

## Faculty of Computers and Information Technology

### Signals and Systems

#### Information :

**Course Code :** DM231

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Digital Media Technology

#### Instructor Information :

Title	Name	Office hours
Lecturer	Eman Ahmed Sayed Ahmed	5
Teaching Assistant	Hajar Saleh Abdelwahab Mohamad Mohamad	
Teaching Assistant	Hoda Ahmad Moustafa Abdelrahman Ismail	

#### Area Of Study :

Comprehend deeply the basic concepts and theories of continuous and discrete-time signals.  
 Understand basic mathematics to learn the principles of signal convolution.  
 Solve problems of linear time-invariant systems based on problem requirements.  
 Compare, evaluate and select methodologies to learn important signal transforms such as continuous time and discrete time Fourier transforms, Laplace transform and z-transform.

#### Description :

Introduction to continuous time and discrete time signals and systems, linear time invariant systems, Fourier transform for continuous and discrete time signals, Sampling theorem, Laplace transform, Z-Transform, Transfer function; State space representation; Applications

#### Course outcomes :

##### **a. Knowledge and Understanding: :**

1 -	Identify the fundamental concepts and theories related to analog signals and systems description and classification
2 -	Discuss fundamental mathematics required to signal convolution integral
3 -	Explain the fundamental topics of signal transform such as Fourier transform, Laplace transform and z-transform

##### **b. Intellectual Skills: :**

1 -	Analyze the application of signal convolution integral
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##### **c. Professional and Practical Skills: :**

1 -	Use MATLAB in signal analysis
2 -	Deploy effective computing technologies to solve problems of linear time invariant systems
3 -	Apply effective information to acquire and manage information storage and retrieval skills in signal transforms

##### **d. General and Transferable Skills: :**

1 -	Exploit a range of learning resources
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#### **ABET Course outcomes :**

1 -	Demonstrate adequate understanding of the basic concepts and theories of continuous and discrete-time signals.
2 -	Understand basic mathematics to learn the principles of signal convolution.
3 -	Solve problems of linear time-invariant systems based on problem requirements.
4 -	Compare, evaluate, and select methodologies to learn important signal transforms such as continuous time and discrete time Fourier transforms, Laplace transform and z-transform.

#### **Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Basic Signals and Systems: Continuous-Time Signal and Discrete-Time Signal	4	2	2
Basic Signals and Systems: Unit impulse and unit step functions	4	2	2
Basic Signals and Systems: Sampling and aliasing	4	2	2
Basic Signals and Systems: Continuous-time and discrete-Time signal properties.	4	2	2
Linear Time-Invariant (LTI) Systems: Convolution sum, the convolution integral	4	2	2
Linear Time-Invariant (LTI) Systems: Properties, difference and differential equations	4	2	2
Fourier Series Representation of Periodic Signals: Continuous- and Discrete-Time	4	2	2
Fourier Series Representation of Periodic Signals: Properties of Continuous-Time and Discrete-Time Fourier Series	4	2	2
Mid-Term Exam	2		
Continuous-Time Fourier Transform (CTFT)	4	2	2
Discrete-Time Fourier Transform (DTFT)	4	2	2
Laplace Transform	4	2	2
Z Transform	4	2	2
Final Exam	2		

#### **Teaching And Learning Methodologies :**

Interactive Lectures including Discussions
Tutorials
Practical Lab Sessions
Self-Study (Project / Reading Materials / Online Material / Presentations)
Problem Solving

#### **Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Assignments	10.00	4	
Final Exam	40.00	14	
Midterm Exam (s)	30.00	9	

Others (Participations)	10.00		
Quizzes	10.00	5	

**Course Notes :**

An Electronic form of the Course Notes and all the slides of the Lectures is available on the Students Learning Management System (Moodle)

**Web Sites :**

Math Works Website <http://www.mathworks.com>