

# CSC486/2502: Knowledge Representation and Reasoning Fall 2025

## Contact Information

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**Instructors:** Bahar Aameri

**Meeting Times:**

- Tuesdays 13:10 -- 15:00

**Course Email:** [csc486-2025-09@cs.toronto.edu](mailto:csc486-2025-09@cs.toronto.edu)

- Thursday 13:10–14:00

**Course website:** Quercus, where all course material, including lecture slides, will be posted.

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**All announcements will be made through the portal (Quercus) and/or course discussion board, and it is your responsibility to check them regularly.**  
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## Course Overview

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This course provides a first and shallow introduction to Knowledge Representation and Reasoning (KR&R) and its role in modern artificial intelligence (AI). It is an excellent starting point for anyone who intends to learn about the theories and algorithms that capture some core elements of symbolic intelligence representation and reasoning and become prepared to dive deeper into a particular advanced topic of KR&R.

**Learning Objectives:** By the end of this course, students will be able to:

- Understand the syntax and semantics of propositional and first-order logics.
- Apply logical formalisms to represent and reason about knowledge.
- Evaluate different methods for expressing knowledge and their suitability, strengths and limitations for various applications.
- Understand the structure of Horn clauses and apply them to represent and solve logical problems.
- Understand the basics of Answer Set Programming and its applications.
- Understand the basics of default reasoning and non-monotonic logics, and apply them to model and reason about incomplete knowledge and beliefs.
- Learn the fundamentals of description logics and their applications, and apply rules and description logics to represent complex knowledge structures.
- Understand the role of the Semantic Web and knowledge graphs in AI.
- Learn the fundamentals of automated planning in AI.

**Textbook:** Knowledge Representation and Reasoning, by Brachman and Levesque (2004) (Recommended but not required).

## Evaluation

The following table summarizes the course-work percentages and due dates. All times are *Toronto time*.

### Graduate Students:

<i>Item</i>	<i>Due Dates</i>	<i>Weight</i>
Assignment #1	Sep 24, 11pm	10%
Assignment #2	Oct 8, 11pm	10%
Assignment #3	Nov 12, 11pm	16%
Quizzes	7 online prep quizzes, each 0.5%, dropping the lowest one	3%
Paper Presentation	Nov. 11 to Nov. 20	15%
Presentations' Attendance	Nov. 11 to Nov. 20, must attend at least half of the presentations, including your own	1%
Test 1	Oct 21, during the class time	20%
Test 2	Nov 25, during the class time	25%

### Undergrad Students:

<i>Item</i>	<i>Due Dates</i>	<i>Weight</i>
Assignment #1	Sep 24, 11pm	10%
Assignment #2	Oct 8, 11pm	10%
Assignment #3	Nov 12, 11pm	16%
Quizzes	7 online prep quizzes, each 0.5%, dropping the lowest one	3%
Presentations' Attendance	Nov. 11 to Nov. 20, must attend at least half of the presentations	1%
Test 1	Oct 21, during the class time	25%
Test 2	Nov 25, during the class time	35%

### Details

- **3 Assignments:** Assignments are to be completed *individually*. Start working on them *early*, so that you have an estimate of how much time you need to complete them, and to identify the parts that you need clarification and/or help with. **IMPORTANT:** See the “Policies and Other Instructions” section for information about assignment submission, late submission policy, and remark requests.
- **7 Weekly quizzes:** worth 3% in total, 6-best quizzes considered in total grade calculation. There will be seven weekly quizzes, due by *Tuesdays, 10am* of each week between Week 2 to Week 9(except weeks of Oct 20). The quizzes are directly on the lecture material covered in the posted recordings. The quizzes are designed so that if

you watch the relevant recording, you will be able to easily get full marks on the relevant quiz. Quizzes will be marked for *correctness*.

- **Paper Presentation (graduate students only):** Each grad student selects and presents a research paper related to the modern applications of KR in AI. The presentation should be 15-20 minutes. The list of papers and presentation guidelines will be posted on the course webpage by the third week of the semester.

