



## COURSE OUTLINE

### 1. **Course:** MATH 271, Discrete Mathematics - Winter 2022

Lecture 01 : MWF 09:00 - 09:50 in ST 148

| Instructor  | Email             | Phone        | Office | Hours             |
|-------------|-------------------|--------------|--------|-------------------|
| Dr Thi Dinh | tdinh@ucalgary.ca | 403 220-2214 | MS 420 | MWF 11:00 - 12:00 |

Lecture 02 : TR 11:00 - 12:15 in CHC 119

| Instructor      | Email                    | Phone        | Office | Hours   |
|-----------------|--------------------------|--------------|--------|---|
| Dr Jerrod Smith | jerrod.smith@ucalgary.ca | 403 220-6766 | MS 442 | Mon 10 - 11 AM, Wed 1 - 2 PM, Thurs 12:30 - 1:30 PM, or by appointment. |

### Office Hour Information

Dr. Smith's office hours will be held on **Zoom**: <https://ucalgary.zoom.us/j/93034180899> (Passcode: ilovemath)

### Supplementary online content (videos)

The supplementary content videos posted to D2L cover fundamental concepts and only basic examples. While these videos are not a replacement for attending classes, we encourage you to make use of them to reinforce key ideas.

If you are not feeling well, or you have any symptoms of respiratory illness, we do encourage you to stay home and watch the content videos for the topics you miss in class. Once you are well, you can visit the Math Help Centre, and talk to your instructor, for additional support.

**Note:** To succeed in this course, students must engage with the **weekly worksheets** posted on D2L (these are test-level questions). Solutions will be provided one week (typically) after the worksheet is posted to provide sufficient opportunity to engage with the problems.

To account for any necessary transition to remote learning in the winter 2022 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:

All classes/lectures and labs are in-person.

All quizzes and exams (midterm and final) are in-person.

Additional short instructional videos will be provided via D2L to supplement in-class material.

### Re-Entry Protocol for Labs and Classrooms:

To limit the spread of COVID-19 on campus, the University of Calgary has implemented safety measures to ensure the campus is a safe and welcoming space for students, faculty and staff. The most current safety information for campus can be found [here](#).

### Course Site:

D2L: MATH 271 L01-(Winter 2022)-Discrete Mathematics

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

### Email policy

All questions of a personal nature (e.g. accommodations, missed assessments) should be directed to Dr. Jerrod Smith (jerrod.smith@ucalgary.ca). You can usually expect a response within 36 hours (except on weekends and

holidays).

### **Questions about math**

Questions about mathematics are best answered during Class, Office Hours, or at the Math Help Centre (MS 457). See D2L for Math Help Centre (MS 457) information and a schedule.

### **Frequently Asked Questions (FAQ)**

Questions about the course organization should be posted to the Frequently Asked Questions (FAQ) discussion board on D2L.

### **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.

### **Course Outcomes:**

- Distinguish among different types of proofs, including: direct proof, indirect proof, proof by contraposition, and proof by induction.
- Outline what must be included in the proof of a statement, being aware that this is highly dependent on the statement to be proved.
- Construct various types of proofs, including: direct proofs, indirect proofs, proofs by contraposition, and proofs by induction.
- Restate all definitions related to the course topics of number systems, sets, functions, relations, and graphs
- Restate named theorems covered in the course
- List different forms of logical statements and write the negation, the converse and the contrapositive of a statement.
- Perform the Euclidean algorithm to find the greatest common divisor of two integers and to find an inverse of an integer modulo  $n$ .
- List the steps in a direct proof, the steps in a proof by contradiction and the steps of a proof by induction
- Produce proofs involving objects covered in the course such as sets, functions, relations, and graphs.
- Outline and perform the steps required to solve counting problems concerning arrangements of objects and selection of objects.

### **2. Requisites:**

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

### **Prerequisite(s):**

Mathematics 211 or 213.

### **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  |
|--|--------|---|--------------------|---|
| Assignments (3, equal weight) <sup>1</sup> | 20%    | Ongoing   |                    |   |
| Quizzes (Best 3 of 4) <sup>2</sup>         | 30%    | Ongoing   |                    |   |
| Midterm Exam <sup>3</sup>                  | 20%    | Mar 10 2022 at 06:00 pm (2 Hours)   | in-person          | ENA 101, ENA 103, ENA 201, ICT 122, ENE 241                                 |
| Registrar Scheduled Final Exam             | 30%    | 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> Due on February 11, March 4 and April 1 at 11:59 PM via D2L Dropbox

<sup>2</sup> Quizzes are in Lab during the weeks of January 24, February 14, March 21, and April 4. During periods of online instruction, Quizzes will take place online and asynchronously; students will have a 24 hour period to complete the quiz and upload their submission to a D2L Dropbox. Online quizzes will not take place during labs; additional details will be provided via D2L.

<sup>3</sup> In the case that the Midterm Exam takes place during a period of online instruction the exam will take place online and asynchronously. Additional details will be provided via D2L in this situation.

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 % | 65 % | 60% | 55% | 53 % | 50 % |

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.

