PROGRAMMING FOR SIGNAL AND INFORMATION PROCESSING APPLICATIONS

University of Washington

EE 241

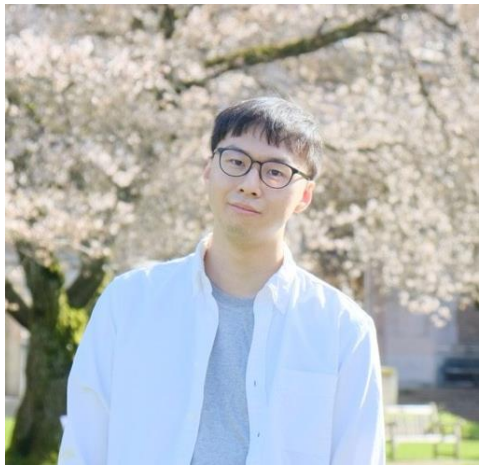
WELCOME FROM EE241 INSTRUCTION TEAM

Instructor:
Dinuka Sahabandu
ECE Professor

Research Interests
Machine Learning
Reinforcement Learning
sdinuka@ece.uw.edu

TA:
Jimin Kim
ECE PhD Graduate

Research Interests
Neuroscience and AI
UW NeuroAI Lab
jk55@uw.edu



TA:
Jinlin Xiang
ECE PhD Grduate

Research Interests
Few shots learning
UW NeuroAI Lab
jinlinx@uw.edu

TA:
Jingyuan Li
ECE PhD Graduate

Research Interests
Deep learning on timeseries
UW NeuroAI Lab
jingyli@uw.edu

WHAT IS THIS COURSE ABOUT?

Fundamental and practical programming skills to perform signal and information processing

Learn how to write codes that are **functional, efficient** and **well documented**

Application to processing **audio, image, tables** and **graph datasets.**

Lab-based undergraduate course

Uses **Python 3** as main programming language

SYLLABUS

W1. Lab 1: Set up Python environment, Getting Started with Python

W2-3. Lab 2: Finishing up Python basics, Numpy, Working with sound data

W4-5. Lab 3: Working with image data

W6-8. Lab 4: Working with real-world structured data & debugging

W9-10. Lab 5: Working with graph data & debugging tools

COURSE INSTRUCTION

Pre-lab Activities:

Lecture video (Watch before lab session)

Lecture Canvas quiz (Submitted before lab session, starts from W2)

In-Lab Activities:

Individual Knowledge Demonstration of Code (In-Lab check up - Individual)

Group programming (Lab reports - Group)

More detailed info on Canvas Page

LAB MATERIAL

Each Lab Report consists of (Canvas)

1) Lecture video (Canvas Panopto)

2) lecture slides (.pdf), (Canvas Assignment page)

3) In-lecture examples (.ipynb), (Canvas Assignment page)

4) Group lab report templates (.ipynb), (Canvas Assignment page)

Additional Resources

Python programming and Numerical Methods: Guide for Engineers and beginners (Berkeley, Free Online)

LAB FORMAT

Each lab is designed with following learning loop:

1. Recorded Lecture	→	Concept Introduction	Before Lab
2. Canvas Quiz	→	Concept Feedback	
2. Lecture Examples	→	Hands-on Review	
3. Group Programming	→	Real World Problem solving	In-Lab

CANVAS PAGE

E E 241 Wi 25: Programming For Signal And Information Processing Applications

Assign To | Edit

Welcome to EE241!

This course aims to provide fundamental programming skills in the context of signal and information processing applications. The course will use **Python 3** as its main programming language and will particularly focus on learning how to write Python codes for real-world applications that are **Functional, Efficient,** and **Documented.**

Home & Syllabus tabs for Detailed Course Info

Announcements tab for important course announcements

Discussions tab for team – team team – instructor discussions

Panopto tab for Lecture recordings

CANVAS ASSIGNMENT PAGE

Lab 1 Report

Start Assignment

Due Jan 19 by 12:30pm **Points** 20 **Submitting** a file upload **File Types** ipynb

Lab report guidelines <-- **IMPORTANT! READ THIS BEFORE STARTING!**

Pre-recorded Lecture Video
Lecture slides in PDF

Lab 1 Lecture Examples
ipynb file containing all the examples discussed in the lecture video. Use this to play with the examples yourself.

Lab 1 Report Template
Zip file containing lab report template ipynb + exercise image files (You need image files to load problems in ipynb). Unzip the file using windows or 7-zip.

Welcome slides

Only one submission per group, in the .ipynb format.

Related sections in Berkeley online textbook :
Chapter 1: 1.1 - 1.6
Chapter 2: 2.1 - 2.3

GRADING

(i): Lab Reports (50%) – Group

Evaluated on code completeness, output and quality of documentation

See **Lab_report_guidelines.pdf** (Canvas assignments) for detailed requirements

Goal: Real-world problem solving + team programming skill

(ii): In-Lab Check ups (40%) – Individual

Evaluated on completeness + clarity of demonstrations

You are expected to attend each lab session unless you have completed the lab report

Goal: Individual code contribution + code organization skill + team communication

(iii): Quizzes (10%) – Individual

Evaluated with Canvas quiz. Each question reviews core concept from lecture

Goal: Knowledge feedback and aid toward the lab report

SCHEDULE

Section A:

T 10:30 – 12:20 PM (SIG 232)

Section B:

T 2:30 – 4:20 PM (SIG 232)

Section C:

W 8:30 – 10:20 AM (SIG 232)

Section D:

Th 10:30 – 12:20 PM (SIG 232)

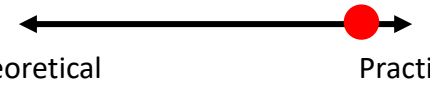
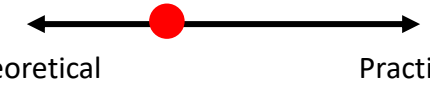
Section E:

F 12:30 – 2:20 PM (SIG 232)

Office Hours

TBD

ECE 241 vs ECE 242

	ECE 241	**ECE 242**
Credits	2cr	5cr
Aim	Signal processing applications using Python	Continuous and discrete time signals and systems
Scope	Basic Python and packages for signal processing Sound, image, table and graph data	Sound, image, Fourier series and transform, linear filters
Assignments		

Additional Remarks

- External resources such as Googling, GPT4, Copilot are allowed:
  With one **caveat**: You can fully explain the code during check-up.

- Use in-person interactions with instructors during lab hours to get most out of this course

- Make sure to write your group members on top of the lab report Notebook

- Deadlines & course timeline can be found on the syllabus page

- Don’t forget to get your laptop to class!

Q/A

Remaining Lab

- Form Lab Groups
  - Each group consists of **2 people**
  - Sign up your group in canvas **People/241 lab groups**
  - Each group will be named **“Section#_Firstname1_Firstname2”**

- Work on Lab 1: Introduction
  - Set up Python environment (Anaconda, Miniconda, etc)
  - Work with your partner to complete on Lab 1 assignment