

# GUJARAT TECHNOLOGICAL UNIVERSITY

## B. E. SEMESTER: VI

### Electrical & Electronics Engineering

Subject Name: **Electronic Communication**

Subject Code: **160802**

Teaching Scheme				Evaluation Scheme		
Theory	Tutorial	Practical	Total	University Exam (Theory) (E)	Mid Sem Exam (Theory) (M)	Practical (I)
4	0	2	6	70	30	50

Sr. No	Course Content	Total Hrs.
1.	<b>Communication Fundamental:</b>  Communication system, Analogue and digital Messages, Introduction to Waveform Spectra, Introduction to Audio Signal, Frequency, Range for Speech and Music, Sound Pressure Level, Intensity, Loudness Level, Historical review of telecommunication.	4
2.	<b>Passive Circuits :</b>  Series tuned circuit, Parallel tuned circuit, Self-capacitance of a coil, Skin effect, Mutual inductance, High frequency transformers, Tapped inductor, Capacitive tap, Low-frequency transformers	3
3.	<b>Noise:</b>  Thermal Noise, Shot Noise, Partition Noise, Low Frequency or Flicker Noise, Burst Noise, Avalanche Noise, Bipolar Transistor Noise, Field Effect Transistor Noise, Equivalent Input Noise Generator, and Comparison of BJTs And FETs, Signal to Noise Ratio, Noise Temperature, Measurement of Noise, Temperature and Noise Factor.	5
4.	<b>Receiver:</b>  Super heterodyne Receivers, Tuning range, Tracking, Sensitivity and gain, Image rejection, Spurious responses, Adjacent channel selectivity, AGC, Double conversion, Electronically Tuned Receivers (ETRs), Integrated-Circuit Receivers.	5
5.	<b>Analysis and Transmission of Signals:</b>  A periodic signal representation by Fourier integral, Transform of some useful function, Some properties of the Fourier transform, Signal transmission through a linear system, Ideal and practical filters, Signal distortion over a	7

	communication channel, Signal energy and energy spectral density, Signal power and power spectral density.	
6.	<b>Amplitude Modulation and Demodulation:</b> Baseband versus carrier communications, Double-Sideband amplitude modulation, Amplitude modulation, Bandwidth-efficient amplitude modulation, Vestigial sideband, Local carrier synchronisation, Frequency division multiplexing, Phase locked loop with applications, Frequency synthesizers.	7
7.	<b>Angle Modulation and Demodulation:</b> Nonlinear modulation, Bandwidth of Angle-Modulated waves, Generating FM waves, Demodulation of FM signals, Effect of non linear distortion and interference, Super heterodyne analogue AM/FM receivers, FM Broadcasting System.	6
8.	<b>Satellite Communication:</b> Kepler's first law , kepler's second law , kepler's third law, orbits , geostationary orbit , power system , attitude control , frequency plans and polarization , transponders, multiple- access method .	7

**List of experiments with emphasis on test kits and breadboard implementation for the following communication circuits (Minimum 10).**

1. To generate amplitude modulation (AM) waveform and to measure modulation index of AM wave using waveform method and trapezoidal method.
2. To extract information signal from the AM wave using diode detector.
3. To generate SSB signal using balance modulator and single sideband filter.
4. To demodulate SSB signal.
5. To perform AM transmitter and receiver.
6. To Perform Frequency modulation. (Observe on CRO & DSO)
7. To extract information signal from the FM wave using FM detector.
8. To verify Carson's rule for FM bandwidth using DSO.
9. To understand block diagram of super-heterodyne AM and FM receiver.
10. To understand working of AGC circuit.
11. To obtain frequency response of RF amplifier.
12. To obtain frequency response of RF amplifier of AM receiver.

**Text Books:**

1. Dennis Roddy, John Coolen, "Electronic Communications", Edition IV, Prentice Hall of India Private Limited.
2. Lathi, B.P., Ding, Z., "Digital and Analog Communication System", (Edition IV), OXFORD university press.

## **Reference Books:**

1. Kennedy, G., Davis, B., “Electronic Communications” Tata McGraw Hill Publication.
2. Wayne Tomasi, “Electronic Communications Systems” Pearson Education India.
3. Haykins, S. “Communication Systems”, Wiley India.
4. Taub, H., Schilling, D., Saha, G., “Taub’s Principles of Communication Systems”, Tata McGraw Hill Publication.
5. Singh, R., Sapre, S., “Communication Systems”, Tata McGraw Hill