

Math 2151A Course Outline

1. Course Information

Course Information

- Math 2151A 001, Fall 2023
- MW- SSC 2050: 12:30-01:30 PM.
- Tuesday: SEB-1200:8:30 -9:30 AM.

List of Prerequisites:

Prerequisite(s): Computer Science 1026A/B or Engineering Science 1036A/B, in each case with at least 60%, and 1.0 courses with at least 60% in each from: Numerical and Mathematical Methods 1411A/B or the former Applied Mathematics 1411A/B, Numerical and Mathematical Methods 1412A/B or the former Applied Mathematics 1412A/B, Numerical and Mathematical Methods 1414A/B or the former Applied Mathematics 1414A/B, or the former Applied Mathematics 1413A/B."

Antirequisite(s): Computer Science 2214A/B, Mathematics 2155F/G.

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

2. Instructor Information

Instructors	Email	Office
Brett Nasserden	bnasserd@uwo.ca	MC 129

Students must use their Western (@uwo.ca) email addresses when contacting their instructors and place math 2151A in the subject heading of an email.

Office hours at MC 129. Office hours specified times or by appointment. Office hours can be done on zoom, but precedence will be given to people in person. The precise times will be determined at a later date.

3. Course Syllabus, Schedule, Delivery Mode

The course will cover the following topics:

Logic, sets and functions, algorithms, mathematical reasoning, counting, relations, graphs, trees, Boolean Algebra, computation, modeling

The goal of this course is to teach you how to think precisely about simple (but not easy!) mathematical concepts that are particularly relevant in computer science/software development.

Learning outcomes:

- 1) Determine the truth value of logical statements using a truth table.
- 2) Do basic computations in Boolean algebra using logical quantifiers such as OR, AND, NOT and Demorgan's laws.
- 3) Precisely define basic objects in elementary number theory such as *prime numbers* and *congruence classes of integers*.
- 4) Do computations in modular arithmetic such as solving linear systems of congruence equations.
- 5) State and prove basic theorems in elementary number theory such as *the square root of 2 is irrational*.
- 6) Explain how elementary number theory is relevant to the RSA cryptography system.
- 7) Define Eulerian circuits and Hamiltonian cycles on a graph.
- 8) Determine when a graph has an Eulerian circuit.

Location and time of classes:

- Monday and Wednesday: SSC-2050: 12:30-01:30 PM.
- Tuesday: SEB-1200: 8:30 -9:30 AM.

Rough schedule for the course:

1. Around 2 weeks of Logic
2. Around 1 week of Proofs
3. Around 1 week of Sets
4. Around 1-2 weeks of Mathematical Induction
5. Around 1-2 weeks of Modular arithmetic
6. Around 2 weeks of Counting
7. Around 2 weeks of Introductory graph theory

[Contingency plan for an in-person class pivoting to 100% online learning

In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, affected course content will be delivered entirely online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will **not** change. Any remaining assessments will also be conducted online as determined by the course instructor.

4. Course Materials

On the Thursday prior to an upcoming week, notes and selected readings will be posted on the Owl website. Some readings may be required to be completed before the upcoming week.

Students are responsible for checking the course OWL site (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class.

All course material will be posted to OWL: <http://owl.uwo.ca>.

If students need assistance with the course OWL site, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

5. Methods of Evaluation

The overall course grade will be calculated as listed below:

3 Assignments	10%
Class Participation	10%
Midterm Test 1	15%
Midterm Test 2	15%
Final Project	10%
Final Exam	40%

Assignment due dates:

- Assignment 1: October 9
- Assignment 2: November 8
- Assignment 3: December 6

One of the methods of evaluation on the assignments will be professionalism and writing quality. As software engineers' communication of technical ideas is important. Some sample questions:

- In a short paragraph describe Modus Ponens and Modus Tollens.
- Describe a non-computer science scenario where you use Modus Tollens
- Describe a computer science scenario where you have used In a short paragraph describe Modus Ponens and Modus Ponens and provide pseudo-code for the example.
- Using a language of your choice provide pseudo-code for an implementation of the extended Euclidean algorithm. Using that same language run an instance of your algorithm to find integers x, y such that $x*266+126*y=14$.

Midterm 1 will be on October 11th in class. It will tentatively contain the material on logic, proofs, sets and relations, and functions.

Midterm 2 will be on November 15th in class. It will tentatively contain the material on mathematical induction, counting and modular arithmetic.

There will be no make up exams. The weight of missed a single missed midterm will be moved to the final exam. If both midterms are missed the weight will be moved to the final exam.

Class Participation: Class participation activities will be conducted in class throughout the year. This may be in the form of a short pop quiz, in class work activities ect. Each activity will have a point value assigned to it. Your class participation mark will be determined by the percentage of points you earned during the year.

The final project is due December 8th: You will write an approximately 3 page report on a mathematical topic of your choosing related to the course material. You must choose and research the topic yourself. Grading will be based on quality of writing/presentation and relevance/difficulty of topic as related to the course. As a rule of thumb, your project should be interesting and readable by another student in the class. More details will be posted about this on OWL.

You must achieve at least 50% on the final exam and hand in the final project to pass the course. The final exam will be cumulative drawing on material from all parts of the course.

6. Student Absences

1. **Assignments:** In extenuating circumstances such as illness/family emergency extensions will be given for the assignments if proper documentation from academic counselling is provided.
2. **Class participation:** In extenuating circumstances such as illness/family emergency that causes a student to miss class participation opportunities a make-up opportunity will be given in the form of an oral assessment and/or make-up work to be handed in.
3. **The final project:** The final project must be completed and handed in on the final day of classes, December 8th.

If you are unable to meet a course requirement due to illness or other serious circumstances, please follow the procedures below.

Assessments worth 10% or more of the overall course grade:

By policy, academic considerations for work totalling 10% or more of the final course grade can be granted only by the student's Faculty of Registration (typically by their academic counsellors). In such cases, students should be directed as follows.

For work totalling 10% or more of the final course grade, you must provide valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration as soon as possible. For further information, please consult the University's medical illness policy at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration.pdf.

Assessments worth less than 10% of the overall course grade:

See the student absence section above for assignments and class participation.

Provided documentation from the office of the registrar

The Student Medical Certificate is available at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

Absences from Final Examinations

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a “Multiple Exam Situation” (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See the Academic Calendar for details (under [Special Examinations](#)).

Note: missed work can *only* be excused through one of the mechanisms above. Being asked not to attend an in-person course requirement due to potential COVID-19 symptoms is **not** sufficient on its own.

6. Accommodation and Accessibility

Religious Accommodation

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

<https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>.

Accommodation Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf.

7. Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

In accordance with policy,

https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf,

the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at their official university address is attended to in a timely manner.

No calculators will be allowed in any exams.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Computer-marked multiple-choice tests and exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

Tests and examinations in this course may be conducted using a remote proctoring service in the event health lockdown. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at:

<https://remoteproctoring.uwo.ca>.

8. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.uwo.ca/sci/counselling/>.

Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html

if you have any questions regarding accommodations.

Learning-skills counsellors at the Student Development Centre (<https://learning.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: <https://www.uwo.ca/se/digital/>.

Additional student-run support services are offered by the USC, <https://westernusc.ca/services/>.