



uOttawa

Université d'Ottawa/University of Ottawa

Faculté des sciences sociales /Faculty of Social Sciences
Science économique/Economics Department

MATHEMATICAL FOUNDATIONS OF ECONOMIC THEORY

ECO 7119 A

NAME OF THE PROFESSOR: NABIL AFODJO

SESSION: FALL 2022

Course schedule: Wednesdays 2:30 PM – 5:20 PM

Course location: MRT 256

Office: TBD

Office hours: Wednesdays 11:00 AM – 12:00 PM or by appointment

E-mail: nabil.afodjo@carleton.ca

OFFICIAL COURSE DESCRIPTION

Mathematical techniques needed to understand micro- and macro-economic theory at the PhD level, and to carry out research. Real analysis. Review of static optimization. Continuous- and discrete-time dynamic optimization in deterministic and stochastic environments. Applications to economic theory are presented. This course is equivalent to ECON 6019 at Carleton University.

GENERAL COURSE OBJECTIVES

The course covers the mathematical tools needed to understand and solve problems in modern analytical economics. It will prepare students for advanced courses in microeconomics and macroeconomics.

SPECIFIC OBJECTIVES

We will emphasize the theory and economic applications of the following topics: set theory and binary relations, spaces, measure theory, differential equations, dynamic optimization.

- The required textbook for the course is Michael Carter, *Foundations of Mathematical Economics*, Michael Carter, 2001, The MIT Press. It is available at the University of Ottawa Bookstore.

Students are supposed to be familiar with topics covered in ECO3145 and ECO4145.

EVALUATION

Problems will be assigned regularly. Assignments will count for 30% of the final grade. A mid-term exam - **scheduled for Nov 2nd** - will count for 30% of the final grade. The final exam will be cumulative and will count for 50% of the final grade. Students are encouraged to work in teams for the assignments. However, a copy from each student must be handed back.

COURSE OUTLINE

Part I. Sets and binary relations

Part II. Spaces and topology

Part III: Static optimization

Part IV. Dynamic Optimization

COURSE CALENDAR		
Date	Subject	Location
Sept. 14 – Sept. 30	Sets and binary relations	MRT 256
Oct. 1 – Oct. 23	Spaces and topology	MRT 256
Oct. 24 – Oct. 30	Reading week	
Nov. 2	Midterm exam	MRT 256
Nov. 9 – Nov. 16	Static optimization	MRT 256
Nov. 23 – Dec. 7	Dynamic optimization	MRT 256
To be determined	Final Exam	TBD
To be determined	Deferred Final Exam	TBD

UNIVERSITY OF OTTAWA GRADING SCHEME

<https://international.uottawa.ca/en/grading-system>

Letter grade	Numerical value	Percentage value
A+	10	90-100
A	9	85-89
A-	8	80-84
B+	7	75-79
B	6	70-74
C+	5	65-69
C	4	60-64
D+	3	55-59
D	2	50-54
E	1	40-49
F	0	0-39
ABS	0	Absent
EIN	0	Failure/Incomplete

Policy on the EIN grade (incomplete):

In all economics courses, students who fail to complete work (either a single piece of work or a combination of work) worth a total of 25% or more of the final grade will receive a grade of EIN in the course. The EIN grade is equivalent to a failure mark (F). See Regulation 10.6 (<https://www.uottawa.ca/administration-and-governance/academic-regulation-10-grading-system>) for details.

Please note that a denied request for a deferral may therefore lead to a failure mark.

Assessment Policies and Expectations

Attendance

Class attendance is compulsory.

Time Commitment

In order to succeed in a 3-credit course, alongside the standard 3 hours of in-class instruction, students should expect to spend a minimum of 6 hours per week outside of the classroom engaged in activities related to the course, e.g. homework, reading, studying, etc., and should expect a minimum time commitment of 9 hours per week per course (on average).

Late Assignments

All assignments and exams are to be submitted by their due date and time.

Missed exams and requests for deferral

Absences from exams, or late submission of assignments will be penalized. Exceptions are made only for illness or other serious situations. The Faculty reserves the right to accept or refuse the reason. Conflicts due to travel, jobs, or any misreading of the examination timetable are not acceptable reasons. Absences from exams which are not excused will result in a mark of zero for the exam.

Students who are excused for missing an exam will be required to write a deferred exam, except where the professor offers a re-weighting scheme which applies to the student's case. (If available, such a scheme is described in this syllabus.) Except in the case of a re-weighting scheme, students wishing to be excused for an absence must complete a [deferral form \(DFR\)](#). This form must be completed for both midterm and final exams.

Absence due to illness must be supported by a medical certificate. Requests for deferral must be submitted, with supporting documentation (ex. medical certificate), within five working days of the exam. The request must respect all the conditions of [Academic Regulation I9.5](#).

