

Mathematics for Economists Syllabus
Department of Economics, Faculty of Science
ECON 3700, Fall 2024

Instructor:	Professor Norovsambuu Tumennasan (Norov for short)
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Office Address:	6206 University Ave. C11
Office hours:	Thursdays 11.30 – 12.50 or by appointment
Lectures (Section 1):	TH 10:05 – 11:25 LSC 244
Teaching Assistants:	Fiona Nguyen (email: ph646069@dal.ca)
TA Office Hours:	Wednesdays, 12.00-13.20 Economics A1

IMPORTANT DATES

MIDTERM	October 17, 6PM	LSC C338
FINAL	TBD	

Course Description

This course presents mathematical methods used in modern economics. The lectures concentrate on the basic concepts of analysis, comparative statics and optimization theory. Topics include an introduction to set theory and matrix algebra, the implicit function theorem, unconstrained optimization, constrained optimization with equality and inequality constraints, and intertemporal choice.

Course Prerequisites

ECON 2200 or ECON 2220, ECON 2201, MATH 1000 or permission of the instructor

This course has a minimum grade requirement of C for its prerequisite courses.

Course Objectives/Learning Outcomes

The main objective of the course is that students learn to apply formal and disciplined arguments when analyzing economic problems. Students are expected to obtain a working knowledge of each topic on the list below. This means, for example, students should be able to recognize situations in which the various techniques are relevant, and should understand how to put the techniques to use.

Course Content

- Linear Models and Matrix Algebra: Vectors, Matrices in Economics, Markov processes, The Identity Matrix, Inverses, and Determinants - Cramer's rule
 - Eigenvectors, Eigenvalues, Power operator on matrices
 - Comparative Statics: Derivatives of functions of a single variable, Partial derivatives, Leontief Input-Output model
 - Differentials, Total Derivatives, Implicit Function Theorem
 - Unconstrained Optimization - First & Second Order Conditions - Positive & Negative Definiteness – Concavity
 - Constrained Optimization – Lagrangian multipliers
 - Constrained Optimization - Second Order Conditions - Examples
 - Optimization with Inequality Constraints - Kuhn-Tucker
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Course Materials

- Mathematics for Economists by C.P. Simon & L. Blume; published by Norton, 1994
- You can access to course materials through Brightspace. Please check the course website frequently for new announcements.

Course Assessment

You can be graded solely on your performance of the final.

Component	Weight (% of final grade)
<i>Assignments</i>	<i>Can substitute 20% of your final</i>
<i>Midterm Exam</i>	<i>Can substitute 30% of your final</i>
<i>Final exam</i>	100% (At least 50 %)

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

A+ (90-100)	B+ (77-79)	C+ (65-69)	D (50-54)
A (85-89)	B (73-76)	C (60-64)	F (<50)
A- (80-84)	B- (70-72)	C- (55-59)	

There will be eight homework problem sets and 4 of these are graded. Each graded problem set can be substituted for 5% of your grade if your score is higher than that of your final exam. Assignments must be done individually and handed in before or on the due date. Only hard copy is acceptable.

Example:

Problem Set 1:	100
Problem Set 2	90
Problem Set 3	30

Problem Set 4	Miss
Midterm	80
Final	70

Your Score:

Problem Set 1:	5 (100>70. Hence, 5% of your grade comes from PS1. Thus, 100 points translate to 5.)
Problem Set 2	4.5 (90>70. Hence, 5% of your grade comes from PS1.)
Problem Set 3	0
Problem Set 4	0
Midterm	27 (80>70. Hence, 30% of your grade comes from PS1.)
Final	42 (70 x 60%)
Final Score	78.5

Course Policies

Policy on Missed Materials: Assignments will NOT be accepted after the due date, unless there is a valid reason. If a student misses the final exam for a valid medical reason, you must notify the instructor immediately, provide appropriate medical documentation and make arrangements to write a comprehensive exam as soon as health permits.

Policy on Emails: Email communication is reserved only for **making appointments** and **pointing out typos or mistakes** on problem sets or solutions. On all other matters, you should meet me in person or virtually. I do not answer any emails on weekdays between 5PM-9AM or weekends.

Policy on Cellphones and Laptops: All cellphones and tablets must be turned off. You are not allowed to take pictures.

Policy on the Final Exam: You must take the final exam to pass this course. If you miss the final exam for a valid reason, you should let me know as soon as possible; I will reschedule the exam. You must provide a doctor's note if you miss for medical reasons.

ACCOMMODATION POLICY FOR STUDENTS

Students may request accommodation as a result of barriers related to disability, religious obligation, or any characteristic protected under Canadian Human Rights legislation. The full text of Dalhousie's Student Accommodation Policy can be accessed here:

Students who require accommodation for classroom participation or the writing of tests and exams should make their request to the **Advising and Access Services Centre (AASC)** prior to or at the outset of the regular academic year. More information and the ***Request for Accommodation*** form are available at www.dal.ca/access.

