CSCI 3660: Theory of Computation

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Office: PKI 275A. Office hours: TR 12:00 AM – 1:00 PM.

Spring 2018. PKI 256.
TR 1:30 PM – 2:45 PM.

Texts

- **Introduction to the Theory of Computation**, by Michael Sipser.

- Supplemental reading may be assigned throughout the semester.

Catalogue Listing

This course is intended to introduce students to the theory of computation in a fashion that emphasizes breadth and a method of detailed analysis found in a normal undergraduate automata course. The topics covered in the course include methods of proof, finite automata, non-determinism, regular expressions, context-free grammars, pushdown automata, context sensitive languages, the Church-Turing Thesis, decidability, reducibility, and space and time complexity.

Prerequisites

- CSCI 3320 and CSCI 3660.

- Topics: Data Structures and Theory of Computation

Key Topics

- Mathematical Background

- Finite Automata and Regular Languages

- Pushdown Automata and Context-Free Languages

- Turing Machines and Computably Enumerable Languages

- Computational Complexity and Intractable Problems

How to Succeed in this Course

"We are what we repeatedly do. Excellence, then, is not an act, but a habit." — Aristotle

- Find a friend with whom you may study.

- Read carefully, and study often and with a purpose.

- Know your definitions.

- Start every assignment on the day it is given.

- Get help if you need it.

GRADING POLICY

Your grade will be determined by homework assignments, three scheduled exams, and a final exam, which are weighted as follows:

- Homework — 30%

- Exams — 50%

- Final — 20%

All exams including the final exam are cumulative (but will be weighted towards current material). An average score of 90% earns an A, 80% a B, 70% a C, and 60% a D. Quizzes may be given at any time and will be a part of the overall homework score. Late assignments **will not be accepted**.

LECTURE AND EXAM SCHEDULE

The table below provides an initial lecture and exam schedule. Please note that **this schedule is tentative and subject to change**. Students are responsible for making sure they are informed about announcements.

Date	Topic
Week 1	Preliminaries (Mathematical Background Review)
Week 2	Finite Automata (Deterministic and Nondeterministic)
Week 3	Equivalence Between DFAs and NDFAs
Week 4	Regular Expressions and Languages
Week 5	Equivalences of Regular Expressions and Finite Automata
Week 6	Properties of Regular Languages, **Exam I**
Week 7	Pushdown Automata and Context-Free Languages
Week 8	Deterministic Pushdown Automata
Week 9	Properties of Context Free Languages, **Exam II**
Week 10	Turing Machines and Computably Enumerable Languages
Week 11	Turing Machines and their Extensions
Week 12	The Church-Turing Thesis
Week 13	Computable/Computably Enumerable Languages and Unsolvable Problems
Week 14	P and NP Problems, The Complexity Hierarchy, **Exam III**
Week 15	Discussion and Extra Topics
Week 16	Discussion and Review

ETHICAL CONDUCT

Any student caught cheating will receive a zero on the assignment, exam, or for the course. It is the instructor's decision. All assignments should be done individually unless the instructor states it is to be a collaborative effort. Plagiarism will not be tolerated and assignments may be electronically checked for plagiarism when applicable. If plagiarism occurs, the student will earn a zero for the course. Unethical behavior will follow the guidelines written in the University Catalog and in the University of Nebraska Bylaws.

STUDENTS WITH DISABILITIES

Any student who, because of a disability, may require special arrangements in order to meet course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from **Accessibility Services Center (ASC)** during the instructor's office hours. Please note instructors are not allowed to provide classroom accommodations to a student until appropriate verification from ASC has been provided. For additional information, please contact ASC in the Student Center or call 402-554-2872.