

**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	Amal Safwat Mehanna	
Teaching Assistant	Nadia Alaa Talaat Tawfik	

**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 -	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.
2 -	Discuss the fundamental mathematics required to Fourier series in different forms, and learn discrete time and fast Fourier transforms.
3 -	Identify the fundamental topics of implementation of discrete time systems, and digital filter design

**b.Intellectual Skills: :**

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

**c.Professional and Practical Skills: :**

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

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

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

**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	

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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>