3 | 3 | 1 | 3 | -- | -- | 2 | 2 | 2 | 1 | 3 | -- | -- | |
| | | | C02 | Use Matlab and Simulink model signals. | 3 | 3 | 3 | 1 | 3 | -- | -- | 2 | 2 | 2 | 1 | 3 | -- | -- | |
| | | | C03 | Use Matlab and Simulink to perform transient analysis of systems for various inputs | 3 | 3 | 3 | 1 | 3 | -- | -- | 2 | 2 | 2 | 1 | 3 | -- | -- | |
| | | | C04 | Use matlab to perform stability analysis of systems in the time domain | 3 | 3 | 3 | 1 | 3 | -- | -- | 2 | 2 | 2 | 1 | 3 | -- | -- | |
| | | | C05 | Use Matlab to perform stability analysis of systems in the frequency domain | 3 | 3 | 3 | 1 | 3 | -- | -- | 2 | 2 | 2 | 1 | 3 | -- | -- | |

| | | | | | | | | | | | | | | | | | | | | |
|---|----------|--|-----|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|
| 4 | 70123409 | Principles of Communication Lab | C01 | Simulate and observe an AM set up and understand the concept of the modulation. | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 3 | -- | | |
| | | | C02 | Simulate and observe an FM set up and understand the concept of the modulation and de-modulation. | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 3 | -- | | |
| | | | C03 | Sample analog signal and recover original signal without any distortion. | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 3 | -- | | |
| | | | C04 | Design an SSB modulation and understand the power control of this scheme. | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 3 | -- | | |
| | | | C05 | Simulate and observe the concept of PCM. | 3 | 3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3 | -- | | |
| 5 | 70123501 | Digital Signal Processing | C01 | To define Discrete Time (DT) signals and perform various operations on DT signals | 3 | 3 | - | - | - | - | - | - | - | - | - | - | 3 | 1 | | |
| | | | C02 | To describe the concept of sampling and aliasing | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 1 | |
| | | | C03 | To analyze discrete time signals and systems using different transforms such as Z- transform and Discrete Fourier Transform (DFT) | 3 | 3 | - | 1 | - | - | - | - | - | - | - | - | - | 3 | 1 | |
| | | | C04 | To design digital filters using different methods | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | - | 3 | 1 | |
| | | | C05 | To understand multirate sampling and Digital Signal Processing (DSP) processor | 3 | 3 | 1 | 1 | - | - | - | - | - | - | - | - | - | 3 | 1 | |
| | | | C06 | To apply the concepts of DSP in speech and image processing | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 3 | 1 | |
| 5 | 70123502 | Digital Communication | C01 | Explain the classification of signals based on various parameters. | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 3 | -- | | |
| | | | C02 | Learn the generation and detection of base band system. | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 3 | -- | | |
| | | | C03 | Describe and determine the performance of line codes and methods to mitigate inter symbol interference. | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 3 | -- | | |
| | | | C04 | Understand the generation, detection signal space diagram, spectrum, bandwidth efficiency, and probability of error analysis of different band pass modulation techniques | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 3 | -- | | |
| | | | C05 | Understand various spreading techniques and determine bit error performance of various digital communication systems | 3 | 3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3 | -- | | |
| 5 | 70123503 | Probability, Random Variables and Stochastic Process | C01 | Understand the basic concepts of probability theory. | 1 | -- | -- | -- | -- | -- | -- | 1 | 2 | -- | -- | 2 | -- | -- | | |
| | | | C02 | Understand the concepts of random variable. | 3 | 3 | 1 | -- | -- | -- | 1 | 2 | -- | -- | -- | -- | 2 | -- | -- | |
| | | | C03 | Analysis of random process. | 3 | 3 | 3 | 2 | -- | -- | -- | 1 | 2 | -- | -- | -- | -- | 3 | -- | |
| | | | C04 | Response of an LTI system. | 3 | 3 | -- | -- | -- | -- | -- | 1 | 2 | -- | -- | -- | -- | 2 | -- | |
| | | | C05 | | | | | | | | | | | | | | | | | |
| | | | C06 | | | | | | | | | | | | | | | | | |
| 5 | 70123504 | Service Learning | C01 | To promote learning through active participation | 2 | 2 | 2 | - | - | - | - | - | 3 | 2 | - | 2 | - | - | | |
| | | | C02 | To provide structured time to students to think, discuss and implement from their past experiences | 2 | 2 | 2 | - | - | - | - | - | - | - | - | - | - | 2 | - | |
| | | | C03 | To apply their skills and knowledge beyond the classroom in real life situations | 2 | 2 | 2 | 2 | - | - | - | - | 3 | - | - | 2 | - | 2 | - | |
| | | | C04 | To stimulate sense of caring in students | - | - | - | - | - | - | - | - | - | - | 2 | - | 2 | - | - | |
| 5 | 70123507 | Digital Signal Processing Lab | C01 | To demonstrate effect of sampling on reconstructed signals | 3 | 3 | 1 | - | 2 | - | - | - | - | - | - | - | 3 | 1 | | |
| | | | C02 | To evaluate the system response using convolution sum and DFT-IDFT method | 3 | 3 | 2 | 1 | 2 | - | - | - | - | - | - | - | 3 | 1 | | |
