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

1. **Course:** CPSC 413, Design & Analysis of Algorithms I -- Fall 2017

   Lecture 01: (TR, 09:30-10:45 in KNB126)

Instructor Name	Email	Phone	Office	Hours
Wayne Michael Eberly	eberly@ucalgary.ca	(403) 220-5073	ICT 613	TR 11:00-11:50

   Course Site:

   D2L: CPSC 413 L01-(Fall 2017)-Design & Analysis of Algorithms I

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

2. **Prerequisites:**

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

   > Either Computer Science 331 or both Computer Science 319 and 105, Computer Science 313, one of Mathematics 211 or 213, and one of Mathematics 249, 251, 265, 275, 281 or Applied Mathematics 217. One of Mathematics 265 or 275 is highly recommended as preparation for this course, but not mandatory. Students who have completed Computer Science 319 instead of Computer Science 331, and who have been unable to complete Computer Science 105, should contact the Department of Computer Science for information about how to be prepared for, and how to be eligible to take, Computer Science 413.

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 4 out of 5)	45%
Midterm Test	20%
Final Exam	35%

   Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a percentage score. The student's average percentage score for the various components 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	95	91	86	81	76	71	66	62	58	55	50

   Bear in mind that a grade of D+ or below will result if students have failed to obtain a weighted average of C- (58%) or better 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:

   Midterm, scheduled for 120 min on Wednesday November 8 2017 at 6:00 pm KNB 132

6. **Course Materials:**

   Optional Textbook(s):

   Cormen, Leiserson, Rivest and Stein, Introduction to Algorithms, MIT Press

   Lecture slides will be posted in D2L

7. **Examination Policy:**

   One double-sided letter-sized page of notes is allowed for each exam. 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:**

   See Section E.2 of the University Calendar.

10. **Human studies statement:**

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

11. **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.

    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 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 Undergraduate Affairs of the Department of Computer Science, Nathaly Verwaal by email nmverwaa@ucalgary.ca or phone 403-220-8485.

    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). 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 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:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in 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. **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:** 2017-09-07 12:17
Associate Dean's Approval for out of regular class-time activity:	Electronically Approved	**Date:** 2017-09-07 15:13

Course Outcomes

1. 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.
2. By the end of the course, students will be able to give a proof that a (reasonably simple) algorithm solves a computational problem correctly.
3. 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.
4. By the end of the course, students will be able to design algorithms using Greedy, Dynamic Programming and Divide and Conquer design approaches.
5. 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.
6. 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.
7. 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.
8. 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.