



## COURSE OUTLINE

### 1. **Course:** CPSC 351, Theoretical Foundations of Computer Science II - Fall 2024

Lecture 01 : TR 12:30 - 13:45 - Online

Instructor	Email	Phone	Office	Hours
Dr Wayne Eberly	eberly@ucalgary.ca	403 220-5073	ICT 613	TR 2:00-2:50pm

This is a **flipped course**: Students are expected to complete preparatory readings, or watch a preparatory video, before attending and participating in each online lecture presentation.

To account for any necessary transition to remote learning for the current semester, courses with in-person lectures, labs, or tutorials may be shifted to remote delivery for a certain period of time. In addition, adjustments may be made to the modality and format of assessments and deadlines, as well as to other course components and/or requirements, so that all coursework tasks are in line with the necessary and evolving health precautions for all involved (students and staff).

#### **In Person Delivery Details:**

Tutorials and tests, for assessment, are in-person.

It is not necessary to notify either the instructor or a teaching assistant if you miss a tutorial. In the event of an absence from a tutorial, please review any solutions for the tutorial exercise that are posted on the course web site, and attend the instructor's office hours to discuss any questions you have on the material that you missed.

See Section 4 of this outline for information about what to do if you miss a class test.

#### **Online Delivery Details:**

This course is being offered online in real-time via scheduled meeting times, 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 are web-based.

Lecture presentations are **not recorded**. In the event of an absence from a lecture presentation, you do not need to notify the instructor. Please review the posted lecture material and attend student hours to discuss any questions you have about the material you missed.

#### **Course Site:**

D2L: CPSC 351 L01-(Fall 2024)-Theoretical Foundations of Computer Science II

Tophat will be used, during lecture presentations, to assess student participation. The Tophat join code will be communicated to students by electronic mail, and posted on the course web site, before the first lecture.

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

All questions about material in missed online or in-person meetings should be asked of the instructor, during the instructor's office hours.

Additional questions about the course should be asked during online lecture presentations or directed to the instructor by electronic mail. The instructor will do his best to read and respond to email within two working days after it has been received.

#### **Equity Diversity & Inclusion:**

The University of Calgary is committed to creating an equitable, diverse and inclusive campus, and condemns harm and discrimination of any form. We value all persons regardless of their race, gender, ethnicity, age, LGBTQIA2S+ identity and expression, disability, religion, spirituality, and socioeconomic status. The Faculty of Science strives to extend these values in every aspect of our courses, research, and teachings to better promote academic excellence and foster belonging for all.

### 2. **Requisites:**

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

**Prerequisite(s):**

3 units from Computer Science 219, 233 or 235; and 3 units from Mathematics 249, 265 or 275; and Philosophy 279 or 377; and Computer Science 251; or Statistics 213 and Mathematics 271 or 273.

**Antirequisite(s):**

Credit for Computer Science 351 and Computer Science 313 will not be allowed.

**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:

Course Component	Weight	Due Date (duration for exams)	Modality for exams	Location for exams
Participation <sup>1</sup>	5%	Ongoing		
Assignment 1 <sup>2</sup>	15%	Oct 09 2024		
Term Test 1	12.5%	Oct 17 2024 at 06:00 pm (90 Minutes)	in-person	ST 148
Term Test 2	12.5%	Nov 06 2024 at 06:00 pm (90 Minutes)	in-person	ST 148
Assignment 2 <sup>3</sup>	15%	Nov 08 2024		
Assignment 3 <sup>4</sup>	15%	Dec 06 2024		
Registrar Scheduled Final Exam	25%	Will be available when the final exam schedule is released by the Registrar	in person	Will be available when the final exam schedule is released by the Registrar

<sup>1</sup> Lecture attendance and Tophat questions, asked during lectures, will be used to calculate a mark for participation.

<sup>2</sup> A first component for this assignment will be due at 11:59pm on Wednesday, September 25. Students will complete each assignment in a group of either three or four students - with groups created, for each assignment, by the course instructor. Additional information about grading of group assignments will be provided on the course web site.

<sup>3</sup> A first component for this assignment will be due at 11:59pm on Friday, November 1.

<sup>4</sup> A first component for this assignment will be due at 11:59pm on Wednesday, November 27.

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>	95 %	90 %	85 %	80%	75%	70 %	66 %	62%	58%	55 %	50 %

An overall percentage grade will be computed using the weightings for components on this outline. This will be **rounded up** to obtain a whole number between 0 and 100, which will be used to obtain a letter grade, using the conversion table.

This course will have a Registrar Scheduled Final exam that will be delivered in-person and on campus. [The Final Examination Schedule](#) will be published by the Registrar's Office approximately one month after the start of the term. The final exam for this course will be designed to be completed within 2 hours.

In order to obtain a grade above "D+" students must obtain a **weighted-average** of "C-" (58%) on the *test component* for this course - that is, for the term tests and the final examination.

