**B.Sc. Electronics**

PO1 – Be able to communicate effectively in term of oral and written communication skills

PO2 - Be passionate to attain professional excellence through lifelong learning

PO3 - Apply the knowledge of Electronics, Computer application and mathematics

 to analyse, design and develop solutions for real time electronics problems

PO4 – Be able to function as a member of a multidisciplinary team with sense of

 ethics, integrity and social responsibility.

PO5 - Be able to use techniques, skills and modern technological/scientific/

 engineering software/tools for professional practices

PO6 - Be competent to pursue higher learning and research

|  |  |  |
| --- | --- | --- |
| **Semester** | **Course** | **Course Outcome** |
| 1 | Basic Electronics | * Demonstrate the operation of passive components in filters, integrator and differentiator
* Describe the basic semiconductor principles , working of p-n junction diode and transistors
* Demonstrate the operation of diodes in clamper and clipper
* Apply standard device models to explain/calculate critical internal parameters of semiconductor devices
* Explain the behavior and characteristics of power devices such as SCR/UJT etc
 |
| Electronic devices LAB | * Choose the appropriate equipment for measuring electrical quantities and verify the same for different circuits
* Examine the characteristics of basic semiconductor devices.
* Perform experiments for studying the behavior of semiconductor devices for circuit design applications.
* Calculate various device parameters’ values from their IV characteristics.
* Interpret the experimental data for better understanding the device behavior.
* Prepare the technical report on the experiments carried.
 |
| 2. | Electronic Circuits | * Study circuits in a systematic manner suitable for analysis and design
* Illustrate about rectifiers, transistor and FET amplifiers and its biasing. Also compare the performances of its low frequency models.
* Explain the concepts of feedback and construct feedback amplifiers and oscillators.
* Summarizes the performance parameters of amplifiers with and without feedback
* Illustrate about various wave shaping circuits using passive components.
 |
| Electronic Circuits lab | * Understand and analyze electronic circuits
* Choose the appropriate equipment for measuring electrical quantities and verify the same for different circuits.
* Ability to understand and apply circuit theorems and concepts in electronics applications
* Design and troubleshoot basic electronics circuits
* Prepare the technical report on the experiments carried.
 |
| 3. | Basic Numerical Skills | * Understand the common numerical methods and how they are used to obtain approximate solutions to mathematical problems.
* Understand set operations, matrix and Mathematics of finance, Statistical tools and their applications
 |
| General Informatics | * Updates and expands basic informatics skills and attitudes relevant to the emerging knowledge of society
* Equip the students to effectively utilize the digital knowledge resources in learning
 |
| Analog & Digital Integrated Circuits | * Infer the DC and AC characteristics of operational amplifiers and its effect on output and their compensation techniques
* Elucidate and design the linear and nonlinear applications of an op-amp and special application ICs
* Explain and compare the working of multi vibrators using special application IC 555 and general purpose op-amp.
* Understand and represent numbers in powers of base and converting one from the other, carry out arithmetic operations
* Understand basic logic gates, concepts of Boolean algebra and techniques to reduce/simplify Boolean expressions
* Analyze and design combinatorial as well as sequential circuits
 |
| Digital electronics LAB | * Construct basic combinational circuits and verify their functionalities
* Apply the design procedures to design basic sequential circuits
* Learn about counters
* Understand the basic digital circuits and to verify their operation
 |
| 4 | Entrepreneurship Development | * Appreciate the importance of embarking on self-employment and has developed the confidence and personal skills for the same.
* Identify business opportunities in chosen sector / sub-sector and plan and market and sell products / services
* Start a small business enterprise by liaising with different stake holders Effectively manage small business enterprise
 |
| Basics of Audio & Video Media | * To study audio recording systems such CD/DVD recording, Audio Standards, and Acoustics principles
 |
| Microprocessors | * Understand the basic blocks of microcomputers i.e CPU, Memory, I/O and architecture of microprocessor’s
* Apply knowledge and demonstrate proficiency of designing hardware interfaces for memory and I/O as well as write assembly language programs for target microprocessor
* Derive specifications of a system based on the requirements of the application and select the appropriate Microprocessor
 |
| Microprocessor 8085 LAB | * Interface various I/O devices and design and evaluate systems that will provide solutions to real-world problem