| | | | C03 | To apply the knowledge of Z- transform for solution of difference equation | 3 | 3 | 2 | 1 | 2 | - | - | - | - | - | - | - | 3 | 1 | | |
| | | | C04 | To design and implement IIR and FIR filters using different techniques | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | - | 3 | 1 | | |
| 5 | 70123508 | Digital Communication Lab | C01 | Simulate and observe an AM set up and understand the concept of the modulation. | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 3 | -- | | |
| | | | C02 | Simulate and observe an FM set up and understand the concept of the modulation and de-modulation. | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 3 | -- | | |
| | | | C03 | Sample analog signal and recover original signal without any distortion. | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 3 | -- | | |
| | | | C04 | Design an SSB modulation and understand the power control of this scheme. | 3 | 3 | -- | -- | 2 | -- | -- | -- | 2 | 2 | -- | 2 | 3 | -- | | |
| | | | C05 | Simulate and observe the concept of PCM. | 3 | 3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3 | -- | | |
| 5 | 70123509 | Introduction to Computer Vision | C01 | To recognize and describe both the theoretical and practical aspects of computing with images and connect issues from Computer Vision to Human Vision. | 3 | 1 | - | - | - | - | - | - | - | - | - | - | 3 | 1 | | |
| | | | C02 | To describe the foundation of image formation and image analysis. Understand the basics of 2D and 3D Computer Vision. | 3 | 2 | - | - | - | - | - | - | - | - | - | - | 3 | 1 | | |
| | | | C03 | To become familiar with the major technical approaches involved in computer vision and describe various methods used for registration, alignment, and matching in images. | 3 | 3 | 2 | 1 | 1 | - | - | - | - | - | - | - | 3 | 1 | | |
| | | | C04 | To get an exposure to advanced concepts leading to object and scene categorization from images and concepts in image segmentation. | 3 | 1 | - | - | - | - | - | - | - | - | - | - | 3 | 1 | | |
| | | | C05 | To build computer vision applications. | 3 | 3 | 2 | 1 | 1 | - | - | - | - | - | - | - | 3 | 1 | | |
| 5 | 70123511 | System Programming | C01 | Understand system software concepts, like the use and implementation of assembler, macros, linker, loaders and compiler | 3 | | 2 | | | | | | 2 | | 1 | 2 | 1 | | | |
| | | | C02 | Learn and understand data structures used in design of system software. | 3 | | 2 | | 1 | | | | 2 | | | 1 | | | | |
| | | | C03 | Learn and understand basics of compilers and tools. | 3 | | 2 | | 1 | | | | 2 | | | 1 | 2 | | | |
| | | | C04 | Study the working of linkers, loaders and debuggers and understand their role in the software development process. | 3 | | 2 | | 1 | | | | 2 | | | 1 | 3 | | | |
| 5 | 70123512 | Industrial Robotics | C01 | Utilize the knowledge about the robot selection criteria, configurations and their workspace. | 3 | - | 2 | - | - | 2 | - | - | - | - | - | - | - | 1 | | |
| | | | C02 | Perform the spatial transformations associated with rigid body motions. | 2 | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - | | |
| | | | C03 | Develop the forward kinematics analysis of up to 6DOF robot systems | 2 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | - | - | | |
| | | | C04 | Analyze the inverse kinematic analysis of up to 4DOF robot systems. | 2 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | - | - | | |
| | | | C05 | Understand the use of various sensors in robot applications. | 2 | 1 | 1 | 2 | - | - | - | - | - | - | - | - | - | 1 | | |
| | | | C06 | Implement the Lagrangian and Jacobian methods for dynamic modeling of robotic systems for robot control | 2 | 1 | 1 | 1 | - | - | - | - | - | - | - | - | - | - | | |
| | | | C01 | Describe about light and spectrum | 2 | 1 | - | - | - | 1 | 1 | - | - | 1 | - | - | - | | | |
| | | | C02 | Define working principle of LASER and its types | 2 | 3 | 1 | - | - | 2 | 1 | 1 | - | - | - | - | - | 1 | | |

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|---|----------|---|-----|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 70123513 | Theory of Light and Lasers | CO3 | Develop science of optics and application of optical electronics | 3 | 2 | - | 1 | 1 | 1 | 1 | - | - | - | - | - | - | 1 | | |
| | | | CO4 | Illustrate various display devices | 3 | - | 1 | - | 1 | 1 | 2 | - | - | 1 | 2 | - | - | - | - | |
| | | | CO5 | Relate LASER applications in industry, medical and defence | 1 | - | 2 | - | - | 3 | 2 | 1 | 1 | - | 1 | 1 | - | 1 | - | 1 |
| | | | CO6 | | | | | | | | | | | | | | | | | |
| 5 | 70123514 | Advanced Digital Signal Processing | CO1 | Understand the basic concepts of discrete random process | 3 | 3 | - | 1 | - | - | - | - | - | - | - | - | - | 3 | 1 | |
| | | | CO2 | Apply parametric and non-parametric methods to estimate spectrum | 3 | 3 | - | 1 | - | - | - | - | - | - | - | - | - | - | 3 | 1 |
| | | | CO3 | Design the optimum filter for linear prediction | 3 | 3 | 2 | 2 | 1 | - | - | - | - | - | - | - | - | - | 3 | 1 |
