



UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF COMPUTER SCIENCE
COURSE OUTLINE

1. **Course:** CPSC 313: Introduction to Computability

Lecture Sections:

L01, MW 13:00-15:45, Catalin Dohotaru, ICT 624B, dcatalin@ucalgary.ca

Office Hours: M 11:00-12:00 or by Appointment

Course Website: <https://sites.google.com/site/cdohotaru/teaching/313p17>

Computer Science Department Office, ICT 602, 220-6015, cpsc@cpsc.ucalgary.ca

2. **Prerequisites:** MATH 271 or 273; PHIL 279 or 377; and one of CPSC 219, 233 or 235

(<http://www.ucalgary.ca/pubs/calendar/current/computer-science.html#3620>)

3. **Grading:** The University policy on grading and related matters is described in sections F.1 and F.2 of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Assignments	20%
Quizzes (2)	15%
Midterm Test	25%
<i>(Monday June 5th, 2017 in ICT 122)</i>	
Final Exam	40%

This course **will** have a Registrar's Scheduled Final Exam.

Special Regulations affecting Final grade: Each of the above components will be given a percentage grade. The final grade will be calculated weighted by the percentages given above and then reconverted to a final letter grade using the attached cut-offs. In order to obtain a final grade of C- or better, a student must achieve a weighted overall average of C- or better on the midterm test and final exam.

4. **Missed Components of Term Work:** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar. Section 3.6. It is the student's responsibility to familiarize themselves with these regulations. See also Section E.6 of the University calendar.
5. **Scheduled Out-of-Class Activities:** REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME ACTIVITY. If you have a clash with this out-of-class activity, please inform your instructor as soon as possible so that alternative arrangements can be made.
6. **Course Materials:**
Introduction to the Theory of Computation, Michael Sipser, *Cengage Learning* (Recommended)
(You can use the 1st, 2nd, or 3rd edition)
Online Course Components:
See course webpage. Grades will be posted on D2L. For discussions we use Piazza. Some course components will be graded using Gradescope.
7. **Examination Policy:** Closed book. One sheet of notes (double sided) is permitted for each exam. The notes must be typeset in font size at least 11. No other aids will be allowed. Students should also read the Calendar, Section G, on examinations.
8. **Approved Mandatory and Optional Course Supplemental Fees:** None.

9. **Writing across the Curriculum Statement:** In this course, the quality of the student's writing in the weighted components of the course will be a factor in the evaluation of these components. See also Section E.2 of the University Calendar.

10. **Human Studies Statement:** Students will be expected to participate as subjects or participants in projects. See also Section E.5 of the University Calendar.

11. **OTHER IMPORTANT INFORMATION FOR STUDENTS:**

- a) **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offense that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under Section K, Student Misconduct to inform yourself of definitions, processes and penalties.
- b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on assembly points which can be found in each classroom and building.
- c) **Student Accommodations:** Students needing an Accommodation because of a Disability or medical condition should contact Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities available at http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.pdf. Students needing an Accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the Associate Head of Computer Science.
- d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 403-220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information see also <http://www.ucalgary.ca/secretariat/privacy>
- f) **Student Union Information:** VP Academic (403) 220-3911 suvpaca@ucalgary.ca SU Faculty Rep (403) 220-3913 science1@su.ucalgary.ca, science2@su.ucalgary.ca and science3@su.ucalgary.ca, Student Ombuds Office: (403) 220-6420 ombuds@ucalgary.ca, <http://ucalgary.ca/provost/students/ombuds>
- g) **Internet and Electronic Device Information:** You can assume that in all classes that you attend your cell phone should be turned off unless instructed otherwise. All communications with other individuals via laptop computers, cell phones or other devices connectable to the internet in not allowed during class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.
- h) **U.S.R.I.:** At the University of Calgary feedback provided by students through the Universal Student ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses (www.ucalgary.ca/usri). Your responses make a difference – please participate in USRI surveys.

Department Approval _____ Date _____

Faculty Approval for
out of regular class-time activity: _____
Date: _____

Faculty Approval for
Alternate final examination arrangements: _____
Date: _____

A signed copy of this document is on file in the Computer Science Main Office

CPSC 313 Percentage to Letter Grade Conversion Table

A+	97-100
A	90-96
A-	85-89
B+	80-84
B	75-79
B-	70-74
C+	66-69
C	62-65
C-	58-61
D+	54-57
D	50-53
F	0-49

CPSC 313 Syllabus

An introduction to abstract models of sequential computation, including finite automata, regular expressions, context-free grammars, and Turing machines. Formal languages, including regular, context-free, and recursive languages, methods for classifying languages according to these types, and relationships among these classes.

Tentative Topics Covered:

Finite Automata:

Strings and languages
Deterministic finite automata
Nondeterministic finite automata
Properties of finite automata
Graph traversals
Elements of dynamic programming
Algorithms for automata
Applications to pattern-matching

Regular Languages:

Regular languages and regular expressions
Closure properties
Myhill-Nerode theorem
Lower bounds on streaming algorithms

Context-Free Grammars and Context-Free Languages:

Context-free languages and grammars
Normal forms
Recursion
Closure properties
CYK algorithm

Turing Machines and Decidable Languages:

Turing machines and variations
Computability
Decidable languages
Recognizable languages
Closure properties
Halting problem and reductions
Time-hierarchy theorem

Learning Outcomes:

By the end of the course, students will:

- Describe and follow a design process when solving specific problems on languages (regular, context-free, decidable, and recognizable languages).
- Establish the correctness of a solution to specified problems on languages.
- Design new algorithms for specific problems involving finite automata and context-free grammars.
- Prove statements on languages using techniques such as closure properties and reductions.
- Prove statements on languages being recognizable or undecidable.
- Explain and prove relationships between language classes.
- Explain what is the streaming model and come up with streaming algorithms for some simple problems.
- Model primitives such as iteration, recursion, complementation, and counting in computational models and grammars.

Allowable Sources:

No restrictions on source material.

Cited Sources:

The use of published literature is allowed. If you use any published literature (texts, articles, lecture notes, websites, etc) to complete your assignment, you must cite your sources. Please use the APA style guide for citations. If citing a website, please make sure you include the date you accessed the website.

Level of Collaboration between Students:

You are welcome to work and discuss the assignment with other students enrolled in this course in this Section in this term. Collaboration with any individual not enrolled in this course is strictly disallowed. You must clearly state who your collaborators are, if any, for each problem on the assignment.

Verbal collaboration is allowed. Written collaboration is strictly forbidden. For instance, notes, papers, emails, messages, texting, twitter, chats, blogs, discussion boards, whiteboards, blackboards, and photos used as communication devices are strictly forbidden. All written work that you submit must be your own sole work. Anything else will be considered plagiarism. When you are discussing this assignment with others, do not use any form of writing.

Disclosure Policy

If you discuss the assignments with others, make sure to cite these discussions.