

Overview for CPSC 421/501 (Introduction to Theory of Computing)

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Class: MWF 4:00–4:50pm
 Dempster 310
 Office Hours: TBA or by appointment

<http://www.math.ubc.ca/~jf/courses/CS421> is currently the location of the most up-to-date versions of all handouts for this course, including this document, homework and solutions, sample exams and solutions, etc. At some point we may switch to www.piazza.com.

Overview: This course will cover introductory computer science theory, using the text *Introduction to the Theory of Computation* by Michael Sipser, 3rd Edition; some additional handouts and references will be given. Formally, the prerequisites are CPSC 221 or both of CPSC 216 and CPSC 220; CPSC 320 is not a prerequisite but is recommended; however, this course develops almost all concepts from scratch, so students outside computer science with enough exposure to math may also be able to take the class (see me).

THE MIDTERM WILL BE GIVEN DURING CLASS HOURS ON WEDNESDAY, NOVEMBER 1, 2017. LOCATION WILL BE ANNOUNCED. It will cover material from the start of class until October 18, 2017.

The rough schedule is below:

0. **Fundamentals:** graphs, big-O notation, walks in graphs, etc.; Chapter 0 and material in “Directed Graphs and Asymptotic Tests;” roughly two classes.
1. **Self-referencing, languages, and uncountable sets:** the handout “Computability and Self-Referencing in CPSC 421,” Sections 1–4; roughly 1 week.
2. **Regular Languages:** Chapter 1; roughly 2 weeks.
3. **Turing Machines and Computability:** Chapters 3–6; roughly 2.5 weeks.
4. **Complexity Theory and NP-Completeness:** Chapter 7, parts of Chapters 8 and 9; roughly 3.5 weeks.
5. **Additional Topics:** Communication complexity, parts of “Computability and Self-Referencing in CPSC 421,” other topics; as time permits.

Homework: Homework will be assigned roughly weekly; you will need to submit your homework via email—instructions will be provided. Late homework will not be graded; I will drop your lowest three homework scores in computing your average homework mark. You may work on homework together, but you must write up your own solutions (and understand what you are writing); at the top of your homework you must declare with whom you worked on the homework, as well as any sources you used (excepting the course textbook and handouts that I provide).

Midterm and Final: Both exams will consist of some calculations and some more conceptual questions.

I will give only one midterm and only one final during the semester; there are no “make-ups” or alternates. Please make sure you do not make travel plans, work plans, etc. without regard for the midterm and final dates; also, do not make such plans assuming that the preliminary exam schedule will not change. A missed midterm normally results in a grade of 0; if documentation is provided for a legitimate excuse (e.g., medical emergency), the midterm grade will be the final exam grade (after any scaling).

Course Grade: For CPSC 421 students, your grade for the course will be

$$(.55)f + (.35) \max(f, m) + (.10) \max(f, m, h),$$

where f, m, h are, respectively, your final exam grade, your midterm grade, and your homework grade. For CPSC 501 students your course grade will be 80% of the CPSC 421 grade plus 20% of the essay grade. The homework grade computation will drop your three lowest homework scores.