| | | | CO4 | Design adaptive filters for applications such as echo cancellation and channel equalization | 3 | 3 | 2 | 2 | 1 | - | - | - | - | - | - | - | - | - | 3 | 1 |
| | | | CO5 | Understand the principles of sampling rate conversion and the use of multirate signal processing in applications such as sub band coding | 3 | 3 | 2 | 3 | 1 | - | - | - | - | - | - | - | - | - | 3 | 1 |
| | | | CO6 | Recognize the limitations of the Fourier Transform for analysis of non-stationary signals and illustrate how these can be overcome using STFT and Wavelet Transform. | 3 | 3 | 2 | 3 | 1 | - | - | - | - | - | - | - | - | - | 3 | 1 |
| 5 | 70123515 | Sustainable Energy And Solar Photovoltaic Systems | CO1 | acquire knowledge on energy demand and renewable energy sources | 2 | - | - | - | - | 1 | 3 | - | - | - | - | - | 2 | - | 1 | |
| | | | CO2 | understand the working principle of solar photovoltaics energy | 2 | 1 | 2 | - | 2 | - | 2 | - | 3 | 1 | - | 2 | - | 2 | - | |
| | | | CO3 | learn about solar PV system | 1 | - | - | - | - | 1 | - | - | 2 | 2 | - | - | - | 2 | - | |
| | | | CO4 | learn about batteries and balance of systems (BOS) | 1 | 2 | 3 | - | - | 1 | 3 | 1 | 2 | - | 2 | 2 | 2 | 2 | 2 | |
| | | | CO5 | get introduced to regular and smart/renewable grid systems | 1 | - | - | - | - | 1 | 3 | 1 | - | - | - | - | 1 | 1 | 2 | |
| | | | CO6 | | | | | | | | | | | | | | | | | |
| 5 | 70123516 | Antenna and Wave Propagation | CO1 | Develop understanding of fundamental parameters of an antenna system. | 2 | 3 | - | - | 2 | - | - | - | 2 | - | - | 2 | 2 | - | | |
| | | | CO2 | Develop suitable design of antenna systems. | 2 | 3 | - | - | 2 | - | - | - | 2 | - | - | 2 | 2 | - | | |
| | | | CO3 | Analyze antennas for various applications. | 2 | 3 | - | - | 2 | - | - | - | 2 | - | - | 2 | 2 | - | | |
| | | | CO4 | Perform comparative analysis and suggest improvement of performance. | 2 | 3 | - | - | 2 | - | - | - | 2 | - | - | 2 | 3 | - | | |
| | | | CO5 | Discuss the various modes of propagation of EM waves. | 2 | 3 | - | - | 2 | - | - | - | 2 | - | - | 2 | 3 | - | | |
| | | | CO6 | | | | | | | | | | | | | | | | | |
| 5 | 70123517 | Electronic System Design | CO1 | To design power supply required in Electronic System | 3 | 2 | | 1 | 1 | | | | | | 1 | | | 1 | | |
| | | | CO2 | To understand the requirements of signal conditioning and data converters. | 2 | 2 | | 3 | 3 | | | | | | | 1 | | | 2 | |
| | | | CO3 | To understand TTL and CMOS family Integrated Circuits characteristics | 3 | 3 | | 1 | 1 | | | | | | | 1 | | | | |
| | | | CO4 | To identify the grounding requirements in system design | 2 | 3 | | 1 | 3 | 1 | | | | | | 1 | | | | 2 |
| | | | CO5 | To understand and design an electronic system from commercial aspects | 3 | 3 | | 1 | 3 | 1 | 1 | | 3 | 3 | 3 | 3 | 2 | | | 2 |
| 5 | 70123518 | Power Electronics | CO1 | Understand the principles of operation of power electronic devices | 2 | | | | | | | | | 1 | | 1 | | | | |
| | | | CO2 | Study the principles of operation of power electronic ac to dc converters | 3 | | 3 | | 2 | | | | | 2 | | 1 | | | | |
| | | | CO3 | Develop understanding of the principles of operation of power electronic dc to ac converters | 3 | | 3 | | 2 | | | | | 2 | | 1 | | | | |
| | | | CO4 | Learn the principles of operation of power electronic dc to dc and ac to ac converters and power controllers | 3 | | 3 | | 2 | | | | | 2 | | 1 | | | | |
| | | | CO5 | | | | | | | | | | | | | | | | | |
| | | | CO6 | | | | | | | | | | | | | | | | | |
| 5 | 70123519 | Antenna and Wave Propagation Lab | CO1 | Develop understanding of fundamental parameters of an antenna system. | 2 | 3 | - | - | 2 | - | - | - | 2 | - | - | 2 | 2 | - | | |
| | | | CO2 | Develop suitable design of antenna systems. | 2 | 3 | - | - | 2 | - | - | - | 2 | - | - | 2 | 2 | - | | |
| | | | CO3 | Analyze antennas for various applications. | 3 | 3 | - | - | 2 | - | - | - | 2 | - | - | 2 | 2 | - | | |
| | | | CO4 | Perform comparative analysis and suggest improvement of performance | 2 | 3 | - | - | 2 | - | - | - | 2 | - | - | 2 | 3 | - | | |
| | | | CO5 | | | | | | | | | | | | | | | | | |
| | | | CO6 | | | | | | | | | | | | | | | | | |
| 5 | 70123520 | Electronic System Design Lab | CO1 | To design linear and switching voltage regulator required in Electronic System. | 3 | 3 | 3 | | 1 | | | | 2 | | | | | | | |
| | | | CO2 | To design signal conditioning circuit | 3 | 3 | 3 | | 1 | | | | 2 | | | | 2 | | | |
| | | | CO3 | To design protection circuit using MOSFET | 3 | 3 | 3 | | 1 | | | | 2 | | | | 2 | | | |
| | | | CO4 | To design printed circuit board layout for electronic circuit. | 3 | 3 | 3 | | 3 | | | | 2 | | | | | | | |
| | | | CO5 | To design an electronic system for physical parameter monitoring. | 3 | 3 | 3 | | 3 | 1 | | | 2 | | | | | 2 | | |
| 5 | 70123521 | Power Electronics Lab | CO1 | Demonstrate the basic working and characteristics of Power electronics devices. | | 2 | | 2 | | 2 | | 2 | 1 | | 1 | | | | | |
| | | | CO2 | Understand the principles of operation and simulation of ac-dc rectifiers- R, RL, RL + FWD | | 2 | | 2 | | 2 | | 2 | 1 | | 1 | | | | | |