## Policies and Other Instructions

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**Re-marking Requests** If you feel a piece of your work has been graded unfairly, please submit a written request within *one week* of receiving the work back. Explain your request clearly and briefly. Remark requests must be submitted through MarkUs.

**Late Work** Late assignments will be handled based on a system of **grace days**: Each student begins the term with **8 grace tokens**, each worth a 12-hour extension. An assignment handed in from one minute to 12 hours late uses up one grace day. You can use these for any assignment, but not more than 4 tokens per any given assignment. Each token is “atomic”, i.e., you cannot use ½ token for a 6-hour extension.

Late submissions are NOT accepted on **Quizzes**. However, there are 7 quizzes in total, and we will only count your best 6. If you must miss more than one quiz due to extraordinary circumstances beyond your control, submit a special consideration request (see the “Special Requests Policies” below).

**Special Consideration Policies:** You must use your **grace tokens** in cases where you require a minor deadline extension (2 days or less) due to extraordinary circumstances beyond your control. If you need a major assignment deadline extension (more than 2 days), cannot complete an assignment, or cannot write the term test due to extraordinary circumstances beyond your control, please submit a special consideration request as soon as possible. You must provide documentations supporting your request. You can find the list of acceptable documents [here](#). Special consideration requests will be evaluated on a case-by-case basis and are not granted automatically. Sometimes, we cannot grant you exactly the special consideration you seek.

If you miss an assignment or a quiz for an approved reason, the weight of the assignment will be shifted to a test. If you miss a test for an approved reason, you will have the opportunity of writing a make-up test (date and time will be determined by instructors).

**Assignment extensions with valid documentation:** If you are registered with Accessibility Services, your accommodation letter will allow for an extension of up to 7 full days. You may

have another documented emergency warranting an extension. However, if you decide to submit the assignment as a *group*, and the other group member does *not have the same eligibility for extension*, we will normally only grant *half* of your approved extension, rounded up (e.g., if the letter states 7-days of extensions, 4 days will be granted).

**Discussion Board** General questions about the course organization, material, and assignments should be posted on the discussion board on Piazza. The discussion board will be monitored by the instructor and TAs, but can also be used for discussion among students. You may NOT discuss the assignment solutions on the board until *9 days after the assignment's due date*.

**Email Policy** If you have an administrative issue, please message us at the *course email address* above. However, if you have a remark request or special consideration request, it is sufficient to fill out the respective online form. Please avoid sending us an email unless you must provide information that cannot be included in the Special Considerations form. Please use your *university email address* and put “[CSC486]” in the subject line of your emails. Compose a short message and clearly describe a single topic. Email response time may be 2 business days or longer; if you do not hear back as your expectation, come to the weekly office hours of either instructor.

**Academic Integrity:** Academic integrity is a fundamental principle in higher education. Any breach of academic honesty is a serious academic offence which eventually can affect one's professional life dramatically. Suspected cases of academic dishonesty will be investigated based on the [University's Integrity Policies](#), with no exception.

When discussing assignment problems with other groups, do NOT take any notes (paper or electronic) from the discussions. Your submissions must be developed and written solely based on *your own interpretation* of group discussions, otherwise it will be considered as plagiarism. For details on the meaning of plagiarism and how it can be avoided read [this](#) document.

The use of ***generative artificial intelligence (AI) tools*** is **strongly discouraged** in course assignments and quizzes. This includes, but is not limited to, ChatGPT, Copilot, and open-source models that you have trained and/or deployed yourself. Though it may be tempting to use generative AI to assist you when completing your assignments, this will simply inhibit your learning – and you cannot use generative AI on your tests! If the work you submit is essentially the output of generative AI, then what have you learned and what value are you adding? Think of it this way: if a potential employer or supervisor can get as much from an AI tool as what you're able to do yourself, then why should they hire you at all? You should aim to understand course content at a level that far exceeds what an automated tool can achieve. Our course—and in particular, each assignment—is designed to help you attain true mastery of the course content. If you have questions or are stuck, please come to office hours, where we'll be happy to help!