

Economics 611.97 Machine Learning in Economics

Pre/Co-Requisites: Consent of the Department	
Instructor: Arvind Magesan	Lecture Location: SS 423
Phone: 220-5276	Lecture Days/Time: MW 11-12:15
Email: anmagesa@ucalgary.ca	
Office: SS 430	
Office Hours: TBA	

Course Description:

This course is an introduction to key methods of machine learning as they are applied in economics research. The objective is to equip students with the tools to consume and produce research that relies on machine learning methods.

Course Outcomes:

By the end of the course, students will recognize key machine learning algorithms and understand which methods are appropriate for a given problem. Students will be able to code and implement their own algorithms to solve complex problems in economics.

Course Outline:

A detailed outline will be discussed in class. Briefly, we will cover:

1. Introduction, recurring notation and concepts. (1 class) .
2. Getting started with Python, working with data in python. (1 class).
3. Supervised learning – prediction and classification. Method and application. (Several Classes).
4. Natural Language Processing and Text analysis. (Several Classes).
5. Scraping data with Python. (One class).
6. Unsupervised learning. Method and Application. (Several Classes) .
7. Machine learning and causal inference and further topics (as time permits).

Prerequisites/corequisites:

Permission of the department.

Required Textbook(s):

There is no required textbook – we will rely primarily on journal articles (to be discussed in class). Students may find “The 100-page Machine Learning book” by Andriy Burkov a useful reference.

Desire2Learn:

This course will make use of the Desire2Learn (D2L) platform. Students who are registered in the course can log on at <http://d2l.ucalgary.ca> through their student centre. Please note that D2L features a class e-mail list that may be used to distribute course-related information. These e-mails go to your University of Calgary e-mail addresses only.

Grade Determination/Assessment:

ASSIGNMENTS	40%
FINAL EXAMINATION (Take Home)	40%
PRESENTATION	<u>20%</u>
	100%

Grade Determination and Final Examination Details

Department of Economics Criteria for Letter Grades. Economics professors use the following criteria when assigning letter grades:

Grade	Grade Point Value	Description
A+	4.00	Outstanding
A	4.00	Excellent-superior performance, showing-comprehensive understanding of subject matter
A-	3.70	Very good performance
B+	3.30	Good performance
B	3.00	Satisfactory performance
B-	2.70	Minimum pass for students in the Faculty of Graduate Studies
C+	2.30	All grades below "B-" are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course requirements. Individual programs may require a higher passing grade.

A letter grade will be assigned to each component (assignments, midterm, final), and the associated grade point values will be used to calculate a final grade using the weights indicated above. A passing grade on at least 50% of the course work (according to the weights above) is required to pass the course.

A passing grade on any particular component of the course is not required for a student to pass the course as a whole.

There will be a department scheduled final examination, held in a classroom, lasting 2 hours. Non-programmable calculators **WILL** be allowed during the writing of tests or final examinations.

Tests and exams **WILL NOT** involve multiple choice questions.

Absence from a Test/Exam

THERE WILL BE NO MAKEUP OR DEFERRED QUIZZES under any circumstances, nor may the quizzes be written early. Students unable to write the quizzes because of documented illness, family emergency, religious observance, or university-sanctioned event will have the weight shifted to the final examination; otherwise a grade of zero will be assigned. If a student cannot write their final exam on the date assigned by the Department, they need to arrange for a deferred exam with the department.

IMPORTANT POLICIES AND INFORMATION**Absence From a Mid-term Examination**

Students who are absent from a scheduled term test or quiz for legitimate reasons are responsible for contacting the instructor via email within 48 hours of the missed test to discuss alternative arrangements. A copy of this email may be requested as proof of the attempt to contact the instructor. Any student who fails to do so forfeits the right to a makeup test.

Deferred Term Work Form: Deferral of term work past the end of a term requires a form to be filled out by the student and submitted, along with any supporting documentation, to the instructor. The form is available at:

<https://live-ucalgary.ucalgary.ca/sites/default/files/teams/14/deferral-of-term-work-2020.pdf>

Once an extension date has been agreed between instructor and student, the instructor will email the form to the Faculty of Arts Program Information Centre (ascarts@ucalgary.ca) for approval by the Associate Dean.

Deferral of a Final Examination

Deferral of a final examination can be granted for reasons of illness, domestic affliction, and unforeseen circumstances, as well as to those with three (3) final exams scheduled within a 24-hour period. Deferred final exams will not be granted to those who sit the exam, who have made travel arrangements that conflict with their exam, or who have misread the examination timetable. The decision to allow a deferred final exam rests not with the instructor but with Enrolment Services. Instructors should, however, be notified if you will be absent during the examination. The Application for Deferred Final Exam, deadlines, requirements and submission instructions can be found on the Enrolment Services website at

<https://www.ucalgary.ca/registrar/exams/deferred-exams>.

