Western Science

Department of Computer Science

COMPSCI 4451/9548 Course Outline

1. Course Information

Course Information
Foundations of Machine Learning (4441/9548), Fall 2026, the lectures will be held in [redacted] on Mondays 8:30 – 10:30 AM and Wednesdays 8:30 – 9:30 AM

List of Prerequisites
Data Science 3000A/B. In addition, students should have a solid background in linear algebra and statistics.

Unless students have either the prerequisites for this course or written special permission from the Department of Computer Science to enroll in it, they may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline of the academic term, and the course will be marked as withdrawn (WDN) on their academic record. This decision may not be appealed.

2. Instructor Information

Full name, title and appropriate contact information of the instructor and, if the course is taught by more than one instructor, the name of the person responsible for the course (course coordinator).

Instructors	Email	Office	Phone	Office Hours
Dr. Boyu Wang	[redacted]	[redacted]		[redacted]
TA: TBD				

Students must use their Western (@uwo.ca) email addresses when contacting their instructors.

3. Course Syllabus, Schedule, Delivery Mode

This course provides a rigorous introduction to the fundamental concepts and mathematical foundations of machine learning. The primary goal is to help students develop a deep understanding of key learning paradigms, such as supervised and unsupervised learning, and the mathematical principles that underpin them. Specifically, this course will cover the following topics: Introduction and Motivation, Review of Mathematical Tools for Machine Learning, Linear Regression, Generalization and Overfitting, Regularization, Logistic Regression, Bayes Rule and Generative Models, Support Vector Machines, Kernel Methods, Dimensionality Reduction, Clustering Algorithms, Ensemble Methods, Deep Learning

Basics, AI Ethics. The programming assignments will be done in Python/Matlab. During this course we will study both algorithmic perspectives of machine learning and their practical applications.

Key Sessional Dates:
Classes begin: September 9, 2026
Fall Reading Week: October 10 – 18, 2026
Classes end: December 9, 2026
Exam period: December 11 – 22, 2026

4. Course Materials

There is no required textbook. However, there are several good machine learning textbooks describing parts of the material that we will cover.

- Bishop, “Pattern Recognition and Machine Learning”, Springer, 2006. Approximate cost: CAD $88.79 (Amazon.ca, accessed August 31, 2026).
- Murphy, "Probabilistic Machine Learning: An Introduction", MIT Press, 2022. Approximate cost: CAD $145.78 (Amazon.ca, accessed August 31, 2026).
- Prince, "Understanding Deep Learning", MIT Press, 2023. Approximate cost: CAD $124.88 (Amazon.ca, accessed August 31, 2026).

Individual papers or web resources may be assigned to supplement lecture material.

All course material will be posted to OWL Brightspace: https://westernu.brightspace.com/

Students are responsible for checking the course OWL Brightspace site regularly for news and updates. This is the primary method by which information will be disseminated to all students in the class.

If students need assistance with the course OWL Brightspace site, they can seek support on the OWL Brightspace Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at [redacted] or [redacted].

5. Methods of Evaluation

Grading Scheme and Assessment Dates

The overall course grade will be calculated as listed below:

Undergrad students:	
Assignments (4)	60%
Final Project	40%

Graduate students:	
Assignments (4)	40%
Project Presentation	10%
Final Project	50%

Tentative Timetable:
Undergraduate students will write submit the report of their final project. Graduate students will present their final project and submit a report of their final project. **Please note that the timetable is tentative and subject to change. Specific deadlines may be adjusted as the course progresses to accommodate the pace and needs of the class.**

Assignment 1: Release: October 10 Due: October 24
Assignment 2: Release: October 27, Due: November 10
Assignment 3: Release: November 10, Due: November 24
Assignment 4: Release: November 24, Due: December 8

Assessments may be submitted within 48 hours after the stated deadline without penalty. After this 48-hour no-late-penalty period, 10% of the total available marks for the assessment will be deducted for each additional 24-hour period. Submissions received more than five days after the original deadline will receive a grade of zero.

Essential Learning Requirements
Reweighting of missed coursework is not offered in this course because individual assessments evaluate distinct learning outcomes. Students are expected to complete all assignments and the final project to receive full credit. The 48-hour no-late-penalty period is intended to accommodate ordinary short-term delays. In exceptional circumstances that are not adequately addressed by this period, students may request Academic Consideration. If granted, the accommodation will normally take the form of an extension.

Final Project:

The project is to be completed in groups of 2-3 graduate students or 3-4 undergrad students. Students who are working for their research on problems that are amenable to machine learning solutions are strongly encouraged to formulate a project related to their work. Students who do not have such problems should contact the course instructor to discuss possible projects.

Undergraduate students will be required to write a project report.
Graduate students will be required to write a project report, and to do a final project presentation (~10 minutes per team). The presentations will be scheduled in the last week of class, during of the class time.

Students are permitted to use ChatGPT or similar software to polish their project reports. However, the use of ChatGPT to generate the entire report is strictly prohibited. Any violation of this policy will result in the report being invalidated, and the grade will be forfeited.

Group Project Contribution Policy
By default, all group members will receive the same grade for the project. If concerns about unequal contribution arise, students should first attempt to resolve the issue within the group and keep records (e.g., emails, chat logs). If the problem persists, members may submit a written complaint with supporting evidence and a contribution score sheet (each member allocating percentages to peers). The instructor will review the materials and make the final decision.
Possible outcomes:

- Minor discrepancies: grade reduction of 5–15%.
- Significant lack of contribution: grade reduced proportionally to peer evaluation.

- No verifiable contribution: grade of 0 and removal from project authorship.

For undergrad students, final project will be due on Dec. 8.
For graduate students, final project report will be due on Dec. 22.

