

Purdue University Northwest
Department of Electrical and Computer Engineering
ECE 30001 Signals and Systems Lab
Fall 2025

Instructor Information:

Instructors: Mengji Yao, yao348@pnw.edu

Lecture Instructor: Lizhe Tan, Ph.D., lizhetan@pnw.edu

Contact:

Email: yao348@pnw.edu; **Office:** N/A; **Cell:** 219-385-8085.

Course Delivery: On-Campus

Office Hours: After class, or after lab completion, or by appointment

Course Description:

Experiments covering the analysis and design of continuous-time and discrete-time linear systems in both the time and frequency domains.

Prerequisites:

Concurrent ECE 30100

Time, Location, and Teaching Staff:

| Section | Day | Time | Campus | Location | Instructors |
|---------|-----|-------------------|---------|----------|-------------|
| 002 | M | 2:00 PM - 4:50 PM | Hammond | POTT 308 | Mengji Yao |
| 003 | W | 2:00 PM - 4:50 PM | Hammond | POTT 308 | Mengji Yao |

Course Objectives:

A student who successfully fulfills the course requirements should be able to:

1. Apply MATLAB/Simulink for analysis and simulation of signals and systems.
2. Use software to perform analysis and simulation of continuous-time signals.
3. Conduct analysis and simulation of linear time-invariant systems in time domain.
4. Conduct analysis and simulation of linear time-invariant systems in frequency domain.
5. Perform analysis and simulation of continuous-time systems in frequency domain using the Fourier representation of signals and systems.
6. Perform analysis and simulation of linear continuous-time systems using Laplace transform.
7. Perform analysis and simulation of linear discrete-time systems using Z-transform.
8. Use data acquisition unit to conduct signal acquisition experiment(s), analyze and process data, and validate the conclusions.

ABET outcome in Criteria 3 addressed:

Outcome 6: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions. (Level of Contribution: 3-substantial)

Reference: (Textbook used ECE 30100):

C. Phillips, J. Parr, and E. Riskin, Signals, Systems, and Transforms, 5th Edition, 2014.

Supplementary Material: Provided by Instructor

Brief list of topics to be covered

1. Introduction to MATLAB calculation and plots of signals
2. Continuous-time signal properties
3. Generation of continuous-time signals
4. System Responses Using Convolution
5. Fourier Series and Gibbs Phenomenon
6. Steady state response and Filtering Effect with MATLAB and Simulink
7. System response to non-sinusoidal signals
8. System response using Laplace transform
9. Active Filter Design
10. Signal Sampling and Data Acquisition for Signal Processing Instrumentation
11. Discrete-Time System with Simulink and Real-Time Processing with LabView Platform

Assignments and Determination of Course Grade:

| | | |
|-----------------------------|------------|------------|
| GRADING SYSTEM: Labs | | 85% |
| | Final Exam | <u>15%</u> |
| | Total | 100% |

| | | | | |
|-------------------------|----|-------|----|-------|
| Grade Scale (%): | A | 93+ | A- | 90-92 |
| | B+ | 87-89 | B | 83-86 |
| | B- | 80-82 | C+ | 77-79 |
| | C | 73-76 | C- | 70-72 |
| | D+ | 67-69 | D | 63-66 |
| | D- | 60-62 | F | 0-59 |

Course Policies:

Due date and time for each lab will be the beginning time and date of the next lab. 10% will be deducted for each calendar day until the said lab score drops to zero.

Exams **must** be taken on the scheduled date(s). An exception may be made for illness, but not for personal or family vacations. In all cases, you must notify the instructor **prior** to the scheduled time, and the test must be taken no later than one week after the scheduled date. A record of lab attendance and participation will be maintained. You are expected to attend every lab section and do your own work. Accumulated three (3) absences will drop your letter grade by one grade.

When you complete your lab section, besides the sign-off part, you need to present or demonstrate your work to your lab instructor for final check on the completion.

ECE 30001 Assignments – Fall 2025

Lab Schedule (17 weeks):

| Week | Laboratory Experiments | % of Grade | Subject |
|------|--------------------------------------------------------------|------------|--------------------------------------------------------------------------------------------------------------|
| 1 | 0 1 | 5% | 0-Preparation and policies Monday section: Introduction to MATLAB calculation and plots of signals |
| 2 | Labor Day (9/1/2025, no lab on Monday) | 5% | Wednesday section: Introduction to MATLAB calculation and plots of signals |
| 3 | 2 | 8.0% | Continuous-time signal properties |
| 4 | 3 | 8.0% | Generation of continuous-time signals |
| 5 | 4 | 8.0% | Analysis of system response using convolution |
| 6 | 4 | | Analysis of system response using convolution |
| 7 | 5 | 8.0% | Fourier series and applications |
| 8 | Fall Break (10/13-14/2025, Mon-Tues, no class on Monday) | | Wednesday: help for both sections, POTT 308 |
| 9 | 6 | 8.0% | Steady state response and filtering effect |
| 10 | 7 | 8.0% | System response due non-sinusoidal signal input |
| 11 | 8 | 8.0% | System response using Laplace transform |
| 12 | 9 | | Active filter design |
| 13 | 10 | 8.0% | Signal sampling and data acquisition for signal processing instrumentation |
| 14 | Thanksgiving (11/26-29/2025 Wes-Sat, no lab on Wednesday) | | Monday: help for both sections, POTT 308 |
| 15 | 11 | 8.0% | Review for exam, Discrete-time system response using Z-transform, Make-up |
| 16 | | 15% | Exam |

