



King Saud University
College of Computer and Information Sciences
Department of Computer Engineering

1. Course number and name: **CEN352, Digital Signal Processing**

2. Credits and contact hours: **3 (3, 0, 1)**

3. Instructor's or course coordinator's name: Ghulam Muhammad

4. Text book, title, author, and year:

Digital Signal Processing Fundamentals and Applications, L. Tan, 2008, Elsevier.

a. other supplemental materials:

Signals and Systems, Oppenheim A. and Willsky A. with S. Nawab, 2nd Ed., 1997, Prentice Hall.

Digital Signal Processing. Principles, algorithms, and applications, John G. Proakis and Dimitris G. Manolakis, 4th Ed., 2007, Prentice Hall.

5. Specific course information

a. Course description (catalog)

History and overview; sampling theorem, aliasing; sampled signals, periodic signals, non-periodic signals; impulse response and convolution; digital spectra analysis; discrete Fourier transform, fast Fourier transform; z-transform; digital filters, FIR and IIR filter design; windowing; effect of finite word length in digital signal processors; application in audio and image processing.

b. prerequisites or co-requisites: CEN340 (prerequisite).

c. Required, elective, or selected elective course: Required.

6. Specific goals for the course

a. **Course Learning Outcomes:** This course requires the student to demonstrate the following

1. Describe the sampling theorem and the spectra of a periodic signal.
2. Determine the spectrum of a signal using the DFT and the FFT.
3. Describe a system in z-transform domain.
4. Design and analyze digital filters that have specified frequency characteristics.
5. Apply windowing on a signal and explain how it improves transform properties.
6. Applications of digital signal processing in audio and image processing.

b. Relationship of Course to Student Outcomes

Outcome	Student Outcome Description	Contribution
(a)	an ability to apply knowledge of mathematics, science, and engineering	√
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	√
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	√
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	√

7. Brief list of topics to be covered and schedule in weeks

Sampling theory, and periodicity	2
Fourier transform (DFT, FFT)	3
z-transform	2
Digital filters	3
Application: audio and image	3
Review and evaluation	2

8. Assessment Plan for the Course

Quizzes and Assignments	20%
Midterm Exams (2)	40%
Final Exam	40%
Total	100%

Midterm exam dates:

Midterm 1: Monday, October 26, 2015.

Midterm 2: Monday, November 30, 2015.

Course Policies:

- Cheating or plagiarism in any form will not be tolerated. A grade of zero will be registered for any infraction.
- **Attendance in the lecture is a must.** Students failed to achieve more than 75% attendance will be reported to the concerned authority; excuse should be directly submitted to the concerned authority; excuses of absence are accepted no later than one week of the absence.
- **All the exams are closed book.**

Contribution of Course to Meeting Curriculum Disciplines:

Curriculum Discipline	Percentage
Mathematics and Basic Science	30
Engineering Science	60
Engineering Design	10
General Education	

Current Instructors, Department, Office Hours and Date:

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