The University of Texas at Tyler
Department of Electrical Engineering

Course: EENG 4311 – 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 3305 Linear Circuits Analysis II, EENG 3308 Programming Languages for Design

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

Text(s): B. P. Lathi, Linear Systems and Signals, 3rd edition, Oxford, 2017

Additional Material: Class Notes

Course Coordinator: Frederic Rizk, Assistant Professor, Department of Electrical and Computer Engineering

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. Evaluate a periodic signal using the Fourier Series. (1)
2. Determine the circuit response to a periodic signal using the Fourier Series. (1)
3. Evaluate linear time-invariant systems using convolution (1,2)
4. Utilize the Fourier Transform in the analysis of electronic circuits. (1)
5. Compute the signal energy using Parseval's Theorem (1,2,4)
6. Apply the frequency shift theorem property of Fourier Transform methods in the spectral analysis of a band pass signal (1)
7. Determine the stability of an LTI system through an analysis of the pole locations in the s-plane. (1,2)
8. Demonstrate what happens in the frequency domain when a continuous signal is sampled. (1,2)

9. Design an anti-alias filter for a sampled data system. (1,2)
10. Apply programming (Matlab) to generate solve problems covering continuous and discrete time signals.
11. Analyze a signal using discrete Fourier Transform (1,2,4)
12. Utilize the z-Transform to describe a discrete-time signal (1,2)
13. Demonstrate knowledge of terms and concepts essential to appreciating current developments for he field of signals and systems (1)

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

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

1. have the ability to apply knowledge of the fundamentals of mathematics, science, and engineering; [1,3,8]
2. have the ability to use modern engineering tools and techniques in the practice of electrical engineering; [5,10]
3. have the ability to analyze electrical circuits, devices, and systems; [7]
4. have the ability to design electrical circuits, devices, and systems to meet application requirements; [2]
5. have the ability to design and conduct experiments, and analyze and interpret experimental results; [9]
6. have the ability to identify, formulate, and solve problems in the practice of electrical engineering using appropriate theoretical and experimental methods; [4,6,11,12]
7. have effective written, visual, and oral communication skills;
8. possess an educational background to understand the global context in which engineering is practiced, including:
   a. knowledge of contemporary issues related to science and engineering;
   b. the impact of engineering on society; [13]
   c. the role of ethics in the practice of engineering;
9. have the ability to contribute effectively as members of multi-disciplinary engineering teams;
10. have a recognition of the need for and ability to pursue continued learning throughout their professional careers;

[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	hours
General Education Component:	0	hours

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