Course specific outcome:

Course	Course prerequisite	Expected outcome
Analog Circuits and Systems		• Impart knowledge on analog circuits • Impart knowledge on circuit operation and functionality • Impart knowledge on analog circuit to solve real-life problems • Impart knowledge in making electronic systems
Solid State Electronic Devices & Materials		• Understand the physics that influences the presence of charge carriers in a semiconductor • Describe the factors that influence the flow of charge in semiconductors • Describe the operation of semiconductor devices • Calculate voltage and current changes in semiconductor devices • Understand the nature of semiconducting materials
Mathematical Methods in Electronics		• Analyze real world scenarios to recognize when vectors, matrices, or linear systems are to be used for modeling • Analyze linear algebra concepts that are encountered in the real world, understand Complex variable • Acquire knowledge about derivative and partial derivative • Acquire knowledge about Laplace transform and Fourier series, Fourier Transform
Lab 1: Analog Circuits		• Impart knowledge on analog circuits • Impart knowledge on circuit operation and functionality • Impart knowledge on analog circuit to solve real-life problems • Impart knowledge in making electronic systems
Lab 2: Characterization of Devices & Materials		• Impart knowledge on Solar Cell • Impart knowledge on Photoconductor • Impart knowledge on p-n junction
Basics of Microwave and Mobile Communication		• Impart knowledge about the different technologies of Mobile Communication • Impart knowledge regarding the operation of Microwave

		tubes and solid state devices • Impart knowledge on Microwave Circuits • Principles of Microwave LOS communication
Digital Circuits and Logic Design		• Acquire the basic knowledge of digital logic levels and understand digital electronics circuits • Convert different type of codes and number systems which are used in digital communication and computer systems • Impart knowledge on design of Digital Circuits
Network Analysis and Synthesis		• Apply the fundamental concepts in solving and analyzing different Electrical networks • Select appropriate and relevant technique for solving the Electrical network in different conditions • Apply mathematics in analyzing and synthesizing the networks in time and frequency domain • Estimate the performance of a particular network from its analysis.
Microprocessor Fundamentals		• Describe the general architecture of a microcomputer system and architecture & organization of 8085 and understand the difference between 8085 and advanced microprocessor • Understand and realize the Interfacing of memory & various I/O devices with 8085 microprocessor • Understand and classify the instruction set of 8085 microprocessor and distinguish the use of different instructions and apply it in assembly language programming • Understand the architecture and operation of Programmable Interface Devices and realize the programming & interfacing of it with 8085 microprocessor • Understand basic architecture of 16 bit and 32 bit microprocessors • Understand interfacing of 16 bit microprocessor with memory and peripheral chips involving system design • Understand techniques for faster execution of instructions

		and improve speed of operation and performance of microprocessors • Understand RISC and CISC based microprocessors
Qunatum and Nano-Electronics: Physics and Materials		• Understand the different quantum Mechanical approaches for solution of potential of low-dimensional structures • Learn about properties of low-dimensional quantized systems • Understand working principle of different quantum effect devices
Lab 3: Digital Circuits		• Design Combinational circuits • Design Sequential circuits
Instrumentation and Power Electronics		• Impart knowledge on electronic measurement system • Impart knowledge on the methods of measuring different physical quantities • Impart knowledge on measuring instruments • Know the principle of operation, design and synthesis of different power conversion circuits and their applications
Optoelectronics		• Acquire fundamental understanding of the basic physics behind optoelectronic devices • Develop basic understanding of light emitting diodes • Develop detailed knowledge of laser operating principles and structures • Acquire in depth understanding of photodetectors • Describe basic laws and phenomena that define behaviour of optoelectronic systems • Use optical fibre equipment, and data transfer using optical fiber
Electronic Communication Systems		• Understand different blocks in communication system and how noise affects communication using different parameters • Distinguish between different amplitude modulation schemes with their advantages, disadvantages and applications • Analyze generation and detection of FM signal and

		comparison between amplitude and angle modulation schemes • Understand PCM, DPCM, ASK, FSK, PSK
Control System		• Demonstrate an understanding of the fundamentals of (feedback) controlsystems • Determine and use models of physical systems in forms suitable for use in the analysis and design of controlsystems • Express and solve system equations in state-variable form (state variablemodels) • Determine the time and frequency-domain responses of first and second-order systems to step and sinusoidal (and to some extent, ramp)inputs. • Determine the (absolute) stability of a closed-loop controlsystem • Apply root-locus technique to analyze and design controlsystems • Communicate design results in writtenreports.
Microelectronic Technology and Charactersation Techniques		• Get an overview the different steps of VLSI Tchnology • Learn about different epitaxial semiconductor growth techniques • Learbn about advanced imaging and characterisation techniques of nanostructure devices.
Mobile Communication		• Understand the architecture of different networklayers. • Understand the basic principle mobile communication with emphasis on GSM architecture • Understand the basics of Wireless Communicationand different multiplexing techniques
Lab 4: Electronic, Fiber Optic and Microwave Communication		• Understand the operation of Electronic Communication trainer kit • Understand the operation of Optical Communication trainer kit • Understand the experiments on Microwave Communication
Electromagnetic Field and		• Understand Maxwells's equation in time varying field

Radiation		• Understand concepts of different coordinate systems, static electric and magnetic fields and methods of solving for the quantities associated with these fields, time varying fields and displacement current, propagation of electromagnetic waves and their applications in practical problems
Digital Signal Processing		• Interpret, represent and process discrete/digital signals and systems • Determine the discrete Fourier transform of discrete-time signals • Design & analyze DSP systems like FIR and IIR Filter
Quantum Computing		• Develop concept on quantum logic and qubit • Develop concept on quantum gate and its operation and designing quantum circuits • Develop concept on quantum algorithm and its application in quantum computing • Develop concept on quantum noise, quantum error correction and detection, and quantum error correcting codes • Develop concept on quantum teleportation and its application in quantum information processing. • Develop concept on quantum communication • Develop concept on quantum cryptography
VLSI Design		• Know various logic methods and their limitations as well as the circuit design using VLSI Technology • Acquire a clear idea about fabrication process of CMOS technology **1.** The physics of Field Effect Transistor **2.** MOS Transistor Models (BSIM models for analog stages) **3.** Elementary transistor stages for analog integrated circuit **4.** Elementary stages for digital integrated circuit **5.** Inverters. **6.** VLSI design methodology

		7. Custom and Semi-custom IC **8.** Mixed signal VLSI **9.** Programmed Logics and FPGAs **10.** Behavioral Modeling of Operational and Transconductance Amplifier **11.** Operational Amplifier design**.**
Lab 5: Microprocessor and Microcontroller		• Understand the operation of typical microprocessor trainer kit • Solve different problems by developing different programs • Develop the quality of assessing and analyzing the obtained data