CSC 438F/2404F – Fall 2019
Computability and Logic

Exclusions: MAT 309H1, PHL348H1
Prerequisites (ugrads): (CSC363H1/CSC463H1)/CSC365H1/CSC373H1/CSC375H1/MAT247H1
Lectures: Monday 3-5, BA 1200
Tutorial: Friday 12-1, BA 1200
Instructor: Toniann Pitassi, toni@cs.toronto.edu
Office hours: Monday 5:10-6, SF2305A
Tutor: Noah Fleming, SF 4306, noahfleming@cs.toronto.edu
Web Page: http://www.cs.toronto.edu/ toni/Courses/438-2019/438.html

Course Notes: Postscript files for course notes and all course handouts will be available on the web page.

Topics:

Syntax and semantics of the propositional and predicate calculus, completeness of Gentzen proof systems, formal theories, nonstandard models, and the Godel Incompleteness Theorems. Recursive and primitive recursive functions, Church's thesis, unsolvable problems, recursively enumerable sets.

Marking Scheme:

Class attendance/participation (2% of final grade)
4 assignments (each worth 12% of final grade)
First Term test (25% of final grade)
Second Term Test (25% of final grade)

Due Dates:

First Term Test: Monday Oct 21, 3-5pm BA 1200
Second Term Test: Thursday Dec 5, 3-5pm BA 1200
Assignment 1 due date: Friday Sept 27 12pm, before tutorial
Assignment 2 due date: Friday Oct 18 12pm, before tutorial
Assignment 3 due date: Friday Nov 1 12pm, before tutorial
Assignment 4 due date: Friday Nov 29 12pm, before tutorial

Assignments are due at the *beginning* of class, since solutions will be discussed during the beginning of class/tutorial.

The work you submit must be your own. You may discuss problems with each other; however, you should prepare written solutions alone. Copying assignments is a serious academic offence and will be dealt with accordingly.

Supplementary References:

S Buss: Chapter I: An introduction to proof theory, in **Handbook of Proof Theory**, S Buss Ed., Elsevier, 1998, pp1-78. (grad)
J Bell and M Machover: **A Course in Mathematical Logic**. North-Holland, 1977. (grad)
H.B. Enderton, **A Mathematical Introduction to Logic** (undergrad)
G Boolos and R.C. Jeffrey, **Computability and Logic** (undergrad)
E. Mendelson, **Introduction to Mathematical Logic**, 3rd edition (undergrad/ grad)
J.N. Crossley and others, **What is Mathematical Logic?** (informal, readable)
A.J.Kfoury, R.Moll, and M. Arbib, **A Programming Approach to Computability** (undergrad)
M.Davis, R. Sigal, and E. Weyuker, **Computability, Complexity, and Languages: Fundamentals of Theoretical Computer Science** (undergrad/grad)