

CMPUT 466/566 (Fall 2021) Syllabus

Instructor: Lili Mou

E-mail: LMOU@ualberta.ca

Course webpage: eClass

Course email: uoa.fall21.466566@gmail.com

Please use the anonymous course forum to ask questions. For other personal requests, please use the above course email.

Course calendar: [link](#)

Course Format: The course is scheduled for in-person delivery and remote participation is possible. However, this is subject to change if there are provincial/university orders. It is also possible that the instructor is unwell and has to self-isolate. In these cases, the course will be delivered online.

Classroom: CCIS L2-190

Online lecture hall: <https://meet.google.com/vqo-vkxv-osy>

Dial-in: (US) +1 337-573-0059 PIN: 584 572 100#

Lecture time: Tuesday Thursday 12:30PM - 1:50PM, 1-Sep-2020 ~ 7-Dec-2020 (Edmonton time)

No course activities during the reading week (Nov 8 to 12)

Lab session (optional): 5:00PM -- 7:50PM, Monday

Online only, use the [zoom](#) link. CAB 269 is still for our course. If you need space, you may go to CCIS L2-190 and kindly ask other students to leave.

First hour: group QA & discussion

Second hour: instructor's office hour

Third hour: unattended. We have distributed TA office hours.

Zoom for lab session:

<https://ualberta-ca.zoom.us/j/99512490988?pwd=Z09WV0xjY2VyeDNvWnR6Mkc4RzIDdz09>





Why Google Meet for lectures and Zoom for lab sessions?

- Classroom desktops do not have Zoom installed
- Google Meet does not support breakout rooms

TAs and Office hours:

With whom	Email	Open door	By appointment
Lili Mou (instructor)	LMOU@ualberta.ca	Mon 6-7PM zoom	Any time as appropriate

Chenyang Huang (TA, PhD student)	chenyangh@ualberta.ca	Thurs 10:00-10:30 AM https://meet.google.com/idz-vogi-qxe	10:30-11:00 AM
Yuqiao Wen (TA, MSc student)	yuqiao@ualberta.ca	Mon 10:00-10:30 AM https://meet.google.com/cev-ksho-pkb	10:30-11:00 AM
Zijun Wu (TA, MSc student)	zijun4@ualberta.ca	Tue 10:00-10:30 AM https://meet.google.com/qj-xsmu-hhn	10:30-11:00 AM

Instructor	Chenyang Huang	Yuqiao Wen	Zijun Wu
			

The student is encouraged to reach out to the instructor if TAs' answer is not satisfactory.

Notes:

The instructor and TAs will not answer such questions: how many marks do I get with this submission? Does my submission suffice to get X mark(s)? etc.

COURSE CONTENT

Course Description:

Machine learning teaches a machine to learn from previous experience and makes a prediction for (possibly new) data. This course covers standard materials of a "Machine Learning" course, such as linear regression, linear classification, as well as non-linear models. In the process, we will have a systematic discussion on training criteria, inference criteria, bias-variance tradeoff, etc. The goal of the course is to build a solid foundation of machine learning, so there would be intensive math derivations in lectures, assignments, and exams.

Course Prerequisites:

One of CMPUT 340, 418 or equivalent knowledge; one of STAT 141, 151, 235 or 265 or SCI 151.

Course Objectives and Expected Learning Outcomes:

By the end of this course, the student will understand the foundations of machine learning and gain experience in machine learning applications.

Official textbook: Bishop, Pattern Recognition and Machine Learning.

The instructor will provide lecture notes, which may also suffice. If not, please use the above text book.

References: [link](#)

Tentative topic list:

Linear regression

- Mean square error (as heuristics)
- Closed-form solution
- Gradient descent
- Maximum likelihood estimation
- Maximum a posteriori training
- Bias-variance tradeoff
- Train-validation-test framework
- Bayesian learning
- Generalized linear models

Linear classification

- Discriminative model: Logistic regression
- Multi-class softmax
- Maximum a posteriori inference
- Generative model: Naïve Bayes
- Discriminant: Linear SVM

Nonlinear models

- Kernels methods: Non-linear SVMs
- Neural networks

Note: The actual lecture pace may vary depending on students' background, interest, as well as the delivering format. Exams will be based on main lectures only.

