Soochow University

CS 342 Formal Languages

Winter 2024

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

COURSE OBJECTIVES

The course provides students with the fundamental concepts, techniques, and applications of formal languages in computer science and related fields. Specific topics will be covered include grammar, regular languages, finite automata, Kleene's theorem, Context-free languages, pushdown automata, determinism, etc. By the end of the course, students will have a solid foundation in formal language theory, enabling them to understand and analyze formal languages and their applications in various fields.

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

1. Gain a comprehensive understanding of formal languages and automata theory.

2. Learn about various types of formal languages and be familiar with different automata models.

3. Be able to analyze and design formal languages and automata for solving computational problems.

4. Gain insights into the applications of formal languages in various areas of computer science.

5. Have an ability to apply formal languages and automata theory to real-world problems.

PREREQUISITES

MATH 242 Discrete Structures I

GRADING

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

ITEM	POINTS
Assignments	20 Points
Quizzes	30 Points
Midterm	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 ≥ 90 > B ≥ 80 > C ≥ 70 > D ≥ 60 > F.

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

COURSE MATERIALS

Required Texts:

Daniel I.A. Cohen, *Introduction to Computer Theory*, 2ed Edition, John Wiley & Sons, 1996.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	**Topics:** Topic 1: Languages Topic 2: Recursive Definitions Topic 3: Regular Expressions Topic 4: Finite Automata **Assessments:** Assignment#1

Module 2	**Topics:** Topic 5: Transition Graphs Topic 6: Kleene's Theorem Topic 7: Finite Automata with Output Topic 8: Regular Languages **Assessments:** Quiz#1
Module 3	**Topics:** Topic 9: Nonregular Languages & Decidability Topic 10: Context-Free Grammars Topic 11: Grammatical Forma Topic 12: Pushdown Automata **Assessments:** Midterm Assignment#2
Module 4	**Topics:** Topic 13: Context-Free Grammars=Pushdown Automata Topic 14: Non-Context-Free Languages Topic 15: Context-Free Languages Topic 16: Decidability **Assessments:** Quiz#2
Module 5	**Topics:** Topic 17: Turing Machines Topic 18: Post Machines Topic 19: Recursively Enumerable Languages Topic 20: Final Exam Reviews **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.