

Course Outline

Applied Logic for Computer Science¹

COMPSCI 2209A

1. Course Information

Course Information

- Course Name: Applied Logic for Computer Science
- Academic Term: Fall 2026
- Instructor: Dr. Sajad Sadeghi
- Lectures:
 - Hours: Tuesdays 9:30-11:30 am, and Thursdays 9:30-10:30 am
 - Location: [REDACTED]

List of Prerequisites

Prerequisite(s): Computer Science 1027A/B, Computer Science 1037A/B, Computer Science 2121A/B or Digital Humanities 2221A/B in each case with at least 65%; Computer Science 1020A/B with at least 60%; and 1.0 course with at least 60% in each from: Applied Mathematics 1201A/B, Numerical and Mathematical Methods 1411A/B, Numerical and Mathematical Methods 1412A/B, Numerical and Mathematical Methods 1414A/B, Calculus 1000A/B, Calculus 1301A/B, Calculus 1500A/B, Calculus 1501A/B, Mathematics 1600A/B, the former Applied Mathematics 1411A/B, the former Applied Mathematics 1412A/B, the former Applied Mathematics 1414A/B, the former Applied Mathematics 1413.

Unless students have either the prerequisites for this course or written special permission from the Department of Computer Science to enroll in it, they may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline of the academic term, and the course will be marked as withdrawn (WDN) on their academic record. This decision may not be appealed.

2. Instructor Information

- Instructor: Dr. Sajad Sadeghi
- Email: [REDACTED]
- Office: [REDACTED]

Information on contacting course teaching assistants will be available on the course website after the course begins.

¹ This course outline is subject to change, and any changes will be clearly communicated via the course OWL website.

Course Contact Policies

- Students must use their Western (@**uwo.ca**) email addresses when contacting their professor.
- Any email sent to the professor **MUST** say CS 2209A in the subject line; Any email without a proper subject line, and/or sent from an email other than a Western email, may be deleted unread.

Office Hours Information

The office hours are held online in Zoom by appointment on Thursdays, 2:30-4 PM. To get an appointment, please send an email to the instructor.

Tutorials:

Tutorials are optional, but students are strongly encouraged to attend to gain additional practice.

3. Course Syllabus, Schedule, Delivery Mode

Applied Logic is an introduction to logic with emphasis on methodologies and applications in Computer Science. Topics include propositional and predicate logic, methods for logical reasoning, SAT solvers, and programming languages based on logic.

Course Delivery:

The course will be delivered in person. Lecture notes will be posted online in OWL. Office hours are online in Zoom.

Course-level learning outcomes:

- Define declarative statements in propositional logic and predicate logic.
- Explain the syntax and the semantics of propositional logic and predicate logic.
- Construct formal proofs in propositional logic and predicate logic.
- Explain the main applications of logic in computer science, including database query languages, software verification, programming languages, and digital electronics.
- Explain the expressiveness and limitations of propositional and predicate logic.

Course Topics:

The lengths of these topics are approximate and may be subject to change.

- What is logic? (1 week)
- Propositional Logic- Syntax and Semantics (2 weeks)
- Propositional Calculus (1 week)
- Boolean Algebra, Logic Gates, Circuit Design and Minimization, Code Analysis (1 week)
- Formal Deduction in Propositional Logic (1 week)
- Resolution in Propositional Logic (1 week)
- First Order Logic- Syntax and Semantics (2 weeks)
- Argument Validity in First Order Logic (2 weeks)
- Formal Deduction in First Order Logic (1 week)
- Resolution in First Order Logic (1 week)
- If time permits, we will also explore topics such as Gödel's Incompleteness Theorem and Turing machines.

Key Sessional Dates:

- Classes begin: September 9, 2026
- National Day for Truth and Reconciliation (non-instructional day): September 30, 2026
- Fall Reading Week: October 10 – 18, 2026
- Classes end: December 9, 2026
- Exam period: December 11–22, 2026

4. Course Materials

We will use the book *Mathematical Logic for Computer Science*, Second Edition, by Lu Zhongwan, mainly for definitions, notation, and the sections on formal deduction, but this book does not cover all the topics we discuss in the course.

