

Major Equipments Available in the Lab

S. No.	Name of the Equipments	Quantity
01	Cathode Ray Oscilloscope (CRO)	15
02	Function generator	15
03	PAM, PPM and PWM kits	02
04	PCM modulation / demodulation kits	02
05	Delta modulation / demodulation kits	02
06	ASK, FSK and PSK modulation / demodulation kits	02
07	PLL frequency synthesizer kits	02
08	FDM kit	01
09	TDM kits	02
10	Sampling and reconstruction kits	02
11	QPSK modulation / demodulation kits	02
12	Line coding and decoding kits	02
13	AM transreceiver kit	02
14	FM transreceiver kit	02
15	Microwave test bench X-0	03
16	Microwave test bench X-1	03
17	Horn antenna with tripod stand	01
18	Fixed attenuator	03
19	Magic Tee, E-Plane Tee, H-Plane Tee	02
20	Directional couplers	02
21	Laser light source	01
22	Fiber optic Power Meter	04
23	Optical fiber communication Kits	05
24	TDM MUX/DEMUX Kits	02
25	Advanced laser communication	02
26	850nm pin diode, LED SMA connector	03
27	Accessories for Microwave test benches	Adequate Nos.

Department of Electronics and Communication Engineering
Communication Lab

Instructional Objectives:

- To become familiar with various analog & digital modulation and demodulation techniques.
- To test and analyse the source coding and channel coding theorems.
- To study the characteristics of optical sources, detectors and microwave components.
- To learn the simulation tools to design communication link.
- To understand the concepts of BER, eye pattern, pulse broadening.
- To study the wireless channel characteristics and wireless communication system.

Students Outcomes:

At the end of the course, the student will be able to:

- Design and implement analog & digital communication systems.
- Apply various source and channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of communication system.
- Identify the optical loss characteristics in optical fibre that affect the performance of transmission systems.
- Simulate & test the performance of various functional modules of a communication link.
- Perform and analyse the microwave measurements.
- Understand the wireless channel characteristics and analyse the performance of wireless communication system.

Courses Offered

S.No.	ODD Semester	Class	No. of Sessions	EVEN Semester	Class	No. of Sessions
1	Communication Systems Laboratory	5 th SemECE	4	Project Work	8 th Sem ECE	8
2	Optical and Microwave Laboratory / Advanced Communication Laboratory	7 th Sem ECE	4			
Percentage of Lab Utilization : 80%				Percentage of Lab Utilization :80%		

List of Experiments

Communication Systems Laboratory

V Sem ECE

01. Signal sampling and reconstruction.
02. Time division multiplexing.
03. AM modulator and demodulator.
04. FM modulator and demodulator.
05. Pulse code modulation and demodulation.
06. Delta modulation and demodulation.
07. Line coding schemes.
08. Simulation of ASK, FSK, and BPSK generation schemes.
09. Simulation of DPSK, QPSK and QAM generation schemes.
10. Simulation of signal constellations of BPSK, QPSK and QAM.
11. Simulation of ASK, FSK and BPSK detection schemes.
12. Simulation of linear block and cyclic error control coding schemes.
13. Simulation of convolutional coding scheme.
14. Communication link simulation.

Optical and Microwave Laboratory

VII Sem ECE

Optical Experiments

01. DC characteristics of LED and PIN photo diode.
02. Mode characteristics of fibbers.
03. Measurement of connector and bending losses.
04. Fibre optic Analog and Digital Link- frequency response(analog) and eye diagram (digital).
05. Numerical aperture determination for fibres.
06. Attenuation measurement in fibres.

Microwave Experiments

07. Reflex klystron or Gunn diode characteristics and basic microwave parameter measurement such as VSWR, frequency, wavelength.
08. Directional Coupler Characteristics.
09. Radiation Pattern of Horn Antenna.
10. S-parameter Measurement of the following microwave components (Isolator, Circulator, E plane Tee, H Plane Tee, Magic Tee)
11. Attenuation and Power Measurement.

List of Experiments

Advanced Communication Laboratory

VII Sem ECE

Optical Experiments

1. Measurement of connector, bending and fiber attenuation losses.
2. Numerical Aperture and Mode characteristics of fibers.
3. DC characteristics of LED and PIN photo diode.
4. Fiber optic analog and digital link characterization - frequency response(analog), eye diagram and BER (digital).

Wireless Communication Experiments

1. Wireless Channel simulation including fading and Doppler effects.
2. Simulation of channel estimation, synchronization & equalization techniques.
3. Analysing impact of pulse shaping and matched filtering using software defined radios.
4. OFDM signal transmission and reception using software defined radios.

Microwave Experiments

1. VSWR and impedance measurement and impedance matching.
2. Characterization of directional couplers, isolators, circulators.
3. Gunn diode characteristics.
4. Microwave IC – filter characteristics.