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

1. **Course:** CPSC 413: Design and Analysis of Algorithms I
   Lecture Sections:
   L01, TR 9:30-10:45, SA 106, Philipp Woelfel, ICT 614, 220-7259, woelfel@ucalgary.ca
   Office Hours: TR 10:45-11:45

   Course Website: D2L

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

2. **Prerequisites:** Either CPSC 331 or CPSC 319 and 105, CPSC 313, one of MATH 211, 213, and one of MATH 249, 251, 265, 275, 281 or AMAT 217
   (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	25%
Midterm	35%
(Thursday November 3rd, 2016 at 17:00 in ENG 60)	
Final Exam	40%

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

   Special Regulations affecting Final grade: Each assignment and each exam will be assigned a percentage grade. An overall percentage grade will be computed according to the weights listed on the course outline. The percentage grade will be converted to a letter grade using the included conversions. In order to obtain a final grade of C- or better, and to pass the course, 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. Section 3.6. It is the student's responsibility to familiarize theirself 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 assignments can be arranged.

6. **Course Materials:**
   Algorithm Design, Kleinberg and Tardos, *Addison Wesley* (Required)

   Online Course Components:
   D2L

7. **Examination Policy:** Closed book. No aids of any kind are permitted. 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_____

Associate Dean's Approval for
out of regular class-time activity: _____Date:_____

Associate Dean's Approval for
Alternate final examination
arrangements:_____Date:_____

A signed copy of this document is kept on file in the Computer Science main Office ICT 602

CPSC 413 Percentage to Letter Grade Conversion Table

A+	98-100
A	90-97
A-	85-89
B+	80-84
B	75-79
B-	70-74
C+	65-69
C	60-64
C-	55-59
D+	50-54
D	40-49
F	0-39

CPSC 413 Syllabus

Tentative Topics Covered:

- Techniques for the Analysis of Algorithms
- Techniques for the Design of Efficient Algorithms
- Techniques for Identifying Intractable Problems

Learning Outcomes:

By the end of the course: students will:

- Illustrate using examples, define and generalize problems definitions.
- Designing algorithms using Greedy, Dynamic Programming and Divide and Conquer design approaches.
- Analyze the run-time of algorithms using summations and recurrences and express this run-time using asymptotic notation.
- Prove a problem NP-Complete using polynomial time reductions and efficient certification.
- Suggest a promising design approach given a problem, initial algorithm and target run-time.
- Classify problems as P, NP, NP-Hard and NP-Complete based on similarity and tractability.