| | | | CO3 | Implement the principles of operation of triggering circuits | | 2 | | 2 | | 2 | | 2 | 1 | | 1 | | | | | |
| | | | CO4 | Develop the understanding of the principles of operation and simulation of dc-dc converter – step down , dc-ac converter ac-ac converter | | 2 | | 2 | | 2 | | 2 | 1 | | 1 | | | | | |
| | | | CO5 | | | | | | | | | | | | | | | | | |
| | | | CO6 | | | | | | | | | | | | | | | | | |
| 6 | 70123602 | Computer Networks | CO1 | | | | | | | | | | | | | | | | | |
| | | | CO2 | | | | | | | | | | | | | | | | | |
| | | | CO3 | | | | | | | | | | | | | | | | | |
| | | | CO4 | | | | | | | | | | | | | | | | | |
| | | | CO5 | | | | | | | | | | | | | | | | | |
| | | | CO6 | | | | | | | | | | | | | | | | | |
| 6 | 70123603 | Design Thinking | CO1 | | | | | | | | | | | | | | | | | |
| | | | CO2 | | | | | | | | | | | | | | | | | |
| | | | CO3 | | | | | | | | | | | | | | | | | |
| | | | CO4 | | | | | | | | | | | | | | | | | |
| | | | CO5 | | | | | | | | | | | | | | | | | |
| | | | CO6 | | | | | | | | | | | | | | | | | |
| | | | CO1 | Understand electronic product requirement specification and design the product based on the specifications using electronic components and circuits. | 1 | 3 | 3 | - | - | 1 | - | - | 2 | - | 2 | 1 | - | | | |

| | | | | | | | | | | | | | | | | | | | |
|---|----------|---------------------------------------|-----|--|---|----|----|----|----|----|----|----|----|----|----|----|----|----|---|
| 6 | 70123605 | Electronic Design Workshop | CO2 | Follow rigorous methodical approach to design an electronic product. | | 2 | 2 | -- | 2 | -- | -- | -- | 2 | -- | 3 | -- | -- | | |
| | | | CO3 | Justify the various choices and decisions made during the design process. | 2 | 3 | -- | -- | -- | -- | 1 | -- | 2 | -- | -- | -- | -- | -- | |
| | | | CO4 | Test the product end-to-end to validate it against requirements. | 1 | -- | -- | 2 | -- | -- | -- | -- | 2 | -- | -- | 2 | 1 | -- | |
| | | | CO5 | | | | | | | | | | | | | | | | |
| | | | CO6 | | | | | | | | | | | | | | | | |
| 6 | 70123607 | Principles of Economics | CO1 | | | | | | | | | | | | | | | | |
| | | | CO2 | | | | | | | | | | | | | | | | |
| | | | CO3 | | | | | | | | | | | | | | | | |
| | | | CO4 | | | | | | | | | | | | | | | | |
| | | | CO5 | | | | | | | | | | | | | | | | |
| | | | CO6 | | | | | | | | | | | | | | | | |
| 6 | 70123608 | Computer Networks Lab | CO1 | | | | | | | | | | | | | | | | |
| | | | CO2 | | | | | | | | | | | | | | | | |
| | | | CO3 | | | | | | | | | | | | | | | | |
| | | | CO4 | | | | | | | | | | | | | | | | |
| | | | CO5 | | | | | | | | | | | | | | | | |
| 6 | 70123609 | Biomedical Imaging Systems | CO1 | To understand basic and intermediate concepts in biomedical imaging transversal across imaging modalities. | 3 | - | - | - | - | - | - | - | - | - | - | 3 | 1 | | |
| | | | CO2 | To design and apply a processing and analysis strategy to extract new biomedical knowledge from given biomedical image. | 3 | 2 | 2 | - | - | - | - | - | - | - | - | - | 3 | 1 | |
| | | | CO3 | To interpret the biomedical image confining its conclusions to assumptions made through the reconstruction and analytical process. | 3 | 1 | 1 | - | - | - | - | - | - | - | - | - | 3 | 1 | |
| | | | CO4 | To propose image construction methods to obtain structural or functional representation for a given biomedical demand. | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 1 | |
| | | | CO5 | To carry out research in the field of biomedical imaging. | 3 | 1 | 1 | 1 | 1 | 1 | - | - | - | - | - | - | 3 | 1 | |
| 6 | 70123612 | Embedded Linux | CO1 | Understand fundamentals of embedded Linux operating system | 3 | | | | | | | | | | 1 | 2 | 3 | | |
| | | | CO2 | Study the architecture of Linux operating system | 3 | | | | 2 | | | | | | | 1 | | | |
| | | | CO3 | Understand and implement the IPCs in linux environment | 2 | 2 | 2 | | 2 | | | | | | | 1 | 2 | | |
| | | | CO4 | Implement embedded linux applications | 2 | 2 | 2 | | 2 | | | | | | | 1 | 2 | | |
| | | | CO5 | Develop basic device drivers. | 3 | 2 | 2 | | 2 | | | | | | | 1 | 2 | 2 | |
| | | | CO6 | | | | | | | | | | | | | | | | |
| 6 | 70123613 | Mechatronics | CO1 | Develop the knowledge in various mechatronics concepts and systems. | 3 | - | 2 | - | - | 2 | - | - | - | - | - | - | - | | |
| | | | CO2 | Understand about the characteristics of transducers, sensors and measuring devices. | 2 | 3 | 3 | - | - | - | - | - | - | - | - | - | - | | |
| | | | CO3 | Analyse the factors that contribute to errors in measurements, such as non-linearity, hysteresis and dead band along with techniques to condition the signals. | 2 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | - | | |
| | | | CO4 | Understand and apply the comparative characteristics of different types of controllers like proportional, integral, derivative and PID and other industrial control strategies | 2 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | - | | |
| | | | CO5 | Gain knowledge and development skills associated with basic Neural network and Fuzzy logic methods | 2 | 1 | 1 | 2 | - | - | - | - | - | - | - | - | - | | |
| | | | CO6 | | | | | | | | | | | | | | | | |