GRADE EVALUATION

Assessment	466 undergraduate students	566 graduate students
Weekly written assignments	15	10
Two coding assignments	10	10
Mini-project	10 + 5 bonus	15
Mid-term exam (Nov 16, Thursday Correction: Tuesday lecture time)	30	30
Final exam	35	35

Syllabus Bonus	5	5
Attendance Bonus	Up to 5	Up to 5

Explanation:

- **Written assignments** will be graded in a (mostly) binary fashion. Students expect to get full marks if they make a serious attempt before the deadline. However, the student should be very serious about written assignments for their own sake because they may be much reflected in mid-term and final exams. The overall written assignment marks will be averaged by the number of problems.
- **Coding assignments** involve implementations of basic machine learning models, such as linear regression and logistic regression. Students are encouraged to use Python but may use other programming languages as they wish (with access to basic algebra libraries). However, they must implement the algorithm in question, and cannot use API calls to the core algorithms. Details will be posted when the assignment is available. The overall coding assignment marks will be a naïve average of the two assignments.
- **Mini-project:** A student is expected to apply a few machine learning models to a certain task and make experimental comparison. 10 marks for accomplishing this basic task, and another 5 marks for non-triviality. For undergrads, the 5 non-triviality marks are bonus. Details will be posted in a [separate doc](#).

No collaboration is allowed for a basic mini-project (or any assignment). For a non-trivial project, collaboration may be allowed up to 3 students. In this case, the students have to form a group themselves and apply to the instructor before **Sep 18, 2021**. Each of the team members **MUST** have substantial previous machine learning background. The approval will be based on students' previous experience and the proposal.

- **Mid-term exam** and **final exam** are **closed-book**. While the instructor will give enough hints and background knowledge, students **cannot** prepare their own cheatsheet. This is because the exam questions will largely overlap with lecture materials. Allowing a cheatsheet doesn't make much sense for such easy exams. No calculator is allowed either, as we do not have calculation questions.

The mid-term exam is optional. When the letter grade is computed,

$$\text{mid-term marks} = \max\{\text{mid-term percentage, final percentage}\} * 30$$

Exams may be taken in-person (if university is still open) or remotely. When taking exams remotely, the student must sign up a form sent by the instructor and agree with video proctoring, including background check, use of webcam and microphone, and screen-sharing.

- **Syllabus Bonus:** A student gets 5 bonus marks for reading and agreeing with the syllabus. The bonus can be claimed through an eClass quiz by 12:30PM, Sep 15. Note: Even if a student does not claim the bonus mark, the course will still run strictly according to the syllabus.
- **Attendance Bonus:** In addition to the syllabus bonus, a student (either undergrad or grad) gets a bonus mark if, for a mathematical/scientific error in the instructor's derivation during live lectures, the student is the first to point it out either in-person or in the video meeting. This excludes typos, grammatical errors, and brevity. Lecture notes, videos, and slides do not count.

A student should send an email to uoa.fall21.466566@gmail.com to claim the bonus points. The bonus request must be sent on the same day of the lecture where the bonus mark is earned, because the instructor may not remember the details of past lectures.

- **[Important]** All submissions are subject to an oral test, if requested, by TAs and/or the instructor. We will select a random subset of submissions plus suspicious ones for the oral test. The performance of the oral test will affect the marking of that submission in the following manner:
 - If a student is reasonably acquainted with the submission, the oral test will **not** affect the mark.
 - If the student is unreasonably unaware of/unfamiliar with the submission, the oral test mark will play a role in a multiplicative manner.

Any suspected cheating will be reported to the Faculty of Science.

Example: If a student gets 100 marks for an assignment but knows nothing about the submission in the oral test, then the mark for the assignment is $0 * 100 = 0$. Further, the case will be submitted to the FoS for further investigation. If the student is convicted of cheating/plagiarism, FoS will apply appropriate sanctions.

Late Policy:

Written assignments. Every submission is due in Edmonton time, but is automatically extended by 48h without penalty. This is intended for possible confusion of students from different time zones, or temporary computer/internet/power failure. Further extensions will not be granted. The student should have finished and submitted the solution by the (first) deadline.

- We automatically approve EA if a student applies before the (first) deadline to Chenyang (chenyangh@ualberta.ca). No explanation is needed.
- Once EA is applied, the mark percentage will be overridden by the final exam. In eClass gradebook, we will annotate it with a funny number, e.g., 99999, and manually correct it when calculating the final mark.
- If a student applies EA, we will not mark the submission even if the student submit his/her solution later on.
- If a student does not apply EA before the (first) deadline, EA will not be granted. Nor will we accept assignments later than the second deadline. Unwellness, computer/power/Internet failures are all **invalid** EA excuses after the (first) deadline.
- The only exception for EA after the (first) deadline is immobility, such as being in hospital, isolation/quarantine without computer/internet access, and diagonalized mental diseases. This will be approved at the discretion of the instructor with seen evidence.