[Honor Code](#)¹

[Academic Dishonesty Policy](#)²

[Classroom Civility Policies](#)³

¹ www.pnw.edu/dean-of-students/honor-code

² www.pnw.edu/dean-of-students/purdue-university-northwest-academic-integrity-policy/

³ www.pnw.edu/dean-of-students/toward-a-model-of-community-civility-student-guide-12006/

University Policies:

Students are strongly encouraged to familiarize themselves with PNW policies on absences, civility in the classroom, complaint procedures, academic integrity, and other relevant policy, at the following link:

<https://www.pnw.edu/dean-of-students/policies/>

Accommodations for students experiencing a diagnosis or injury, pregnancy, chronic medical, psychological or learning concerns, or disability:

Students needing accommodations to address barriers caused by a documented circumstance such as a diagnosis or injury impacting their PNW experience, pregnancy, chronic medical, psychological or learning concerns, or disability under federal law need to register with the PNW Disability Access Center (DAC) in order to receive accommodations. To request accommodations, students must first complete an [Accommodation Request form](#). DAC staff will evaluate supporting documentation, and work with the student and faculty to develop reasonable accommodations.

The student selects appropriate accommodations based on course modality and expectations, and sends an Access Plan for each course to instructors. Accommodations are required to be provided from the date the Access Plan is sent and are not retroactive. The DAC is located at the Hammond campus in the Student Union & Library Building (SUL) 341 and Westville in the Technology Building (TECH) 101. The DAC can be reached at (219) 989-2455 or emailing: dac@pnw.edu.

Student Mental Health and Wellbeing:

Purdue University Northwest is committed to supporting and advancing the mental health and well-being of PNW students. During the course of their academic careers, students often experience personal challenges that contribute to barriers in learning, such as drug or alcohol problems, strained relationships, anxiety, family conflict, problems with organization, procrastination and/or lack of motivation. These mental health concerns can lead to diminished academic performance and can interfere with daily life activities. If you or someone you know has a history of mental health concerns, or if you are unsure and would like a consultation, a variety of confidential services are available. The Counseling Center is located at the Riley Center, 2250 173rd Street, Hammond, and TECH 101 in Westville. You can also reach us at (219) 989-2366 or on [the Counseling website](#). If you or someone you know is experiencing a mental health crisis, the national 988 Suicide and Crisis Lifeline is available 24 hours a day, in English and Spanish, by calling or texting 988. More information is available at 988lifeline.org.

Non-Discrimination:

Purdue University Northwest prohibits discrimination against any member of the University community on the basis of race, religion, color, sex, age, national origin or ancestry, genetic information, marital status, parental status, sexual orientation, gender identity and expression, disability, or status as a veteran. Any student who believes they have witnessed or experienced discrimination are encouraged to report the incident to the Office of Equity, Diversity & Inclusion in Lawshe 231, Hammond or call (219) 989-2337 or in Schwarz 25, Westville or call (219) 785-5545. Additional information can be found on the [Diversity website](http://www.pnw.edu/diversity).⁴

Emergency Preparedness:

An information sheet, with instructions for various types of possible emergencies, is posted in each room on campus. These emergencies include criminal activity, severe weather, fire, medical emergencies, and noises sounding like gunshots. Students are strongly encouraged to review this instruction sheet carefully and acquaint themselves with these important guidelines. PNW will hold annual drills to prepare for emergencies such as severe weather, active shooter and fire. It is strongly encouraged that all students participate in these drills in an effort to strengthen our emergency preparedness efforts.

COVID-19 Preparedness:

To keep our students, faculty, staff, and community safe, students are required by the University to follow the current [face covering protocols](#) and other COVID-related guidelines established by the Director of Public Safety. (Face coverings must cover both nose and mouth.) Students are required to follow these guidelines when on campus or participating in University-sponsored activities. These same protocols will be followed in the classroom environment. Because of the importance of these protocols to the safety of the University community, failure and refusal to comply with the protocols will be treated as “obstruction or disruption of a University activity” as defined in the [Code of Conduct](#).

If you feel any symptoms, please stay at home. You will not be penalized for putting your health and those around you first, rather, such consideration is encouraged and praised.

If you test positive for COVID-19, please contact Colin Fewer, Dean of Students at 219.989.4141 or through email at fewer@pnw.edu.

Zoom Etiquette:

The [classroom civility policies](#) apply to all class formats, including courses meeting synchronously via Zoom. When others are speaking, please mute your microphone. We encourage your active engagement in Zoom discussions and request that you use the “hand raise” function to allow the instructor to facilitate a respectful conversation. Please arrive to your Zoom sessions a few minutes early to allow the instructor time to get all members of the course admitted.

⁴ <http://www.pnw.edu/diversity>

Course Engagement:

Student engagement in coursework and class activities is essential for learning and student success. Additionally, to comply with federal mandates related to financial aid, the university is required to track attendance and engagement in course activities. Depending on the delivery format of your course, attendance and engagement in the course may be defined and tracked in different ways. Meaningful engagement in a course may include attending live class sessions (in person or remotely), engaging with learning materials, participating in learning activities, completing assessments, and interacting with classmates and/or the instructor. Logging into the course site in Brightspace alone does not constitute meaningful engagement in a course. You are expected to be actively engaged in the course activities as explained in the course syllabus.