| 6 | 70123614 | Optical Devices and Fiber Optics | CO1 | describe elements of light | 2 | 1 | 1 | - | - | - | 1 | 1 | 1 | - | - | - | - | 2 | |
| | | | CO2 | identify about the Laser instrumentation | 2 | 2 | 1 | - | - | - | 1 | 2 | 1 | 1 | 1 | - | - | - | 1 |
| | | | CO3 | familiarize with optical devices and components of fibre optics | 3 | - | 1 | - | - | 1 | 2 | 1 | 1 | 1 | - | - | 1 | - | 1 |
| | | | CO4 | list sources and detectors for optical fibres | 2 | 1 | 1 | - | - | - | - | 1 | 1 | 1 | 1 | - | - | - | |
| | | | CO5 | get introduced to optical amplifiers and integrated optics | 2 | 1 | 2 | 1 | - | 2 | 2 | 1 | - | 2 | 1 | - | - | - | |
| | | | CO6 | | | | | | | | | | | | | | | | |
| 6 | 70123615 | VLSI Digital Signal Processing System | CO1 | Understand the concept of pipelining and parallel processing and able design the system for high speed and low power requirements. | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 2 | 3 | | |
| | | | CO2 | Differentiate between folding and unfolding architectures. | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 2 | 3 | | |
| | | | CO3 | Analyze the fast convolution algorithm in signal processing | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 2 | 3 | | |
| | | | CO4 | Implement bit level architectures for DSP using low power design. | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 2 | 3 | | |
| | | | CO5 | Evaluate numerical strength reduction techniques. | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 2 | 3 | | |
| | | | CO6 | | | | | | | | | | | | | | | | |
| 6 | 70123616 | Wind Energy Systems | CO1 | recognise and sources of renewable sustainable energy | 2 | 1 | 1 | - | - | 1 | 2 | 1 | - | - | - | 2 | - | 1 | |
| | | | CO2 | define the working principle of wind turbine | 2 | 1 | - | - | - | 1 | 2 | 1 | - | - | - | 2 | - | 2 | |
| | | | CO3 | learn wind turbine energy conversion systems | 3 | 1 | 1 | - | 1 | 2 | 1 | 1 | - | 1 | 2 | - | 1 | | |
| | | | CO4 | study devices and systems require for wind energy | 1 | 1 | 2 | 1 | - | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | - | 1 |
| | | | CO5 | get introduced to grid system for wind energy | 1 | - | - | 1 | - | 1 | 2 | 1 | - | - | - | - | 1 | - | 1 |
| | | | CO6 | | | | | | | | | | | | | | | | |
| 6 | 70123617 | Microwaves and Radar | CO1 | Understand the concept of transmission lines. | 2 | 3 | -- | -- | -- | -- | -- | 1 | 2 | -- | -- | -- | -- | | |
| | | | CO2 | Explain the concept of waveguide propagation | 2 | 3 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | |
| | | | CO3 | Illustrate the principle of working of passive microwave devices. | 2 | 2 | -- | -- | -- | -- | -- | 1 | 2 | -- | -- | -- | -- | | |
| | | | CO4 | Discuss the concepts of microwave tubes. | 1 | 1 | -- | -- | -- | -- | -- | 1 | 2 | -- | -- | -- | -- | | |
| | | | CO5 | Illustrate the principle of working of solid state microwave devices. | 1 | 1 | -- | -- | -- | -- | -- | 1 | 2 | -- | -- | -- | -- | 2 | |
| | | | CO6 | Explain the concept and the working of different types of radars. | 2 | 2 | -- | 1 | -- | -- | -- | 1 | 2 | -- | -- | -- | -- | 3 | |
| 6 | 70123618 | Modern Control Theory | CO1 | Model, design and analyse continuous time linear systems | 3 | 3 | 2 | 2 | 2 | -- | -- | -- | -- | -- | 2 | 2 | -- | | |
| | | | CO2 | Perform stability analysis of linear and nonlinear systems | 3 | 3 | 2 | 2 | 2 | -- | -- | -- | -- | -- | -- | 2 | 2 | -- | |
| | | | CO3 | Perform pole assignment using state feedback | 3 | 3 | 2 | 2 | 2 | -- | -- | -- | -- | -- | -- | 2 | 2 | -- | |
| | | | CO4 | Design observers and controllers for linear systems | 3 | 3 | 2 | 2 | 2 | -- | -- | -- | -- | -- | -- | 2 | 2 | -- | |
| | | | CO5 | Model, design and analyse discrete-time linear systems | 3 | 3 | 2 | 2 | 2 | -- | -- | -- | -- | -- | -- | 2 | 2 | -- | |

| | | | | | | | | | | | | | | | | | | | | | |
|---|----------|--|-----|---|---|---|----|----|----|----|----|----|----|---|---|---|----|----|---|---|---|
| 6 | 70123628 | Introduction to Robotics | C03 | Develop the forward kinematics analysis of up to 4DOF robot systems | 2 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 1 | 1 | | | |
| | | | C04 | Analyze the inverse kinematic analysis of up to 4DOF robot systems. | 2 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | - | - | 1 | 1 | |
| | | | C05 | Explain the methods used for robot control | 2 | 1 | 1 | 2 | - | - | - | - | - | - | - | - | - | - | - | - | |
| 6 | 70123629 | Renewable Energy Systems | C01 | know energy demand and renewable energy sources | 2 | - | - | - | - | 1 | 3 | 1 | - | - | - | 2 | - | 1 | | | |
| | | | C02 | define the working principle of solar photovoltaics energy | 2 | 1 | 1 | - | - | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 3 | - | 3 | | |
| | | | C03 | describe wind energy and wind turbine system | 2 | 1 | 1 | - | - | 1 | 2 | 1 | - | - | - | - | 2 | - | 2 | | |
| | | | C04 | define biomass, fuel cells, geothermal energy and ocean energy | 1 | - | - | - | - | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 3 | - | 2 | | |
