The University of Texas at Tyler
Department of Electrical Engineering

EENG 4311-031 – Signals and Systems

Syllabus

Catalog Description:

Types of signals; Types of systems; Properties of systems; Convolution; Fourier series, Fourier transforms; Laplace transforms; Difference equations; Z-transform; Discrete-time systems; Applications and design concepts.

Prerequisites:

EENG 2101, and EENG 3305

Credits: (3 hours lecture, 0 hours laboratory per week)

Text(s): B. P. Lathi, R. Green, Linear Systems and Signals, 2nd edition, Oxford, 2005.
A. V Oppenheim, A. S. Willsky, S. H. Nawab, Signals and Systems, 2nd edition, Prentice Hall, 1997.

Additional Material: Class Notes

Course Coordinator: Ali Ghorshi, PhD

Topics Covered: (paragraph of topics separated by semicolons)

Signal and System Modeling; Time domain modeling of systems; Fourier Series; Fourier Transform and its applications; The Laplace Transform; Applications of the Laplace Transform; Z-Transform

Evaluation Methods: (only items in dark print apply):

1. Examinations / Quizzes
2. Homework
3. Report
4. Computer Programming
5. Project
6. Presentation
7. Course Participation
8. Peer Review

Course Learning Outcomes[1]: By the end of this course students will be able to:

[1]Numbers in brackets refer to method(s) used to evaluate the course objective.

1. Determine the circuit response to a periodic signal using the Fourier Series. (1)
2. Model linear time-invariant systems using convolution (1,2)
3. Describe how composite signals are used to determine the response of linear systems (1)
4. Utilize the Fourier Transform in the analysis of electronic circuits. (1)
5. Compute the signal energy using Parseval's Theorem (1)
6. Construct a proof for the frequency shifting theorem using the Fourier Transform (1)

7. Determine the stability of an LTI system through an analysis of the pole locations in the s-plane. (1)
8. Demonstrate what happens in the frequency domain when a continuous signal is sampled. (2)
9. Design an anti-alias filter for a sampled data system. (1)
10. Design a FIR filter using the frequency-sampling method (2,4)
11. Utilize the z-Transform to describe a discrete-time signal (1)
12. Write a paper on a contemporary issue related to signals and systems (3)
13. Design a discrete-time system using multipliers, adders, and delay elements (1)

Relationship to Student Outcomes (only items in dark print apply)[2]: This course supports the following Electrical Engineering Student Outcomes, which state that our students will possess:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics; [1, 3, 4, 6, 10, 11]
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors; [2, 5, 7, 8, 9, 13]
3. an ability to communicate effectively with a range of audiences;
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts;
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions; [12]
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

[2]Numbers in brackets refer to course objective(s) that address the Program Outcome.

Contribution to Meeting Professional Component: (in semester hours)

Mathematics and Basic Sciences:	0	hours
Engineering Sciences and Design:	3.0	hours
General Education Component:	0	hours

Prepared By:	R. Hippenstiel	Date:	14 Jan 2007
Modified By:	Hector A. Ochoa	Date:	7 Jan 2008
	David Hoe		12 Jan 2014
	Ali Ghorshi		11 Jan 2019
			6 Jan 2020
			12 Dec 2022