Laboratories

The laboratories in department of Electronics and Communication Engineering are intended to give practical experience to the students. Laboratories are useful for students to implement the theory in practical aspects and helps student to apply their knowledge of theory for various courses of their course outcomes.

ECE is equipped with highly developed hardware and software labs, that have superior quality and sophisticated equipment and trainer kits that allows students to design and implement. ECE finds its application both in hardware and software these days. The department has computer laboratory, possessing computers of Intel Pentium i3/i5 processors, connected over campus LAN with high speed Internet connection.

Detail of various laboratories and their facilities are as follow:

Hardware Laboratories

- ➢ **Electronic Devices and Circuits Laboratory**
- ➢ **Network Analysis laboratory**
- ➢ **Switching Theory and Logic Design Laboratory**
- ➢ **Analog and Digital Circuits Laboratory**
- ➢ **Analog and Digital Communication Laboratory**
- ➢ **Linear Integrated Circuits Applications Laboratory**
- ➢ **Microwave Engineering Laboratory**
- ➢ **Microprocessors and Microcontrollers Laboratory**

Software Laboratories

- ➢ **Microprocessors and Microcontrollers Laboratory**
- ➢ **Digital Signal Processing Laboratory**
- ➢ **VLSI Design Laboratory**

Electronics Devices and Circuits Laboratory:

This lab mainly focuses on semiconductor device physics. The students get familiarized with the analysis and design of circuits by using semiconductor devices like diodes, transistors, FETs, SCRs, and UJTs.

Facilities: (Function Generators (1 MHz) -6,Regulated Power Supply(0-30V) -6,Cathode Ray Oscilloscope (30 MHz) Scientific -2,Full Wave Rectifier &Half Wave Rectifier Trainer Kits -1,BJT ,E-Characteristics -1,FET Characteristics(CS Configuration) -1,BJT As Switch- 1,Frequency Response ,F ,JT-CE Amplifier -1,Frequency Response of BJT-CC Amplifier -1,Frequency Response of BJT-CS Amplifier -1,SCR Characteristics -1,UJT Characteristics -1,Multimeters -5,Bread Boards -5,Digital Panel Meters -30,Decade Resistance Boxes -5,Silicon Control Rectifier -30 ,Resistors (All Values for Laboratory) EACH -10,Capacitors- 50,Zenor Diodes -30,Germanium Diodes -30.

Switching Theory and Logic Design Laboratory:

This course is intended to enhance the learning experience to gain experience in using the basics logic gates(AND, OR, NOT) and universal logic gates(NAND, NOR) Combinational logic circuits design and control and timing circuitry, Sequential logic circuit design, Synchronous and asynchronous systems.

Facilities: Realization of Logic Gates-1,3 To 8 Decoder Using IC 74138-1,8:1 Multiplexer Using IC 74151 And 2:1 De-Multiplexer Using IC 74155-1,4 Bit Comparator Using IC 7485 -1,D Flip- Flop Using IC 7474 -1,Decade Counter Using IC 7490 -1,4 Bit Counter Using 7493 -1,Shift Register Using IC 7495 –1,Universal Shift Register Using IC 74194/195 -1,Ram (16x4) Using IC 74189(Read and Write Operations) -1.

Network Analysis:

This laboratory provides all hardware required to design and analysis of linear and Non linear circuits, basic circuit laws and Network theorems with their applications. This laboratory provides a platform to the students to understand the basics of Circuit and Network analysis and design.

Facilities: Verification of KCL &KVL -2,Series & Parallel resonance -2,Time response of first order RC/RL network -2,Two port network parameters-Z, Y-Parameters -2,Two port network parameters ABCD and h-Parameters -2,Verification of Superposition and Reciprocity theorems -2,Verification of Maximum Power Transfer theorem -2,Experimental verification of Thevenin's and Norton's theorems -2.

Analog and Pulse Circuits Laboratory:

This laboratory provides all hardware and software required to measure the characteristics of various electronic components. In this lab, the students are emphasized to design and analyse the electronic circuits as well as pulse digital circuits and are supposed to co-relate it theoretically. The students learn to obtain different parameters in the circuits.
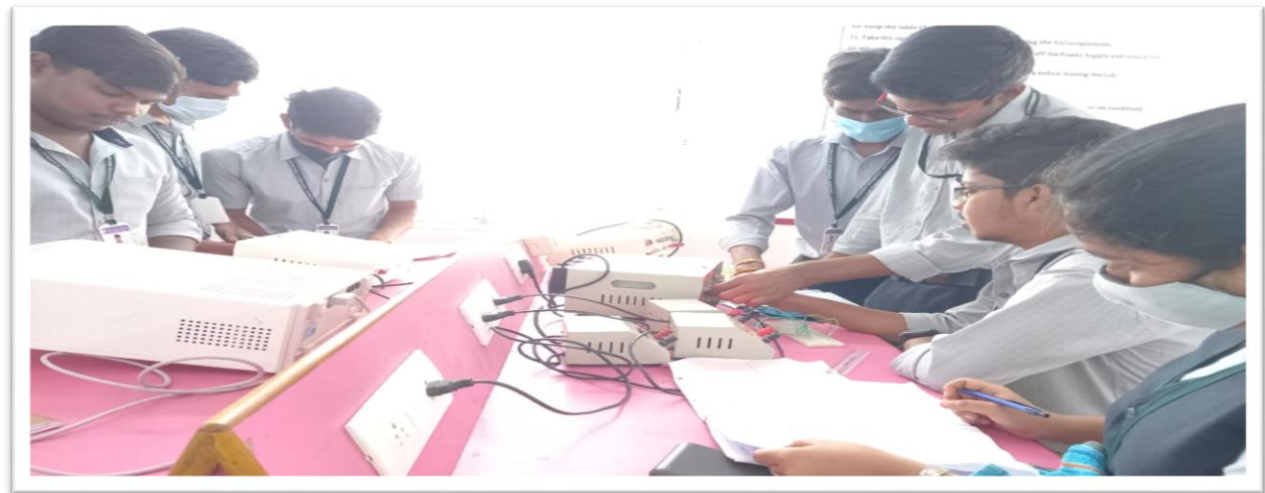
Facilities: Linear wave shaping-2,Non Linear wave shaping – Clippers-2,Non Linear wave shaping – Clampers-2,Transistor as a switch-2,Study of Logic Gates & Some applications-2,Study of Flip-Flops & some applications-2,Sampling Gates-2,Astable Multivibrator-2,Monostable Multivibrator-2,Bitable Multivibrator-2,Schmitt Trigger-2,UJT Relaxation Oscillator-2,Bootstrap sweep circuit-2.