The University of Calgary offers a [flexible grade option](#), Credit Granted (CG) to support student's breadth of learning and student wellness. Faculty units may have additional requirements or restrictions for the use of the CG grade at the faculty, degree or program level. To see the full list of Faculty of Science courses where CG is not eligible, please visit the following website: <https://science.ucalgary.ca/current-students/undergraduate/program-advising/undergraduate-processes>

**4. Missed Components Of Term Work:**

Students who are absent from an in-course assessment or who miss a deadline to submit course work are responsible for understanding and following the recommended steps provided in this Course Outline, and in the event of unexpected circumstances, contacting their course instructor to determine the impact of the missed assessment. At the discretion of the course instructor, alternative arrangements may be considered for missed components of term work, as described in Section [G2.3](#) Absence from In-Course Assessments of the Calendar. For additional information and resources on the steps you can take in the event of unexpected circumstances interrupting your studies, see the website link in [Section M.1](#) of the Calendar.

The course instructor may ask for supporting documentation to confirm an absence. For information on supporting documentation that you can provide, see [Section M.1](#) Supporting Documentation for Absences of the Calendar.

In the event that an alternative arrangement is denied by the course instructor, students can email [science@ucalgary.ca](mailto:science@ucalgary.ca) to discuss the matter further with an Associate Dean.

TopHat questions will only be available to answer during the in-class activities. In the event of missed in-class activities, students will receive a score of zero for any questions missed. The final TopHat grade will be calculated based on completion of a percentage of questions during the term to allow for absences.

Each assignment for this course will have two components. Late submissions for the first component will not be accepted, in order for rapid feedback to be supplied. The second component may be submitted for up to 48 hours after it is due: 10% of the total mark available for this component will be deducted for late submissions that are at most 24 hours late, and 25 of the total mark for the component will be deducted for submissions that are more than 24 hours late but at most 48 hours late. Submissions that are more than 48 hours late will not be accepted.

No reweightings or alternative assessments will be available for assignments that are missed.

Students who do not write a term test should contact the instructor by electronic mail, as soon as possible after the missed test, to begin a discussion of how documentation for the absence can be supplied. No alternative test will be available, but the weight of the missed test may be moved to the Final Examination - provided that acceptable documentation to explain the absence has been supplied within one week of the test.

## 5. Scheduled Out-of-Class Activities:

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

Activity	Location	Date and Time	Duration
Term Test 1	ST 148	Thursday, October 17, 2024 at 6:00 pm	90 Minutes
Term Test 2	ST 148	Wednesday, November 6, 2024 at 6:00 pm	90 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 and recommended course material will be provided online, at the course web site.

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:

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

For more information please refer to the UofC [ELearning](#) online website.

## 7. Academic Assessment & Examination Policy:

Students will be allowed to prepare a double-sided letter-sized page of printed or handwritten notes and use this as an aid, for each of the tests in this course. No other aids are allowed.

When students are learning new skills the use of artificial intelligence tools can impair student learning instead of improve it. Consequently the use of advanced artificial intelligence tools, such as ChatGPT, is **strictly prohibited** for all work to be submitted for assessment (including participation questions, assignments and tests) in this course.

Any use of AI tools for your academic work may result in academic penalties and be considered an act of academic misconduct. If you have questions about the use of AI tools, please contact the instructor by electronic mail to arrange a discussion of this.

See also [Section G](#) of the Calendar, on Academic Assessments and 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:

Writing skills are not exclusive to English courses and, in fact, should cross all disciplines. The University supports the belief that throughout their University careers, students should be taught how to write well so that when they graduate their writing abilities will be far above the minimal standards required at entrance. Consistent with this belief, students are expected to do a substantial amount of writing in their University courses and, where appropriate, members of faculty can and should use writing and the grading thereof as a factor in the evaluation of student work. The services provided by the [Writing Support](#), part of the [Student Success Centre](#), can be utilized by all undergraduate and graduate students who feel they require further assistance. 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](#) 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**, found on the [Grade Reappraisals & Appeals](#) web presence 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 Calendar and <https://science.ucalgary.ca/current-students/undergraduate/program-advising/grade-reappraisals-and-appeals>
- b. **Final Exam:** student seeking a reappraisal of a final grade should first attempt to review the final grade with the department or faculty offering the course. After which, if the student wishes to initiate a formal grade reappraisal, they should refer to [ucalgary.ca/registrar/student-centre/grades](https://ucalgary.ca/registrar/student-centre/grades) for more information. The student must indicate exactly what error was made in marking the final assessment and/or in computing the final grade. 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 [Section I.3](#) Reappraisal of Final Grades of the University Calendar.

