Syllabus

The Cooper Union for the Advancement of Science and Art

Albert Nerken School of Engineering

Department of Electrical Engineering

Spring 2025

ECE 210-B: MATLAB Seminar – Signals & Systems

Course Overview

Catalog Description:

> A weekly hands-on, interactive seminar that introduces students to MATLAB, in general, and the Signal Processing Toolbox in particular. Students explore scientific computation and scientific visualization with MATLAB. Concepts of signal processing and system analysis that are presented in ECE 211 or other introductory courses on the subject are reinforced through a variety of demonstrations and exercises. It is strongly encouraged for students taking a first course in signals and systems, or for students expecting to use MATLAB in projects or courses.
>
> ***Pre-requisite:*** *MA 113 – Calculus II*
>
> ***Co-requisite:*** *ECE 211 – Signals Processing*
>
> ***tldr:*** *we'll be learning how to use MATLAB from a signals processing perspective*

Instructor: Jacob Koziej (EE '25)

Location: 41 Cooper Square, Room 802

Time: Mondays 16:00–16:50

Credits: Zero

Office Hours: On request

Preferred Contact Method: Email

Course Website: `https://github.com/jacobkoziej/jk-ece210`

Prerequisite Skills

Although not explicit prerequisites, we will *heavily* utilize concepts from linear algebra and an introductory programming course. After all, MATrix LABoratory has *matrix* in the name and is synonymous with the word *code*. We will also deal with differentiation, integration, summation, complex numbers, and numerical representation. If you are uncomfortable with **any** of these topics, I highly suggest visiting an ARC tutor to get caught up to speed.

Course Goals

The ultimate goal of this course is to familiarize you enough with MATLAB so that you can perform calculations expected of every EE to know by heart. By the end of the semester, you should:

- Write *clean & effective* MATLAB code.
- Vectorize numerical operations.
- Visualize data in a meaningful manner.
- Mitigate round-off error.
- Work in the z, s, and frequency domains.
- Design filters.

This course will also achieve the following ABET outcomes:

1. *An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.*
6. *An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.*
7. *An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

Policy

Overall, I am a *very* understanding person, but please don't force my hand.

Ask Questions

> The man who asks a question is a fool for a minute, the man who does not ask is a fool for life. (Confucius)

At times, my mind moves too fast for my own good, and I may *skip* steps. If at any moment you are confused for any reason, **stop me**. I can guarantee you are not the only person in the room. If you're so confused you can't compose a meaningful question, **please reach out**, and we'll identify the problem together.

Academic Integrity

I will not tolerate cheating of **any** kind. This is such a low-stakes course that if you cheat, I will seriously be disappointed and question how you're operating in your more rigorous courses. Generative AI is permitted but strongly discouraged. The whole point of this course is to *learn* how to write good MATLAB code, not to mention that the code quality of such tools is still quite shit. You'll have plenty of time in your career to toy with these tools. *If* you get stumped and receive help from someone or find code online, **cite the source(s)** in your submission. Ultimately, if I suspect you have cheated, I must, by school policy, report you to the Dean's office for a formal investigation.[1]

Attendance

Attendance is mandatory. You do not need to inform me if you can't make a lecture, but if I notice you have not attended my lectures regularly, I will reach out to find out why. Although I am creating supplementary lecture material, it will not cover everything I cover during a lecture.

Course Material

All course material is freely available on the course website. The page will always have the most up-to-date course material. The bottom right of each PDF has a clickable link to the course website, and the top right also has a clickable Git commit hash associated with the generated PDF. It is essential for assignments we all operate on the **same** commit hash. *If,* for any reason, a change is necessary, I will inform you of the new commit hash. *However,* I will not penalize you for using previous commit hashes due to an error on my end.

Grading

All assignments are pass/fail. If you fail, you will receive detailed feedback as to *why.* **I do not allow re-submissions.** There are six "core" assignments you need to successfully complete to pass this course. If you fail one or more, you will need to complete an equal amount of additional assignments I create that delve

[1] `https://cooper.edu/engineering/curriculum/academic-standards-regulations`

into topics that interest *me* to "make up" these failures. You can expect about six of these.

You will have *at least* one week to complete each assignment, and submissions are to be handed in at the start of class. **I do not accept late work.**[2] If you need an extension, **reach out to me.** I also expect all submissions to follow my submission guidelines,[3] as I will not grade work that does not meet these expectations!

Student Resources

Accommodations: `https://cooper.edu/students/student-affairs/disability`

Mental Health Services: `https://cooper.edu/students/student-affairs/health/counseling`

Title IX Policy: `https://cooper.edu/sites/default/files/uploads/assets/site/files/2020/Cooper-Union-Policy-Upholding-Human-Rights-Title-IX-Protections.pdf`

[2] Late in my book means when I get to grading.

[3] `https://github.com/jacobkoziej/jk-ece210/blob/build/submissions.pdf`

