ENR 320 Signals and Systems

Winter 2024

Course Credits: 4
Contact Hours: 56 hours
Instructor: TBA
Email:TBA

COURSE OBJECTIVES

The course will provide strong foundation on signals and systems which will be useful for creating foundation of communication and signal processing. This course includes topics like Fourier analysis, Laplace transforms, Z-transforms, and linear systems. It also covers practical applications of signals and systems in communication systems, control systems, and digital signal processing. With this course, students can gain a strong foundation in signals and systems, which is essential for any electrical engineer.

Upon Completion of this Course, students will be able to:

1. Analyze the different types of signals and systems;
2. Utilize the Laplace transform method to solve continuous, linear, time-invariant systems and to obtain transfer functions;
3. Analyze continuous, linear time-invariant systems using state variable formulation and solve the resulting state equations;
4. Represent continuous and discrete systems in time and frequency domain using different transforms Test whether the system is stable.

PREREQUISITES

MAT 258 Introduction to Complex Analysis

GRADING

Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS
2 Assignments	20 Points
2 Quizzes	20 Points
Midterm Exam	25 Points
Final Exam	35 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F$.

We reserve the right to make adjustments to the overall grading policy.

COURSE MATERIALS

Required Texts:

Simon Haykins and Barry Van Veen, ***Signals and Systems***, 2nd Edition, 2008, Wiley.

Recommended (Optional) Texts or Other Materials:

None.

COURSE TOPICS

MODULE	TASKS
Module 1	**Topics:** Topic 1: Basic definitions of signals and systems Topic 2: Spaces of discrete-time signals Topic 3: Spaces of continuous-time signals Topic 4: Signals in multiple-dimensions **Assessments:** Assignment #1
Module 2	**Topics:** Topic 5: Signals in the frequency-domain Topic 6: System identification using frequency response Topic 7: Distributions in the time-domain Topic 8: Periodic distributions **Assessments:** Quiz #1

Module 3	**Topics:** Topic 9: Introduction to Fourier Transform & DTFT Topic 10: Fourier Series representation of periodic signals Topic 11: Frequency spectrum of a periodic signals Topic 12: System analysis using Fourier Transform **Assessments:** Assignment #2 Midterm Exam
Module 4	Topics: Topic 13: Z-transform Topic 14: Discrete-time Fourier transforms Topic 15: The Laplace transforms Topic 16: The Laplace transform for distributions **Assessments:** Quiz #2
Module 5	Topics: Topic 17: Causality and stability Topic 18: The sampling theorem Topic 19: Signal transmission schemes Topic 20: Digital filtering **Assessments:** Final Exam

ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

LEARNING REQUIREMENTS

1) Late assignments are not acceptable and are subjected to grade deductions.
2) Assignments submitted in the wrong format will be counted as not submitted.
3) Failure to submit or fulfill any required course component results in failure of the class.
4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

TECHNOLOGY POLICY

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

ACEDEMIC INTEGRITY POLICY

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

DISABILITY ACCOMMODATION

Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a

learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.