DEPARTMENT OF ECONOMICS STATEMENT ON ACADEMIC INTEGRITY

At Dalhousie University, we respect the values of academic integrity: honesty, trust, fairness, responsibility, and respect. As a student, adherence to the values of academic integrity and related policies is a requirement of being part of the academic community at Dalhousie University.

What does academic integrity mean?

Academic integrity means being honest in the fulfillment of your academic responsibilities, thus establishing mutual trust. Fairness is essential to the interactions of the academic community and is achieved through respect for the opinions and ideas of others. "Violations of intellectual honesty are offensive to the entire academic community, not just to the individual faculty member and students in whose class an offence occurs."

(<http://academiccalendar.dal.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=1&chapterid=89&topicgroupid=381&loadusercredits=False>)

How can you achieve academic integrity?

- * Make sure you understand Dalhousie's policies on academic integrity.
- * While discussion with your fellow students is valuable, do not submit an assignment or essay that is essentially identical to an assignment or essay submitted by another individual or group.
- * In assignments or essays, use an approved method of citation for any material taken directly from an existing source or any material that is a paraphrase of an existing source.
- * Do not download the work of another from the Internet and submit it as your own.
- * Do not submit work that has been completed through collaboration or previously submitted for another assignment without permission from your instructor.
- * Do not have someone else write a test for you, or write a test for someone else.
- * During a test, do not talk with other students and do not try to copy the work of another student.

What will happen if an allegation of an academic offence is made against you?

Instructors are required to report any suspected offence. The full process is outlined in the Discipline flow chart (found at <http://academicintegrity.dal.ca>) and includes the following:

- * Each Faculty has an Academic Integrity Officer (AIO) who receives allegations from instructors.
- * The AIO decides whether to proceed with the allegation and you will be notified of the process.
- * If the case proceeds, you will receive a PENDING grade until the matter is resolved.
- * If you are found guilty of an academic offence, a penalty will be assigned ranging from a warning to suspension or expulsion from the University and can include a notation on your transcript, failure of the assignment, or failure of the course. All penalties are academic in nature.

Where can you turn for help?

* If you are ever unsure about ANYTHING, contact your instructor. * See <http://academicintegrity.dal.ca> for links to policies, definitions, online tutorials, and tips on citing and paraphrasing. * See <http://writingcentre.dal.ca> for assistance with proofreading, writing styles, and citations. * See <http://libraries.dal.ca/research.html> for a set of research tools including Subject Guides, Assignment Calculator, and RefWorks. * See <http://studentservices.dal.ca> for assistance with appeals and discipline procedures. * See <http://senate.dal.ca> for a list of Academic Integrity Officers, a discipline flow chart, and the

Senate Discipline Committee. The Policy on Student Submission of Assignments & Use of Originality Checking Software states that “any instructor may require student assignments to be submitted in both written and electronic (computer-readable) form, e.g., a text file or as an email attachment, as defined by the instructor. Use of third-party originality checking software does not preclude instructor use of alternate means to identify lapses in originality and attribution. The results of such assessment may be used as evidence in any disciplinary action taken by the Senate.”

ACADEMIC INTEGRITY

Academic integrity, with its embodied values, is seen as a foundation of Dalhousie University. It is the responsibility of all students to be familiar with behaviours and practices associated with academic integrity. Instructors are required to forward any suspected cases of plagiarism or other forms of academic cheating to the Academic Integrity Officer for their Faculty.

The Academic Integrity website (<http://academicintegrity.dal.ca>) provides students and faculty with information on plagiarism and other forms of academic dishonesty, and has resources to help students succeed honestly. The full text of Dalhousie’s **Policy on Intellectual Honesty** and **Faculty Discipline Procedures** is available here:

http://www.dal.ca/dept/university_secretariat/academic-integrity/academic-policies.html

STUDENT CODE OF CONDUCT

Dalhousie University has a student code of conduct, and it is expected that students will adhere to the code during their participation in lectures and other activities associated with this course. In general:

“The University treats students as adults free to organize their own personal lives, behaviour and associations subject only to the law, and to University regulations that are necessary to protect

- the integrity and proper functioning of the academic and non – academic programs and activities of the University or its faculties, schools or departments;
- the peaceful and safe enjoyment of University facilities by other members of the University and the public;
- the freedom of members of the University to participate reasonably in the programs of the University and in activities on the University's premises;
- the property of the University or its members.”

The full text of the code can be found here:

http://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

SERVICES AVAILABLE TO STUDENTS

The following campus services are available to help students develop skills in library research, scientific writing, and effective study habits. The services are available to all Dalhousie students and, unless noted otherwise, are free.

