

ECE 330 Signals and Systems II

Required for Electrical Students

Catalog Data

ECE 330 Signals and Systems (5 Credits)

Analysis of both continuous-time and discrete-time signals, convolution, frequency domain analysis, Fourier series, Fourier transforms, and z-transforms, filters, applications to communications and control systems. Each week lecture meets for 200 minutes and lab meets for 150 minutes.

Required Textbook

- “Signals and Systems (2nd Edition)”, Alan V. Oppenheim, Alan S. Willsky, S. Hamid ISBN: 978-0138147570.

Recommended Textbook

- “Schaum’s Outline of Signals and Systems, 3rd Edition”, Hwei Hsu, ISBN: 978-0071829465.

Coordinators

Hani Mehrpouyan

Relationship to Student Outcomes

This course relates to student outcomes EAC a, e, and k.

Student Learning Outcomes, Students will

1. Carry out convolution and filtering operations on time domain signals (EAC a).
2. Apply Fourier and Z-domain analysis to analyze discrete time signals and systems. (EAC a).
3. Apply Fourier analysis to design filters that can be used to solve engineering problems speech and image processing, channel equalization, signal de-noising, etc (EAC e).
4. Use modern measurements tools such as Matlab, software defined radios, spectrum analyzers, and digital oscilloscopes, to complete the assigned project (EAC k).

Prerequisite by topic

- Differential and integration calculus
- Vector Calculus
- Signals and Systems
- Freshman level electricity and magnetics
- Algebra
- Trigonometry

Lecture Topics

This course is aimed at providing a firm foundation of signals and systems for discrete time signals to both specialist and non-specialists undergraduates.

Class Schedule

Meets for 5 hours of lecture and 2:30 hours of laboratory exercises each week for 10 weeks.

Computer Usage

Matlab.

Laboratory Projects

1. Convolution in the time domain
2. Fourier series
3. Discrete time Fourier transform
4. Discrete Fourier transform and fast Fourier transform
5. Z-transform
6. Finite impulse response (FIR) low/high pass filter design
7. Infinite impulse response (IIR) low/high pass filter design

Professional Component

Contributes towards the Electrical Engineering Topic Courses.

Design Content Description

- *Approach:* The design component is provided through lecture materials, laboratory exercises, homework, and tests.
- *Lectures:* 80%
- *Labs:* 20%

Prepared by

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Approved by

Approved by CEE/CS Department on December 2012.