Analog and Digital Communication Laboratory:

This laboratory provides all hardware and software required to design and simulation of analog and digital communications with the applications using MATLAB software. This laboratory provides a platform to the students to understand the basics of analog and digital communication systems, modulation techniques, data transmission, multiplexing.

Facilities: Facilities: Amplitude Modulation & De- Modulation-2,AM - DSB SC - Modulation &Demodulation-1,AM - SSB SC - Modulation &Demodulation-1,Pre-Emphasis & De-Emphasis-2,Frequency Modulation And De-Modulation-2,Cathode Ray Oscilloscopes(30 MHz) Scientific -2,Servo Stabilizer(5KVA) Time Division Multiplexing And De-Multiplexing-2,Pulse Code Modulation-2,Differential Phase Shift Keying-2,Delta Modulation-2,Frequency Shift Keying-2,Phase Shift Keying.

Linear Integrated Circuits Applications Laboratory:

This laboratory provides all hardware required to design and analysis of linear integrated circuits with their applications. This lab aims at teaching the students about Linear Integrated Circuit design using 555 Timer, phase-locked loop and implementing those circuits in real time applications.

Facilities: Study of Op-Amp -2,Integrator And Differentiator Using IC 741 -2,Active Filters – LPF & HPF Using IC 741 -2,RC Phase Shift Oscillator Using IC 741 -2,Wein Bridge Oscillator Using IC 741 -2, D/A Conversion Using IC 741 -2,Monostable Multivibrator Using 555 Timer -2,Astable Multivibrator Using 555 Timer -2,Schmitt Trigger Using 555 Timer -2,Phase Locked Loop Using 565 Timer -,Cathode Ray Oscilloscopes(30 MHz) Scientific -3,Servo Stabilizer(5KVA).

Microwave Engineering Laboratory:

This laboratory provides all hardware requirements to observe the microwave and waveguide parameters. The laboratory is designed to get the exposure to various microwave components, microwave benches in this lab. This laboratory helps the students understand the basics of Microwave engineering and gives a detailed description of the working principle of microwave components.

Facilities: Klystron Power Supply -2,VSWR Power Supply -2, Tube with mount -2, Directional Coupler-2, Slotted Section -2, Tunable Probe -2, Fixed Attenuator 3dB -2, Fixed Attenuator 6dB -2, Fixed Attenuator 10dB -2, SS Tuner -2, Matched Termination -2, Pin detector -2, Variable matched Terminals -2, Magic Tee -2, Isolators-2port -2, Isolators -3port, Power cords -4, Frequency meters -2,Fan with stand-2,Stands-8,BNC cables -6,Variable attenuator-2.

Microprocessors and Microcontrollers Laboratory:

This laboratory provides all hardware and software required to learn the assembly language programming systematically for the different applications of microprocessor and microcontrollers by using hardware and software environment. The microprocessor lab helps the students to gain a better understanding of 8086 microprocessors. Students are able to execute basic assembly language programs as well as interface ADC, DAC and stepper motor through various interface cards available in the lab.

Facilities: Intel 8086 Microprocessor kits with keyboards), Intel 8051 Trainer Kits with Keyboards , Serial Interface Cable , and interfacing modules for 8086 Microprocessor like Stepper Motor , 8-Channel 8-Bit Analog To Digital Converter , Dual Digital To Analog Converter , 8-Channel 8-Bit Analog To Digital Converter & Dual Digital To Analog Converter, Programmable Peripheral Interface-8255, Universal Synchronous/Asynchronous Receiver/Transmitter-8251, Traffic Light Controller, Interfacing

Modules for 8051 Microcontroller like Liquid Crystal Display, Timer/Counter, UART & Interrupt , and Matrix Keyboard.

Digital Signal Processing Laboratory:

This laboratory provides software to design signal processing, and analysis of analog and digital signals by using MATLAB software. The Digital Signal Processing Lab is based on MATLAB tools which are used to evaluate the effectiveness of Fast Fourier Transform algorithms in Discrete Fourier Transform implementation. We can also do the analysis of digital filter design of Finite Impulse Response and Infinite Impulse Response filters.

VLSI Design Laboratory:

This laboratory provides all hardware and software required to design and development of design and simulation of the integrated circuits using cadence software. To develop familiarity and confidence with designing, building and testing digital circuits, including the use of CAD tools. Behavioral, register-transfer, logic, and physical-level structured VLSI design using CAD tools and hardware description languages.