Reappraisal of Grades:

For Reappraisal of Graded Term Work, see Calendar I.2

<http://www.ucalgary.ca/pubs/calendar/current/i-2.html>

For Reappraisal of Final Grade, see Calendar I.3

<http://www.ucalgary.ca/pubs/calendar/current/i-3.html>

Academic Misconduct:

Academic Misconduct refers to student behavior that compromises proper assessment of students' academic activities and includes: cheating; fabrication; falsification; plagiarism; unauthorized assistance; failure to comply with an instructor's expectations regarding conduct required of students completing academic assessments in their courses; and failure to comply with exam regulations applied by the Registrar.

Student committing academic misconduct during the final exam will not receive a passing grade for the course.

For information on the Student Academic Misconduct Policy, Procedure and Academic Integrity, please visit: <https://www.ucalgary.ca/pubs/calendar/current/k-3.html>

Plagiarism And Other Forms Of Academic Misconduct

Academic misconduct in any form (e.g. cheating, plagiarism) is a serious academic offence that can lead to disciplinary probation, suspension or expulsion from the University. Students are expected to be familiar with the standards surrounding academic honesty; these can be found in the University of Calgary calendar at <http://www.ucalgary.ca/pubs/calendar/current/k.html>. Such offences will be taken seriously and reported immediately, as required by Faculty of Arts policy.

Recording of Lectures:

Recording of lectures is prohibited, except for audio recordings authorized as an accommodation by SAS or an audio recording for individual private study and only with the written permission of the instructor. Any unauthorized electronic or mechanical recording of lectures, their transcription, copying, or distribution, constitutes academic misconduct. See <https://www.ucalgary.ca/pubs/calendar/current/e-6.html>.

Academic Accommodations:

Students seeking an accommodation based on disability or medical concerns should contact Student Accessibility Services. SAS will process the request and issue letters of accommodation to instructors. Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to their instructor. The full policy on Student Accommodations is available at <https://www.ucalgary.ca/legal-services/university-policies-procedures/accommodation-students-disabilities-procedure>

Research Ethics

Students are advised that any research with human subjects – including any interviewing (even with friends and family), opinion polling, or nonobtrusive observation – must have the approval of the Conjoint Faculties Research Ethics Board. In completing course requirements, students must not undertake any human subject research without discussing their plans with the instructor, to determine if ethics approval is required.

Instructor Intellectual Property

Course materials created by instructors (including presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the instructor. These materials may NOT be reproduced, redistributed or copied without the explicit consent of the instructor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course at the same time may be allowed under fair dealing.

Freedom of Information and Protection of Privacy (FOIP) Act:

Personal information is collected in accordance with FOIP. Assignments can only be returned to the student and will be accessible only to authorized faculty and staff. For more information, see <https://www.ucalgary.ca/legal-services/access-information-privacy>

Copyright Legislation:

See the University of Calgary policy on Acceptable Use of Material Protected by Copyright at <https://www.ucalgary.ca/legal-services/university-policies-procedures/acceptable-use-material-protected-copyright-policy> Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy.

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Evacuation Assembly Points

In the event of an emergency evacuation from class, students are required to gather in designated assembly points. Please check the list found at <https://www.ucalgary.ca/risk/emergency-management/evac-drills-assembly-points/assembly-points> and note the assembly point nearest to your classroom.

Important Dates:

Please check: <http://www.ucalgary.ca/pubs/calendar/current/academic-schedule.html>.

Faculty of Arts Program Advising and Student Information Resources

- Have a question, but not sure where to start? The Arts Students' Centre is your information resource for everything in Arts! Drop in at SS102, call them at 403-220-3580, or email them at artsads@ucalgary.ca. You can also visit the Faculty of Arts website at <http://arts.ucalgary.ca/undergraduate>, which has detailed information on common academic concerns, including program planning and advice.
- For registration (add/drop/swap), paying fees and assistance with your Student Centre, contact Enrolment Services at 403-210-ROCK [7625] or visit them in the MacKimmie Tower.

Important Contact Information

Campus Security and Safewalk (24 hours a day/7 days a week/365 days a year)

Phone: 403-220-5333

Faculty of Arts Undergraduate Students' Union Representatives

Phone: 403-220-6551

Email: arts1@su.ucalgary.ca, arts2@su.ucalgary.ca, arts3@su.ucalgary.ca,
arts4@su.ucalgary.ca

Students' Union URL: www.su.ucalgary.ca

Graduate Students' Association

Phone: 403-220-5997

Email: askgsa@ucalgary.ca

URL: www.ucalgary.ca/gsa

Student Ombudsman

Phone: 403-220-6420

Email: ombuds@ucalgary.ca

Campus Mental Health Resources

The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the excellent mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the following resources:

SU Wellness Centre: <http://www.ucalgary.ca/wellnesscentre/>

Student Wellness Services:

<https://www.ucalgary.ca/wellness-services/services/mental-health-services>

Campus Mental Health Strategy website: <https://www.ucalgary.ca/mentalhealth/>.

Notes:

Students are responsible for all assigned material, e.g., supplementary material posted on D2L, regardless of whether or not the material was covered in class.

ANM

2022-12-19