

COURSE CODE	COURSE NAME	L-T-P-C	YEAR OF INTRODUCTION
EC208	ANALOG COMMUNICATION ENGINEERING	3-0-0-3	2016
Prerequisite: EC205 Electronic circuits			
Course objectives: <ul style="list-style-type: none"> To study the concepts and types of modulation schemes. To study different types of radio transmitters and receivers. To study the effects of noise in analog communication systems 			
Syllabus: Elements of communication system, Need for modulation, amplitude Modulation, amplitude modulator circuit, demodulator circuit, AM transmitters, Types of AM, AM Receiver, Angle modulation: principles of frequency modulation, phase modulation, frequency modulator circuits, FM transmitters, FM receiver, Noise in communication system, Effect of noise in Analog Communication Systems, Telephone systems, standard telephone set, cordless telephones .			
Expected outcome: <ul style="list-style-type: none"> Student will understand the fundamentals ideas of noises and its effect in communication system. Students can explain the principle and working of AM, FM, and PM system and transmitters and receivers. Students will be able to know the basic ideas of PSTN and advanced line communication systems. 			
Text Books:			
1. Simon Haykin, Communication Systems, Wiley 4/e, 2006. 2. Tomasi, Electronic Communications System, Pearson, 5/e, 2011.			
References:			
3. Dennis Roody and John Coolen, Electronic Communication, Pearson, 4/e, 2011. 4. Tomasi, Advanced Electronic Communications Systems, Pearson, 6/e, 2012. 5. Taub, Schilling, Saha, Principles of communication system, McGraw Hill, 2013. 6. George Kennedy, Electronic Communication Systems, McGraw Hill, 4/e, 2008. 7. Blake, Electronic Communication system, Cengage, 2/e, 2012.			
Course Plan			
Module	Course content (42 hrs)	Hours	Sem. Exam Marks
I	Introduction, elements of communication system, time and frequency domains, Need for modulation	2	15
	Noise in communication system, shot noise, thermal noise, white noise, partition noise, flicker noise, burst noise, signal to noise ratio, noise figure, noise temperature, narrow band noise, representation in terms of in-phase and quadrature components, envelope and phase components, sine wave plus narrow band noise.	5	
II	Amplitude modulation: Sinusoidal AM modulation index, Average power, Effective voltage and current, Nonsinusoidal modulation	4	
	Amplitude modulator circuits, Amplitude demodulator circuit,	3	

	AM transmitters		
FIRST INTERNAL EXAM			
III	AM Receiver, super heterodyne receiver, detector, tuning range, tracking, sensitivity and gain, Image rejection, double conversion, adjacent channel rejection, Automatic Gain Control (AGC).	4	15
	Single Sideband Modulation, Principles, Balanced Modulators, Singly & Doubly Balanced Modulators, SSB Generation, Filter Method, Phasing Method & Third Method, SSB Reception, Modified SSB Systems, Pilot Carrier SSB & ISB, Companded SSB.	5	
IV	Angle modulation: Frequency modulation, Sinusoidal FM, Frequency spectrum, modulation index, average power, Non-sinusoidal modulation, deviation ratio, comparison of AM and FM	3	15
	Phase modulation, Equivalence between PM and FM, Sinusoidal Phase Modulation, Digital Phase Modulation.	3	
SECOND INTERNAL EXAM			
	Angle modulator Circuits : Varactor Diode Modulators, Transistors Modulators, FM Transmitters: Direct & Indirect Methods.	2	
V	FM receiver, slope detector, balanced slope detector, Foster-Seeley discriminator, Ratio Detector, Quadrature detector, PLL demodulator, Automatic Frequency Control, Amplitude limiters, Pre-emphasis and De-emphasis,	3	20
	Effect of noise in analog communication Systems- AM Systems, DSBSC AM, SSB AM, Angle modulation, Threshold Effect in Angle modulation.	4	
VI	Telephone systems, standard telephone set, basic call procedures and tones, DTMF, cordless telephones.	4	
END SEMESTER EXAM			

Assignment

Study of

1. The telephone circuit - Local subscriber loop, Private-line circuits, Voice-frequency circuit arrangements.
2. The public telephone network - Instruments, Local loops, Trunk circuits and exchanges, Local central office Exchanges, Automated central office switches and Exchanges.

Question Paper Pattern

The question paper consists of three parts. Part A covers modules I and II, Part B covers modules III and IV and Part C covers modules V and VI. Each part has three questions. Each question can have a maximum of four subparts. Among the three questions one will be a compulsory question covering both the modules and the remaining two questions will be as one question from each module, of which one is to be answered. Mark pattern is according to the syllabus with maximum 30 % for theory and 70% for logical/numerical problems, derivation and proof.