- **Cost**

- USD 83 for hardcover
- USD 33 for ebook
- More information at the publisher's webpage
https://www.worldscientific.com/worldscibooks/10.1142/3434?srsId=AfmBOoqMknhgkzrJpvcpeBOGXNTT84wzOSa5pUN_gZ4u2tV4K9Arui vJ#t=aboutBook

Students are welcome to purchase a second-hand version of this textbook. The notes will be posted on OWL Brightspace. The book is not required.

The following books are also recommended:

- *Logic in Computer Science: Modelling and Reasoning about Systems*, Second Edition, Michael Huth and Mark Ryan

<https://www.cambridge.org/highereducation/books/logic-in-computer-science/9022E2BE5E7C9F20D259F4A83986236C#overview>

- *Logic for Computer Science*, Uwe Schöningh

<https://link.springer.com/book/10.1007/978-0-8176-4763-6>

- *Introduction to Logic*, Fifteenth Edition, Irving M. Copi, Carl Cohen, Kenneth McMahon

<https://www.routledge.com/Introduction-to-Logic/Copi-Cohen-Rodych/p/book/9781138500860>

All course material will be posted to OWL Brightspace: <https://westernu.brightspace.com/>

Students are responsible for checking the course OWL Brightspace site regularly for news and updates. This is the primary method by which information will be disseminated to all students in the class.

If students need assistance with the course OWL Brightspace site, they can seek support on the [OWL Brightspace Help](#) page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or [REDACTED].

5. Methods of Evaluation

The final course grade will be determined by student performance on the following course components:

- Assignments 10% (best two of three assignments: 5% each)
- Online quizzes 6% (best three of four quizzes, 2% each)
- Midterm Test 34%
- Final exam 50%

Essential Learning Requirements

Even when Academic Consideration is granted for missed coursework, the following is essential to earn a passing grade in this course:

- a weighted average of at least 50% between the Midterm Test and the Final Exam to ensure that students demonstrate sufficient mastery of the learning outcomes.

When a student has not demonstrated proficiency in the essential learning requirement listed above, and when the shortfall results from a granted Academic Consideration, they will be withdrawn (WDN) from the course. The student may appeal to the Associate Dean (Academic) for reinstatement with an Incomplete (INC) standing. Where an appeal for INC is granted, their maximum course load may be reduced during the term in which they complete the outstanding course requirements.

Timetable

Please refer to the timetable below for the tentative schedule of assignments, quizzes, and the midterm test. Note that the dates and content **are not final** and may be subject to change. The confirmed dates and topics will be posted on OWL Brightspace.

- **Week 1**, September 9-September 13
- **Week 2**, September 14-September 20
- **Week 3**, September 21-September 27
- **Week 4**, September 28-October 4
- **Week 5**, October 5-October 11
- **Week 6**, October 12-October 18 (Reading week)
- **Week 7**, October 19-October 25
 - The **Midterm Test** is on October 20, during the lecture time; the location will be announced, and we'll have class on Thursday.
- **Week 8**, October 26-November 1
- **Week 9**, November 2-November 8
- **Week 10**, November 9-November 15
- **Week 11**, November 16-November 22
- **Week 12**, November 23-November 29
- **Week 13**, November 30-December 6
- **Week 14**, December 7-December 9

Assignments:

- Assignment 1: From the content of Weeks 1-3 (available: September 24, deadline: October 2, at 11:55 pm)

- Assignment 2: From the content of Weeks 4-8 (available: October 29, deadline: November 6, at 11:55 pm)
- Assignment 3: From the content of Weeks 9-12 (available: November 26, deadline: December 4, at 11:55 pm)

Assignments are to be done individually, not in groups. The submitted assignments should be your own work.

Do not:

- Show any part of your solutions to another student
- Send any part of your solutions to someone
- Upload any part of your solution to a publicly accessible location.
- Receive or accept any part of anyone else's solutions.
- **Use a generative AI tool to construct solutions to the assignment.**
- Pay someone else to do the assignment for you

Any of the above actions constitutes a violation of the academic integrity guidelines and may result in disciplinary action.

Assignment Submission:

All assignments have to be submitted to Gradescope as PDF files. You can either create these files with software (for example, LaTeX), scan a paper copy, or photograph a paper copy and convert the photo to a PDF file. It is the student's responsibility to make sure that the PDF file is uploaded correctly.