Service	Support Provided	Location	Contact
General Academic Advising	Help with - understanding degree requirements and academic regulations - choosing your major - achieving your educational or career goals - dealing with academic or other difficulties	Killam Library Ground floor Rm G28 Bissett Centre for Academic Success	In person: Killam Library Rm G28 By appointment: - e-mail: advising@dal.ca - Phone: (902) 494-3077 - Book online through MyDal
Dalhousie Libraries	Help to find books and articles for assignments Help with citing sources in the text of your paper and preparation of bibliography	Killam Library Ground floor Librarian Offices	In person: Service Point (Ground floor) By appointment: Identify your subject librarian (URL below) and contact by email or phone to arrange a time: http://dal.beta.libguides.com/sb.php?subject_id=34328
Studying for Success (SFS)	Help to develop essential study skills through small group workshops or one-on-one coaching sessions Match to a tutor for help in course-specific content (for a reasonable fee)	Killam Library 3rd floor Coordinator Rm 3104 Study Coaches Rm 3103	To make an appointment: - Visit main office (Killam Library main floor, Rm G28) - Call (902) 494-3077 - email Coordinator at: sfs@dal.ca or - Simply drop in to see us during posted office hours All information can be found on our website: www.dal.ca/sfs

Writing Centre	Meet with coach/tutor to discuss writing assignments (e.g., lab report, research paper, thesis, poster) - Learn to integrate source material into your own work appropriately - Learn about disciplinary writing from a peer or staff member in your field	Killam Library Ground floor Learning Commons & Rm G25	To make an appointment: - Visit the Centre (Rm G25) and book an appointment - Call (902) 494-1963 - email writingcentre@dal.ca - Book online through MyDal We are open six days a week See our website: writingcentre.dal.ca
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University Policies and Statements

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit or e-mail the Indigenous Student Centre at 1321 Edward St or elders@dal.ca. Additional information regarding the Indigenous Student Centre can be found at: https://www.dal.ca/campus_life/communities/indigenous.html

Internationalization

At Dalhousie, 'thinking and acting globally' enhances the quality and impact of education, supporting learning that is "interdisciplinary, cross-cultural, global in reach, and orientated toward solving problems that extend across national borders." Additional internationalization information can be found at: <https://www.dal.ca/about-dal/internationalization.html>

Academic Integrity

At Dalhousie University, we are guided in all our work by the values of academic integrity: honesty, trust, fairness, responsibility, and respect. As a student, you are required to demonstrate these values in all the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity. Additional academic integrity information can be found at: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Student Accessibility Centre is Dalhousie's centre of expertise for matters related to student accessibility and accommodation. If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion, please contact the Student Accessibility Centre (https://www.dal.ca/campus_life/academic-support/accessibility.html) for all courses offered by Dalhousie with the exception of Truro. For courses offered by the Faculty of Agriculture, please contact the Student Success Centre in Truro (<https://www.dal.ca/about-dal/agricultural-campus/student-success-centre.html>)

Conduct in the Classroom – Culture of Respect

Substantial and constructive dialogue on challenging issues is an important part of academic inquiry and exchange. It requires willingness to listen and tolerance of opposing points of view. Consideration of individual differences and alternative viewpoints is required of all class members, towards each other, towards instructors, and towards guest speakers. While expressions of differing perspectives are welcome and encouraged, the words and language used should remain within acceptable bounds of civility and respect.

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness (Strategic Priority 5.2). Additional diversity and inclusion information can be found at: <http://www.dal.ca/cultureofrespect.html>

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner - perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution. The full Code of Student Conduct can be found at: https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

Fair Dealing Policy

The Dalhousie University Fair Dealing Policy provides guidance for the limited use of copyright protected material without the risk of infringement and without having to seek the permission of copyright owners. It is intended to provide a balance between the rights of creators and the rights of users at Dalhousie. Additional information regarding the Fair Dealing Policy can be found at: https://www.dal.ca/dept/university_secretariat/policies/academic/fair-dealing-policy-.html

Originality Checking Software

The course instructor may use Dalhousie's approved originality checking software and Google to check the originality of any work submitted for credit, in accordance with the Student Submission of Assignments and Use of Originality Checking Software Policy. Students are free, without penalty of grade, to choose an alternative method of attesting to the authenticity of their work and must inform the instructor no later than the last day to add/drop classes of their intent to choose an alternate method. Additional information regarding Originality Checking Software can be found at: <https://www.dal.ca/about/leadership-governance/academic-integrity/faculty-resources/ouriginal-plagiarism-detection.html>

Student Use of Course Materials

Course materials are designed for use as part of this course at Dalhousie University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as books, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. Copying this course material for distribution (e.g. uploading to a commercial third-party website) may lead to a violation of Copyright law.