

ENGR 071 Digital Signal Processing

Spring 2025

COURSE AND CONTACT INFORMATION

Instructor Information:

Allan Moser

Available after class, Wed 1:15 (during lab), and by appointment

Office: Singer Rm 236

(610) 328-8446

amoser2@swarthmore.edu

Class & Lab Schedule

Class

TTh 9:55 – 11:10

Science Center 264

Lab

Nominally Self-Scheduled

Time reserved: Wed 1:15 – 4:00 Singer 246

MOODLE:

Materials and communications will be available using Moodle.

TEXTBOOK:

John G. Proakis and Dimitris G. Manolakis, *Digital Signal Processing: Principles, Algorithms and Applications*, Fifth Edition. Pearson, 2022.

ISBN: 978-0137348244

Available through Tap+ Program on Moodle page: [here](#)

COURSE DESCRIPTION

Students will be introduced to difference equations and discrete-time transform theory, the Z-transform and Fourier representation of sequences, and fast Fourier transform algorithms. Discrete time transfer functions and filter design techniques are also introduced.

SPECIFIC TOPICS COVERED IN THIS COURSE INCLUDE:

- Discrete time signals and systems
- The z-transform and its application to linear time invariant systems
- Frequency analysis of signals
- Sampling and reconstruction of signals
- The discrete Fourier transform
- Fast Fourier transform
- Design of digital filters

COMPUTER USAGE:

- Matlab
- Simulink

LABORATORY PROJECTS/ASSIGNMENTS:

- Labs will primarily be computational.
- If time and resources are available, there may be some hardware labs
- Labs are self-scheduled, but a lab time has been reserved for this class which will be used to help you get started.
- There is a lot of flexibility for projects. It should be driven by your interests.
- Lab and project groups should consist of 3 or 4 students.
- There will be weekly homework assignments.

ASSESSMENT/GRADING

Table 1 - course activity and grade value

Activity	Grade Percentage
Homework	20 %
Exam 1	25 %
Exam 2	25 %
Labs	15 %
Final Project	15 %

LEARNING OUTCOMES

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- An ability to communicate effectively with a range of audiences, writing complete, accurate and cogent technical reports and giving oral presentations for projects and assignments.
- 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.
- An ability to develop and conduct appropriate experimentation, analyze, and interpret data, and use engineering judgment to draw conclusions.
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

HOMEWORK

I encourage you to work together on homework. You may also consult on-line resources, however, your goal should be to explore options rather than to avoid work. Do not copy from fellow students or from solutions found online. Besides being dishonest, you will not learn the material until you attempt problems alone first.

DISABILITY ACCOMMODATIONS STATEMENT

If you believe you need accommodations for a disability or a chronic medical condition, please visit the [Student Disability Services website](#) for details about the accommodations process. Since accommodations require early planning and are not retroactive, contact Student Disability Services as soon as possible. You are also welcome to contact me privately to discuss your academic needs. However, all disability-related accommodations must be arranged, in advance, through Student Disability Services.