Exam conflicts

- Any conflict with a midterm exam schedule should be reported to the Professor at the beginning of the term. This request is especially applicable to the type 3 conflict (two in-class exams back-to-back) for students with special learning needs.
- Any conflict with a final exam schedule should be reported to the Faculty's undergraduate office as soon as the final examination schedule is released.

Regulation on Academic Fraud

Preamble

Academic integrity is a fundamental value at the core of all academic activities. [The regulation on academic fraud](#) defines the acts that can compromise academic integrity and outlines the various sanctions and consequences of such acts, and the procedures for handling allegations and setting sanctions. Further information on academic integrity is available on the [website of the Provost and Vice-President, Academic Affairs](#).

Definition

1. Any act by a student that may result in a distorted academic evaluation for that student or another student. Academic fraud includes but is not limited to activities such as:
 1. plagiarising or cheating in any way;
 2. submitting work not partially or fully the student's own, excluding properly cited quotations and references. Such work includes assignments, essays, tests, exams, research reports and theses, regardless of whether the work is in written, oral or any other form;
 3. presenting research data that are forged, falsified or fabricated in any manner.
 4. attributing a statement of fact or reference to a fabricated source;
 5. submitting the same work or a significant part of the same piece of work in more than one course, or a thesis or any other piece of work submitted elsewhere without the prior approval of the appropriate professors or academic units;
 6. falsifying or misrepresenting an academic evaluation, using a forged or altered supporting document or facilitating the use of such a document;
 7. taking any action aimed at falsifying an academic evaluation.

Sanctions

1. Students who commit or attempt to commit academic fraud, or who are a party to academic fraud, are subject to one or more sanctions ([full list](#)), such as:
 1. a written warning;
 2. zero for part of the work in question;
 3. zero for the work in question;
 4. zero for the work in question and the loss of additional marks for the course in question;
 5. zero for the work in question, with a final grade no higher than the passing grade for the course in question;
 6. an F or NS grade for the course in question.

University Policies

Intellectual property right of course content

The materials you receive for this course are protected by [copyright](#) and must be used for this course only. These materials include but are not limited to, any course notes provided by the professor, their Powerpoint presentations, and any lecture recordings you may have.

Regulation on Bilingualism at the University of Ottawa

Every student has the right to require that a course be given in the language used to describe the course in the course calendar ([Academic Regulation I-2](#)).

Except in programs and courses for which language is a requirement, all students have the right to produce their written work and to answer examination questions in the official language of their choice, regardless of the course's language of instruction.

[Prevention of Sexual Violence](#)

If you feel unsafe, call 9-1-1 or reach out to Campus Protective Services at 613-562-5411.

The University of Ottawa has a zero-tolerance policy for any sexual act or act targeting a person's sexuality, gender identity or gender expression. This includes both physical and psychological acts that are committed, threatened, or attempted against a person without the person's consent, such as sexual assault, sexual harassment, stalking, indecent exposure, voyeurism, sexual exploitation, and cyberbullying. The University, as well as various employee and student groups, offers a variety of services and resources to ensure that all uOttawa community members have access to confidential support and information, and to procedures for reporting an incident or filing a complaint.

Notice: Collection of Personal Information with Adobe Connect/Zoom/MS Teams Recordings

In accordance with the *Freedom of Information and Protection of Privacy Act* in Ontario and with University [Policy 90](#), your personal information is collected under the authority of the *University of Ottawa Act*, 1965.

The Adobe Connect/Zoom/MS Teams sessions will be recorded for purposes consistent with the fulfillment of the course learning activities and outcomes. The recording may include the use of your video presence, picture, and voice. If you choose not to have your picture or voice recorded, you may disable the audio and video functionality or request accommodation from your instructor. The recording will be available only to authorized individuals through University of Ottawa systems.

If you have questions about the collection, use and disclosure of your personal information in this notice, please contact [email of the professor@UOTTAWA.CA](mailto:email_of_the_professor@UOTTAWA.CA).

Student Services & Resources

Faculty Student Experience Centre

The goal of the [Student Experience Centre](#) is to help students with their academic and social well-being during their time at the University of Ottawa. Regardless of where a student stands academically, or how far along they are in completing their degree, the Student Experience Centre is there to help students continue on their path to success.

A student may choose to visit the [Student Experience Centre](#) for very different reasons. Younger students may wish to talk to their older peers to gain insight into programs and services offered by the University, while older student may simply want to brush up on study and time management skills or learn about programs and services for students nearing the end of their degree.

In all, the [Student Experience Centre](#) offers a place for students to talk about concerns and problems that they might have in any facet of their lives. While students are able to voice their concerns and problems without fear of judgment, mentors can garner further insight in issues unique to students and find a more practical solution to better improve the services that the Faculty of Social Sciences offers, as well as the services offered by the University of Ottawa.

Academic GPS

The *Academic GPS* hub is a one-stop shop for academic support. Whether you're an experienced student or just starting out, you'll find some great resources to help you succeed.

