COMP 5801W
Reinforcement Learning
Course Outline

Instructor: Junfeng Wen (junfeng.wen [AT] carleton.ca)

Winter 2026
School of Computer Science
Carleton University

Course Information

Instructor: Junfeng Wen

Contact: junfeng.wen [AT] carleton.ca

Office Location: HP 5413

Office Hours: By appointment

Lectures: Tuesdays & Thursdays 8:35 am - 9:55 am

Class Location: Please check Carleton Central for the room location.

Course Website: https://brightspace.carleton.ca/d2l/home/364894

Brightspace access for University of Ottawa Students: Please see information here. uOttawa OCICS students can find the room location on Brightspace.

University of Ottawa Students who need access to SCS IT resources such, as OpenStack and Nextcloud, must submit a request to SCS Tech Support. The request must be sent from their @cmail.carleton.ca email address and the email should say which resource is required and for which course (including section).

Important dates and deadlines can be found here: Dates, Deadlines, and Regulations – Registrar's Office, including class suspension for fall, winter breaks, and statutory holidays.

Course Description

Reinforcement learning (RL) focuses on learning by interacting with a complicated environment through trial and error. In this research-oriented course, students will first learn the fundamental concepts of RL, including Markov decision processes, value prediction, and optimal control. Then we will investigate several advanced topics in the recent RL literature, such as offline/batch RL, distributional RL and RL applications. Priority will be given to OCICS joint institute students and students in thesis-based research programs.

Precludes Any additional credit for COMP 5900 Introduction to Reinforcement Learning.

Prerequisites Students are expected to be familiar with linear algebra, calculus, basic statistics and Python programming.

Recommended Textbooks

Students are not required to purchase textbooks or other learning materials for this course. The following textbooks are recommended and two of them are freely available online.

- *Reinforcement Learning: An Introduction* (2nd edition), Sutton Barto
- *Algorithms for Reinforcement Learning*, Szepesvari
- *Markov Decision Processes: Discrete Stochastic Dynamic Programming*, Puterman

Topics Covered and Learning Outcomes

This course will cover the following (tentative) topics

Week	Topic
Jan 6/8	Course intro; Markov decision process
Jan 13/15	Policy & value; Dynamic programming prediction
Jan 20/22	Dynamic programming control; Monte-Carlo methods
Jan 27/29	Temporal difference learning
Feb 3/5	Function approximation; Policy Gradient
Feb 10/12	Actor-critic; Deep Q network
Feb 17	None (winter break)
Feb 24/26	Deep RL algorithms
Mar 3/5	Offline/Batch RL
Mar 10/12	Distributional RL
Mar 17/19	Exploration
Mar 24/26	Special models
Mar 31/Apr 2	RL applications

Upon completion, students should be able to

- Develop a solid understanding of the fundamental concepts and principles in reinforcement learning
- Understand a wide range of reinforcement learning algorithms, their applicability, strengths and weaknesses
- Design and implement reinforcement learning algorithms for real-world problems, and evaluate their performance

Assessment Scheme

Component	Grade Value	Due Date
Assignment 1	20%	**Feb 8**
Assignment 2	20%	**Feb 23**
Paper Presentation	10%	
Project Proposal	0%	**Feb 1**
Project Environment Demo	5%	**Mar 1**
Project Result Demo	5%	**Mar 29**
Project Final Report	40%	**Apr 5**

For assignments

- Done individually
- For assignments only, you have three excused days **throughout the term** (rounded up to the nearest day) to account for any unforeseeable difficulties. After that no late submission will be accepted

- You have **one week** to change the assignment grade after posted if there is any issue. After that there will be no regrade

For paper presentation

- Done individually in class

For project components

- Done individually
- No late submission would be accepted
- Should exceptional circumstances occur, students should inform the instructor **before the submission deadline**, and submit the academic considerations form at the earliest convenience

Submissions are handled electronically (i.e., through Brightspace). Technical problems do not exempt you from late policy, so if you wait until the last minute and then have issues with your connection, it will still count as a late submission. Consequently, you are advised to

1. Periodically upload you progress
2. Attempt to submit your final submission early (e.g., at least one hour in advance of the due date and time) and
3. Download the submitted files to make sure they are correct

For each assignment, you will be submitting one or more files that contain source code, and these files must be given the correct filename and be provided in the specified format. Assignments that are incorrectly named or in the incorrect format will be penalized and may receive a mark of zero.

