

Math 4931 / 5931 – Theory of Computation and Formal Languages

My Contact Information

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Lectures: MWF, 9:00am - 9:50am
Cudahy Hall 120
Office Hours: Mondays, 1:00pm - 2:00pm (in person, Cudahy 307)
Wednesdays, 2:30pm - 3:30pm (virtual, on Teams)
and by appointment (just email me!)

Course Description

This course will cover the mathematical foundations of the theory of computation, a branch of mathematics and computer science focused on different models of computation and their ability to solve problems. Depending on time and interest, topics may include: finite state automata and regular expressions; push down automata and context-free grammars; Turing machines and the Church-Turing thesis; computability; undecidability; and Gödel's Incompleteness Theorem. The course will also include applications of several of these topics to other areas, particularly the mathematical field of combinatorics.

Prerequisites

Students should have previously taken at least one proof-based course (e.g., Math 2100 / 2350 or Math 3100). This is a 4000/5000-level course covering both concrete and abstract topics, and so students who are unsure whether their "mathematical maturity" is sufficient are more than welcome to contact me at any time!

Textbook

Our main textbook will be *Introduction to the Theory of Computation*, 3rd Edition, by Michael Sipser. I've seen paperback copies for \$20 - \$30 often on Amazon. It is okay to get the 2nd Edition if that's all you can find. I will use a collection of other books / resources that I will make available as needed.

Assessments

Grades will be based on homework assignments. Late work may be accepted with penalty at my discretion. There will be no exams. Depending on how the course proceeds, we may have students read research papers about the topics of the course and present them to the class. If we do so, this will also count as one or several homework assignments (depending on the amount of work involved).

Students registered with the 5000-level course code will be required to do more of the questions in the homework assignment than students registered with the 4000-level course code.

The letter grade scale is as follows:

A:	[90, ∞)%
A-:	[87, 90)%
B+:	[85, 87)%
B:	[80, 85)%
B-:	[77, 80)%
C+:	[75, 77)%
C:	[70, 75)%
C-:	[67, 70)%
D+:	[65, 67)%
D:	[60, 65)%
F:	[0, 60)%

Homework Collaboration Policy

Discussing course material with your classmates is a very important part of the learning process, and collaborative learning is highly encouraged. However there is a fine line between productive discussion, and cheating. Discussing and brainstorming *together* is good, one person telling another person how to solve a problem is bad – collaboration should be on equal footing.

Another fine line is using other resources (e.g., online) for help. It is *completely fine* to use online resources to learn more background and information about the topics of the course. It is not okay to search for anything that directly answers the questions you have been assigned. If you are stuck on a problem, instead of looking for a solution online (which may be wrong anyway), come to office hours and let me help!

You are required to list all external resources used to complete your assignment. This includes names of any classmates you worked with. Failure to do so may be considered plagiarism.

If you are ever in doubt about what is allowed, please just ask me!

Attendance

You are expected to arrive in class on time, having completed any assigned readings and problems, ready to engage in class, ask questions, and discuss. If a session is missed, you are responsible for obtaining notes from a classmate.

Office Hours

Office hours are scheduled times that I will be available to help you with course material, including topics from lecture, homework questions, revisions, etc. You are *strongly encouraged* to come to office hours frequently! You don't need an appointment, you can come in and out at any time, and often

office hours are empty so they are essentially free one-on-one help. Please watch this instructional and informative video about office hours: <https://vimeo.com/270014784>.

Grading Disputes

If you believe that I have made an error in scoring an assignment, you must bring it to my attention within one week of the graded paper being returned. I will carefully reread, and if necessary rescore, the assignment.

Classroom Conduct

The classroom is an interactive learning environment in which everyone should feel valued and comfortable. I strongly encourage you to ask questions and give answers throughout the term, even if (particularly if!) you're not sure that your answers are correct. This is an important part of the learning process.

Returned Papers

You must retain all returned papers in case of any discrepancy with the recorded grades on D2L. I cannot correct any mistakes in grading or recording of scores without the original document. All concerns regarding grades on assignments must be brought to me within one week of the return of the paper.

Accommodations and Special Needs

If you have a disability and require accommodations, please contact your instructor during the first week of class so that your learning needs may be appropriately met. You will need to provide documentation of your disability to the Office of Disability Services. If you are unsure of what you need to qualify for services, visit the Office of Disability Services' website at <http://www.marquette.edu/disability-services> or contact their office by phone at (414) 288-1645.

Excused Absences

Students with absences due to legal obligations, religious observances, or participation in Division 1 athletics and other university sanctioned events will be given an opportunity to make up examinations or other graded assignments, if a request is made to the instructor prior to the absence. After all absences, excused or unexcused, you are responsible for contacting your classmates to obtain lecture note and any other missed materials.