

GUJARAT TECHNOLOGICAL UNIVERSITY

Diploma in Electronics & Communication Engineering

Semester: 3

Subject Code

Subject Name COMMUNICATION ENGINEERING - I

Sr. No.	Course content
1.	INTRODUCTION TO COMMUNICATION SYSTEMS : 1.1 Block diagram of general communication system 1.2 Modulation: definition, needs and types 1.3 Bandwidth requirements 1.4 Noise: types, sources, signal-to-noise ratio and noise figure
2.	AMPLITUDE MODULATION : 2.1 Mathematical expression for AM signal 2.2 Frequency spectrum of the AM signal 2.3 Modulation Index: definition, equation and numericals 2.4 Carrier and modulating signal power relation: equation and numericals 2.5 Generation of AM 2.6 Low level and High Level Modulation 2.7 Grid and Plate modulated Class-C Amplifier 2.8 Collector Modulated Class-C Amplifier 2.9 Block diagram of AM broadcasting Transmitter
3.	FREQUENCY AND PHASE MODULATION : 3.1 Mathematical representation of FM signal 3.2 Modulation Index: definition, equation and numericals 3.3 Carson's rule for bandwidth: equation and numericals 3.4 Phase Modulation. 3.5 Comparison between FM and AM 3.6 Comparison of wideband and Narrowband of FM 3.7 Pre-emphasis de-emphasis networks. 3.8 Generation of FM: Basic reluctance modulation, Varactor diode Modulation, Transistor redandance modulation and Reactance tube modulation 3.9 Stabilized Reactance Modulation 3.10 Indirect Method generation of FM (Armstrong Method) 3.11 A complete block diagram of FM broadcasting Transmitter
4.	AM RADIO RECEIVER : 4.1 Tuned Radio frequency receiver. 4.2 Characteristic of radio receiver : Sensitivity, Selectivity, fidelity 4.3 Super heterodyne Receiver. 4.4 RF Amplifier section: circuit and working.

	4.5 RF Converters and RF Mixers: circuits and working 4.6 Selection of intermediate frequency, IF amplifier section and its working 4.7 AM Detection and Automatic gain control circuits and its working. 4.8 AF Sections of AM receiver Circuit and its working.
5.	FM RECEIVER : 5.1 FM receiver block diagram. 5.2 Comparison of FM receiver with AM, receiver 5.3 Amplitude Limiting. 5.4 Basic FM demodulators: Slope detection, Balanced slope detection, Phase discriminator and Ratio detector and balanced ratio detector
6.	ANTENNA AND WAVE PROPAGATION : 6.1 Physical concept of EM wave generation and factors involved in propagation of EM waves 6.2 Antenna: introduction, functions and classification 6.3 Antenna parameters: impedance, radiation resistance, radiation pattern, effective length, directivity, gain, efficiency, beam width 6.4 Types of antenna: Yagi-Uda, helical, log-periodic, horn, parabolic reflector 6.5 Ground waves: features, factors affecting propagation, wave tilt 6.6 Space wave: features, factors affecting propagation, radio horizon 6.7 Sky wave: ionosphere, propagation mechanism, parameters, ionospheric abnormalities 6.8 Duct propagation, Troposcattering 6.9 Types of fading and diversity techniques

LABORATORY EXPERIENCES:

The sample experiments to be performed include, but are not limited to the following.

1. To study the standard signal generator.
2. To measure modulation index for AM wave using CRO, SSG and AFG.
3. To measure modulation index for AM wave for different values of AF voltage [use collector modulation.
4. To study tuned plate modulation.
5. To study pre-emphasis and de-emphasis networks.
6. To plot the S curve for the ratio detector circuits.
7. To measure selectivity, sensitivity and fidelity of a super heterodyne AM receiver.
8. To plot the output voltage v/s frequency for a tuned RF amplifier and to find the bandwidth.
9. To study the fault finding procedure on AM receiver trainer kit.
10. To study the varactor diode modulator used for frequency modulation.
11. To take the observations for simple A.G.C. circuit used in the receiver

Reference Books:

1. Electronic Communication systems - George Kennedy - MGH
2. Electronic Communications Modulation and Transmission. - Robert J. Schoenbeck - PHI
3. Electronic Communications - Dennis Roddy-John Coolen - Pearson
4. Principles of Communication Engineering.- Anokh Singh. S.Chand &Co
5. Electronics Communication - Sanjeev Gupta
6. Antennas and wave propagation – G. S. N. Raju - Pearson
7. Basic Radio & Television - S.P.Sharma
8. Radiation & Propagation - Sathuraman & Balkrishnan