Course Profile

Course Name:-	**Signals Systems**
Course Code:-	**CEN214**
Academic Year:-	**1434-1435**
Semester:-	**2nd**

Course Overview

This course is introducing the following topics: Signals and Systems is an introduction to analog and digital signal processing, a topic that forms an integral part of engineering systems in many diverse areas, including seismic data processing, communications, speech processing, image processing, defence electronics, consumer electronics, and consumer products.

The course presents and integrates the basic concepts for both continuous-time and discrete-time signals and systems. Signal and system representations are developed for both time and frequency domains. These representations are related through the Fourier transform and its generalizations, which are explored in detail. System Analysis in the Time Domain: System Modeling Concept- Superposition integral for fixed and linear system, modulation, and sampling for both analog and digital systems, as well as exposition and demonstration of the basic concepts of feedback systems for both analog and digital systems, are discussed and illustrated.

Course Details	
Level:-	6th
Credit:-	3
Pre-Requisites:-	EE 111, MATH 204
Co- Requisites:-	None

Learning Outcomes of Course

After successful completion of this course, student will be able to-

1. To understand the different types of systems and signals.
2. To understand The Systems Characterization and Analysis in the time domain, Sketch signals and perform basic time-domain operations on them, Classify signals into periodic/non-periodic.

3. Determine if a system is linear, time-invariant, causal, memoryless, and stable.
4. To knowledge about a linear time-invariant system by its impulse/step response
5. Understanding the Fourier representation of signals and systems and ability to use it to analyze linear systems.
6. To understand the Laplace Transform and several of its properties. How to obtain inverse Laplace transforms and use this tools to analyze electrical networks.
7. Applications to communication systems

Course Assessment

Name of Assessment Task	Weight of Assessment	Week Due
1. Midterm Exam-1	15%	7
2. Midterm Exam-2	15%	13
3. Quizzes/ Assignments/ Seminar	10%	2,4,6,8,11
4. Lab	20%	15
5. Final Exam	40%	As per Schedule

Assessment Task and Learning Outcomes Alignment

Assessment Task Name	Course Learning Outcomes						
	1	2	3	4	5	6	7
1. Midterm Exam-1	√	√	√				
2. Midterm Exam-2				√	√	√	
3. Quizzes		√		√			
4. Assignments/Report/Seminar	√		√		√		
5. Final Exam	√	√	√	√	√	√	√

Teaching Contact Details

Name of Course Coordinator:-	Mohd Abdul Rahim Khan
Email of Course Coordinator:-	m.khan@mu.edu.sa
Lab/Tutorial Instructor:-	Mohd Abdul Rahim Khan
Email of Lab/Tutorial Instructor:-	m.khan@mu.edu.sa
Office Hours:-	Wed 10 AM to 12 Noon

Office Number:-	R-10
Office Phone Number:-	5384

Details of Required Text Book

Book Name	Authors Name	Publisher	Year	Edition
Signals and Systems	Oppenheim A. and Willsky A. with S. Nawab	Prentice Hall	1997	2nd

Details of Required Reference Books

Book Name	Authors Name	Publisher	Year	Edition
Signals and Systems	Richard Baraniuk	Orange Grove Texts Plu	2009	

IT Resources

The following IT Resources will require to access-

1. Majma'ah University Faculty Email
2. Faculty Web Page
3. Projector
4. Matlab Installed Computer Lab
5. http://ocw.mit.edu/resources/res-6-007-signals-and-systems-spring-2011/

Course Schedule

Course Topics	Book's Chapter	Event Name	Week Due
Introduction to Signal and System: Signal Models-discrete	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch. 1		Week-1
Continuous time system- Periodic and	Oppenheim A. and	Assignment1	Week-2

