



CS 233 Advanced Computer Science

Summer 2024

Course Credits: 4

Contact Hours: 56 hours

Instructor: TBA

Email: TBA

COURSE OBJECTIVES

This course equips students with the indispensable knowledge and skills essential for advanced studies in computer science. Students embark on a journey blending theory and practice, delving into computational thinking, problem-solving, and algorithm development. Leveraging a production-level programming language, students actualize advanced data structures and algorithms, and probe into advanced programming concepts. The course underscores effective algorithm development and analysis. Through hands-on programming projects, students can develop practical expertise in complex areas.

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

1. Develop a comprehensive understanding of computational principles;
2. Apply advanced data structures and algorithms using a production-level language;
3. Analyze and optimize algorithms for efficiency and effectiveness;
4. Gain proficiency in testing and debugging complex programs;
5. Cultivate problem-solving skills through practical programming projects.

PREREQUISITES

CS 100 Introductory Computer Science

GRADING

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



ITEM	POINTS
2 Assignments	20 Points
Midterm 1	15 Points
Midterm 2	15 Points
2 Presentations	20 Points
Final Exam	30 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:

Robert Sedgewick, Kevin Wayne, *Computer Science: An Interdisciplinary Approach*, 1st Edition, Addison-Wesley, 2016.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	Topics: Topic 1: Introduction to Computer Science: Basic Concepts and Terminology Topic 2: Data Types and Data Structures in Programming Topic 3: Algorithms: Design, Analysis, and Efficiency Topic 4: Principles of Software Engineering and Development Assessments: Assignment 1



Module 2	Topics: Topic 5: Introduction to Object-Oriented Programming (OOP) Topic 6: Recursion and Recursive Algorithms Topic 7: Searching and Sorting Algorithms Topic 8: Abstract Data Types and their Implementation Assessments: Presentation 1
Module 3	Topics: Topic 9: Graphs and Graph Algorithms Topic 10: Trees: Binary Trees, AVL Trees, B-Trees Topic 11: Hashing and Hash Tables Topic 12: Dynamic Programming: Principles and Applications Assessments: Midterm#1 Assignment 2
Module 4	Topics: Topic 13: Introduction to Computer Networks and Communication Topic 14: Database Management Systems: Concepts and Implementation Topic 15: Operating Systems: Structure and Functions Topic 16: Computer Architecture: Components and Organization Assessments: Midterm#2 Presentation 2
Module 5	Topics: Topic 17: Introduction to Artificial Intelligence and Machine Learning Topic 18: Principles of Compilers and Interpreters Topic 19: Cryptography and Network Security Topic 20: Ethical and Social Implications of Computing 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).

ACADEMIC 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



蘇州大學
Soochow University

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.