



CS 280 Logic for Computer Science

Summer 2024

Course Credits: 4

Contact Hours: 56 hours

Instructor: TBA

Email: TBA

COURSE OBJECTIVES

Logic plays a foundational role across various domains in computer science, including computer architecture, software engineering, programming languages, databases, artificial intelligence, and the theory of computation. This course offers an elementary yet mathematically rigorous introduction to logic and explores its applications within computer science. Through a computer science perspective, students delve into mathematical logic, covering syntax, semantics, decision procedures, formal systems, and their relevance to computational paradigms.

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

1. Grasp the fundamental principles of mathematical logic within the context of computer science;
2. Analyze and evaluate the syntax and semantics of formal logic systems;
3. Employ decision procedures for logical reasoning and problem-solving in computational contexts;
4. Develop critical thinking skills to assess the role of logic in computational theory and practice.

PREREQUISITES

CS 100 Introductory Computer Science

GRADING

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



ITEM	POINTS
4 Assignments	20 Points
2 Quizzes	20 Points
Final Project	20 Points
Midterm Exam	15 Points
Final Exam	25 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:

Mathematical Logic for Computer Science by M. Ben-Ari. Springer, 2012.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	<p>Topics: Topic 1: Introduction to Logic Topic 2: Logic and Computing Topic 3: Propositional Logic Syntax and Semantics Topic 4: Compactness Theorem</p> <p>Assessments: Assignment #1</p>
Module 2	<p>Topics: Topic 5: Propositional Logic: Formulas, Models, Tableaux Topic 6: Propositional Logic: Deductive Systems Topic 7: Propositional Logic: Resolution Topic 8: Propositional Logic: Binary Decision Diagrams</p> <p>Assessments:</p>



	Assignment #2 Quiz #1
Module 3	Topics: Topic 9: First-Order Logic: Formulas, Models, Tableaux Topic 10: First-Order Logic: Deductive Systems Topic 11: First-Order Logic: Terms and Normal Forms Topic 12: First-Order Logic: Resolution Assessments: Assignment #3 Midterm Exam
Module 4	Topics: Topic 13: First-Order Logic: Logic Programming Topic 14: Temporal Logic: Formulas, Models, Tableaux Topic 15: Temporal Logic: A Deductive System Topic 16: Predicate Logic Assessments: Assignment #4 Quiz #2
Module 5	Topics: Topic 17: Existential Second Order Logic Topic 18: Verification of Sequential Programs Topic 19: Verification of Concurrent Programs Topic 20: Software Modeling Assessments: Final Project 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

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



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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.