CSCI 538: Computability
Fall 2018 Syllabus

Instructor: Dr. Brendan Mumey, brendan.mumey@montana.edu

Lecture times: Tue/Thu: 1:40 - 2:55 pm, Barnard Hall 323

Office hours: Wed: 8:30 am - 9:30 am, Thu: 8:30am-10am, Barnard Hall 364

This semester you can also reach me on webex during office hours:
https://montana.webex.com/join/q88x929

Resources

Brightspace (D2L): https://ecat.montana.edu

Google drive: Course documents such as the lecture schedule and homework will store in a google drive folder.

https://drive.google.com/drive/folders/1e6BhQgs9N4SybngPvmy1YJMCFyunDbMG?usp=sharing

Textbook

Sipser, *Introduction to the Theory of Computation, 3rd edition*

References: Arora and Barak, *Computational Complexity: A Modern Approach*

Garey and Johnson, *Computers and Intractability: A Guide to the Theory of NP-Completeness*

Course Outline

We will cover the material from Part II of Sipser's book in approximately the order that it is presented. Time permitting we will cover some complexity theory (Arora and Barak book) and may also discuss some newer topics such as quantum computation. Students will be required to give some presentations during the semester and actively participate in class.

A day-to-day lecture schedule is located on google drive.

Homework

Approximately every two weeks you will have a homework assignment. We will discuss the homework in a class and I may call on students to present their solutions.

Paper Presentation

You will present a computability/complexity-related research paper. You may work with a partner. The presentation should be 15-20 minutes in length. You will also need to come up with 1-2 questions for the rest of the class to answer related to the paper.

You can also speak with your advisor about potential papers to present. Please send a link to the paper so I can approve it. Once approved, you can also pick an open date to present (see lecture schedule).

Complexity-related project

You will be required to do a project in this course. You may work with a partner. The topic of the project must relate to the course in some way. There are three general types of projects:

1. Survey a topic that we did not cover in class : You should find several references about an area/problem and survey what is known.
2. Complexity experimentation: Implement and test one or more approaches for solving an NP-hard problem of interest. Create a few experimental scenarios to test your program on. Discuss your results.
3. Do some new research: Read some background for a problem that interests you, formalize the problem and analyze its computational complexity.

Topics must be approved.

You will give a short 5-10 minute presentation of your project to the class and also submit a written paper detailing the project. The paper should be 2-3 pages in length.

Grading Scheme (final course grades may be curved)

Homework	40%
Paper presentation	10%
Project	20%
Quizzes	30%