Mid-term exam is optional, because the mid-term will be lifted up to the mark percentage of the final.

Deferred Final Examination:

Exams may be taken in-person (if university is still open) or remotely. When taking exams remotely, the student must sign up a form sent by the instructor and agree with video proctoring, including background check, use of webcam and microphone, and screen-sharing.

A student who cannot write the final examination due to incapacitating illness, severe domestic affliction or other compelling reasons can apply for a deferred final examination. Such an application must be made to the student's Faculty office within two working days of the missed examination and must be supported by appropriate documentation or a Statutory Declaration

(<https://calendar.ualberta.ca/content.php?catoid=29&navoid=7238#Attendance>). Deferred examinations are a privilege and not a right; there is no guarantee that a deferred examination will be granted. Misrepresentation of facts to gain a deferred examination is a serious breach of the Code of Student Behaviour.

The instructor strongly suggests students attending the scheduled final exam if a student has any mobility, because it is possible that the deferred examination is not approved by FoS. If approved, the deferred exam will be scheduled at 7PM on Jan 17, 2022.

Letter grade:

The final letter grade will be given by some cut-off based on numerical marks. Assuming a student does reasonably well in all assignments and the course project, then the letter grades roughly maps to the following criteria:

- A+ = The student well understands lecture materials and can generalize well to new problems
- A = The student well understands lecture materials and can generalize certain new problems
- A- = The student well understands lecture materials but is unable to generalize to new problems
- B+ = The student understands most part of the lecture materials, but a few details are missing
- B = The student understands some part of the lecture materials, but a significant portion are missing
- B- = The student has some qualitative/philosophical understanding of lecture materials, but does only a little quantitative derivation
- C-level or lower: The student performs worse

Letter grade cutoff may be different for undergrads and undergrads, because they are two courses.

Other administrative notes:

Students must verify this date on BearTracks when the Final Exam Schedule is posted.

Grades are unofficial until approved by the Department and/or Faculty offering the course.

STUDENT RESPONSIBILITIES

Academic Integrity:

All forms of academic dishonesty are unacceptable at the University. Any suspected offence will be reported to the Faculty of Science. Anyone who is found in violation of the Code of Student Behaviour may receive a sanction. Typical sanctions include conduct probation, a mark reduction or a mark of 0 on an assessment, a grade reduction or a grade of F in a course, a remark on the transcript, and a recommendation for suspension or expulsion.

[Requested changes from the Department]

Appropriate Collaboration:

No collaboration is allowed for assignments (coding and written). Collaboration for projects is subject to the instructor's approval, and such applications must be sent to the instructor before September 18, 2020.

Exam Conduct:

- Both exams are close-book, close-computer. No cheatsheet or calculator is allowed.
- Photo I.D. is required at exams to verify your identity.

- Exams may be taken in-person (if university is still open) or remotely. When taking exams remotely, the student must sign up a form sent by the instructor and agree with video proctoring, including background check, use of webcam and microphone, and screen-sharing.

Students Eligible for Accessibility-Related Accommodations:

Eligible students have both rights and responsibilities with regard to accessibility-related accommodations. Consequently, scheduling exam accommodations in accordance with [Accessibility Resources](#) deadlines and procedures is essential. Please note adherence to procedures and deadlines is required for U of A to provide accommodations. Contact [Accessibility Resources](#) for further information.

Special Measures for Accessibility and Inclusiveness

1. All lectures and exams may be attended both in-person and remotely.
 2. The instructor and TAs will host office hours at different time and days. This provides accessibility to the instructor and TAs for students from different time zones.
 3. Every submission is due in Edmonton time, but is automatically extended by 48h without penalty. This is intended for possible confusion of students from different time zones. Further extensions will not be granted. The student should take the early deadline seriously instead of waiting for the second one.
 4. We will host social events (random bumping and panel discussion) during lab sessions.
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Disclaimer:

Any typographical errors in this Course Outline are subject to change and will be announced in class. The date of the final examination is set by the Registrar and takes precedence over the final examination date reported in this syllabus.