

Purdue University Northwest
Department of Electrical and Computer Engineering
ECE 30100 Signals and Systems
Fall 2025

Instructor Information:

Instructor: Lizhe Tan, Ph.D.

Contact:

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Office Hours: **T, R 2:00-4:00 PM, F: 12:00-2:00 PM; or by appointment**

Teaching Assistants for Labs (ECE 30001):

Mengji Yao, Email: yao348@pnw.edu

Lab Section, 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 Description:

Continuous and discrete time signal and system representation and analysis. Fourier series and transforms. Bode plots, sampling and discrete Fourier transforms. Laplace transforms. Transient response characteristics. Discrete-time systems. Difference equations. Z transforms. S-plane to Z-plane mapping and stability relationships. Continuous and discrete time system convolution. MATLAB usage is integrated in the course.

Prerequisites: ECE 20200 and MA 26400

Course Objectives:

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

1. Classify signals and systems as represented by their mathematical models.
2. Analyze both continuous and discrete linear time-invariant systems in the time domain.
3. Apply the Fourier representation of continuous signals and systems to analyze continuous linear systems in the frequency domain.
4. Understand the Laplace representation of continuous-time signals and systems; and apply Laplace transform to analyze linear continuous-time systems.
5. Understand the representation of discrete-time signals and systems in Z-domain; and apply the Z-transform to analyze discrete-time systems.

ABET outcome in Criteria 3 addressed:

Outcome 1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. (Level of Contribution: 3-substantial)

Required Materials:

Textbook:

Signals, Systems, and Transforms, 5th Edition, C. Phillips, J. Parr, and E. Riskin, Pearson, 2014. ISBN: 978-0-13-350647-1.

Supplementary Material:

a. Signals and Systems, Second Edition, A. V. Oppenheim, A. S. Willsky with S. H. Nawab, Prentice-Hall, Inc., 1997. ISBN 0-13-814757-4.

Brief list of topics to be covered

- a. Introduction, signals and systems
- b. CT signals, properties, singularity and mathematic functions
- c. CT systems, system properties, linearity and stability
- d. Convolution of CT LTI systems, properties of convolution
- e. Properties of CT LTI system, differential equation model, and system responses
- f. Fourier series and properties
- g. Fourier series and frequency spectra
- h. Fourier transform, properties, Fourier transform of time functions
- i. Filters, sampling of CT signal, and signal reconstruction from sampled data
- j. Laplace transform, properties, and applications
- k. Bilateral Laplace transform
- l. Discrete-time signals, and properties and system properties
- m. Convolution of DT LTI system, properties, responses of DT LTI systems
- n. Z-transform, properties, and applications
- o. Bilateral z-transform

Assignments and Determination of Course Grade:

GRADING SYSTEM:	Exam 1	20%
	Exam 2	20%
	Final	25%
	Homework	20%
	Quizzes	15%
	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:

Material to be covered in class is listed on the schedule. Minor adjustments to the schedule may occur. The student is responsible for having read the material **prior to class** so knowledgeable discussions can take place and any questions answered.

Exams **must** be taken on the scheduled dates, and homework will not be accepted late. An exception may be made for illness, but not for personal or family vacations. In all cases, you must notify the professor **prior** to the scheduled time, and the test must be taken no later than one week after the scheduled date. A record of class attendance and participation will be maintained. Accumulated five (5) absences will drop your letter grade by an half grade. You are expected to attend every class and do your own work.

ECE 30100

Assignments – Fall 2025, Gyte 123

Classes meet weekly on Monday and Wednesday from 12:30 PM – 1:45 PM

Weekly Tentative Course Schedule (17 weeks):

Week	Topic	Text	Exam Date	Exam Covers	Homework Due
1	Introduction, signals and systems	Ch 1			
2	(Labor Day: 9/1/2025, no class on Monday) Wednesday: Continuous-time signals and systems	Ch 2			
3	Continuous-time linear time-invariant systems	Ch 3			#1
4	Continuous-time linear time-invariant systems	Ch 3			#2
5-6	Fourier series	Ch 4	Exam 1	weeks 1-5	#3
7	Fourier transform	Ch 5			#4
8	(Fall Break: 10/13-14/2025, Mon-Tues, no class on Monday) Wednesday: Fourier transform and applications	Ch 5			
9	Fourier Transform/Laplace transform	Ch 5, Ch 7			#5
10	Laplace transform	Ch 7			#6
11	Laplace transform /Fourier transform and applications	Ch 7, Ch 6			#7
12	Fourier transform and applications/Discrete-time signals and systems	Ch6, Ch 9	Exam 2	Weeks 6-11	
13	Discrete-time signals and systems/Discrete-time linear time-invariant systems	Ch 9, Ch 10			#8
14	Monday: The Z-transform (Thanksgiving: 11/26-29/2025 Wes-Sat, no class on Wednesday)	Ch 11			#9
15	The Z-transform	Ch 11			#10
16	Make up topics, Review				
17	Final Exam		Final	All	None

[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](#).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.