4150 - COMMUNICATION SYSTEMS - I

Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)			
					Theory		Orals.	Total
Lectures	Practical	Credits						
3	2	5	25	25	3 Hrs	100	50	200

Pre-requisite	Source
4132	EXN

Semester	Theory	Test	Total	TW	PR	Gr Total
	75	25	100	25	–	125

Rationale: This subject forms the foundation of Communication Engineering. It enables the students to understand the basic principles and applications of various modulation techniques and transmitter receiver circuits.

COURSE CONTENTS	Hrs	Mks
1. SIGNALS, NOISE AND FREQUENCY BANDS	3	8
Analog and digital signals.Transmissions paths & need for wireless communication. Types of noise–Internal noise, Thermal noise, Shot noise, Partition noise, Flicker noise, Transit time noise and External noise. Signal to noise ratio, Noise Figure. Various Frequencies bands used for communication.		
2. MODULATION	6	12
Definition, need for modulation. Types of modulation-AM, FM and PM. Amplitude Modulation. Principles of amplitude modulation; Derivation of AM equation. Modulation Index. Derivation of modulation index in terms of max. and min. voltages off AM wave. Frequency Spectrum and bandwidth of the AM wave. Derivation of current and power relation in the AM wave. Modulation by several modulating signals. Generation of AM wave. Grid/base and plate/collector modulation circuits		
3. DSB AND SSB TECHNIQUES	6	14
Suppression of Carrier – balanced modulator (diode and FET circuit) Mathematical treatment). Suppression of side band. Filter method, phase – shift method and the third method. Basic concepts and block diagram of ISB and VSB transmission.		
4. ANGLE MODULATION	12	20
Types of angle modulation : Frequency Modulation (FM). Principle and mathematical representation of FM. Modulation index. Frequency spectrum and bandwidth of the FM wave. Effect of noise on the FM wave. Pre-emphasis and de-emphasis Definition of narrow – band and wide-band FM. Generation of FM wave – Direct method – basic reactance modulator, varactor diode modulator & stabilised reactance modulator. Indirect method – Armstrong method Phase modulation (PM) Principles & Mathematical expression for PM. Comparison of AM, FM and PM.		
5. TRANSMITTERS	5	10
AM- block diagram of low –level and high-level transmitters. FM – block diagram of FM stereophonic broadcast transmitter.		
6. DEMODULATION OF AM & FM WAVES	5	10
Basic diode envelop detector for demodulation of AM signal. Basic demodulators for FM signal. Balanced slope detector. Phase discriminator		
7. RADIO RECEIVERS	7	16
Principle and block diagram of different types of AM receivers – tuned radio frequency receiver, super heterodyne receivers. Characteristics of receivers – Sensitivity, Selectivity and fidelity (mathematical treatment). Principle of Automatic gain controller (AGC) and Automatic Frequency Controller (AFC). Superheterodyne tracking and squelch circuit.		
8. FM RECEIVERS	4	10
Block diagram of basic FM receiver. Block diagram of stereophonic FM receiver.		
Total	48	100

PRACTICAL:

Eight experiments on the following topics	(No. Of turns)		(No. Of turns)
Study of AM	1	Study of FM	2
Study of different types radio receivers	6	Assembly of a radio receiver	6