CS 365, Models of Computation

Course Outline, Winter 2018

Online Resources

The course web page, at https://www.student.cs.uwaterloo.ca/~cs365, contains additional information and clarification. It includes a link to the course’s Piazza site.

Lectures, Personnel and Contact Information

Lectures: Tuesdays and Thursdays, 2:30–3:50pm, DWE 1502.

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<tr>
<th>Name</th>
<th>UW id/username</th>
<th>Office</th>
<th>Office Hours</th>
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<tbody>
<tr>
<td>Instructor:</td>
<td>Jonathan Buss</td>
<td>DC 3353</td>
<td>Wed/Fri 10:00–11:00*</td>
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<tr>
<td>TA:</td>
<td>John Wittnebel</td>
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*You are also encouraged to arrange an appointment via email, or simply to drop by.

Course Topics

For details of topics, readings, etc., see the course web page.


Context-Free Grammars. Equivalence with pushdown automata. The pumping lemma for CFLs.


Time Complexity. Robustness of time measures. The classes P and NP. A formal introduction to NP-completeness.

Space Complexity. Savitch’s Theorem. PSPACE, L, NL: complete problems and closure properties.

Intractability. Diagonalization and hierarchy theorems.

Advanced Topics. A brief look at topics chosen by the instructor, such as probabilistic or parallel complexity classes.

Term work

Homework assignments (40%) will occur approximately once per week. You must submit your own, independent solutions in class; your solutions may represent collaborative work. See the course web page for details, or consult the instructor.

Generally, late work will not be accepted. One exception is permitted; see the web page.

Marked assignments will be returned in class. Unclaimed assignments will be destroyed one month after the term grades are submitted to the Registrar.

A midterm exam (25%) will be held during class period on Thursday, March 1.

A final exam (45%) will be scheduled by the Registrar during the normal exam period.

The above materials, and related instructional materials, will be copyrighted. Unless expressed otherwise, you do not have permission to distribute them further.

You retain copyright on the material you submit, as well as the promise of confidentiality.
Textbook

You will require access to M. Sipser, *Introduction to the Theory of Computation*, third edition, Cengage, 2013. (The second edition, from 2006, should also be suitable—but be careful with page numbers.)

Additional materials may be posted from time to time on the course web page.

Note for students with disabilities

AccessAbility Services (AAS), located in Needles Hall 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the AAS at the beginning of each academic term.

Students who have difficulty with handwriting and wish to produce course work on a computer should also contact their instructor.

UW policies on academic integrity

Academic Integrity

In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. All members of the UW community are expected to hold to the highest standard of academic integrity in their studies, teaching, and research.

The Office of Academic Integrity’s website contains detailed information on UW policy for students and faculty. This site explains why academic integrity is important and how students can avoid academic misconduct. It also identifies resources available on campus for students and faculty to help achieve academic integrity in—and out of—the classroom.

Grievance

A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70—Student Petitions and Grievances, Section 4.

Discipline

A student is expected to know what constitutes academic integrity, to avoid committing academic offenses, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71—Student Discipline. For information on categories of offenses and types of penalties, students should refer to the Guidelines for the Assessment of Penalties.

Avoiding Academic Offenses

For information on commonly misunderstood academic offenses and how to avoid them, students should refer to the Faculty of Mathematics Cheating and Student Academic Discipline Policy.

Appeals

A student may appeal the finding and/or penalty in a decision made under Policy 70—Student Petitions and Grievances (other than regarding a petition) or Policy 71—Student Discipline if a ground for an appeal can be established. See Policy 72—Student Appeals.