Information about Missed Coursework

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs,* posted on the Academic Calendar: https://uwo.ca/univsec//pdf/academic_policies/appeals/academic_consideration_Sep24.pdf,

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person. The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult Accessible Education.

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage: https://registrar.uwo.ca/academics/academic_considerations/
All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

Deadlines: The 48-Hour No-Late-Penalty Period
All take-home assignments, quizzes, and labs with a stated due date include an automatic 48-hour period after the deadline during which students may still submit without a late penalty. For example, if an assignment is due on November 5, they may submit it until November 7 without penalty.

Presentations and Teamwork-Based Assessments
For graduate students, presentation is an essential requirement of this course. If a student misses it, they should coordinate with the instructor to reschedule their presentation.

6. Additional Statements

6.1 Religious Accommodation
When a recognized religious holiday either requires a student to be absent from the University, or requires or prohibits an activity that makes it impossible for them to complete an academic requirement scheduled that day, they are entitled to accommodation. No student will be penalized for an absence for religious reasons, and an alternative means of satisfying the requirement will be arranged. This accommodation is provided in accordance with the University's policy on Accommodation for Religious Holidays:
https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

The student should submit their requests through the Student Absence Portal (SAP), identifying the conflict and the specific course component(s) affected (e.g., test, midterm, exam).

Midterms and Tests: If a religious observance conflicts with a midterm test, they must submit their request no later than **one week** before the test. Their instructor will arrange an early sitting of the

test. As set out above, no makeup test is offered for any other reason; this early sitting is available specifically for this accommodation.

Final Examinations: If a religious observance conflicts with the final exam, the student must submit their request no later than **two weeks** before the exam. Their instructor will arrange a Special Examination to take place no later than one month after the end of the examination period.

Students are responsible for finding out what was covered in any class they miss due to a religious observance, and for taking the appropriate steps to keep up with the course.

If a suitable arrangement cannot be reached between a student and their instructor, they should consult the Undergraduate Chair of the department offering the course, and if necessary, the Associate Dean (Academic) of the Faculty of Science.

For a list of recognized religious observances, please visit the calendars posted on the Equity, Diversity & Inclusion website - https://www.edi.uwo.ca (About Us – Resources – Additional Resources – Calendars).

6.2 Academic 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.

6.3 General Academic Policies

The website for Registrar Services is https://www.registrar.uwo.ca/.

Use of @uwo.ca email: 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 email address. It is the responsibility of the account holder to ensure that emails received from the University at their official university address are attended to in a timely manner.

Requests for Relief (formally known as "appeals")

Policy on Request for Relief from Academic Decision:
https://uwo.ca/univsec//pdf/academic_policies/appeals/requests_for_relief_from_academic_decisions.pdf

Procedures on Request for Relief from Academic Decision (Undergraduate):
https://uwo.ca/univsec//pdf/academic_policies/appeals/undergrad_requests_for_relief_procedure.pdf

Procedures on Request for Relief from Academic Decision (Graduate):
https://uwo.ca/univsec//pdf/academic_policies/appeals/graduate_requests_for_relief_procedure.pdf

6.4 Scholastic Offences

Policy on Scholastic Offences:
https://uwo.ca/univsec//pdf/academic_policies/appeals/scholastic_offences.pdf

Procedures on Scholastic Offences (Undergraduate):

https://uwo.ca/univsec//pdf/academic_policies/appeals/undergrad_scholastic_offence_procedure.pdf

Procedures on Scholastic Offences (Graduate):
https://uwo.ca/univsec//pdf/academic_policies/appeals/graduate_scholastic_offence_procedure.pdf

Use of Electronic Devices During Assessments

In courses offered by the Faculty of Science, the **possession** of unauthorized electronic devices during any in-person assessment (such as tests, midterms, and final examinations) is strictly prohibited. This includes, but is not limited to: mobile phones, smart watches, smart glasses, hidden cameras and wireless earbuds.

Unless explicitly stated otherwise in advance by the instructor, the presence of any such device at a student's desk, on their person, or within reach during an assessment will be treated as a scholastic offence, **even if the device is not in use**.

Effective September 2026, the typical penalty for this offence is a failing grade in the course AND a 12-month prohibition on retaking the course.

Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is their responsibility to review and comply with these expectations.

Use of Generative AI Tools

Unless otherwise stated, the use of generative AI tools (e.g., ChatGPT, Microsoft Copilot, Google Gemini, or similar platforms) is **not permitted** in the completion of any course assessments, including but not limited to: assignments, lab reports, presentations, tests, and final examinations.

Using such tools for content generation, code writing, problem solving, translation, or summarization—when not explicitly allowed—will be treated as a **scholastic offence**.

If the use of generative AI is permitted for a particular assessment, the conditions of use will be specified by the instructor in advance. If no such permission is granted, students must assume that use is prohibited. It is the student's responsibility to seek clarification before using any AI tools in academic work.

6.5 Support Services

Academic Advising. Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, requests for relief, exam conflicts, and many other academic-related matters: https://www.uwo.ca/sci/advising/.

Mental Health Support. 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.

Gender-Based and Sexual Violence. Western is committed to reducing incidents of gender-based and sexual violence (GBSV) and providing compassionate support to anyone who has gone through these traumatic events. If a student has experienced GBSV (either recently or in the past), they can 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 [redacted].

Accessibility for Coursework. A student may contact the course instructor if they require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to them. If they have any questions regarding accommodations, they may also contact Accessible Education at http://academicsupport.uwo.ca/accessible_education/index.html

Learning Development and Success. Learning-skills counsellors at Learning Development and Success (https://learning.uwo.ca) are ready to help students improve their learning skills. The facility offers 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.

Student Councils.
Student-run support services are offered by the University Students' Council (https://westernusc.ca) and the Science Students' Council (https://www.westernssc.ca).