Online Quizzes:

- Quiz 1: From the content of Weeks 1-3 (available: September 24 at 11:55 pm, deadline: September 25 at 11:55 pm)
- Quiz 2: From the content of Weeks 4-5 (available: October 7 at 11:55 pm, deadline: October 8 at 11:55 pm)
- Quiz 3: From the content of Weeks 7-9 (available: November 5 at 11:55 pm, deadline: November 6 at 11:55 pm)
- Quiz 4: From the content of Weeks 10-12 (available: November 26 at 11:55 pm, deadline: November 27 at 11:55 pm)
- **Midterm Test:** From the content of weeks 1-5 (date and time: October 20, at 9:30 AM, in class)
- **Final Exam:** From the content of weeks 1-14 (date and time: TBD)

Information about Missed Coursework

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs*, posted on the Academic Calendar:

https://uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf,

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person. The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult [Accessible Education](#).

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage: https://registrar.uwo.ca/academics/academic_considerations/. All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

Midterms and Tests

This course has a midterm test and a **cumulative** final exam. There is no makeup test for a missed midterm. If a student misses a midterm, its weight will shift automatically to their final exam grade. If their final exam grade is higher than their midterm grade, their final exam grade will replace the midterm's weight in their overall grade. They do not need to request Academic Consideration for a missed midterm; the reweighing will be done automatically.

The only exception is an early sitting, offered solely for a university-sanctioned schedule conflict (e.g., conflict of two midterms, Varsity competitions) or a religious accommodation that prevents a student from writing the midterm at its scheduled time. If a student requires this accommodation, they must notify their instructor in writing no later than one week before the test. No other circumstance, including illness, qualifies for an early sitting or makeup; these are addressed through the automatic reweighting described above.

Assignments

This course has three assignments. Students are expected to complete 2 of 3 to receive full credit for this component. If they miss one of the three assignments, they do not need to request Academic Consideration; the missing item will not count against them, and their grade for this component will be calculated from their best 2 submissions.

If a student completes fewer than two of the three assignments, the missing items will be recorded as a zero and included in their grade for this component. They are encouraged to submit all work, even if incomplete, since a partial mark is always better than a zero. If the student's final exam grade is higher than their average assignment grade, the weight of the assignments will be shifted to the final exam.

Online quizzes

This course has four online quizzes. Students are expected to complete 3 of 4 to receive full credit for this component. If they miss one of the the four online quizzes, they do not need to request Academic Consideration; the missing item will not count against them, and their grade for this component will be calculated from their best 3 submissions.

If a student completes fewer than three of the four online quizzes, the missing items will be recorded as a zero and included in their grade for this component. They are encouraged to submit all work, even if incomplete, since a partial mark is always better than a zero. If the student's final exam grade is higher than their average quiz grade, the weight of the quizzes will be shifted to the final exam.

Deadlines: The 48-Hour No-Late-Penalty Period

All assignments and quizzes with a stated due date include an automatic 48-hour period after the deadline during which students may still submit without a late penalty. For example, if an assignment is due on November 5, they may submit it until November 7 without penalty. After this 48-hour period, no further submissions will be accepted, and students do not need to request Academic Consideration for a missed deadline; their grade for this component will be calculated as described above.

Special Examination

Per university policy, Academic Consideration requests with supporting documentation are required for the final examinations scheduled during official examination periods by the Registrar's Office.

If the student has been approved by the Academic Advising Office to write a Special Examination (SPC) and the final exam is their only outstanding course component, an SPC will be assigned to them and scheduled by the instructor per university policy.

If the student misses their SPC exam and is approved for Academic Consideration, they will be withdrawn from the course without academic penalty. If they experienced extenuating circumstances such as prolonged illness, they may appeal to the Associate Dean (Academic), on a case-by-case basis, for the opportunity to write the final exam the next time the course is offered. An outstanding SPC will reduce their course load for the term in which the exam is deferred, as outlined in the [Definitions of Types of Examinations](#) policy.

If the student misses their SPC exam and Academic Consideration is not approved, or was not requested, they will receive a grade of zero on the exam.

