

## Faculty of Engineering & Technology

### Communication Systems

**Information :**

**Course Code :** COM 414

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Specialization of Electrical Power Engineering

**Instructor Information :**

Title	Name	Office hours
Associate Professor	Waleed Eid Abd Elrahman Alhanafy	6
Lecturer	MOHAMED MOUSA SAYED EMAM AHMED	5

**Area Of Study :**

- Develop the students' knowledge about fundamentals of analog & digital communication systems.
- Prepare students to distinguish between analog & digital communication systems.
- Develop students' knowledge about basics of optical fiber communication systems.

**Description :**

Communication Systems objective, block diagram, transmission media, and signal impairments. SNR, and channel bandwidth, Shannon's equation. Analog and digital messages. Amplitude modulation (conventional AM, SSB, DSB and VSB) and demodulation, Angle modulation and demodulation (PM and FM), Broadcast transmitters and receivers (AM and FM). Principles of digital data transmission: Digital communication system: Sampling Theorem, PCM, and DM techniques Regenerative repeaters. Optical fiber communication system (Main features, OPGW Cable System). Hybrid networks (Power and data networks).  
2- Overall Aims of the Course:

**Course outcomes :**

**a. Knowledge and Understanding: :**

1 -	Describe communication systems and transmission media.
2 -	Explain channel bandwidth and SNR.
3 -	Define analog modulation techniques including AM, PM and FM.
4 -	Recognize digital communication systems and signal formatting.
5 -	Illustrate digital modulation techniques including ASK, FSK and PSK.
6 -	Recognize optical fiber communication system.

**b. Intellectual Skills: :**

1 -	Examine the channel capacity and its relation with SNR.
2 -	Apply the theory of the amplitude and angle modulation to solve the analog transmission problems.
3 -	Apply the digital transmission theories and techniques in the digital communication systems
4 -	Conduct theories and techniques of optical fiber communication system.

**c. Professional and Practical Skills :**

1 -	Use software tools to analyze experiment on analog and digital modulation techniques.
2 -	Examine laboratory equipment to conduct experiments on the techniques of digital communication system.

**d. General and Transferable Skills :**

1 -	d1. Collaborate effectively within team.
2 -	d2. Work in stressful environment and within constraints.
3 -	d3. Communicate effectively.
4 -	d4. Effectively manage tasks, time, and resources.

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Review on signal analysis	5	3	2
Review on Fourier representations	5	3	2
Introduction to noise and channel capacity	5	3	2
Introduction to analog communication system. Amplitude modulation and demodulation	15	9	6
Angle modulation and demodulation	10	6	4
Introduction to digital communication systems and A/D conversion	10	6	4
Signal formatting	5	3	2
Digital modulation techniques	10	6	4
Introduction to Optical fiber systems	10	6	4

**Teaching And Learning Methodologies :**

Interactive Lecturing
Discussion
Problem Solving
Experiential Learning

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Final exam	40.00		
o Assignments	10.00		
o In Class Quizzes	10.00		
o Lab Experiments	10.00		
o Mid-Term Exams	30.00		

**Course Notes :**

B. P. Lathi : "Modern analog and digital communication systems"

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**Recommended books :**

A. Goldsmith, Wireless Communications, Cambridge University Press, 2005.