CEN214

Signal Systems

Term 2nd – 2014 or 1435H

Course Profile

All details in this course profile for Signal and Systems (CEN214) have been officially approved by College of Computer and Information Sciences Majmaa'h University and represent a learning partnership between the University and you (our student). The information will not be change unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

General Information

OVERVIEW

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.

DETAILS

Level	6,Undergraduate
Credit Points	3

PRE-REQUISITES OR CO-REQUISITES

Pre-requisite: EE 111, MATH 204

ATTENDANCE REQUIRMENTS

All students are expected to attend scheduled classes – in some courses, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. all student, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for any students is defined as maintaining at least an 75% attendance record).

ASSESSMENT OVERVIEW

Assessment Task	Weighting
1. Midterm Exam-1	**15%**
2. Midterm Exam-2	**15%**
3. Quizzes/ Assignments	**15%**
4. Lab	**15%**
5. Final Exam	**40%**

This is a graded course: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the course of at least 50%, or an overall grade of 'pass' in order to pass the course. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than or equal 60%).

Majma'ah University Policies

All University policies are available on the Majma'ah University Portal.

You may wish to view these policies:

- Assessment of Coursework Procedures
- Grads and Results Procedure
- Review ox Grade Policy
- Plagiarism Procedure
- Student Misconduct and Plagiarism Policy
- Monitoring Academic Progress Policy
- Monitoring Academic Progress Policy
- Monitoring Academic Progress Procedures
- Refund Excess Payments (Credit Balances) Policy
- Student complaints Policy
- Use of Internet, mail and Computing Facilities Policy

This list is not an exhaustive list of all University policies. The full lists of University policies are available on the University web portal.

Course Learning Outcomes

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.

Alignment of Learning outcomes, Assessment and Graduate attributes

ALLIGNMENT OF ASSESSMENT TASKS TO LEARNING OUTCOMES

	Learning Outcomes						
Assessment Task	**1**	**2**	**3**	**4**	**5**	**6**	**7**

1. Midterm Exam-1	. . . .
2. Midterm Exam-2	. . .
3. Quizzes	. . . . . .
4. Assignments/Report/Seminar	. . . . . .
5. Final Exam	. . . .

Textbook and Resources

PRESCRIBED TEXTBOOKS

Guide to signal Systems			
Author/s	: Oppenheim A. and Willsky A. with S. Nawab	Year	: 1997
Edition	: 2nd (Chapters 1, 2, 3,4,5, 7 and 10 only)	Publisher	: Prentice Hall;
Author/s	Richard Baraniuk	Year	: 2007
Edition	: 2nd (Chapters 2,3,5 and 7)	Publisher	: Orange Grove Texts Plu

IT RESOURCES

You will need access to the following IT resources:

- Majma'ah University Faculty Email
- Faculty Web Page
- Projector
- Matlab Installed Computer Lab
- Online video Lecture
- http://ocw.mit.edu/resources/res-6-007-signals-and-systems-spring-2011/

Teaching Contacts

Course Coordinator:	Mohd Abdul Rahim Khan
Lab/Tutorial Instructor:	Mohd Abdul Rahim Khan
Email:	m.khan@mu.edu.sa
Office Hours:	Sunday 12 PM to 2 PM, Wednesday 12 PM to 2 PM
Office Number:	5384

Schedule

Week	Module/Topic	Chapter	Event and submission
Week-1	Introduction to Signal and System: Signal Models-discrete	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch. 1	Assigment1 09-02-2014 till 11AM
Week-2	Continuous time system-Periodic and Aperiodic Signal-Phasor Signals.	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch. 1	Quiz 1 16-02-2014 12:00AM
Week-3	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	Assigment2 23-02-2014 till 11AM
Week-4	Impulse Response and Frequency Response of fixed and linear system.	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch.2	Quiz 2 02-03-2014 12:00AM
Week-5	Fourier Series and Application: Trigonometric Series	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch.3	Assigment3 09-03-2014 till 11AM
Week-6	Fourier Series and Application: Trigonometric	Oppenheim A. and Willsky A. with S.	Quiz 3 16-03-2014 12:00AM