* Prepare the technical report on the experiments carried
 |
| 5 | Electromagnetic Theory | * Understand the fundamentals of Electrostatics and Magnetostatics hence get the insight of the characteristics of materials and their interactions with electric and magnetic fields
* Understand the application of Vector Differential and Integral operators in Electromagnetic Theory.
* Interpret Maxwell’s equations in differential and integral forms, both in time and frequency domains.
* Describe the complex ε, µ, and σ, plane waves, Snell’s laws from phase matching, and calculate the reflection and transmission coefficients at the interface of simple media
* Calculate input impedance and reflection coefficient of an arbitrarily terminated transmission-line and can use Smith chart to convert these quantities.
 |
| Microcontroller 8051 | * Understand the basic blocks of microcomputers i.e CPU, Memory, I/O and architecture of microcontroller
* Apply knowledge and demonstrate proficiency of designing hardware interfaces for memory and I/O as well as write assembly language programs for target microcontroller
* Derive specifications of a system based on the requirements of the application and select the appropriate microcontroller
 |
| Network Theory | * Understands how to formulate circuit analysis problems in a mathematically tractable way with an emphasis on solving linear systems of equations
* Analyze the electric circuit using network theorems
* Determine Sinusoidal steady state response.
 |
| Analog Integrated Circuits LAB | * Interpret op-amp data sheets.
* Analyze and prepare the technical report on the experiments carried out.
* Design application oriented circuits using Op-amp and 555 timer ICs
* Create and demonstrate live project using ICs.
 |
| Microcontroller 8051 LAB | * Interface various I/O devices and design and evaluate systems that will provide solutions to real-world problem
* Prepare the technical report on the experiments carried
 |
| Digital Fundamentals (Open Course) | * Understand and represent numbers in powers of base and converting one from the other, carry out arithmetic operations
* Understand basic logic gates, concepts of Boolean algebra and techniques to reduce/simplify Boolean expressions
* Analyze and design combinatorial as well as sequential circuits
 |
| Project | * Survey and study of published literature on the assigned topic
* Working out a preliminary Approach to the Problem relating to the assigned topic
* Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility
 |
| 6 | Communication System | * Design basic digital communication systems to solve a given communications problem and they become conversant with the requirements and the protocols employed in the fundamental components in a communication network.
* Understand simple block forward error correction codes and basic dispersion compensation concepts and also the concepts of up/down conversion and modulation
* Determine the suitability of a particular communication system to a given problem
* Describe the concept of "noise" in analog and digital communication systems. Also, get insight on the trade-offs (in terms of bandwidth, power, and complexity requirements) in basic digital communication systems.
 |
| Principles of DSP | * Represent various types of continuous-time and discrete-time signals
* Understand the basic concepts related to discrete time signals, systems, Z transform and Fourier transform
* Apply knowledge and demonstrate proficiency of analyzing signals in time as well as frequency domain using Fourier and Z transform
* Design and analyze IIR/FIR filters with given specifications
* Apply transform methods for representing signals and systems in time and frequency domain
 |
| Control Systems | * Understand the concepts of closed loop control systems
* Analyse the stability of closed loop systems.
* Apply the control techniques to any electrical systems
* Compute and assess system stability
 |
| Microwave and radar engineering (Elective) | * Identify the use of microwave components and devices in microwave applications.
* Understand the working principles of all the microwave tubes
* Understand the working principles of all the solid state devices
* Choose a suitable microwave tube and solid state device for a particular application
 |
| Communication System LAB | * Understand basic elements of a communication system
* Analyze the baseband signals in time domain and in frequency domain
* Build understanding of various analog and digital modulation and demodulation techniques
* Prepare the technical report on the experiments carried.
 |
| DSP LAB | * Learn the practical implementation issues stemming from the lecture material
* Simulate, synthesize and process signals using software tools
* Learn to work in groups and to develop MATLAB/ Scilab simulations of various signals and systems.
* Prepare the technical report on the experiments carried
 |
| Project | * Implement the working model
* Preparing a Written Report on the Study conducted
 |