ADVANCED LABORATORIES

1. Electronic Devices and Circuits Laboratory

This lab is for II year I semester ECE students

The students completing this course are expected to understand the V-I characteristics and design of different devices experimentally and carryout the experiments like.

- PN junction diode V-I characteristics, Zener diode V-I characteristics ,Half wave rectifier• ,full wave rectifier, bridge rectifier with different filters, BJT input and output characteristics in common base, common emitter and common collector configurations, JFET characteristics, CE amplifier, CC amplifier , Common Source FET amplifier, UJT characteristics, UJT Relaxation oscillator and SCR characteristics
- Multistage Amplifier, Feedback Amplifier. Calculation of Gain, Input Resistance, Output• Resistance and Frequency Response Characteristic. Colpitt's Oscillators, RC Phase - Shift Oscillator, Wein - Bridge Oscillator, Class B Push - Pull Power Amplifier, Class A Transformer - Coupled Amplifier.
- To achieve this, the lab is equipped with a good number of lab consumables i.e all electronic components and DC Regulated power supplies, 15MHz/20MHz Cathode Ray oscilloscopes,3MHz Function generators, Multirange digital meters, Digital multimeters, stabilizer, Decade inductance boxes, Decade capacitance boxes, Decade resistance boxes , Bread boards and charts.

2. Electronic and Pulse Circuits laboratory:

This lab is for II year II semester ECE students

- The students completing this course are expected to understand the principles, design and simulation of various BJT and FET amplifiers, BJT oscillators, power amplifiers , wave shaping circuits and measurement of different parameters experimentally and carryout the experiments like.
- Multistage Amplifier, Feedback Amplifier. Calculation of Gain, Input Resistance, Output Resistance and Frequency Response Characteristic. RC Phase Shift Oscillator, Hartley and Colpitt's Oscillators, Class B complementary Symmetry Amplifier, MOS Amplifier.
- Linear & Non Linear wave shaping circuits. Calculation of percentage of tilt, rise time, Frequency Response and Transfer characteristics, Logic gates: verification of truth tables, Multivibrators: Calculation of frequency of oscillation and pulse width, Schmitt Trigger: Calculation of UTP, LTP and Hysteresis curve, UJT Relaxation Oscillator, Bootstrap circuits.
- To achieve this, the lab is equipped with a good number of experimental modules, power supplies, 20MHz/30MHz oscilloscopes, function generators, stabilizer, Decade inductance boxes, Decade capacitance boxes, Decade resistance boxes, multi-meters, Multirange Digital Meters 0-200µA, 0-2000µA, 0-200 mA Ammeters, 0-200v, 0-2V, 0-20V Voltmeters, Computers and charts.

3. Basic Simulation Laboratory:

This lab is for II year I semester ECE students.

- The students completing this course are expected to understand the principles, characteristics of the different signals and systems. They are able to perform different operations like convolution, correlation etc… on them.
- Basic Operations on Matrices, Generation of various signals and sequences (Periodic and Aperiodic), such as unit Impulse step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc., Operations on signals and sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power, Finding the Even and Odd parts of Signal / Sequence and Real and imaginary parts of Signal, Convolution between Signals and Sequences, Auto Correlation and Cross Correlation of Signals and Sequences, Verification of Linearity and Time Invariance Properties of a given Continuous / Discrete System, Computation of Unit sample, Unit step and sinusoidal responses of the given LTI system and verifying its Physical realiazability and stability properties, Gibbs Phenomenon, Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum, Waveform Synthesis using Laplace Transform, Locating the Zeros and Poles and Plotting the Pole-Zero maps in S plane and ZPlane for the given transfer function, Generation of Gaussian noise (Real and Complex), Computation of its mean, M.S. Value and its Skew, Kurtosis and PSD,

Probability Distribution Function, Sampling theorem Verification, Removal of noise by Autocorrelation / Cross correlation, Extraction of Periodic Signal, masked by noise using Correlation, Verification of Weiner – Khinchine Relations, Checking a Random Process for Stationary in Wide sense