| | | | C05 | design solar PV system for home applications | 2 | 2 | 3 | 1 | - | 1 | 3 | 1 | 2 | - | 2 | 3 | - | 1 | | | |
| | | | C06 | | | | | | | | | | | | | | | | | | |
| 6 | 70123630 | Introduction to Image Processing | C01 | To demonstrate understanding of basic concepts of two dimensional signal acquisition, sampling and quantization. | 3 | 1 | - | - | - | - | - | - | - | - | - | - | 3 | 1 | | | |
| | | | C02 | To demonstrate understanding of fundamental image manipulations such as histogram stretching, histogram equalization, contrast enhancement, log transforms and image negatives, and spatial filtering techniques. | 3 | 2 | - | - | - | - | - | - | - | - | - | - | - | 3 | 1 | | |
| | | | C03 | To demonstrate understanding of 2D Fourier transform, 2D FFT and filtering images in Fourier domain. | 3 | 2 | - | - | - | - | - | - | - | - | - | - | - | 3 | 1 | | |
| | | | C04 | To demonstrate understanding of image morphology that includes image manipulation using set theory. | 3 | 2 | - | - | - | - | - | - | - | - | - | - | - | 3 | 1 | | |
| | | | C05 | To understand concepts in image segmentation. | 3 | 1 | - | - | - | - | - | - | - | - | - | - | - | 3 | 1 | | |
| | | | C06 | To describe the basic issues and the scope of image processing, and the roles of image processing and systems in a variety of applications | 3 | 2 | 2 | 1 | 1 | - | - | - | - | - | - | - | - | 3 | 1 | | |
| 7 | 70123702 | Cyber Security | C01 | | | | | | | | | | | | | | | | | | |
| | | | C02 | | | | | | | | | | | | | | | | | | |
| | | | C03 | | | | | | | | | | | | | | | | | | |
| | | | C04 | | | | | | | | | | | | | | | | | | |
| | | | C05 | | | | | | | | | | | | | | | | | | |
| | | | C06 | | | | | | | | | | | | | | | | | | |
| 7 | 70123704 | Biomedical Instrumentation | C01 | Learn working of various sensors, transducers related to biomedical field | 3 | - | - | - | 1 | - | - | - | - | - | - | - | - | 1 | | | |
| | | | C02 | Analyze various biomedical instruments | 3 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | 1 | 1 | | |
| | | | C03 | Implement feature extraction techniques of signal | 3 | 1 | 1 | 1 | 1 | - | - | - | - | - | - | - | - | 1 | 1 | | |
| 7 | 70123706 | Biomedical Instrumentation Lab | C01 | Learn working of various sensors, transducers related to biomedical field | 3 | - | - | - | 1 | - | - | - | - | - | - | - | - | 1 | | | |
| | | | C02 | Analyze various biomedical instruments | 3 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | 1 | 1 | | |
| | | | C03 | Implement feature extraction techniques of signal | 3 | 1 | 1 | 1 | 1 | - | - | - | - | - | - | - | - | 1 | 1 | | |
| 7 | 70123707 | Advanced Microcontrollers and RTOS | C01 | Understand the advanced microcontroller architecture | 2 | 3 | | | | | | | | | | | | 2 | | | |
| | | | C02 | Describe the ARM cortex M3 architecture in details | 3 | 1 | 2 | | | | | | | | | | | | 2 | | |
| | | | C03 | Interface peripherals with the ARM cortex M3 based microcontroller | 2 | 3 | 2 | | 2 | | 1 | | | | | | | | | 1 | |
| | | | C04 | Use the standard peripheral libraries for application developments. | | 2 | 2 | | 3 | | | | | | | | 2 | | | 2 | |
| | | | C05 | Study the concepts of operating system and differentiate it from real time operating system. | 1 | 2 | 2 | | 3 | | | | | | | | | | | 2 | |
| | | | C06 | Understand and apply the concepts of real time operating system by considering a commercial RTOS. | | 3 | 2 | | | | | | | | | | 2 | | | 2 | |
| 7 | 70123708 | Advanced Microcontrollers and RTOS Lab | C01 | Understand the specific features of advanced microcontroller architecture of ARM cortex M3 | 2 | 1 | | | 3 | | | | | | | | | | 2 | | |
| | | | C02 | Write programs using relevant tools to interface peripherals and sensors with the ARM cortex M3 microcontroller | 1 | 2 | | | 3 | | | | 2 | | | | 2 | | | 3 | |
| | | | C03 | Use the standard peripheral libraries for application developments. | | 2 | 2 | | 3 | | | 3 | | | | | 2 | | | | |
| | | | C04 | Understand and apply the concepts of real time operating system by considering a commercial RTOS. | | 2 | 3 | | 1 | | | 2 | 3 | | | | 2 | | | | 3 |
| | | | C05 | | | | | | | | | | | | | | | | | | |
| | | | C06 | | | | | | | | | | | | | | | | | | |
| 7 | 70123709 | Mobile Robotics | C01 | To develop the student's knowledge in various robotic systems such as holonomic and nonholonomic | 2 | 2 | 2 | 3 | 1 | 1 | - | - | - | - | - | - | - | 1 | 1 | | |
| | | | C02 | To develop student's skills in performing mobile robot dynamic modelling | 2 | 1 | 1 | 2 | - | - | - | - | - | - | - | - | - | - | 1 | 1 | |
| | | | C03 | To develop student's understanding of principle of working of various sensors in mobile robot applications. | 2 | 3 | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | |
| | | | C04 | To develop student's skills to survey and select a particular sensor for a specific robot task | 2 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | - | - | 1 | - | |
| | | | C05 | To provide the student with some knowledge and understanding of robot localization methods | 1 | 1 | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | |
