

## 312 CNE Course Syllabus

<b>Course Code</b>	312 CNE
<b>Course Name</b>	Digital and Analog Communications
<b>Credit Hours</b>	3
<b>Contact Hours</b>	4
<b>Instructor Name</b>	Dr. Brijesh Kumar Gupta

<b>Text Book</b> (title, author, and year)
<ul style="list-style-type: none"><li>• Communication Systems, Carlson and Crilly, 2009.</li><li>• Modern Digital and Analog Communication Systems, Lathi and Zhi Ding, 4e, Oxford University Press, 2009.</li></ul>

<b>Specific Course Information</b>	
<b>Catalog Description</b>	This course introduces the students to communications systems, transmitter and receiver rules, noise, communication channel, analog and digital modulation techniques.
<b>Prerequisites</b>	CNE220
<b>Co-requisites</b>	NIL
<b>Required/Elective</b>	Required

<b>Course Learning Outcomes</b>	
1	To state the mathematical skills used for analyzing the performance of a digital communication link when additive white Gaussian noise is present in terms of the signal-to-noise ratio and bit error rate
2	To explain analog modulation schemes, AM, FM and PM and describe the baseband modulation (Line Codes).
3	To describe bit rate, Baud rate, digital communications and signal processing techniques relevant to wireless, including ASK, FSK, BPSK, QPSK, and QAM.
4	To compute the power and bandwidth requirements of modern communication systems employing ASK, PSK, FSK, and QAM modulation formats.
5	To conduct experiments for optimum communications systems that satisfies the required constraints of power and data rate.
6	To explain the importance of communications in connecting remote people and places.
7	To use simulation tools such as MATLAB for implementing line codes, ASK, FSK, BPSK, QPSK, and QAM schemes
8	To demonstrate the ability to search the internet for new modulation techniques and resources.

### Mapping course LOs to the SLO.

Course LOs #	Student Learning Outcomes											
	a1	a2	b1	b2	b3	b4	b5	c1	c2	c3	d1	d2
1	√											
2			√									
3			√									
4			√	√								
5				√	√							
6						√						
7							√					
8										√		

### List of Theory Topics

**Communication system:** Transmitter, channel and receiver.

**Noise in communication systems.**

**Analog Modulation Data:** AM, FM and PM, Signal to noise ratio and noise consideration.

**Pulse modulation:** PAM, PWM, PPM, PCM, and DM.

**Digital Modulation Techniques:** ASK, PSK, FSK, QAM, M-ary, bit error rate, and Matched filter receivers.

### List of Lab Experiments

1. Introduction to MATLAB
2. Analog Modulation Techniques – AM without MATLAB inbuilt function
3. Plot the Frequency spectrum for AM
4. AM- DSB SC Modulation
5. AM – DSB SC Demodulation with filter
6. AM – DSB SC Ideal Demodulation
7. Baseband Modulation Techniques - Line Coding Techniques – NRZ, RZ, Manchester Coding
8. Amplitude Shift Keying (ASK) Modulation
9. Frequency Shift Keying (FSK) Modulation
10. Binary Phase Shift Keying (BPSK) Modulation