JOHNS HOPKINS
WHITING SCHOOL
of ENGINEERING

EN.553.285 Introduction to Scientific Programming in Python
Department of Applied Mathematics and Statistics
Winter 2026 (1 credit)

Course Title
Introduction to Scientific Programming in Python

Instructor Information
Zan Ahmad
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Office hours: Fridays after class.

Meetings
Wednesday, Thursday, Friday 11am
Location: Zoom
Zoom link: https://JHUBlueJays.zoom.us/j/4321415629
7 Jan 2026 – 16 Jan 2026.

Description
This is an introductory course in Python programming for students in the mathematical sciences and related fields which often require scientific programming and computation. Class time will include lectures as well as coding exercise sessions to familiarize students with the necessary material. Beyond the essentials of computer programming and Python, students will be introduced to ways one can use Python for solving problems that require linear algebra, ordinary differential equation, optimization, and machine learning based problems in Python. Any mathematical prerequisites will be reviewed in the course as needed.

Course Topics There will be six lectures with the following topics covered:

- Lecture 0: What is Python? Getting started with IDEs, environments, library installations, etc.
- Lecture 1: Intro to Python syntax (strings, ints, arrays, printing, etc.)
- Lecture 2: Numpy Library
- Lecture 3: Scipy Library (ODEs, Linear Algebra, Opti, Stats)
- Lecture 4: Matplotlib
- Lecture 5: Supervised and Unsupervised Machine Learning in Python

Textbook
The textbook we will roughly be following is called "Introduction to Scientific Computing in Python" by Robert Johansson. It can be accessed for free here. The relevant sections are Chapters 1-5.

Course Expectations There will be two homework assignments to be posted on Canvas. The first will revolve around familiarizing ourselves with some fundamental computing in Python and with the type of thinking many coding problems give life to. The second homework will focus on using different popular Python packages. As long as you write your own code, you are free to work with your classmates as you see fit and are encouraged to discuss problems with one another. I am happy to have you collaborate and learn from one another!

Assignments & Grading The class is graded on a S/U basis. Grading is determined as follows:

- Homework 1: 50%
- Homework 2: 50%

The majority of credit will be given if your code "does the job," although some minor grade deductions may occur if something is quite inefficiently or badly coded (good coding practices to be discussed in lecture will make this point more clear). Partial credit will be given as appropriate, even if a piece of code doesn't end up fully working. A 60% course average guarantees a passing grade of S.
Late work will be accepted as follows:

- 10% penalty if submitted after the deadline but before solutions are posted.
- No late work accepted past the posting of the solutions.

Please communicate with the instructor if any work will be submitted late.

Course Objectives

(1) Cover basic computer programming concepts.
(2) Develop skills in Python for solving computational and numerical problems.
(3) Prepare for coding portions of future classes.

Ethics

The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition. Report any violations you witness to the instructor. You can find more information about university misconduct policies on the web at these sites: e-catalog.jhu.edu/undergrad-students/student-life-policies/

Additionally, the use of language models (e.g., ChatGPT) for generating code to complete any portion of the assignments for this course is strongly discouraged. The goal of this course is to learn the fundamentals of scientific programming in Python, and aside from using these models to remind you of syntax, having language models write code for you will defeat the purpose of the exercises.

Students with Disabilities

Any student with a disability who may need accommodations in this class must obtain an accommodation letter from Student Disability Services, 385 Garland, (410) 516–4720, studentdisabilityservices@jhu.edu.