Aperiodic Signal- Phasor Signals.	Willsky A. with S. Nawab, Signals and Systems, ch. 1		
System Analysis in the Time Domain: System Modeling Concept- Superposition integral for fixed and linear system	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch.2		Week-3
Impulse Response and Frequency Response of fixed and linear system.	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch.2	Quiz1	Week-4
Fourier Series and Application: Trigonometric Series	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch.3		Week-5
Fourier Series and Application: Trigonometric Series	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch.3	Assigment2	Week-6
Fourier Series and Application: Trigonometric Series	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch.3	1st Mid Term	Week-7
Fourier Series Complex Exponential Fourier Series	Richard Baraniuk, Signals and Systems, ch.7	Quiz 2	Week-8
Fourier Transforms	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch.4		Week-9
Fourier Transforms Theorms- System	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch.4		Week-10
Analysis with Fourier Transform- Steady-State System Response to Sinusoidal inputs.	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch.5	Assignment3	Week-11
The Laplace Transform and Applications: Example of Evaluation Laplace Transform	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch.9		Week-12
The z-Transform- Difference Equation and Discrete- Time system	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch.10	2nd Mid Term Exam	Week-13
Discrete Time Systems: Analog-to-Digital Conversion.	Oppenheim A. and Willsky A. with S.		Week-14

	Nawab, Signals and Systems, ch.7		
		Lab Exam	Week -15

Referencing Style

The **American Psychological Association (APA)** referencing style must be use for all submissions of this course.

Course Assessment Task

Assessment Name:-	Mid Term Exam1
Description of Task Assessment:-	Close book written examination will be conducted, various types of question such as multiple types, subjective and analytical, having appropriate weightage and with respect to time are allotted.
Task Assessment Due Week/Date:-	7th Week
Return Week/Date to Students:-	8th Week
Weight of Task Assessment:-	15%
List of Learning Outcomes Assessed:-	1. To understand the different types of systems and signals. 2. To understand The Systems Characterization and Analysis in the time domain, Sketch signals and perform basic time-domain operations on them, Classify, signals into periodic/non-periodic. **3.** Determine if a system is linear, time-invariant, causal, memoryless, and stable.

Assessment Name:-	Mid Term Exam 2
Description of Task Assessment:-	Close book written examination will be conducted, various types of question such as multiple types, subjective and analytical, having appropriate weightage and with respect to time are allotted.
Task Assessment Due Week/Date:-	14th Week
Return Week/Date to Students:-	15th Week
Weight of Task Assessment:-	**15%**
List of Learning Outcomes Assessed:-	1. To knowledge about a linear time-invariant system by its impulse/step response 2. Understanding the Fourier representation of signals and systems and ability to use it to analyze linear systems. 3. To understand the Laplace Transform and several of its properties. How to obtain inverse Laplace transforms and use this tools to analyze electrical networks.

Assessment Name:-	Assignment /Quiz
Description of Task Assessment:-	Close book written examination will be conducted, various types of question such as multiple types, subjective and analytical, having appropriate weightage and with respect to time are allotted.
Task Assessment Due Week/Date:-	**2,4,6,8,11**
Return Week/Date to Students:-	**Next Day**
Weight of Task Assessment:-	**10%**
List of Learning Outcomes Assessed:-	1. To understand the different types of systems and signals. 2. To understand The Systems Characterization and Analysis in the time domain, Sketch signals and perform basic time-domain operations on them, Classify, signals into periodic/non-periodic. 3. Determine if a system is linear, time-invariant, causal, memoryless, and stable. 4. To knowledge about a linear time-invariant system by its impulse/step response 5. Understanding the Fourier representation of signals and systems and ability to use it to analyze linear systems.

Assessment Name:-	Final Exam
Weight of Task Assessment:-	40%
Duration:-	180 Minutes
Warning:-	None
List of Learning Outcomes Assessed:-	1. To understand the different types of systems and signals. 2. To understand The Systems Characterization and Analysis in the time domain, Sketch signals and perform basic time-domain operations on them, Classify, signals into periodic/non-periodic. 3. Determine if a system is linear, time-invariant, causal, memoryless, and stable. 4. To knowledge about a linear time-invariant system by its impulse/step response 5. Understanding the Fourier representation of signals and systems and ability to use it to analyze linear systems. 6. To understand the Laplace Transform and several of its properties. How to obtain inverse Laplace transforms and use this tools to analyze electrical networks. **7.** Applications to communication systems