

The University of Western Ontario
London, Canada.
Department of Computer Science
CS 2209A - Applied Logic for Computer Science
Fall 2019

Course Description

This course presents an introduction to mathematical logic with emphasis on methodologies and applications in Computer Science. Topics include propositional and predicate logic, methods for deductive reasoning, an introduction to SAT solving, and programming languages based on logic.

Prerequisites

Either 1) 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, Applied Mathematics 1413, Calculus 1000A/B, Calculus 1301A/B, Calculus 1500A/B, Calculus 1501A/B, Mathematics 1600A/B; or 2) 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 will 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.

Instructor

Dinesh Valluri
Office: MC 364
Office hours: Tuesdays and Thursdays 10:30-11:30 AM (tentative)
E-mail: dvalluri@uwo.ca

Textbook, Lecture Notes

The textbook will be a zyBook. Here are the instructions to subscribe for the zyBook:

1. Sign in or create an account at learn.zybooks.com
2. Enter zyBook code: UWOCOMPSCI2209ValluriFall2019
3. Subscribe

As you go through the textbook please note that the interactive exercises (called Participation Activities or PAs) there are an integral part of the text, NOT supplementary material.

Additional class notes, suggested readings, and supplementary materials will be available on OWL as the instructor finds it appropriate.

Supplementary Reading

- M. Huth and M. Ryan, *Logic in Computer Science: Modelling and reasoning about systems*.
- N. Nisanke, *Introductory logic and sets for computer scientists*, Addison Wesley, 1999.
- I. Copi, *Introduction to logic*, (numerous editions). B. Mates, *Elementary logic*, Oxford University Press, 1972, 2nd ed.
- E. Mendelson, *Introduction to mathematical logic*, Van Nostrand, 1997, 4th ed. H. Enderton. *A mathematical introduction to logic*, Academic Press, 1978.

Course Website

<http://owl.uwo.ca>

Students should check the course website as well as OWL on a regular basis for news and updates. These are the primary methods by which information will be disseminated to all students in the class. The missing of critical information due to your failure to check the course website or OWL cannot be used as a basis for appeal.

Course Topics

Introduction to logic

Propositional logic: the language

Propositional logic: proofs (natural deduction; resolution)

Restricted languages: definite clauses, Horn clauses

Proof techniques for restricted languages

Predicate logic: the language

Predicate logic: proofs (natural deduction; resolution)

Restricted languages: definite clauses, Horn clauses
Proof techniques for restricted languages
Sets, Mathematical Induction and Recursion
Other topics (SAT solving, Prolog, Answer Set Programming)
The course topics above should be thought of as guidelines. There might be minor changes to the topics as the course runs.

Class Schedule

Tuesday, Wednesday, Thursday 9:30-10:30am

Tuesday's and Thursday's class is in WSC 55, Wednesday's class in TC 141. One tutorial per week. The timing and place depends on your chosen section. Please check the Western time tables for this (<https://studentservices.uwo.ca/secure/timetables/mastertt/ttindex.cfm>). Tutorials will start on the week of September 15th.

Teaching Assistant Consultation Hours

TBD

Course Work Evaluation

4 Assignments: 16% (4% each)

5 in-class Quizzes: 10% (2% each)

Midterm: 34%

Final: 40%

None of the components will be dropped, and it is not possible to have the components reweighed unless they were legitimately missed.

It is Faculty of Science policy that a student who chooses to write a test or exam deems themselves fit enough to do so, and the student must accept the mark obtained. Claims of medical, physical, or emotional distress after the fact will not be considered.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at this website: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

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.

Late assignments will be deducted 10% of the assignment for one day late, 30% for two days late, and 50% for three days late unless an extension has been granted. No assignment will be accepted for marking after three days has passed from the due-date. To obtain a passing grade in the course, a student must obtain at least 50% on the two exams (weighted 34-40).

Every effort will be made to have assignments, quizzes and tests marked and handed back within 2 weeks of the hand-in date.

If for any reason the assignment schedules given below cannot be adhered to, the assignment marks will be pro-rated. (The 4 assignments are worth 16% of the overall mark for the course. If an assignment has to be cancelled for any reason, the remaining assignment weights will be prorated to add up to 16%.)

Every effort will be made to have (on-time) assignments marked and handed back before the next assignment is due. Midterm exam marks will be posted within 2 weeks of the exam at the latest.

