

Course Outline

Applied Logic (COMPSCI 2209 B)

1. Course Information

Course Information

- Course title: Applied Logic
- Course code: COMPSCI 2209B
- Academic term: Winter 2024
- Lectures:
 - o Hours: Wednesdays 9:30-10:30 am, and Fridays 9:30-11:30 am
 - o Location: MC-110, AHB-1R40
- Tutorials for this course are not mandatory. Check your tutorial time/day on Western's Fall/Winter academic timetable.

List of Prerequisites

Computer Science 1027A/B, Computer Science 1037A/B, Computer Science 2101A/B, Computer Science 2121A/B or Digital Humanities 2221A/B in each case with at least 65%, and 1.0 course with at least 60% in each from: Applied Mathematics 1201A/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 1412A/B, the former Applied Mathematics 1414A/B, the former Applied Mathematics 1413; or Integrated Science 1001X with at least 60%.

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	Phone	Office Hours
Dr. Mostafa Milani (Course Coordinator)	mostafa.milani@uwo.ca	MC384		Thursdays 4:00-5:00 pm

Students must use their Western (@uwo.ca) email addresses when contacting their instructors. The preferred email address to contact the instructor and TAs is cs2209@groups.uwo.ca.

Office hours are online (in Zoom). TA's office hours TBD.

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-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 logics.

The course will be delivered in person. Lecture notes will be posted online in OWL. Office hours are online (in Zoom) and require completing a sign-up sheet 3 hours before the office hours as outlined in OWL.

Table of contents (tentative):

- Introduction, and set theory (Week 1)
- Propositional logic (syntax and semantics) (Week 2)
- Propositional logic (equivalence, identities, and simplification) (Week 3)
- Propositional logic (natural deduction and resolution) (Weeks 4 and 5)
- **Midterm exam (Week 6, Feb 16, during the lecture time, the location TBD)**
- Predicate logic (syntax and semantics) (Week 7)
- Predicate logic (natural deduction and resolution) (Weeks 8 and 9)
- Logic programs, Prolog and Answer Set Programming (Week 10)
- Applications of logic (Week 11)
- Course Review (Week 12)

Key Sessional Dates:

Classes begin: January 8, 2024
Fall Reading Week: February 17 – 25, 2024
Classes end: April 8, 2024
Exam period: April 11 – 30, 2024

Contingency plan

Although the intent is for this course to be delivered in person, should any university-declared emergency require some or all of the course to be delivered online, either synchronously or asynchronously, the course will adapt accordingly. The grading scheme will not change. Any assessments affected will be conducted online as determined by the course instructor.

4. Course Materials

The lectures are from the following textbooks:

- *Logic in Computer Science: Modeling and Reasoning about Systems*, Second Edition, Michael Huth and Mark Ryan
- *Logic for Computer Science*, Uwe Schöningh

- *Introduction to Logic*, Fourteenth Edition, Irving M. Copi, Carl Cohen, Kenneth McMahon
- *The Foundations of Mathematics*, Kenneth Kunen

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:

- Assignments 20% (four assignments, 5% each)
- Quizzes (online) 15% (five quizzes, 3% each)
- Midterm exam 25%
- Final exam 40%

Tentative list of subjects and dates (all deadlines are Sunday 11:55 pm of the week):

- Assignment 1: Propositional logic (Weeks 1 and 2) (available: Week 2, deadline: Week 4)
- Assignment 2: Propositional logic (Weeks 3-5) (available: Week 4, deadline: Week 8)
- Assignment 3: Predicate logic (Weeks 6-9) (available: Week 7, deadline: Week 9)
- Assignment 4: Predicate logic (Weeks 10-12) (available: Week 9, deadline: Week 12)
- Quiz 1: Propositional logic (Weeks 1 and 2) (Week 2, online)
- Quiz 2: Propositional logic (Weeks 3-5) (Week 5, online)
- Quiz 3: Predicate logic (Week 6 and 7) (Week 7, online)
- Quiz 4: Predicate logic (Weeks 8 and 9) (Week 9, online)
- Quiz 5: Logic programs, Prolog, and ASP (Weeks 10-12) (Week 12, online)
- Midterm exam: Weeks 1-5 (date and time: Feb 16, during the class time)
- Final exam: Weeks 1-12 (date and time: TBD)

To pass the course, students need to obtain at least 50% of the marks assigned to the two exams.

6. Student Absences

Lecture participation is encouraged but is not mandatory.

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

Assessments worth less than 10% of the overall course grade: In case of missing assignments or quizzes, the final exam will be reweighted to cover their marks. The first missing assignment and the first missed quiz do not require providing medical or supporting documentation. For the second or more missed assignments and the second or more missed quizzes, the student must provide valid medical or

supporting documentation to the Academic Counseling Office of their Faculty of Registration otherwise, the student will receive zero marks for the assessment.

Assessments worth 10% or more of the overall course grade: There is no make-up for the midterm exam. If a student misses the midterm exam, they need to provide valid medical or supporting documentation to the Academic Counseling Office of their Faculty of Registration, and their final will be reweighted to cover the mark for the midterm. Failure to provide proper documentation will result in zero mark for the midterm.

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.

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](#)).

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.

Electronic devices are not permitted on tests and 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.

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/>.