**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

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| **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 |