Faculty of Engineering & Technology

Communication 2

Information :

Course Code :	COM 412	**Level**	: Undergraduate	**Course Hours :**	3.00- Hours

Department :	Specialization of Electronics & Communication

Instructor Information :

Title	Name	Office hours
Associate Professor	KAMEL MOHAMED MAHMOUD HASSAN	10
Associate Professor	Heba Mohamed Abdelatty Ahmed	1
Assistant Lecturer	Mahmoud Ahmed Nasr Kamal Abdo Mostafa	5
Assistant Lecturer	Mahmoud Ahmed Nasr Kamal Abdo Mostafa	5

Area Of Study :

- Recognize the basic concepts of digital communication.
- Execute the necessary calculations of different A/Ds convertors.
- Explain the fundamentals of TDM multiplexing technique and the associated synchronisation methods.
- Analyze the line codes (waveforms).
- Estimate the error probability in threshold detection.
- Perform a comparison of Digital Carrier systems.

Description :

Overview of Analog communication systems. Introduction to Digital communication. Analog to Digital Convertors. Sampling Theorem. Practical Aspects .Aliasing error. Information Rate and Bandwidth .Pulse modulation PAM, PWM, and PPM. Features, generation and detection. Pulse Code Modulation (PCM). Sampling, Quantization and Encoding. SNRo. Companding Process, TDM: principles, framing bits, total bit rate Rb .T1 carrier system. Synchronization and signaling. Plesichronous Digital Hierarchy. Differential Pulse Code Modulation (DPCM).ADPCM, and DM. Line Codes: Properties, types, PSDs, and comparison, Pulse Shaping; ISI, Nyquist s First Criterion. Digital Receivers, and Regenerative repeaters. Equalizers, Time Extraction Detection Error. Error probability for different signals. Eye Diagram Digital Carrier Systems. M-ary Digital Modulation. Comparison of digital modulation schemes.

Course outcomes :

a.Knowledge and Understanding: :

1 -	a1. Explain the basic features of communication (analog & digital).
2 -	Describe A/D techniques and the line coders.
3 -	Explain knowledge and understanding of asynchronous and synchronous systems as well as ISI, pulse shaping and equalizers.
4 -	Classify digital carrier systems as well as M-ary signalling.

b.Intellectual Skills: :

1 -	b1. Analyze of a digital communication system

2 -	b2. Quantify the Nyquist sampling rate for different signals and perform the basic calculations for TDM system.
3 -	b3. Examine the transmission BW and the Output SNR for a binary PCM ,and DM signals
4 -	b4. Compare the different line codes and calculate its basic parameters.
5 -	b5. Estimate the BER for different digital carrier systems and design an appropriate equalizer

c.Professional and Practical Skills: :

1 -	c1. Design a simple digital communication system
2 -	c2. Provide the appropriate digital carrier system for a certain application.
3 -	c3. Design a TDM system.
4 -	c4. Build-up the appropriate scheme to investigate the system performance.
5 -	c5. Develop software programs to analyze and to design a digital communication system.

d.General and Transferable Skills: :

1 -	d1. Demonstrate a self-directed manner
2 -	d2. Show the ability to work coherently and successfully as a part of a team..
3 -	d3. Manage time and meet deadlines
4 -	d4. Analyze problems and use innovative thinking in their solution

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Overview of Analog communication systems. Introduction to Digital communication.	5	3	2
Analog to Digital Convertors, Sampling Theorem. Practical Aspects, Aliasing error, Information Rate, and Bandwidth.	5	3	2
Pulse Modulation: PAM, PWM, and PPM. Features ,generation and detection	5	3	2
Pulse Code Modulation {PCM}. Sampling, Quantization and Encoding. SNRo. Companding Process	10	6	4
TDM: principles, framing bits, total bit rate Rb .T1 carrier system. Synchronization and signaling. Plesichronous Digital Hierarchy.	5	3	2
Differential Pulse Code Modulation {DPCM}. ADPCM, and DM.	10	6	4
Line Codes: Properties, types, PSDs, and comparison	5	3	2
Pulse Shaping; ISI, Nyquist s First Criterion. Digital Receivers and Regenerative repeaters. Equalizers, Time Extraction	10	6	4
Detection Error. Error probability for different signals. Eye Diagram	5	3	2
Digital Carrier Systems. M-ary Digital Modulation	10	6	4
Course Project & Technical Assignments	5	3	2

Teaching And Learning Methodologies :

Interactive Lecturing and Discussions.
Experiential Learning
Site Visit.

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| Problem Solving |
| Project and Presentations |

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
˝ÁFinal exam	40.00		
o Assignments and Course Project	15.00		
o In Class Quizzes and Homework	10.00		
o Lab test	5.00		
o Mid-Term exams	30.00		

Recommended books :

B. P. Lathi, Z. Ding, Modern Digital and Analog Communication Systems 4ed, Oxford University Press, 2011.

http://www.fue.edu.eg

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