**King Saud University**

**College of Computer and Information Sciences**

**Department of Computer Engineering**

**Semester I, Academic Year 2018-2019**

1. **Course number and name: CEN 543 – DIGITAL SIGNAL PROCESSING (DSP)**
2. **Credits and contact hours: 3 (3,0,1)**
3. **Instructor’s or course coordinator’s name:**

**Dr. Nassim Amor, Prof. Mansour Alsulaiman**

1. **Text books, title, author, and year:**

#### Primary: L. Tan, *Digital Signal Processing Fundamentals and Applications*, Elsevier.

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

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

1. **Specific course information**
2. **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.

1. **Prerequisites: - Courses** CEN340
* **Topics** Concept of analog signals
1. **Specific goals for the course**

**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.
7. **Major Topics covered and schedule in weeks:**

# Sampling theory, and periodicity 2

Fourier transform (DFT, FFT) 3

# Z-transform 3

# Digital filters 3

Application: audio and image 2

Review and evaluation 1

1. **Assessment Plan for the Course**

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| --- | --- |
| Quizzes and Homeworks | **20%** |
| Midterm Exams | **40%** |
| Final | **40%** |
| Total | **100%** |

**Midterm exam dates:**

**Midterm 1**: Tuesday 7/2/1440, 16/10/2018 (week 7)

**Midterm 2**: Tuesday 5/3/1440, 13/11/2018 (week 11)

**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 failing 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.**

**Current Instructor, Department, Office Hours and Date:**

Prof. Mansour Alsulaiman

Department of Computer Engineering

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Office Hours:

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