Course Outline
Applied Logic for Computer Science[1]
COMPSCI 2209A

1. Course Information

Course Information

- Course Name: Applied Logic for Computer Science
- Academic Term: Fall 2025
- Instructor: Dr. Sajad Sadeghi
- Lectures:
  - Hours: Tuesdays 9:30-11:30 am, and Thursdays 9:30-10:30 am
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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 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 if you are dropped from a course for failing to have the necessary prerequisites.

2. Instructor Information

- Instructor: Dr. Sajad Sadeghi
- Email: ssadegh3@uwo.ca
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Information on contacting course teaching assistants will be available on the course website after the course begins.

Course Contact Policies

- Students must use their Western (**@uwo.ca**) email addresses when contacting their professor.

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

- 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 Mondays, 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 4, 2025
- Last day to add or drop: September 12, 2025
- National Day for Truth and Reconciliation (non-instructional day): September 30, 2025
- Fall Reading Week: November 3 – 9
- Last day to drop (without academic penalty): December 1, 2025
- Classes end: December 9, 2025
- Exam period: December 11–22, 2025

4. Course Materials

We will use the book *Mathematical Logic for Computer Science*, Second Edition, by Lu Zhongwan, https://www.worldscientific.com/worldscibooks/10.1142/3434?
srsltid=AfmBOoqMknhgkzrJpvcpeBOGXNTT84wzOSa5pUN_gZ4u2tV4K9AruivJ#t=aboutBook
mainly for definitions, notation, and the sections on formal deduction, but this book does not cover all the topics we discuss in the course. Students are welcome to purchase a second-hand version of this textbook. The notes will be posted on OWL. 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
- *Logic for Computer Science*, Uwe Schoning
- *Introduction to Logic*, Fifteenth Edition, Irving M. Copi, Carl Cohen, Kenneth McMahon
- *The Foundations of Mathematics*, Kenneth Kunen

Learning Management System (OWL Brightspace)

Students are responsible for checking the course OWL site (https://westernu.brightspace.com) on a regular basis for the course content, 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: https://westernu.brightspace.com. All students are expected to be aware of the information and make use of the materials posted on the course website. Important information will be posted on the Announcement tab of the website.

Students must acquaint themselves with OWL Brightspace and configure their settings to receive all notifications for announcements. Upon logging into OWL Brightspace, they can access the "Getting Started (for students)" guide under the Help dropdown menu to undergo the necessary training for navigating this new platform. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800, extension 83800.

5. Methods of Evaluation

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

- Assignments   17% (three assignments: the first one 5%, and the remaining two, 6% each)
- Quizzes (online)   8% (four quizzes, 2% each)
- Midterm Test   30%
- Final exam   45%

To pass the course, students must obtain a weighted average of at least 50% between the Midterm Test and the Final Exam.

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.

0. **Week 0**, September 4-September 5
1. **Week 1**, September 8-September 14
2. **Week 2**, September 15-September 21
3. **Week 3**, September 22-September 28
4. **Week 4**, September 29-October 5
5. **Week 5**, October 6-October 12
6. **Week 6**, October 13-October 19
7. **Week 7**, October 20-October 26
   - The **M**idterm **Test** is on October 21, during the lecture time; the location will be announced, and we'll have class on Thursday.
8. **Week 8**, October 27-November 2
9. **Week 9**, November 3-November 9 (Reading week)
10. **Week 10**, November 10-November 16
11. **Week 11**, November 17-November 23
12. **Week 12**, November 24-November 30
13. **Week 13**, December 1-December 7
14. **Week 14**, December 8-December 9

Assignments:
- Assignment 1: From the content of Weeks 0-3 (available: September 28, deadline: October 8, at 11:55 pm)
- Assignment 2: From the content of Weeks 4-7 (available: October 30, deadline: November 10, at 11:55 pm)
- Assignment 3: From the content of Weeks 8, 10, 11 and 12 (available: November 29, deadline: December 9, 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.

Late assignments:

Late submissions may be submitted up to two days after the deadline without penalty. After two days, assignments will not be accepted and will be marked as 0. This does not account for accommodations. No accommodated assignments will be accepted more than one week after the assignment deadline. Any accommodations that extend more than one week after the assignment deadline will result in the weight of that assignment being moved to the final exam.

Online Quizzes:

- Quiz 1: From the content of Weeks 0-2 (available: September 18 at 11:55 pm, deadline: September 21 at 11:55 pm)
- Quiz 2: From the content of Weeks 3-5 (available: October 16 at 11:55 pm, deadline: October 19 at 11:55 pm)
- Quiz 3: From the content of Weeks 6-8 (available: November 13 at 11:55 pm, deadline: November 16 at 11:55 pm)
- Quiz 4: From the content of Weeks 10-12 (available: December 5 at 11:55 pm, deadline: December 8 at 11:55 pm)

The online quizzes are available within a three-day window. Once you start, you will have **30 minutes** or until the deadline, whichever is shorter, to complete the quiz. It will be automatically submitted at that time, regardless of whether you have answered all the questions. You can submit each quiz **only once**.

- **Midterm Test**: From the content of weeks 0-6 (date and time: October 21, 9:30 AM-11:30 AM, in class)

- **Final Exam**: From the content of weeks 0-14 (date and time: TBD)

  • See the Absence/Missed Work Policy on the next page.

General 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://www.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.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request **without supporting documentation** in this course. However, the **Final Exam** is excluded from this and therefore **always requires formal supporting documentation**.

When a student *mistakenly* submits their one allowed Academic Consideration request **without supporting documentation** for the Final Exam or those in the **Coursework with Assessment Flexibility** section below, the request cannot be recalled and reapplied. This privilege is forfeited.

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

Midterm Test:

There is no make-up for the midterm exam. If a student misses the midterm exam, they need to submit an **Academic Consideration request** to the Academic Counselling Office of their Faculty of Registration, and their Final Exam will be reweighted to cover the mark for the Midterm Test.

Coursework with Assessment Flexibility

Online Quizzes and Assignments:
Since there is built-in flexibility for assignments (a 48-hour no-penalty grace period) and online quizzes (a 72-hour submission window), all Academic Consideration requests for Online Quizzes and Assignments will be denied, and the mark for any missed quiz or assignment will be recorded as zero.

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 can 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., 3 or more exams in a 23-hour period, 4 or more 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).

6. Additional Statements

6.1 Religious Accommodation
When conflicts arise with a religious holiday that requires an absence from the University or prohibits certain activities, students should request an accommodation for their absence in writing to the course instructor and/or the Academic Advising office of their Faculty of Registration. This notice should be made as early as possible, but not later than two weeks prior to the writing of the examination (or one week prior to the writing of the test).

Please visit the Diversity Calendars posted on our university's EDID website for the recognized religious holidays - https://www.edi.uwo.ca

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, and wireless earbuds or headphones.

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

Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is your 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 your responsibility to seek clarification before using any AI tools in academic work.

6.5 Support Services

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/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.

Learning-skills counsellors at Learning Development and Success (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/.