Intellectual Property

All materials created for this course (including, but not limited to, lecture notes, in-class examples, tutorial exercises, assignments, examinations, and posted solutions) remain the intellectual property of the instructor. These materials are intended for the personal and non-transferable use of students registered in the current offering of the course. Reposting, reproducing, or redistributing any course materials, in part or in whole, without the written consent of the instructor, is strictly prohibited.

Sharing assignment or quiz specifications or posting them online (to sites like Chegg, CourseHero, OneClass, etc.) is ALWAYS considered academic misconduct. You are NEVER permitted to post, share, or upload course materials without explicit permission from your instructor. Academic integrity offences are reported to the office of the Dean of Science. Information, process and penalties for such offences can be found on the ODS webpage.

Graduate Academic Advisors

The Graduate Advisors for the School of Computer Science are available in Room 5302 HP; or by email at grad.scs@carleton.ca. The graduate advisors can assist with understanding your academic audit and the remaining courses required to meet graduation requirements.

SCS Computer Laboratory

Students taking a COMP course can access the SCS computer labs. The lab schedule and location can be found here. All SCS computer lab and technical support information can be found here. Technical support staff may be contacted in-person or virtually, see this page for details.

Mental Health and Wellness

The Carleton Wellness Website is a wonderful resource link to include in the course outline for students.

Academic Accommodations and Regulations

Academic Accommodations. Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The accommodation request processes are outlined on the Academic Accommodations website. If you are unsure of the expectations regarding academic Integrity (how to use and cite references, if unauthorized collaboration with lab- or classmates is permitted (and, if so, to what degree), then you must ASK your instructor.

Chat GPT/Generative AI Usage As our understanding of the uses of AI and its relationship to student work and academic Integrity continue to evolve, students are required to discuss their use of AI in any circumstance not described here with the course instructor to ensure it supports the learning goals for the course.

Academic Integrity. Students are expected to uphold the values of academic Integrity, which include fairness, honesty, trust, and responsibility. Examples of actions that compromise these values include but are not limited to plagiarism, accessing unauthorized sites for assignments or tests, unauthorized collaboration on assignments or exams, and using artificial intelligence tools such as ChatGPT when your assessment instructions say it is not permitted.

Misconduct in scholarly activity will not be tolerated and will result in consequences as outlined in Carleton University's Academic Integrity Policy. A list of standard sanctions in the Faculty of Science can be found here.

Additional details about this process can be found on the Faculty of Science Academic Integrity website.

Students are expected to familiarize themselves with and abide by Carleton University's Academic Integrity Policy.

Every student should be familiar with the Carleton University student academic integrity policy. A student found in violation of academic integrity standards may be awarded penalties which range from a reprimand to receiving a grade of F in the course or even being expelled from the program or University. Examples of punishable offences include: plagiarism and unauthorized co-operation or collaboration. Information on this policy may be found here.

Student Rights & Responsibilities Students are expected to act responsibly and engage respectfully with other students and members of the Carleton and the broader community. See the 7 Rights and Responsibilities Policy for details regarding the expectations of non-academic behaviour of students. Those who participate with another student in the commission of an infraction of this Policy will also be held liable for their actions.

Student Concerns If you have any concerns regarding this course, your first point of contact is me. Please email me or visit during my student hours, and I will do my best to address your concerns. If I cannot resolve the issue, the next point of contact is the School of Computer Science at studentconcerns@scs.carleton.ca. If the concern remains unresolved, the final point of contact is the Office of the Dean of Science at ODScience@carleton.ca. Please follow this order of contact.

Note: You can also bring your concerns to Ombuds services.