CS 173 Introduction to Programming for Scientists

Summer 2024

Course Credits: 4
Contact Hours: 56 hours
Instructor: TBA
Email:TBA

COURSE OBJECTIVES

This course aims to introduce scientists to programming and computer science concepts. The course covers topics including the application of programming concepts in scientific research, simulation, data analysis and visualization. The course focuses on designing and writing the right programs. Testing and debugging are considered an integral part of a programming enterprise. Participants will acquire practical skills in coding to improve their ability to analyze data, automate tasks, and solve scientific problems.

Upon Completion of this Course, students will be able to:

1. Design and write programming code to solve practical computational problem
2. Ability to read, test and debug small computer programs
3. Develop proficiency in a programming language suitable for scientific applications (e.g., Python)
4. Explore data manipulation and analysis techniques for scientific datasets
5. Empower scientists with the necessary programming skills to enhance their research capabilities, facilitate data-driven decision-making

PREREQUISITES

N/A

GRADING

Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS
Quizzes	20 Points
Midterm Exam	25 Points
Project Design	20 Points
Final Exam	35 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F$.

We reserve the right to make adjustments to the overall grading policy.

COURSE MATERIALS

Required Texts:

Johnny Wei-Bing Lin; Hannah Aizenman; Erin Manette Cartas Espinel; Kim Gunnerson; Joanne Liu, ***An Introduction to Python Programming for Scientists and Engineers***, Cambridge University Press.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	**Topics:** Topic 1: Getting Basic Tasks Done Topic 2: Python as a Basic Calculator Topic 3: Python Programming Essentials Topic 4: Introductory Programming Topics **Assessments:** Quiz#1

Module 2	**Topics:** Topic 5: What Is Python and Why Learn This Language? Topic 6: Make It Talk to Other Languages Topic 7: Advanced Programming Concepts Topic 8: Random Numbers in Computers **Assessments:** Quiz#2 Project Design 1
Module 3	**Topics:** Topic 9: Basic Diagnostic Data Analysis Topic 10: Two-Dimensional Diagnostic Data Analysis Topic 11: Visualization Topic 12: Python as a Scientific Calculator **Assessments:** Midterm Exam
Module 4	**Topics:** Topic 13: Basic Line and Scatter Plots Topic 14: Basic Diagnostic Data Analysis Topic 15: Customized Line and Scatter Plots Topic 16: Basic Prognostic Modeling **Assessments:** Project Design 2
Module 5	**Topics:** Topic 17: Managing Files, Directories, and Programs Topic 18: Segue: How to Write Programs Topic 19: Basic Image Processing Topic 20: Describing the Complexity of Code **Assessments:** Final Exam

ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

LEARNING REQUIREMENTS

1) Late assignments are not acceptable and are subjected to grade deductions.
2) Assignments submitted in the wrong format will be counted as not submitted.
3) Failure to submit or fulfill any required course component results in failure of the class.
4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

TECHNOLOGY POLICY

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

ACEDEMIC INTEGRITY POLICY

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

DISABILITY ACCOMMODATION

Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.