

## Faculty of Computers and Information Technology

### Digital Signals Processing

#### Information :

**Course Code :** DM331

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Digital Media Technology

#### Instructor Information :

Title	Name	Office hours
Lecturer	Eman Ahmed Sayed Ahmed	2
Lecturer	Eman Ahmed Sayed Ahmed	2
Teaching Assistant	Hoda Ahmad Moustafa Abdelrahman Ismail	
Teaching Assistant	Hajar Saleh Abdelwahab Mohamad Mohamad	
Teaching Assistant	Debaj Shady Mahmoud Talha Mohamed Elmaghraby	

#### Area Of Study :

"Use and adopt fundamental concepts and properties of discrete linear time invariant systems.  
 "Solve problems using mathematical knowledge to convolve two discrete time signals.  
 "Use all available principles and tools to solve difference equations and system function, and design digital filters.  
 "Compare and evaluate different methods to learn discrete-time Fourier series, discrete time Fourier transform (DTFT), Z-transform, and Fast Fourier transform (FFT).

#### Description :

Review of principles of discrete signals in time and frequency; Transform-domain representations of discrete time sequences; Fast Fourier transform ; Structural representations of digital filters ; Digital Filter design problems; Implementation aspect of DSP algorithms; Introduction to filter banks and wavelets; Introduction to spectral estimation ; Applications

#### Course outcomes :

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

1 -	Identify the fundamental topics of implementation of discrete time systems, and digital filter design
2 -	Discuss the fundamental mathematics required to Fourier series in different forms, and learn discrete time and fast Fourier transforms.
3 -	Discuss the fundamental concepts and theories related to discrete-time signals and systems description and classification, know the different types of Digital signals and systems.

##### b.Intellectual Skills: :

1 -	Select appropriate methodologies and techniques for digital filter design
2 -	Propose set of alternative solutions for discrete systems in time and frequency domains by examples on electric systems
3 -	Analyze the discrete signals in time and frequency domains

##### c.Professional and Practical Skills: :

1 -	Apply effective information storage and retrieval skills indifferent signal transforms
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2 -	Create technical reports according to professional standards
3 -	Deploy MATLAB for implementing different discrete time signal processing techniques

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

1 -	Apply communications skills in presentation and report writing of requirements engineering deliverables
2 -	Work on a team for the development of a requirements document, and manage time to meet deadlines
3 -	Exploit a range of learning resources

#### **ABET Course outcomes :**

1 -	Use and adopt fundamental concepts and principles of discrete linear time invariant systems.
2 -	Solve problems using mathematical knowledge to convolve two discrete time signals.
3 -	Use advanced techniques and tools to solve difference equations and system function, and design digital filters.
4 -	Compare and evaluate different methods and techniques of discrete-time Fourier series, discrete time Fourier transform, Z-transform, and Fast Fourier transform.

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

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction to Digital Signal Processing	4	2	2
Discrete-Time Signals	4	2	2
Discrete-Time Systems	4	2	2
The Z- Transform	4	2	2
Sampling of Continuous Time Signals (p1)	4	2	2
Sampling of Continuous Time signals (p2)	4	2	2
Structures for Discrete-Time Systems	4	2	2
Filter Design Techniques (p1)	4	2	2
Mid-Term Exam	2		
Filter Design Techniques (p2)	4	2	2
The Discrete-Fourier Transform (p1)	4	2	2
The Discrete-Fourier Transform (p2)	4	2	2
Computation of the Discrete Fourier Transform	4	2	2
Final Exam	2		

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

Interactive Lectures including Discussions
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	5.00	4	

Final Exam	40.00	14	
Midterm Exam (s)	30.00	9	
Others (Participations)	5.00		
Quizzes	5.00	5	
Research and Reporting	5.00		

#### **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)

#### **Recommended books :**

A. Oppenheim, A. Willsky and S. Hamid, Signals and Systems, Latest edition, ISBN: 978-0138147570

#### **Web Sites :**

<http://www.mathworks.com>