Tentative Assignment, Quiz and Test Schedule, and Other Test and Exam Rules

Quiz 1	Week of September 23rd	In tutorial	2%
Quiz 2	Week of October 7th	In tutorial	2%
Assignment 1	Due October 10th	In class	4%
Quiz 3	Week of October 21st	In tutorial	2%
Assignment 2	Due October 22nd	In class	4%
Midterm	October 25th, 7:00 PM - 9:00 PM	TBD	34%
Assignment 3	Due November 14th		4%
Quiz 4	Week of November 18th	In tutorial	2%
Quiz 5	Week of December 2nd	In tutorial	2%
Assignment 4	Due December 3rd	In class	4%
Final	TBD	TBD	40%

Generally, no extensions to assignments will be given (except for lengthy illness, or other compassionate grounds). In those cases where an extension is granted, only the course instructor can grant the extension. If you have serious medical or compassionate grounds for an extension, you should take supporting documentation to the office of the Dean of your faculty, who will contact the instructor. There will be no makeup Midterm Exam, except for students requesting a Special Midterm Exam for religious reasons. These students must have notified the course instructor and led documentation with their Dean's office at least 2 weeks prior to the Midterm Exam in question. If you miss the Midterm Exam for any other reason, and present valid documentation to the Dean's office, your Final Exam mark will be reweighed to include the weight of the Midterm Exam. You must notify the course instructor within a week of the missed Midterm Exam, and documentation must be received by your Dean's

office within 2 weeks of the missed exam. For computer-marked multiple-choice tests and/or exams, use may be made of software to check for unusual coincidences in answer patterns that may indicate cheating. If for any reason the assignment and quiz schedules cannot be adhered to, the marks will be pro-rated. No electronic devices may be in your possession during tests and exams. All exams, tests and quizzes are closed book. A reference sheet (provided by the instructor) is allowed for the Midterm Test and Final Exam, but not for the quizzes. In case of questions regarding the marks, please note that no quizzes or exams will be accepted for re-marking later than two weeks after they have been marked. We reserve the right not to re-mark quizzes or exams that have been written in pencil. All students are expected to attend all classes. A student found to be missing a large number of classes without acceptable reasons risks being denied a passing grade. If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or supporting documentation to the Academic Counselling Office of your home faculty as soon as possible. If you are a science student, the Academic Counselling Office of the Faculty of Science is located in WSC 191, and can be contacted at 519-661-3040 or scibmsac@uwo.ca. Their website is https://www.uwo.ca/sci/undergraduate/future_students/academic_support/academic_counselling.html. A student requiring academic accommodation due to illness is recommended to follow the policy on Accommodation for Illness https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Consideration_for_absences.pdf (which includes a link to the Student Medical Certificate) There are no make-up tests or quizzes. If your faculty's Academic Counselling Office has approved your circumstances, the value of the missed test or quiz will be reallocated. If you miss the Final Exam, contact your faculty's Academic Counselling Office as soon as possible. They will assess your eligibility to write the Special Exam (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": https://registrar.uwo.ca/academics/examinations/exam_conflicts.html

Assignment Submission

All assignments are to be submitted in class. Due dates are as given in the table in the previous section.

Ethical Conduct

All assignments are individual assignments. You may discuss approaches to problems among yourselves; however, the actual details of the work must be an individual effort. The standard departmental penalty for assignments that are judged to be the result of academic dishonesty is, for the student's first offence, a mark of zero for the assignment, with an additional penalty equal to the weight of the assignment also being applied. You are responsible for reading and respecting the Computer Science Department's policy on Scholastic Offences https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf and Rules of Ethical Conduct https://www.csd.uwo.ca/current_students/undergraduate_students/rules_of_ethical_conduct.html The University of Western Ontario uses soft-

ware for plagiarism checking. Students may be required to submit their written work and programs in electronic form for plagiarism checking.

Missed Test or Final Exam

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or supporting documentation to the Academic Counselling Office of your home faculty as soon as possible. If you are a science student, the Academic Counselling Office of the Faculty of Science is located in WSC 191, and can be contacted at 519- 661-3040 or scibmsac@uwo.ca. Their website is http://www.uwo.ca/sci/undergrad/academic_counselling/index.html. A student requiring academic accommodation due to illness is recommended to follow the policy on Accommodation for Illness http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf (which includes a link to the Student Medical Certificate) There are no make-up tests or quizzes. If your faculty's Academic Counselling Office has approved your circumstances, the value of the missed test or quiz will be reallocated. If you miss the Final Exam, contact your faculty's Academic Counselling Office as soon as possible. They will assess your eligibility to write the Special Exam (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": http://www.registrar.uwo.ca/examinations/exam_schedule.html.

Accessibility

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 Services for Students with Disabilities (SSD) at 661-2111 ext. 82147 if you have questions regarding accommodation.

Support Services

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/mental_health. for a complete list of options about how to obtain help. Additional student-run support services are offered by the USC <https://westernusc.ca/student-support/>. The website for Registrarial Services is <http://www.registrar.uwo.ca>.