## 12. Other Important Information For Students:

- a. **Wellness and Mental Health Resources** 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. **Student Wellness Services:** For more information, see their [website](#) or call [403-210-9355](tel:403-210-9355).
- c. **Student Success:** The Student Success Centre provides services and programs to ensure students can make the most of their time at the University of Calgary. Our advisors, learning support staff, and writing support staff assist students in enhancing their skills and achieving their academic goals. They provide tailored learning support and advising programs, as well as one-on-one services, free of charge to all undergraduate and graduate students. For more information visit: <https://www.ucalgary.ca/student-services/student-success>
- d. **Student Ombuds Office:** The Student Ombuds Office supports and provides a safe, neutral space for students. For more information, please visit [www.ucalgary.ca/ombuds/](http://www.ucalgary.ca/ombuds/) or email [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca)
- e. **Student Union (SU) Information:** The SU Vice-President Academic can be reached at [\(403\) 220-3911](tel:403-220-3911) or [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca); Information about the SU, including elected Faculty Representatives, can be found here: <https://www.su.ucalgary.ca>. Email your SU Science Reps: [science1@su.ucalgary.ca](mailto:science1@su.ucalgary.ca), [science2@su.ucalgary.ca](mailto:science2@su.ucalgary.ca), [science3@su.ucalgary.ca](mailto:science3@su.ucalgary.ca).
- f. **Academic Accommodation Policy:**

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf>

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.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, by filling out the [Request for Accommodation in Academic Courses Form](#) and sending by email to [science@ucalgary.ca](mailto:science@ucalgary.ca) preferably 10 business days before the due date of an assessment or scheduled absence.

- g. **Academic Integrity and 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](#)  
[Faculty of Science Academic Misconduct Process](#)  
[Research Integrity Policy](#)

Additional information is available on the [Student Success Centre Academic Integrity page](#)

- h. **Copyright Legislation:** All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright ( [ucalgary.ca/legal-services/university-policies-procedures/acceptable-use-material-protected-copyright-policy](http://ucalgary.ca/legal-services/university-policies-procedures/acceptable-use-material-protected-copyright-policy) ) and requirements of the copyright act ( [laws-lois.justice.gc.ca/eng/acts/C-42/index.html](http://laws-lois.justice.gc.ca/eng/acts/C-42/index.html) ) to ensure they are aware of the consequences of unauthorized sharing of course materials (including instructor notes, electronic versions of textbooks etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy.
- 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.
- j. **Recording of Lecture:** Audio recording of lectures, other than where an audio recording is an accommodation, shall be permitted for individual private study only at the discretion of the instructor. For any other use, whether by duplication, transcription, publication, sale or transfer of recordings, written approval must be obtained from the instructor for the specific use proposed. Any use other than that described above constitutes academic misconduct and may result in suspension or expulsion. For more information, see [Section E.6](#) Recording of Lectures of the University Calendar.
- k. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIP). 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.
- l. **Surveys:** At the University of Calgary, feedback through the UCalgary Course Experience Survey provide valuable information to help instructors and programs evaluate the student experience. Your responses make a difference and facilitate instructors in improving the learning and teaching experience offered in our courses. For more information, please visit <https://www.ucalgary.ca/provost/teaching-learning/student-surveys>.
- m. **Emergency Evacuation/Assembly Points:** Assembly points for emergencies have been identified across campus. Assembly points are designed to establish a location for information updates from the emergency responders to the evacuees; from the evacuated population to the emergency responders. For more information, see the University of Calgary's Emergency Management website: <https://www.ucalgary.ca/risk/emergency-management/evac-drills-assembly-points/assembly-points>
- n. **Safewalk:** Campus security will escort individuals, day or night, anywhere on campus (including McMahon Stadium, Health Sciences Centre, Student Family Housing, the Alberta Children's Hospital and the University LRT station). Call [403-220-5333](tel:403-220-5333) or visit <https://www.ucalgary.ca/security/safewalk>. Use any campus phone, emergency phone or the yellow phone located at most parking lot pay booths. Please ensure your personal safety by taking advantage of this service.

- o. **Campus Supports & Resources:** A link to required information that is not course-specific related to student wellness and safety resources, can be found on the Office of the Registrar's website: <https://www.ucalgary.ca/registrar/registration/course-outlines>

**Course Outcomes:**

- o Able to perform advanced transformations and operations on fundamental discrete structures.
- o Familiar with common discrete probability distributions (e.g., uniform, binomial, Poisson, geometric, hypergeometric).
- o Able to apply concentration bounds (e.g., Markov, Chebyshev and Chernoff bounds).
- o Able to devise abstract representations of computational problems.
- o Able to construct various types of proofs about discrete structures, including direct proofs, indirect proofs, and mathematical induction.
- o Able to specify the behaviour of programs through pre- and postconditions, and prove the correctness of iterative and recursive programs.
- o Able to design and analyze abstract machine models including finite automata and Turing machines, and explain the relationship to the classes of computational problems that can be solved by these models.
- o Able to classify computational problems as regular, not regular, decidable, or undecidable.

Electronically Approved - Aug 27 2024 08:51

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**Department Approval**

Electronically Approved - Aug 29 2024 16:53

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**Associate Dean's Approval**