	Series	Nawab, Signals and Systems, ch.3	
Week- 7	Mid Term1		23-03-2014 First Mid
Week-8	Fourier Series Complex Exponential Fourier Series	Richard Baraniuk, Signals and Systems, ch.7	Assigment3 06-04-2014 till 11AM
Week-9	Fourier Transforms	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch.4	Quiz 4 13-04-2014 12:00AM
Week-10	Fourier Transforms Theorms-System	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch.4	Assigment4 20-04-2014 till 11AM
Week-11	Analysis with Fourier Transform- Steady-State System Response to Sinusoidal inputs.	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch.5	Quiz 4 27-04-2014 12:00AM
Week-12	The Laplace Transform and Applications: Example of Evaluation Laplace Transform	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch.9	Assigment4 04-05-2014 till 11AM
Week-13	The z-Transform- Difference Equation and Discrete- Time system	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch.10	
Week-14	Discrete Time Systems: Analog-to-Digital Conversion.	Oppenheim A. and Willsky A. with S. Nawab, Signals and Systems, ch.7	
Week-15	Mid term2		11-05-2014
Review Exam Week			
Exam Week			As per schedule of exam committee

Assessment Task

WRITTEN ASSESMENT

Assessment Title	Midterm Exam-1
Task Description	This assignment is aligned to learning outcomes 1, 2 and 3. In that regard, the assignment contains questions that assess:

	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 The complete details of the assessment task are provided in Faculty web Page.
Assessment Due Date	23-03-2014
Weighting	15%
Assessment Criteria	The assessment criteria for this task are under continuous revision. Please refer to Faculty Web page for an up-to-date and complete set of assessment criteria for this task.
Referencing Style	American Psychological Association (APA) or Harvard (author-date)
Submission	Online Submission instructions are provided in Faculty Web Page.
Learning Outcomes Assessed	1. Mathematical description and classification of various signals and systems. 2. Mathematical software packages. 3. Continuous linear time-invariant systems. 4. Determine if a system is linear, time-invariant, causal, memory less, and stable. Describe a linear time-invariant system by its impulse/step response.

Assessment Title	Midterm Exam-2
Task Description	1. This assignment is aligned to learning outcomes 4, 6 and 7. In that regard, the assignment contains questions that assess: Understanding the Fourier representation of signals and systems and ability to use it to analyze linear systems. 2. To understand the Laplace Transform and several of its properties. How to obtain inverse Laplace transforms and use this tools to analyze electrical networks. 3. Applications to communication systems.
Assessment Due Date	

Return Date to Students	11-05-2014
Weighting	15%
Assessment Criteria	The assessment criteria for this task are under continuous revision. Please refer to Faculty Web page for an up-to-date and complete set of assessment criteria for this task.
Referencing Style	American Psychological Association (APA) or Harvard (author-date)
Submission	Online Submission instructions are provided in Faculty Web Page.
Learning Outcomes Assessed	1. Ability to use Fourier representation to analyze linear systems. 2. An ability to obtain inverse Laplace transforms and uses these tools to analyze electrical networks. 3. Understanding the Z-transform of Discrete-time signals to arise by sampling a continuous-time signal.

EXAMINATION

Outline	Final examination
Date	**During University examination period**
Weighting	**40%**
Length	180 Minutes
Details	Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments) Calculator Permitted Closed Books
Learning Outcomes Assessed	1. Mathematical description and classification of various signals and systems. 2. Mathematical software packages. 3. Continuous linear time-invariant systems. 4. Determine if a system is linear, time-invariant, causal, memory less, and stable. Describe a linear time-invariant system by its impulse/step response. 4. Ability to use Fourier representation to analyze linear systems. 5. An ability to obtain inverse Laplace transforms and uses these tools to analyze electrical networks.

	6. Understanding the Z-transform of Discrete-time signals to arise by sampling a continuous-time signal.