4. Analog and Digital Communications Laboratory:

This lab is for II year I semester & III Year I Sem ECE students

- The students completing this course are expected to understand the principles, design of various modulation techniques in communications.
- To get familiar with every principles and to analyze various problems students implement the following experiments using experimental kits, Simulation tool and DSP Processors.
- Amplitude, Frequency, SSB Modulation and Demodulation, Characteristics of Mixer, Pre and De Emphasis, Phase Locked Loop, Receiver Measurements and AGC Characteristics. After dealing with complete Analog signals, students start to explore digital signals and perform various experiments like .
- Pulse Amplitude, Width, Position Modulations and demodulation, Sampling theorem, Multiplexing, Pulse code and differential pulse code modulation, Delta Modulation and Keying techniques

- To achieve this, the lab is equipped with a good number of experimental modules and to carry out advance research work in the field of communication, the lab also have Mobile Lab station, Spectrum Analyzer, RF Signal generator and Texas ASLKV Kits. The general equipment for smooth functioning of lab are power supplies, 15MHz/20MHz digital storage oscilloscopes, function generators, Regulated power supplies, IC tester, stabilizer, Decade inductance boxes, Decade capacitance boxes, Decade resistance boxes, charts.

5. Linear and Digital IC Applications Laboratory:

IMAGE 5

This lab is for III year/ I semester ECE B.Tech students.

- In this lab Students conduct experiments and interprets data in the context of learning the operation of different Linear and Digital IC's. The students completing this course are expected to understand the principles, design, and measurement of different parameters experimentally and carryout the experiments like
- Operational Amplifier in Inverting and Non Inverting configurations, Design of different Applications like Adder, Subractors, Oscillators, Filters, Voltage Regulators, A/D and D/A converters.
- IC 555 timer in Astable and Monostable Modes and different Applications like• Oscillators, Schmitt Trigger.
- Voltage Regulators by using IC's like 723, 7805,7905.
- Voltage Controlled Oscillator by using 566, PLL 565.
- Implementation of Different Combinational and Sequential circuits using different Digital IC's

  To achieve this, the lab is equipped with a good number of
- Digital IC Trainer kits
- ASLKV 2010 Experimental KIT (Analog system lab starter kit version)
- DC Regulated Power Supplies (Range 0-30V)
- 20MHz oscilloscopes and 50MHz Digital Storage oscilloscopes
- 3 MHz- Function generators
- 40 pin Analog and Digital IC Tester
- Stabilizer
- Decade inductance boxes With different Ranges
- Decade capacitance boxes With different Ranges
- Decade resistance boxes With different Ranges
- Multi Meters current- 0-200µA,0-500mA,0-1A- Voltage 0-200 mV,0-200V, 1-1MOhm Resistance measurement
- Multi Range Meters to Measure current and voltages 0-200µA,0-50mA,0-50mV, 0-50V.
- LCR Q-Meter/ For lab oriented projects required equipment are available

6. Microprocessor and Microcontroller lab:

IMAGE 6

This lab is for III year II semester students.

- The students completing this course are expected to understand and apply the fundamentals of assembly level programming of 8086 microprocessor and 8051 microcontroller and work with standard real time interfaces
- List of Experiments which can be conducted in the lab are arithmetic operations using various addressing modes of 8086,sorting an array for 8086,searching for character in a string for 8086, string manipulations for 8086, digital clock design using 8086, Interfacing ADC and DAC to 8086 / 8051, Interfacing stepper motor to 8086 / 8051, arithmetic, logical and bit manipulation instructions of 8051, Timer/ Counter in 8051, Interrupt handling in 8051, UART Operation in 8051, Communication between 8051 kit and PC, Interfacing LCD to 8051 and Interfacing Matrix / Keyboard to 8051.
- To achieve this, the lab is equipped with High end computers and Microprocessor and Microcontroller interfacing kits.. Students dump the programs and check the results. check the results.

