1. Course Information

Course Information

- Course title and code: Applied Logic, COMPSCI 2209B
- Academic term: Winter 2022
- Lectures:
  - Hours: Tuesday, Wednesday, and Thursday 2:30-3:30 pm
  - Location: WSC-55
- Tutorials (5 sections):
  - Hours: Tuesday, Wednesday, and Thursday 3:30-4:30 pm, and Wednesday, and Thursday 4:30-5:30 pm
  - Location: MC-17

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 appeal. 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

Instructors	Email	Office	Phone	Office Hours
Dr. Mostafa Milani	mostafa.milani@uwo.ca	Middlesex College 384		Mon/Fri 4-5 pm
				TBD

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.

From January 10 to January 30, the course will be delivered in live online lectures that are held during the lecture hours. After January 30, the course will be delivered in-person. Lecture videos and 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):

- Week 1 (Jan 10): Introduction, propositional logic (syntax and semantics)
- Week 2 (Jan 17): Propositional logic (equivalence, identities, and simplification)
- Week 3 (Jan 24): Propositional logic (formal proofs, natural deduction, and resolution)
- Week 4 (Jan 31): Propositional logic (horn formulas, compactness theorem)
- Week 5 (Feb 7): Predicate logic (syntax and semantics)
- Week 6 (Feb 14): Review and midterm exam
- Week 7 (Feb 21): Reading week
- Week 8 (Feb 28): Predicate logic (applications)
- Week 9 (March 7): Predicate logic (normal forms)
- Week 10 (March 14): Predicate logic (undecidability and resolution)
- Week 11 (March 21): SAT Solvers
- Week 12 (March 28): Logic programs, Prolog and Answer Set Programming
- Week 13 (April 4): Course Review

Key Sessional Dates:

Classes begin: Jan 10 (extended due to pandemic)
Reading Week: Feb 21
Classes end: April 8 (extended due to pandemic)

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

In the event of a COVID-19 resurgence after Jan 30 that necessitates the course delivery moving away from face-to-face interaction, all remaining 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

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

The followings are required for attending the online lectures before from Jan 10 to Jan 30:

- A laptop or computer
- A working microphone and webcam
- A reliable internet connection

Students are responsible for checking the course OWL site (http://owl.uwo.ca) on a regular basis for news and updates. 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 (in-class)	10% (five quizzes, 2% each)
Midterm exam	30%
Final exam	40%

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

- Assignment 1: Propositional logic (Week 1 and 2) (available: Jan 17, deadline: Jan 30)
- Assignment 2: Propositional logic (Week 3 and 4) (available: Jan 31, deadline: Feb 17)
- Assignment 3: Predicate logic (Week 5, 8, and 9) (available: Feb 28, deadline: March 13)
- Assignment 4: Predicate logic (Week 10), SAT solvers, logic programs, and ASP (Week 11 and 12) (available: March 21, deadline: April 3)
- Quiz 1: Propositional logic (Week 1 and 2) (Jan 20, in class)
- Quiz 2: Propositional logic (Week 3 and 4) (Feb 3, in class)
- Quiz 3: Predicate logic (Wee 5) (Feb 10, in class)
- Quiz 4: Predicate logic (Week 8 and 9) (March 10, in class)
- Quiz 5: Predicate logic (undecidability and resolution), SAT solvers, logic programs, and ASP (Week 10, 11 and 12) (April 4, in class)
- Midterm exam: Week 1-4 (date and time: Feb 17, 2:30-3:30 pm, in class)
- Final exam: Week 5, and 8-12 (date and time: TBD)

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

Project: Students are expected to complete a course project. The topic of the project must be related to database systems and the course material, and it will be chosen in consultation with the instructor. Students will research the topic and present their ideas and findings in a written report and a recorded presentation at the end of the term. You will be graded on your written report, your presentation, and other deliverables. More detail about the project and some suggested subjects will be posted on OWL.

Accommodated Evaluations
For students who miss the midterm exam, the final exam will be reweighted to also cover the midterm marks. The deadlines for submitting the assignments and the project will be posted on OWL. There is a 20% daily penalty for late submissions (0 marks after 5 days).

6. Student Absences

Academic Consideration for Student Absences
Students who experience an extenuating circumstance (illness, injury or other extenuating circumstance) sufficiently significant to temporarily render them unable to meet academic requirements may submit a request for academic consideration through the following routes:

(i) Submitting a Self-Reported Absence (SRA) form provided that the conditions for submission are met. To be eligible for a Self-Reported Absence:

- an absence must be no more than 48 hours
- the assessments must be worth no more than 30% of the student's final grade
- no more than two SRAs may be submitted during the Fall/Winter term

(ii) For medical absences, submitting a Student Medical Certificate (SMC) signed by a licensed medical or mental health practitioner to the Academic Counselling office of their Faculty of Registration.

(iii) Submitting appropriate documentation for non-medical absences to the Academic Counselling office in their Faculty of Registration.

Note that in all cases, students are required to contact their instructors within 24 hours of the end of the period covered, unless otherwise instructed in the course outline.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**

For the policy on Academic Consideration for Student Absences – Undergraduate Students in First Entry Programs, see:

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

and for the Student Medical Certificate (SMC), see:

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

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.

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

Accommodation Policies
Students with disabilities work with Accessible Education (formerly SSD), 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 his/her 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/.

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 (519) 661-2147 if you have any questions regarding accommodations.

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/.

Learning-skills counsellors at the Student Development Centre (http://www.sdc.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.

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

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