CS 448/2405 – Winter 2005
Location: LM 148
Time: MW, 11 am Tutorial F 11am

Instructor: Toniann Pitassi
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Office hours: Wednesday 10-11 am

Course Web Site: http://www.cs.toronto.edu/ toni/Courses/448-2005/CS448.html
Refer to this site periodically for important announcements and other information. All handouts will be available on the site in postscript form.

Text: There is one required text for this course. "Introduction to the Theory of Computation" by Michael Sipser, PWS Publishing Company.

Course Description

This is an upper level undergraduate or lower level graduate course in the theory of computation. Below we give a more detailed list of the topics that will be covered.

(0) **Motivation, Background concepts and definitions** Sipser, Chapter 0.

(1) **Regular languages and finite automata** Sipser, Chapter 1.

(2) **Context free languages and push-down automata** Sipser, Chapter 2.

(3) **Turing Machines and Computability** Using the Turing machine model, we can characterize precisely which languages can be recognized by a Turing machine (and hence by any computer). Then we show the famous result that there are many problems that cannot be solved by any modern day computer.

   (a) Turing machines, and the Church-Turing Thesis. (Sipser, Chapter 3)
   (b) Decidability (Sipser, Chapter 4)
   (c) Reducibility (Sipser, Chapter 5)

Marking Scheme:

3 assignments, each worth 1/9th of your grade. 3 closed book tests, each worth 2/9th of your final grade. The tentative dates for the three tests are: February 4, March 4, April 8. The assignments (due approximately one week before the test) are due at the beginning of tutorial on the following dates: January 28, February 25, April 1. There will be no final exam.

Assignments are due at the *beginning* of class or tutorial, since solutions will be discussed during the class/tutorial. In marking assignments, the style of the written presentation will be a significant portion of the grade.

The work you submit must be your own. You may discuss problems with each other; however you should prepare written solutions alone. You are not permitted to consult other texts, papers or web sites for solutions. Copying assignments is a serious academic offense and will dealth with accordingly.

This is a theoretical course. Certain concepts may be difficult to understand at first and will require diligence. Practicing on many problems (homework assignments and problems at the end of each chapter) is often the most effective way to learn the course material. You are also encouraged to ask many questions in class, during tutorial, and during office hours.