COURSE OUTLINE

1. **Course:** CPSC 413, Design and Analysis of Algorithms I - Spring 2021
   
   **Lecture 01:** MW 13:00 - 15:45 - Online

   **Instructor**
   
   Nathaly Verwaal
   
   **Email**
   
   nmverwaal@ucalgary.ca
   
   **Phone**
   
   403 210-8485
   
   **Office**
   
   ICT 710
   
   **Hours**
   
   By appointment.

   **Online Delivery Details:**

   Some aspects of this course are being offered in real-time via scheduled meeting times. For those aspects you are required to be online at the same time.

   To help ensure Zoom sessions are private, do not share the Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published without the instructor’s permission.

   **Lectures and quizzes:** Lectures are pre-recorded and made available online at least a week before you need to apply the lecture content. There will be a quiz that tests your understanding of lecture content. The quiz will be available for a week. The quiz will be timed: once you start the quiz you will have limited time to complete the quiz. There will be ample time to go back to the materials you’ve studied for reference but not enough time to study the materials during the quiz.

   During the scheduled class time,

   - we'll go over the more challenging parts of the quiz,
   - you'll work in a group to apply the materials studied to design algorithms, analyze their runtime and write proofs of correctness,
   - consider some of the solutions groups created as a class, and
   - reflect on study strategies for this course.

   **Assignments and Presentations:** There are three assignments. Assignments will ask you to design algorithms, analyze the runtime of solutions and provide proofs of correctness. Each assignment will require a presentation. Your presentation must be recorded and submitted. (You can submit the video file or a link to a video.) It is required that you have a web camera or similar recording device since each presentation must contain a video that shows you presenting. (This can just be a video of you at the start that introduces your presentation, it is not required that you are visible in the video throughout.)

   **Reflections:** At the end of each week, you're asked to reflect on your learning process in the course. This includes considering the strategies you've used to study the course content, the work you have done with your group and how you could realistically improve your performance in the course.

   **Course Site:**

   D2L: CPSC 413 L01-(Spring 2021)-Design and Analysis of Algorithms I

   **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 331; and 313 or 351; and Mathematics 211 or 213; and 3 units from Mathematics 249, 265 or 275.

   **Note(s):**
   
   a. 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:

<table>
<thead>
<tr>
<th>Component(s)</th>
<th>Weighting %</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments (3)</td>
<td>60%</td>
<td>May 26, Jun 8, Jun 17</td>
</tr>
<tr>
<td>Quizzes (7)</td>
<td>30%</td>
<td>May 8, May 11, May 15, May 25, May 29, Jun 5, Jun 12</td>
</tr>
<tr>
<td>Reflections (7)</td>
<td>10%</td>
<td>May 5, May 12, May 19, May 26, Jun 2, Jun 9, Jun 16</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Minimum % Required</th>
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<tbody>
<tr>
<td>A+</td>
<td>99 %</td>
</tr>
<tr>
<td>A</td>
<td>95 %</td>
</tr>
<tr>
<td>A-</td>
<td>90 %</td>
</tr>
<tr>
<td>B+</td>
<td>85 %</td>
</tr>
<tr>
<td>B</td>
<td>80 %</td>
</tr>
<tr>
<td>B-</td>
<td>75 %</td>
</tr>
<tr>
<td>C+</td>
<td>70 %</td>
</tr>
<tr>
<td>C</td>
<td>65 %</td>
</tr>
<tr>
<td>C-</td>
<td>60 %</td>
</tr>
<tr>
<td>D+</td>
<td>55 %</td>
</tr>
<tr>
<td>D</td>
<td>50 %</td>
</tr>
</tbody>
</table>

4. Missed Components Of Term Work:

The university has suspended the requirement for students to provide evidence for absences. Please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations.

In the event that a student legitimately fails to submit any online assessment on time (e.g. due to illness etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date. Absences not reported within 48 hours will not be accommodated. If an excused absence is approved, one possible arrangement is that the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course. This option is at the discretion of the coordinator and may not be a viable option based on the design of this course.

5. Scheduled Out-of-Class Activities:

There are no scheduled out of class activities for this course.

6. Course Materials:

Required Textbook(s):


In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam/Camera (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Stable internet connection.

For more information please refer to the UofC [ELearning](https://www.ucalgary.ca/el) online website.

7. Examination Policy:

No aids are allowed on tests or examinations.

Students should also read the Calendar, [Section G](https://www.ucalgary.ca/calendar), 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.

a. Term Work: The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within ten business 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 submit the Reappraisal of Graded Term work form to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections I.1 and I.2 of the University Calendar.

b. 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. 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 Services: For more information, see www.ucalgary.ca/wellnesscentre or call 403-210-9355.

c. Sexual Violence: 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) or phone at 403-220-2208. The complete University of Calgary policy on sexual violence can be viewed at (https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf).

d. Misconduct: Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. Research integrity, ethics, and principles of conduct are key to academic integrity. Members of our campus community are required to abide by our institutional Code of Conduct and promote academic integrity in upholding the University of Calgary’s reputation of excellence. Some examples of academic misconduct include but are not limited to: posting course material to online platforms or file sharing without the course instructor’s consent; submitting or presenting work as if it were the student’s own work; submitting or presenting work in one course which has also been submitted in another course without the instructor’s permission; borrowing experimental values from others without the instructor’s approval; falsification/fabrication of experimental values in a report. Please read the following to inform yourself more on academic integrity:

Student Handbook on Academic Integrity
Student Academic Misconduct Policy and Procedure
Research Integrity Policy

Additional information is available on the Student Success Centre Academic Integrity page.

e. 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 the Department of Computer Science, Nelson Wong by email nelson@cpsc.ucalgary.ca or phone 403-210-8483. 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.

f. **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.

g. **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: ombuds@ucalgary.ca.

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. **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or non-academic misconduct, in addition to any other remedies available at law.

**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.
Associate Dean's Approval