KING FAHD UNIVERSITY OF PETROLEUM & MINERALS **ELECTRICAL ENGINEERING DEPARTMENT**

EE 207 – Signals and Systems **Course Syllabus (113)**

Prerequisite: **EE201**

Textbook:
Signals, Systems, and Transforms, 4th Ed. C. L. Phillips, J. M. Parr, and E. A. Riskin, 2008

References:
Ziemer, RE, Tranter, WH, and Fannin, DR, (1998) "Signals and Systems: Continuous and Discrete", Prentice Hall.

Course Description:

This course introduces and emphasizes essential analytical tools and theories of Fourier series, Fourier transform, Laplace transform, and z-transform. Linear circuits and systems concepts, such as impulse response, convolution, and transfer function, are very well elaborated and relationships between them are detailed. The concept of frequency response is also introduced and clarified. Finally, discrete-time signals and systems are explained and an introduction to sampling of analog signals is emphasized in this course. Eventually, the Nyquist theorem is introduced.

Course Objectives:
The course objectives are to enable the students to:

1. Understand the fundamental concepts of continuous-time signals and systems.
2. Understand the fundamental concepts of discrete-time signals and systems
3. Understand and compare several transform-domain techniques.
4. Analyze continuous linear time invariant systems using the concept of convolution.
5. Apply the sampling theorem to convert analog signals to digital.

Learning Outcomes:
At the end of the course, the students will be able to:

1. Discern between continuous and discrete time signal and systems.
2. Manipulate the different transform-domain techniques.
3. Convert analog signals to digital while satisfying certain specs.
4. Evaluate fundamental signal and system parameters, such as energy, power and bandwidth.
5. Understanding practical implementation issues, such as aliasing.

Regulations:

1. University regulations regarding attendance are enforced. Only official excuses will be accepted and must be submitted no later than one week after the absence.
2. Homework assignments are given in the table below and will be collected. HW solutions will be posted on WebCT. Quizzes on the same material of the homework assignment will be administered.
3. Cheating in quizzes, exams, or the final exam will result in failing the course.

GRADING POLICY:
CLASS WORK: 25% EXAM I: 20% EXAM II: 20% FINAL EXAM: 35% (Comprehensive)

INSTRUCTOR:
Dr. Azzedine Zerguine Office: 59-1068 Tel: 4430 e-mail: azzedine@kfupm.edu.sa

Tentative Schedule:

Wk/Date	Topics	HW
1 June 9 June 13	**Chapter 1: Introduction** 1.1: Modeling 1.2: Continuous-Time Physical Systems 1.3: Samplers and Discrete-Time Physical Systems **Chapter 2: Continuous-Time Signals and Systems** 2.1: Transformation of Continuous-Time Signals 2.2: Signal Characteristics 2.3: Common Signals in Engineering 2.4: Singularity Functions 2.5: Mathematical Functions for Signals 2.6: Continuous-Time Systems 2.7: Properties of Continuous-Time Systems	2.2 (a) , 2.4 , 2.10, 2.21 (c) , 2.23 (a) , 2.24 , 2.29 , 2.30 (a, b, c, e)
2 June 16 June 20	**Chapter 3: Continuous-Time Linear Time-Invariant Systems** 3.1: Impulse Representation of Continuous-Time Signals 3.2: Convolution for Continuous-Time LTI Systems 3.3: Properties of Convolution 3.4: Properties of Continuous-Time LTI Systems **Chapter 4: Fourier Series** 4.1: Approximating Periodic Signals	3.2 , 3.4 (a, c) , 3.8 (a) , 3.15 , 3.20 , 3.22 , 3.25 , 3.28 (a, b for Equation (ii))
3 June 23 June 27	4.2: Fourier Series 4.3: Fourier Series and Frequency Spectra 4.4: Properties of Fourier Series 4.6: Fourier Series Transformation	4.2 ii, iii, 4.8 (c), 4.9 (c), 4.10 (c), 4.18 (c), 4.22, 4.26
Major Exam I: Tuesday June 26, 2012		
4 June 30 July 4	**Chapter 5: Fourier Transform** 5.1: Definition of the Fourier Transform 5.2: Properties of the Fourier Transform 5.3: Fourier Transforms of Time Functions 5.5: Applications of the Fourier Transform 5.6: Energy and Power Density Spectra	5.8, 5.11, 5.12 (a), 5.17 (a, b, d), 5.19 (a, b, c, d, g), 5.27
5 July 7 July 11	**Chapter 6: Applications of the Fourier Transform** 6.1: Ideal Filters 6.2: Real Filters *(only RC Low-Pass Filter)* 6.3: Bandwidth Relationships **Chapter 7: The Laplace Transform** 7.1: Definition of Laplace Transforms 7.2: Examples 7.3: Laplace Transforms of Functions	7.6 (a, c, d, f), 7.13 (b), 7.14 (c, d), 7.15 (b, d, f) (ignore the Matlab part), 7.17 (a for the differential equation (iii))
6 July 14 July 18	7.4: Laplace Transform Properties 7.6: Response of LTI Systems (and Appendix F) 7.7: LTI Systems Characteristics **Sampling and Reconstruction** 5.4: Sampling Continuous-Time Signals 6.4: Reconstruction of Signals from Sampled Data **Chapter 10: Discrete-Time Linear Time-Invariant Systems** 10.1: Impulse Representation of Discrete-Time signals 10.2: Convolution for Discrete-Time Systems	
Major Exam II: Tuesday July 17, 2012		
7 July 21 July 25	10.3: Properties of Discrete-Time LTI Systems 10.4: Difference-Equation Models *(to equation 10.48 only)* **Chapter 11: The z-Transform** 11.1: Definition of z-Transform 11.2: Examples 11.3: z-Transforms of Functions	
8 July 28 July 30	11.4: z-Transform Properties 11.5: Additional Properties (only Convolution in Time) 11.6: LTI System Applications (up to end of Example 11.8 only) Review	
Final Exam: Thursday August 2, 2012 (8:30 am - 11:00 am)		