**On all assessments: both mathematical correctness and quality of mathematical writing will be assessed.**

**Late submissions of assessments will not be accepted.**

**\*\*\* Assignments:** Students will typically have one week to complete written assignments. Assignments will be submitted electronically via D2L Dropbox by 11:59 PM MT on the due date.

**One question** (chosen at random) **on each assignment will be assessed** out of 15 points. Both mathematical correctness and quality of writing will be assessed.

See D2L > Content > Mathematical Writing Resources for more information.

Submissions must be a **single PDF file** uploaded to the appropriate D2L Dropbox.

**\*\*\* Quizzes** are closed-book (no aids allowed) written assessments that will be completed individually during lab.

**NOTE:** During periods of online instruction, Quizzes will take place online and asynchronously; students will have a 24 hour period to complete the quiz and upload their submission to a D2L Dropbox. Online quizzes will not take place during labs; additional details regarding the online quiz format will be provided via D2L.

**\*\*\* Exams (Midterm and Final)** are closed-book (no aids allowed) written assessments that will be completed individually.

**NOTE:** In the case that the Midterm Exam takes place during a period of online instruction the exam will take place online and asynchronously. Additional details regarding the online exam format will be provided via D2L in this situation.

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/flexible-grading-option-cg-grade>

#### 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.

The lowest single quiz score will be dropped (the best 3 out of 4 quizzes will contribute to the overall quiz grade).  
**If a student misses one quiz (for any reason), then this is the quiz grade that will be dropped.**

If a student misses two or more quizzes, then they must contact Dr. Jerrod Smith with 48 hours of the second missed quiz. Accommodation for two or more missed quizzes will be made on a case-by-case basis.

There will be no make-up midterm exam. If a student misses the midterm exam, then they must contact Dr. Jerrod Smith within 48 hours of the missed exam. If a student misses the midterm exam due to an approved absence (e.g., illness or emergency), then the weight of the midterm exam will be transferred to the final examination.

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

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

| Activity     | Location  | Date and Time                       | Duration |
|--------------|-----------|-------------------------------------|----------|
| Midterm Exam | On Campus | Thursday, March 10, 2022 at 6:00 pm | 2 Hours  |

**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:

Recommended Textbook(s):

Susanna S. Epp, *Discrete Mathematics with Applications*, 5th edition: Brooks/Cole.

Book of Proof, 3rd edition, *Richard Hammack*: Richard Hammack: PDF available online: <https://www.people.vcu.edu/~rhammack/BookOfProof/>.

#### Technology Requirements

Students **must** be able to **scan/photograph** written work and convert the images to **PDF files**.

- For iPhone / iPad try the \*free\* Adobe Scan Digital PDF Scanner <https://tinyurl.com/tlhhkj3>
- On Google Play try the \*free\* Adobe Scan Digital PDF Scanner <https://tinyurl.com/v7csw88>

Alternative to scanning; students may create PDF files of written work by:

- writing with tablet application and saving to a PDF file
- typing work with a **LaTeX distribution** (<https://www.latex-project.org/get/>) or online LaTeX editor (such as Overleaf <https://www.overleaf.com>) and saving to a PDF file. See D2L for more information about writing mathematics with LaTeX.

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](#) online website.

## 7. Examination Policy:

**No aids are allowed on tests or examinations unless otherwise indicated in the examination instructions.**

Students must submit assignments as single PDF files. This may be done by:

- Completing the assessment on 8.5" by 11" paper and then scanning your solutions.
- Using a tablet app to write your assignment and saving it as a PDF file.
- Typeset with the assignment with LaTeX.

## Assignment Expectations

- Assignments are intended to help you practice problem solving and mathematical writing.
- You should use your notes, the topic videos, and the course text(s) to help you assignments.
- You may discuss assignment problems with your peers (on the D2L discussion boards); however **you must write your assignment solutions on your own** (i.e., independently).
  - Please see the topic description of the Assignment Discussion Board for detailed instructions for how to discuss Assignments while maintaining Academic Integrity.
- **You may NOT use:** homework answer services, like Chegg.com, Slader, etc.
- **You may NOT use:** mathematics question & answer forums like Mathematics Stack Exchange
- We recommend that you only use (online) computer algebra systems like Wolfram Alpha, Mathematica, etc. to verify any necessary calculations that you have performed by hand.

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.

**On all assessments: both mathematical correctness and quality of mathematical writing will be assessed.**

## 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.

- 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
- 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:

- 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](http://www.ucalgary.ca/wellnesscentre) or call [403-210-9355](tel: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 ([syssa@ucalgary.ca](mailto:syssa@ucalgary.ca)) or phone at [403-220-2208](tel:403-220-2208). The complete University of Calgary policy on sexual violence can be viewed at (<https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-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:**

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 Academic Accommodation Form](#) and sending it to Mark Bauer by email [bauerm@ucalgary.ca](mailto:bauerm@ucalgary.ca) preferably 10 business days before the due date of an assessment or scheduled absence.

- f. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPPA). 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](tel:403-220-3911) Email: [suvpaca@ucalgary.ca](mailto:suvpaca@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: [ombuds@ucalgary.ca](mailto: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.

Electronically Approved - Jan 04 2022 15:41

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**Department Approval**

Electronically Approved - Jan 06 2022 09:11

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**Associate Dean's Approval**