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

CEN 543 – Digital Signal Processing (3-0-0), Masters Course

Semester I, Academic Year 2012-2013

Course Description (catalog):

Discrete time signals, Z-transforms, discrete Fourier transforms (DFT), Fast Fourier transforms (FFT), design of finite impulse response filter (FIR) and Infinite impulse response filter (IIR), Adaptive filters, multirate signal processing, application on audio and image processing.

Textbook(s) and/or Other Required Materials:

Primary: Li Tan, *Digital Signal Processing: Fundamentals and* Applications, 2008, AP, Elsevier.

Supplementary: (1) Steven W. Smith, *The Scientist and Engineer's Guide to Digital Signal Processing*, 1997, California Technical Publishing., (2) A. V. Oppenheim and R. W. Schafer , *Discrete-Time Signal Processing,* 1999, Prentice Hall, (3) Tamal Bose, *Digital Signal and Image* Processing, 2004, Wiley., (4) All lecture material can be accessed through the Learning Management System/ Blackboard from the website http://lms.ksu.edu.sa

Course Objectives: This course is designed to help the student:

1) Analyze signals using the discrete Fourier transform (DFT).
2) Implement DFTs using fast Fourier transform (FFT).
3) Apply DFT in speech and image signal processing.
4) Implement digital filters in a variety of forms.
5) Design of FIR filters using window method.
6) Determine stability of filters.
7) Analyze signals using Z-transform.
8) Perform multirate signal processing.

Topics covered and schedule in weeks:

• Statistics, probability, noise, analog-to-digital conversion	1
• Discrete Fourier Transform (DFT), Fast Fourier Transform (FFT)	3
• Digital filters	3
• Discrete models of sampled data systems: Difference equations and z-Transform	1
• Multirate signal processing	1
• Discrete wavelet transform	1
• Applications to speech and image signal processing	2
• Review and evaluation	2

Project assignment: Individual students will be assigned to some particular project assignments. Students should implement, present, and write report for that project.

Evaluation:

Home Work	10%
Project Assignment	30%
Midterm Exam	20% (November 21, 2012)
Final Exam	40%
Total	**100%**

Course Policies:
- **No late** homework submission will be accepted.
- Homework submission should be hardcopy.
- There will be no relative grading.
- Students are encouraged to discuss homework problems but **not copy**.
- Cheating or plagiarism in any form will not be tolerated. A grade of zero will be registered for any infraction.

Current Instructor Details:

Dr. Abdul Wadood Abdul Waheed
Assistant Professor
Department of Computer Engineering
Room 2210, Phone: 014696280
Email: aabdulwaheed@ksu.edu.sa
Webpage: http://fac.ksu.edu.sa/aabdulwaheed/home