7. Digital Signal Processing Laboratory:

IMAGE 7

This lab is for III year II semester ECE students

- The students completing this course are expected to understand the principles, design, and implementation of different Signal processing algorithms using simulation softwares such as Matlab and Simulink as well as Hardware realization using DSP processors, Embedded Processors, FPGA boards.
- Computation of Power Spectrum, Generation of DTMF tones, Using Difference equation for LTI system representation, Examining difference between linear and circular convolution. Implementation of IIR, FIR filters and plotting their magnitude and phase responses. Implementation of Multirate systems building blocks such as Decimation and Interpolation. Also real time signal processing using CODEC to process audio, image and external analog signals.
- To achieve this, the lab is equipped with a high end computing systems, Matlab latest version with campus wide license supporting fifty toolboxes. DSP fixed and floating point processor boards such as TMS320C6713, C6711, C5510, C5416, UPS, DSOs, function generators, and Code composer software are available in the lab.

8. Microwave Engineering and DC Laboratory:

This lab is for IV year I semester ECE students

- The students completing this course are expected to understand the Characteristics and measurement of different parameters experimentally and carryout the experiments like.
- Reflex Klystron characteristics, Gunn Diode Characteristics, Attenuation Measurement, Directional Coupler Characteristics, VSWR Measurement, Impedance and Frequency Measurement, Waveguide Parameters Measurement, Scattering Parameters of Circulator, Scattering Parameters of Magic Tee, E-Plane, H-Plane.
- To achieve this, the lab is equipped with a good number of experimental Bench setups, power supplies, 15MHz/20MHz oscilloscopes, function generator, stabilizer, multi-meters, 0-250µA, 0-500µA, 0-100 mA Ammeters, and computers

9. VLSI Laboratory:

IMAGE 9

This lab is for III

year I semester ECE students.

- The students completing this course are expected to understand the principles, design, and implementation of digital circuits using software such as XILINX and Mentor Graphics. The students are able to realize the modules using FPGA kits such as SPARTAN 6 ATLYS and SPARTAN 3E boards.
  The design constraints such as critical path delay, power dissipation and area were calculated by using Mentor Graphics Chip design tools and the experimental modules are
- In cycle 1; Code to realize all the logic gates, 2-to -4 decoder, 8-to-3 encoder (Without and with parity), 8-to-1 Multiplexer, 4 bit binary to gray converter, Comparator, Full adder using 3 modeling styles, flips: SR, D, JK, T, 4-bit binary, BCD counters (synchronous /asynchronous reset), Sequence detector which can be done by using Xilinx and Quartus tools.
- In cycle 2; CMOS inverter, CMOS NOR/ NAND gates, CMOS XOR gate and MUX, CMOS 1-bit full adder, Flip Flops: SR, D, JK, T which can be done by using Mentor Graphics Pyxis Schematic and Pyxis Layout tools.
- To achieve this, the lab is equipped with a high end computing systems, XILINX latest version with campus wide license. For implementation of circuits Xilinx and For FSM design and verification, Quartus Tools is available.

10. Embedded Systems Laboratory:

IMAGE 10

This lab is for M.Tech Embedded Systems students.

- Embedded Systems Laboratory is an advanced course offered within the context of our Embedded Systems Degree Program. The students completing this course are expected to understand the development of embedded systems based on microcontrollers and programmable logic devices. The students carry out experiments like.
- Interfacing switch, buzzer, keypad, LCD, elevator, seven segment display, temperature sensor, stepper motor, memory card to the 8051 and ARM microcontrollers, creating time delay using timers, serial transmission and reception, interrupt handling, I2C protocol implementation, generation of PWM signal and uCOS-II Real time operating systems based applications.
- To achieve this, the lab is equipped with ARM7 LPC-2148 development boards, ARM 9 Kits, Keil Software, Proteus VSM software Complete Electronic Circuit Simulation Software, Lab VIEW Rio

Evaluation Kit, TIVA Launch Pad, MSP 430G2553 Launch Pad, TIVAC Series Dev Kit, 8051 Microcontroller Dev Board, 3D Printer, DSP Processor with EVM along with required accessories, E Health sensor platform kit, XBEE Pro ZBSMT (ZigBee Develoment Kit), IC Trainer kits, DC Regulated Power Supply, Function Generators, Digital Storage Oscilloscope, Digital Video Development platform kit, PSOC First Touch kit.