**King Saud University**

**College of Computer and Information Sciences**

**Department of Computer Engineering**

**Semester II, Academic Year 2015-2016**

1. **Course number and name: CEN 352 – DIGITAL SIGNAL PROCESSING (DSP)**
2. **Credits and contact hours: 3 (3,0,1)**
3. **Instructor’s or course coordinator’s name:**

**DR. Nassim Ammour and Dr. Abdulwadood Abdulwaheed**

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

#### Primary: L. Tan, *Digital Signal Processing Fundamentals and Applications*, 2008, 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**
2. **Course Learning Outcomes:** This course requires the student to demonstrate the following:
3. Describe the sampling theorem and the spectra of a periodic signal.
4. Determine the spectrum of a signal using the DFT and the FFT.
5. Describe a system in z-transform domain.
6. Design and analyze digital filters that have specified frequency characteristics.
7. Apply windowing on a signal and explain how it improves transform properties.
8. Applications of digital signal processing in audio and image processing.
9. **Relationship of Course to Program Outcomes**

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| --- | --- | --- |
| **Outcome** | **Program Outcome Description** | **Level of 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. | √ |

1. **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 3

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**: Wednesday, March 11, 2016.

**Midterm 2**: Wednesday, May 06, 2016.

**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 | 50 |
| Engineering Design | 20 |
| General Education |  |

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

Dr. Nassim Ammour.

Department of Computer Engineering

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Phone #: 0114696298

Office Hours: Mon 12:00-13:00, 15:00-16:00, Tue 8:00-11:00, 12:00-13:00, Wed 10:00-11:00,

Thu 08:00-11:00

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