| | | | C06 | To develop student's understanding of standard path planning and search algorithms | 2 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | - | - | - | 1 | |
| | | | C07 | To provide the student with some knowledge and skills associated with mobile robot motion and its control. | 2 | 1 | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | 1 | |
| 7 | 70123710 | Mobile Robotics Lab | C01 | To develop the student's knowledge in various robotic simulation platforms | 2 | 2 | 2 | 3 | 1 | 1 | - | - | - | - | - | - | - | - | | | |
| | | | C02 | To develop student's skills in performing mobile robot simulation | 2 | 1 | 1 | 2 | - | - | - | - | - | - | - | - | - | - | | | |
| | | | C03 | To develop student's understanding of principle of working of various sensors in mobile robot applications. | 2 | 3 | 3 | 3 | - | - | - | - | - | - | - | - | - | - | | | |
| | | | C04 | To develop student's understanding of standard path planning and search algorithms | 2 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | - | - | | | |
| 7 | 70123711 | Optical Communication Systems | C01 | Demonstrate a basic understanding of optical communication system. | 2 | 1 | -- | -- | -- | -- | -- | -- | 2 | 2 | 1 | 2 | -- | 2 | | | |
| | | | C02 | Describe the use of structure, propagation and transmission properties of optical fiber for telecommunication purpose. | 2 | 3 | -- | -- | -- | -- | -- | -- | -- | 2 | 2 | 1 | 2 | -- | 2 | | |
| | | | C03 | Comprehend the need of optical fiber sources and detectors. | 2 | 3 | -- | -- | -- | -- | -- | -- | -- | 2 | 2 | 1 | 2 | -- | 2 | | |
| | | | C04 | Understand the design concept of fiber optic link. | 2 | - | -- | -- | -- | -- | -- | -- | -- | 2 | 2 | 1 | 2 | -- | 2 | | |

| | | | | | | | | | | | | | | | | | | | |
|---|----------|--|-----|--|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | | Lab | | Perform comparative analysis and suggest improvement of link design in both the system. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | -- |
| | | | C04 | | | | | | | | | | | | | | | | |
| | | | C05 | | | | | | | | | | | | | | | | |
| | | | C06 | | | | | | | | | | | | | | | | |
| 7 | 70123724 | Scientific Computing Lab | C01 | To make students familiar with the concepts of programming and the get them accustomed with high-level languages like Matlab, Mathematica, etc. | 3 | 2 | 2 | -- | 2 | -- | -- | -- | 2 | 1 | -- | 2 | | | 2 |
| | | | C02 | To provide an overview of some of the issues and problems that arise in scientific computation, such as (non-)linear systems, numerical and symbolic integration, differential equations and simulation. | 3 | 2 | 2 | -- | 2 | -- | -- | -- | 2 | 1 | -- | 2 | | | 2 |
| 7 | 70123725 | Biomedical Electronics | C01 | To understand the application of the electronic systems in biological and medical applications. | 3 | 1 | 1 | - | - | - | - | - | - | - | - | - | - | 3 | 1 |
| | | | C02 | To understand the practical limitations on the electronic components while handling bio-substances. | 3 | 1 | 1 | - | - | - | - | - | - | - | - | - | - | 3 | 1 |
| | | | C03 | To understand and analyse the biological processes like other electronic processes. | 3 | 2 | 2 | 1 | 1 | - | - | - | - | - | - | - | - | 3 | 1 |
| 7 | 70123726 | Digital Control System | C01 | Derive mathematical models of discrete time control systems | 3 | 3 | 2 | 2 | 2 | -- | -- | -- | -- | -- | -- | -- | 2 | 2 | -- |
| | | | C02 | Perform the transient and steady state analysis of digital control systems | 3 | 3 | 2 | 2 | 2 | -- | -- | -- | -- | -- | -- | -- | 2 | 2 | -- |
| | | | C03 | Perform stability analysis of Digital controllers in the time domain | 3 | 3 | 2 | 2 | 2 | -- | -- | -- | -- | -- | -- | -- | 2 | 2 | -- |
| | | | C04 | Perform the stability analysis if digital control systems in the frequency domain | 3 | 3 | 2 | 2 | 2 | -- | -- | -- | -- | -- | -- | -- | 2 | 2 | -- |
| | | | C05 | Design compensating circuits in the time and frequency domain | 3 | 3 | 2 | 2 | 2 | -- | -- | -- | -- | -- | -- | -- | 2 | 2 | -- |
| 7 | 70123727 | Speech and Audio Signal Processing | C01 | To understand basic concepts and methodologies for the analysis and modeling of speech signal. | 3 | 1 | - | - | - | - | - | - | - | - | - | - | - | 3 | 1 |
| | | | C02 | To characterize the speech signal as generated by a speech production model | 3 | 1 | - | - | - | - | - | - | - | - | - | - | - | 3 | 1 |
| | | | C03 | To understand the mechanism of speech and audio perception, and the motivation of short-term analysis of speech and audio | 3 | 1 | 1 | - | - | - | - | - | - | - | - | - | - | 3 | 1 |
| | | | C04 | To perform the analysis of speech signal using LPC | 3 | 2 | 2 | - | - | - | - | - | - | - | - | - | - | 3 | 1 |
| | | | C05 | To extract the information of the speech or audio signals in terms of cepstral features | 3 | 2 | 2 | 1 | 1 | - | - | - | - | - | - | - | - | 3 | 1 |
| | | | C06 | To know various Audio coding techniques based on perceptual modeling of the human ear. | 3 | 1 | 1 | - | - | - | - | - | - | - | - | - | - | 3 | 1 |
| 7 | 70123728 | Wireless Communication | C01 | Explain the basics of wireless communication. | 2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3 | -- | 3 |