6. Additional Statements

6.1 Religious Accommodation

When a recognized religious holiday either requires a student to be absent from the University, or requires or prohibits an activity that makes it impossible for them to complete an academic requirement scheduled that day, they are entitled to accommodation. No student will be penalized for an absence for religious reasons, and an alternative means of satisfying the requirement will be arranged. This accommodation is provided in accordance with the University's policy on Accommodation for Religious Holidays:

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

The student should submit their requests through the Student Absence Portal (SAP), identifying the conflict and the specific course component(s) affected (e.g., test, midterm, exam).

Midterms and Tests: If a religious observance conflicts with a midterm test, they must submit their request no later than **one week** before the test. Their instructor will arrange an early sitting of the

test. As set out above, no makeup test is offered for any other reason; this early sitting is available specifically for this accommodation.

Final Examinations: If a religious observance conflicts with the final exam, the student must submit their request no later than **two weeks** before the exam. Their instructor will arrange a Special Examination to take place no later than one month after the end of the examination period.

Students are responsible for finding out what was covered in any class they miss due to a religious observance, and for taking the appropriate steps to keep up with the course.

If a suitable arrangement cannot be reached between a student and their instructor, they should consult the Undergraduate Chair of the department offering the course, and if necessary, the Associate Dean (Academic) of the Faculty of Science.

For a list of recognized religious observances, please visit the calendars posted on the Equity, Diversity & Inclusion website - <https://www.edi.uwo.ca> (About Us – Resources – Additional Resources – Calendars).

6.2 Academic 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.

6.3 General Academic Policies

The website for Registrar Services is <https://www.registrar.uwo.ca/>.

Use of @uwo.ca email: 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 email address. It is the responsibility of the account holder to ensure that emails received from the University at their official university address are attended to in a timely manner.

Requests for Relief (formally known as “appeals”)

Policy on Request for Relief from Academic Decision:

https://uwo.ca/univsec/pdf/academic_policies/appeals/requests_for_relief_from_academic_decisions.pdf

Procedures on Request for Relief from Academic Decision (Undergraduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/undergrad_requests_for_relief_procedure.pdf

6.4 Scholastic Offences

Policy on Scholastic Offences: https://uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_offences.pdf

Procedures on Scholastic Offences (Undergraduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/undergrad_scholastic_offence_procedure.pdf

Use of Electronic Devices During Assessments

In courses offered by the Faculty of Science, the **possession** of unauthorized electronic devices during any in-person assessment (such as tests, midterms, and final examinations) is strictly prohibited. This includes, but is not limited to: mobile phones, smart watches, smart glasses, hidden cameras and wireless earbuds.

Unless explicitly stated otherwise in advance by the instructor, the presence of any such device at a student's desk, on their person, or within reach during an assessment will be treated as a scholastic offence, **even if the device is not in use**.

Effective September 2026, the typical penalty for this offence is a failing grade in the course AND a 12-month prohibition on retaking the course.

Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is their responsibility to review and comply with these expectations.

Use of Generative AI Tools

Unless otherwise stated, the use of generative AI tools (e.g., ChatGPT, Microsoft Copilot, Google Gemini, or similar platforms) is **not permitted** in the completion of any course assessments, including but not limited to: assignments, lab reports, presentations, tests, and final examinations.

Using such tools for content generation, code writing, problem solving, translation, or summarization—when not explicitly allowed—will be treated as a **scholastic offence**.

If the use of generative AI is permitted for a particular assessment, the conditions of use will be specified by the instructor in advance. If no such permission is granted, students must assume that use is prohibited. It is the student's responsibility to seek clarification before using any AI tools in academic work.

Use of Software for Assessments

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.

6.5 Support Services

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

Mental Health Support. 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.

Gender-Based and Sexual Violence. Western is committed to reducing incidents of gender-based and sexual violence (GBSV) and providing compassionate support to anyone who has gone through these traumatic events. If a student has experienced GBSV (either recently or in the past), they can 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 [REDACTED].

Accessibility for Coursework. A student may contact the course instructor if they require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to them. If they have any questions regarding accommodations, they may also contact Accessible Education at http://academicsupport.uwo.ca/accessible_education/index.html

Learning Development and Success. Learning-skills counsellors at Learning Development and Success (<https://learning.uwo.ca>) are ready to help students improve their learning skills. The facility offers 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.

Student Councils.

Student-run support services are offered by the University Students' Council (<https://westernusc.ca>) and the Science Students' Council (<https://www.westernssc.ca>).