

CSC 463S – Winter, 2018
Computational Complexity and Computability

Instructor: S. Cook: Office SF2303C, Tel 416-978-5183, e-mail: sacook@cs.toronto.edu
Instructor office hours: MW 3:15-4:00. Or make an appointment, or drop in, or send a question via email.
Lectures: MW 2 in GB 303
Tutorials: F2
T1 GB 303 A-L Robert Robere
T2 RW 140 M-Z Ian Mertz

Prerequisites: CSC 236H/238H/240H

Course Web Site: <http://www.cs.toronto.edu/~sacook/csc463h/>

Refer to this site periodically for problem sets, notes, solutions, important announcements, and other information.

Text: M. Sipser: Introduction to the Theory of Computation. (Second or third Edition) Chapters 3,4,5,7,8 and parts of other chapters.

Notes: Notes supplementing the text are posted on the course web site.

References:

M. Garey and D. Johnson: Computers and Intractability: A Guide to the Theory of NP-Completeness. Chapters 1-3 especially relevant.

Cormen, Leiserson, Rivest, and Stein: Introduction to Algorithms (Second Edition), MIT Press and McGraw-Hill. Chapter 34 on NP-completeness is the relevant chapter here.

Course Contents:

- Computability Theory (5 weeks): Turing machines, Church's Thesis, decidability and semi-decidability, diagonal arguments, the Halting Problem and other undecidable problems, reductions, complete problems.
- Computational Complexity (7 weeks): The classes P and NP, polynomial time reducibility, NP-completeness, Cook-Levin Theorem, various NP-complete problems, time and space complexity, intractable problems, other topics.

Marking Scheme:

4 assignments worth 10% each (Due beginning of tutorial)
Jan 26, Feb 16, March 16, April 2 (Monday)
1 closed book test worth 20% (March 2: In tutorial)
final exam worth 40%.

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

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.