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

1. **Course:** CPSC 511, Introduction To Complexity Theory -- Winter 2018

   Lecture 01: (TR, 09:30-10:45 in SS209)

Instructor Name	Email	Phone	Office	Hours
Wayne Michael Eberly	eberly@ucalgary.ca	(403) 220-5073	ICT 613	See D2L

   Course Site:

   D2L: CPSC 511 L01-(Winter 2018)-Introduction To Complexity Theory

   Department of Computer Science: ICT 602, 403 220-6015, cpsc@cpsc.ucalgary.ca

   Students must use their U of C account for all course correspondence.

2. **Prerequisites:**

   See section 3.5.C in the Faculty of Science section of the online Calendar.

   > Computer Science 413.
   > Lectures may run concurrently with Computer Science 611[CPSC611].

3. **Grading:**

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

Component(s)	Weighting %
Assignments (Best 3 of 4)	40
Midterm Test	25
Final Examination	35

   Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

   The conversion between a percentage grade and letter grade is as follows;

Letter Grade	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Minimum Percent Required	96	91	86	81	76	71	66	62	58	55	50

   Bear in mind that a grade of D+ or below will result if a weighted average grade of C- (58%) is not earned on the midterm test and final examination..

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 in Section 3.6. It is the student's responsibility to familiarize himself/herself with these regulations. See also Section E.3 of the University Calendar

5. **Scheduled out-of-class activities:**

The following out of class activities are scheduled for this course:

Out of Class Midterm, scheduled for 90 min on Monday February 26 2018 at 6:30 pm ST 061

REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY. If you have a conflict with the out-of-class-time-activity, please contact your course coordinator/instructor no later than **14 days prior** to the date of the out-of-class activity so that alternative arrangements may be made.

6. **Course Materials:**

7. **Examination Policy:**

   No aids are allowed on tests or examinations

   Students should also read the Calendar, Section G, on Examinations.

8. **Approved Mandatory and Optional Course Supplemental Fees:**

   There are no mandatory or optional course supplemental fees for this course

9. **Writing across the Curriculum Statement:**

   For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of those reports. See also Section E.2 of the University Calendar.

10. **Human studies statement:**

    Students will not participate as subjects or researchers in human studies.

11. **Reappraisal of Grades:**

    A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See Section I.3 of the University Calendar.

    1. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **15 days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall immediately submit the Reappraisal of Graded Term work form to the department in which the course is offered. The department will arrange for a re-assessment of the work if, and only if, the student has sufficient academic grounds. See sections I.1 and I.2 of the University Calendar

    2. **Final Exam:** The student shall submit the request to Enrolment Services. See Section I.3 of the University Calendar.

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

    a. **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence 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. Examples of academic misconduct may include: submitting or presenting work as if it were the student's own work when it is not; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; collaborating in whole or in part without prior agreement of the instructor; borrowing experimental values from others without the instructor's approval; falsification/ fabrication of experimental values in a report. **These are only examples**.

    b. **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on assembly points.

    c. **Academic Accommodation Policy:** 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 procedure-for-accomodations-for-students-with-disabilities_0.pdf.

       Students needing an accommodation in relation to their coursework or to fulfill 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 Undergraduate Affairs of the Department of Computer Science, Nathaly Verwaal by email nmverwaa@ucalgary.ca or phone 403-220-8485. Religious accommodation requests

relating to class, test or exam scheduling or absences must be submitted no later than **14 days** prior to the date in question: http://www.ucalgary.ca/pubs/calendar/current/e-4.html

d. **Safewalk:** Campus Security will escort individuals day or night (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). 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 www.ucalgary.ca/legalservices/foip.

f. **Student Union Information:** VP Academic, Phone: 403-220-3911 Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: 403-220-3913 Email: sciencerep@su.ucalgary.ca. Student Ombudsman, Email: suvpaca@ucalgary.ca.

g. **Internet and Electronic Device Information:** Unless instructed otherwise, cell phones should be turned off during class. All communication with other individuals via laptop, tablet, smart phone or other device is prohibited during class unless specifically permitted by the instructor. Students that violate this policy may be asked to leave the classroom. Repeated violations may result in a charge of misconduct.

h. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction (USRI) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.

i. **SU Wellness Center:** The Students Union Wellness Centre provides health and wellness support for students including information and counselling on physical health, mental health and nutrition. For more information, see www.ucalgary.ca/wellnesscentre or call 403-210-9355.

Department Approval:	Electronically Approved	**Date:** 2018-01-04 07:41
Associate Dean's Approval for out of regular class-time activity:	Electronically Approved	**Date:** 2018-01-04 09:13

Course Outcomes

1. A student will (be able to) define a variety of resource-based complexity classes and describe the proved - as well as conjectured - relationships between these.

2. A student will (be able to) define several kinds of reductions between computational complexity classes and identify one or of these that should be used to define "hardness" and "completeness" for most or all of the complexity classes that have been studied.

3. A student can name and describe languages (and corresponding decision problems) that are complete for most or all of the complexity classes that have been studied, with respect to appropriate kinds of reducibility.

4. A student will (be able to) describe the implications of the fact that a given computational problem is hard for a given complexity class - both with, and without, conjectures about the relationship between this and other complexity classes.

5. A student will discover and precisely describe reductions between computational problems in order to prove that specified problems are hard for specified complexity classes.

6. A student will recall, and be able to precisely state, classical results in computational complexity theory - including various speedup theorems and hierarchy theorems - that relate the complexity classes being studied.

7. A student will explain relationships between nondeterministic, probabilistic and deterministic resource-bounded computation that have presently been proved - along with others that are consequences of standard complexity-theoretic conjectures.

8. A student will comprehend (and be able to summarize) proofs of various results, to the extent that the proof technique being applied can be accurately described and some details of a required argument can be provided.

9. A student will apply proof techniques - including diagonalization arguments, and the use of simulations - that have been used during the course to prove various results concerning computational complexity theory.

10. By doing the above... a student will have demonstrated the ability to read, understand and explain technical material concerning theoretical computer science, and to write such material that is readable and correct.