

Course Code	ECE240	
Course Name	Principles of Communication Systems	
Credits	4	
Course Offered to	UG/PG	
Course Description	The course is intended to be a broad introduction to Communication Systems. The course will develop understanding of the principles underlying communication systems, describe basic methods for communication and develop requisite mathematical background required for noise analysis of communication systems. The lectures will be supplemented by PyLab simulation exercises, a final term paper/project.	

Pre-requisites		
Pre-requisite (Mandatory)	Pre-requisite (Desirable)	Pre-requisite(other)
ECE250,MTH201		

*Please insert more rows if required

Post Conditions* (For suggestions on verbs please refer the second sheet)				
CO1	CO2	CO3	CO4	CO5
Students are ab Apply the ideas of various transforms (Fourier, Z etc) for AM, FM and other digital communication systems (e.g, power, bandwidth, demodulation etc)	Students are able to differentiate between an analog and a digital comm system.	Students are able to Simulate simple communication systems and their blocks in MATLAB/PYTHON	Students are able to perform SNR calculations for simple analog and digital modulation scenarios.	Students are Able to solve problems around entropy and Huffman coding.

Weekly Lecture Plan			
Lecture	Topics Covered	Learning Outcome	Assignment etc
1-5	Revision of Signals and Sytems: Fourier Transforms, Fourier Series, Channel and Convolution, Complex representation of signals	1	Assignment 1
6-10	Basic Analog Modulation - AM (DSB, SSB, VSB), FM, PM; noise free analysis	1	Homework problems from the text
11-13	Random Processes - definitions, Wide sense stationarity, Auto-correlations and power spectral density, noise models	1&2	Homework problems from the text. MATLAB/PyLab assignment

13-16	Sampling, Nyquit sampling theorem, digital Baseband Communication: Quantization, PCM, PPM, PDM	2,3,4	Assignment 3
17-20	Digital Bandpass Modulation: ASK, PSK, QAM, Bit Error Analysis, spectral efficiency, power-bandwidth trade-offs	2,3	Assignment 4
21-22	Entropy, Huffman coding, Intro to Info theory	5	Problems from text
23-25	Extra Lectures	Class Lectures	Assignment 5

*Please insert more rows if required

Assessment Plan

Type of Evaluation	% Contribution in Grade
Programming Quiz (or Assignment)	10
Quiz (one before mid sem and one after mid sem)	20
Mid Sem	20
Mid Sem	40
Attendance in Tutorials	10
Resource Material	
Type	Title
Textbook	Communication Systems by Simon Haykin, 5th Edition Introduction to communications systems by upamanyu madhow.