



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

1. **Course:** CPSC 413, Design and Analysis of Algorithms I -- Fall 2018

Instructor Name	Email	Phone	Office	Hours
<i>L01:</i> ( TR 09:30 - 10:45 in ST 141)				
Peter Hoyer	hoyer@ucalgary.ca	403-210-9468	ICT 653	Tuesdays 10:45-11:40 and 16:15-17:00

**Course Site:**

D2L: CPSC 413 L01-(Fall 2018)-Design and Analysis of Algorithms I

**Department of Computer Science:**

Office: ICT 602  
Phone: 403 220-6015  
Email: cpsc@cpsc.ucalgary.ca

**Note:**

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

2. **Requisites:**

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

**Prerequisite(s):** Computer Science 313, 331; Mathematics 211 or 213; and one of Mathematics 249, 265 or 275.

**Notes:** One of Mathematics 265 or 275 is highly recommended as preparation for this course, but not mandatory. Students who have credit for Computer Science 319 instead of Computer Science 331 should contact the department for instructions on how to enrol in this course.

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 %	Date
Mini-assignments	10	
Assignments	20	
Midterm	30	Oct 30, 2018 at 18:00-20:40
Final	40	

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.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
<b>Minimum % Required</b>	98 %	90 %	85 %	80%	75%	70 %	66 %	62%	58%	54 %	50 %

Percentage grades will be assigned to the assignments, mini assignments, midterm and final. An overall percentage grade will then be computed, which is converted to a letter grade using the included conversions.

This course has a registrar scheduled final exam.

In order to obtain a final grade of C- or better, a student must achieve a **weighted average of C- or better on the midterm and final exams.**

#### 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/themself 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.

Activity	Location	Date and Time	Duration
Out of Class Midterm	ENA 101 and ENA 103	Tuesday, October 30, 2018 at 5:30 pm	210 Minutes

**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:

Required Textbook(s):

Jon Kleinberg and Eva Tardos, *Algorithm Design*: Pearson .

#### 7. Examination Policy:

Two double-sided letter-sized pieces of papers with notes are allowed to both the midterm and the final. No other aids allowed.

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 the work. See also [Section E.2](#) of the University Calendar.

#### 10. Human studies statement:

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

See also [Section E.5](#) of the University Calendar.

#### 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

## 12. OTHER IMPORTANT INFORMATION FOR STUDENTS:

- a. **Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, [Mental Health Services Website](#)) and the Campus Mental Health Strategy website ([Mental Health](#)).
- b. **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](http://www.ucalgary.ca/wellnesscentre) or call [403-210-9355](tel:403-210-9355).
- c. **Sexual Violence:** The University of Calgary is committed to fostering a safe, productive learning environment. The Sexual Violence Policy (<https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf>) is a fundamental element in creating and sustaining a safer campus environment for all community members. We understand that sexual violence can undermine students' academic success and we encourage students who have experienced some form of sexual misconduct to talk to someone about their experience, so they can get the support they need. The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email ([svsa@ucalgary.ca](mailto:svsa@ucalgary.ca)) or phone at [403-220-2208](tel:403-220-2208).
- d. **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.**
- e. **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#).
- f. **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-accommodations-for-students-with-disabilities.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](mailto:nmverwaa@ucalgary.ca) or phone [403-220-8485](tel: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. See [Section E.4](#) of the University Calendar.
- g. **Safewalk:** Campus Security will escort individuals day or night (See the [Campus Safewalk](#) website). Call [403-220-5333](tel:403-220-5333) for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- h. **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 [Legal Services](#) website.
- i. **Student Union Information:** [VP Academic](#), Phone: [403-220-3911](tel:403-220-3911) Email: [suypaca@ucalgary.ca](mailto:suypaca@ucalgary.ca). SU Faculty Rep., Phone: [403-220-3913](tel:403-220-3913) Email: [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca). Student Ombudsman, Email: [suypaca@ucalgary.ca](mailto:suypaca@ucalgary.ca).
- j. **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.

- k. **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.

**Department Approval:** Electronically Approved **Date:** 2018-09-07 08:20

**Associate Dean's Approval for out of regular class-time activity:** Electronically Approved **Date:** 2018-09-07 08:46

## Course Outcomes

- By the end of the course, students will be able to illustrate using examples, define and generalize problems definitions. Students will be able to understand preconditions and postconditions, and use these to define computational problems in a reasonably precise way.
- By the end of the course, students will be able to give a proof that a (reasonably simple) algorithm solves a computational problem correctly.
- By the end of the course, students will be able to analyze the running time of a (reasonably simple) algorithm using summations and recurrences, and express this running time using asymptotic notation.
- By the end of the course, students will be able to design algorithms using Greedy, Dynamic Programming and Divide and Conquer design approaches.
- By the end of the course, students will be able to suggest a promising design approach given a problem, initial algorithm and target run-time.
- By the end of the course, students will be able to prove a problem to be NP-Complete using polynomial-time reductions and efficient certification.
- By the end of the course, students will be able to Classify problems as being in P, NP, NP-hard or NP-complete - or, at least, make an informed guess about this, based on the complexity of other problems that they know about.