| | | | C02 | Discuss delay spread, fading, multipath propagation, multiple accesses and illustrate diversity techniques and explain the concepts of MIMO systems. | 3 | 2 | 2 | 1 | -- | -- | -- | -- | 1 | 1 | 1 | 1 | 3 | -- | 3 |
| | | | C03 | List the key mobile network components; explain their operation and data transmission over cellular networks. | 3 | 2 | 2 | 1 | -- | -- | -- | -- | 1 | 1 | -- | 3 | -- | 3 | |
| | | | C04 | To understand cellular standards such as TDMA, CDMA and GSM. | 3 | 2 | 2 | 1 | -- | -- | -- | -- | 1 | 1 | -- | 3 | -- | 3 | |
| | | | C05 | To understand the concept of wireless networking | 3 | 1 | -- | 1 | -- | -- | -- | -- | 1 | 1 | -- | 3 | -- | 3 | |
| | | | C06 | | | | | | | | | | | | | | | | |
| 7 | 70123729 | Biomedical Electronics Lab | C01 | To understand the basics of the biomedical signals. | 3 | 1 | 1 | - | - | - | - | - | - | - | - | - | - | 3 | 1 |
| | | | C02 | To understand the concept about ECG, EMG and EEG. | 3 | 1 | 1 | - | - | - | - | - | - | - | - | - | - | 3 | 1 |
| | | | C03 | To simulate the biomedical signals using software tool and analyse the same. | 3 | 2 | 2 | 1 | 1 | - | - | - | - | - | - | - | - | 3 | 1 |
| 7 | 70123730 | Digital Control System Lab | C01 | Develop models of discrete time control systems using Matlab and Simulink | 3 | 3 | 3 | 3 | 3 | -- | -- | 2 | 2 | 3 | -- | | | 3 | |
| | | | C02 | Perform the transient and steady state analysis of digital control systems using Matlab and Simulink | 3 | 3 | 3 | 3 | 3 | -- | -- | 2 | 2 | 3 | -- | | | 3 | |
| | | | C03 | Design a digital controller using the Root Locus Method | 3 | 3 | 3 | 3 | 3 | -- | -- | 2 | 2 | 3 | -- | | | 3 | |
| | | | C04 | Design a compensator in the frequency domain | 3 | 3 | 3 | 3 | 3 | -- | -- | 2 | 2 | 3 | -- | | | 3 | |
| | | | C05 | Design a digital control system with dead beat response | 3 | 3 | 3 | 3 | 3 | -- | -- | 2 | 2 | 3 | -- | | | 3 | |
| 7 | 70123731 | Speech and Audio Signal Processing Lab | C01 | To record speech and audio signals and analyse them using Matlab and PRAAT | 3 | | | | | | | | | | | | | 2 | -- |
| | | | C02 | To segment a speech signal into voiced, unvoiced and silence regions. | 3 | 2 | 2 | 1 | - | - | - | - | - | - | - | - | - | 3 | 1 |
| | | | C03 | To perform spectral analysis of speech and audio signals. | 3 | 2 | 2 | 1 | - | - | - | - | - | - | - | - | - | 3 | 1 |
| | | | C04 | To enhance the quality of speech and audio signals corrupted by noise. | 3 | 2 | 2 | 1 | - | - | - | - | - | - | - | - | - | 3 | 1 |
| 7 | 70123732 | Wireless Communication Lab | C01 | To study and implement various propagation models | 3 | 2 | 1 | - | 3 | 2 | - | - | - | - | - | - | 2 | - | - |
| | | | C02 | To analyse mobile communication systems to interpret how to m | 2 | 2 | 1 | - | - | 2 | - | - | - | - | - | - | 2 | - | - |
| | | | C03 | To test mobile communication equipment for the technical functi | 2 | 2 | - | - | - | 1 | - | - | - | - | - | - | 2 | - | - |
| | | | C04 | | | | | | | | | | | | | | | | |
| | | | C05 | | | | | | | | | | | | | | | | |
| | | | C06 | | | | | | | | | | | | | | | | |
| 7 | 70123741 | Printed Circuit Board (PCB) Design | C01 | acquire knowledge on PCB | 2 | 1 | - | - | - | - | - | - | 1 | - | - | - | - | 1 | 1 |
| | | | C02 | learn PCB layout and general rules | 2 | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - |
| | | | C03 | study PCB fabrication steps | 3 | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - |
| | | | C04 | get familiarize with current trends in PCB | 3 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | C05 | design PCB using CAD software tool | 2 | - | - | - | - | - | - | - | 3 | - | - | - | 2 | 3 | 1 |
| | | | C06 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 7 | 70123744 | Introduction to Mechatronics | C01 | Develop the knowledge in various mechatronics concepts and systems. | 3 | - | 2 | - | - | 2 | - | - | - | - | - | - | - | 1 | - |
| | | | C02 | Understand about the characteristics of transducers, sensors and measuring devices. | 2 | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - | 1 |
| | | | C03 | Analyse the factors that contribute to errors in measurements, such as non-linearity, hysteresis and dead band along with techniques to condition the signals. | 2 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | - | 1 | - |
| | | | C04 | Understand and apply the comparative characteristics of different types of controllers like proportional, integral, derivative and PID and other industrial control strategies | 2 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | - | - | - |
| | | | C05 | Gain knowledge and development skills associated with basic Neural network and Fuzzy logic methods | 2 | 1 | 1 | 2 | - | - | - | - | - | - | - | - | - | - | 1 |
| | | | C06 | | | | | | | | | | | | | | | | |
| | | | C01 | To analyse different components of analog communication systems such as modulator, demodulator, mixer, receiver etc in time and frequency domain. | 3 | 2 | -- | -- | -- | -- | -- | 2 | -- | -- | 1 | -- | 2 | -- | 3 |

