COMP 330, Fall 2016

Course Information:

Session:	Fall 2016	Time:	Tuesday-Thursday 13:05 - 14:25 am
Room:	Macdonald Harrington Building	Web:	http://www.cs.mcgill.ca/~ hatami/comp330-F2016

Instructor:

Instructor:	Hamed Hatami	Email:	hatami@cs.mcgill.ca
Office:	McConnell 308	Phone:	1 (514) 398–7071
Office Hours:	TR 15:00-16:00 pm (also by appointment)		

Teaching Assistants: Ira Kones, Yaqiao Li, Harrison Humphrey, Weiwei Zhang

Evaluation: Homeworks 20%, Midterms 30%, Final 50% or Homeworks 20%, Final 80% if this leads to a better grade.

1 Course Description

This is the principal undergraduate course in theoretical computer science at the School of Computer Science (SOCS). It focuses on the central concepts that constitute the foundations of computer science. *What kinds of problems can be solved mechanically? What does it mean that there is a process (algorithm) that solves a problem? What is an algorithm?* These important questions are raised in the early twentieth century (before the invention of the modern computers), and by the mid twentieth century satisfactory answers were provided by the contribution of great mathematicians such as Turing, Church, Hilbert, Gödel, Tarski, Post, Markov, Kleene. Some of these results are now considered to be among the greatest scientific achievements in the twentieth century.

To investigate these questions one has to introduce rigorous models of computations, and then study their capabilities and limitations. In this course we study models of computation of increasing power. We begin with finite automata and regular languages which are models of computations with very limited power. The next phase deals with context-free languages invented by linguistics and now an essential aspect of every modern programming language. Finally we explore the limits of computability with the study of Turing machines (the theoretical model for modern computers), recursive sets, enumerable sets, self-reproducing programs and undecidability theory.

Be prepared to see lots of proofs and abstract mathematical concepts in this course. If you are used to rigorous mathematical proofs, then this course will be easy for you. But if not, then you need to familiarize yourself with such proofs, and this can only be achieved by solving a lot of problems.

2 Textbook

The textbook of the course is

Introduction to the Theory of Computation, Second Edition by Michael Sipser.

We will study Part One and Part Two of the book.

3 Prerequisite:

COMP 251 and MATH 240.

4 Assignments

There will be 5 assignments each worth 4% towards your overall grade. The due dates are going to be announced, and they are restrict.

5 Academic Integrity

McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism and other academic offenses under the Code of Student Conduct and Disciplinary Procedures (see http://www.mcgill.ca/integrity for more information). Most importantly, work submitted for this course must represent your own efforts. Copying assignments or tests from any source, completely or partially, allowing others to copy your work, will not be tolerated.

6 Submission of written work in French

In accord [sic] with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.