With the Academic GPS, you can:

- chat with a mentor seven days a week
- register for study groups
- take part in study methods workshops (note taking, time management, exam preparation, stress management, Academic Integrity Session, etc.)
- book an appointment with a mentor

Health and Wellness

Your wellness is an integral part of your success. If you don't feel well, it can be hard to focus on your studies. Dedicated professionals and fellow students who care about you are always ready to provide advice and support. Depending on your needs, many activities and services exist to accompany you during your academic journey.

Services include:

- opportunities to connect;
- counselling sessions
- peer support;
- physical activity;
- wellness activities and workshops;
- spiritual guidance.

If you want to connect with a counsellor, you can book an appointment online or go to their walk-in clinic at 100 Marie-Curie, fourth floor.

You can also drop-in to our wellness space, chat online with a peer helper, or access 24/7 professional help through the website.

Academic accommodations

The [Access Service](#) tries to make sure all students with disabilities have equal access to learning and research environments, the physical campus and University-related programs and activities. The Academic Accommodations service works with other campus services to create an accessible campus learning environment, where students with disabilities have an equal opportunity to flourish.

We offer a wide range of services and resources, provided with expertise, professionalism and confidentiality.

Some services we offer

- Help for students with disabilities in making the transition
- Permanent and temporary accommodation measures
- Learning strategy development
- Adaptive exams
- Transcriptions of learning material
- Interpretation (ASL and LSQ)
- Assistive technologies

If you think that you might need any of our services or supports, [email the Academic Accommodations service \(adapt@uOttawa.ca\)](mailto:adapt@uOttawa.ca).

Human Rights Office

The mandate of the [Human Rights Office](#) is to provide leadership in the creation, implementation and evaluation of policies, procedures and practices on diversity, inclusion, equity, accessibility and the prevention of harassment and discrimination.

Contact information: 1 Stewart St. (Main Floor – Room 121) - Tel.: 613-562-5222 / Email: respect@uOttawa.ca

Career Services

[Career Services](#) offers various services and a career development program to enable you to recognize and enhance the employability skills you need in today's world of work.

Indigenous Affirmation

ANISHINÀBE

Ni manàdjiyànàniḡ Màmìwinini Anishinàbeg, ogog kà nàgadawàbandadjig iyo akì eko weshkad. Ako nongom ega wikàd kì migiwewàdj.

Ni manàdjiyànàniḡ kakina Anishinàbeg ondaje kaye ogog kakina eniyagizidjig enigokamigàḡ Kanadàng eji ondàpinangig endàwàdjin Odàwàng.

Ninisiḡawinawànàniḡ kenawendamòdjig kije kikenindamàwin; weshkinìgidjig kaye kejeyàdizidjig.

Nigijeweninmànàniḡ ogog kà nìḡàni sòngideyedjig; weshkad, nongom; kaye àyànikàdj.



[Listen to the audio file](#)

ENGLISH

We pay respect to the Algonquin people, who are the traditional guardians of this land. We acknowledge their longstanding relationship with this territory, which remains unceded.

We pay respect to all Indigenous people in this region, from all nations across Canada, who call Ottawa home.

We acknowledge the traditional knowledge keepers, both young and old.

And we honour their courageous leaders: past, present, and future.

Inclusion

The University of Ottawa aims to be an equitable and inclusive institution, actively participating in ensuring the wellbeing of students, personnel and faculty members. The University is committed to eliminating obstacles to student inclusion in accordance with the [Ontario Human Rights Code](#). The *Code* provides that every person has the right to equal treatment with respect to goods, services, facilities, housing, contracts and employment as well as membership in trade or professional associations and unions without discrimination because of “Race, Ancestry, Place of origin, Colour, Ethnic origin, Citizenship, Creed, Sex, Sexual orientation, Gender identity, Gender expression, Age, Record of offence (in employment only), Receipt of public assistance, Marital status, Family status, Disability”.

The [Human Rights Office of the University of Ottawa](#) adds “although the Human Rights Code does not provide a definition of discrimination, the notion of discrimination covers unfair treatment on the basis of race, disability, sex, or any other personal characteristic. It can take many different forms, can target a single person or a group and can be part of a system.”

If you have experienced discrimination or harassment, you can seek confidential assistance through the University Human Rights Office to discuss your situation and/or [to file a formal complaint](#).

The following uOttawa Campus based services are available to you and your fellow students:

- [uOttawa Counselling Service](#) including Individual Counselling provided by uOttawa Counsellor, Pierre Bercy who specializes in anti-black racism;
- University of Ottawa Students’ Union (UOSU) [Resources for/from the Black Community](#), [Centre for Students with Disabilities](#), [Racialized and Indigenous Students Experience Centre](#), [Women’s Resource Centre](#) and [uOttawa Pride Center](#)
- Anti-racism student committee (Email: car.arc.uottawa@gmail.com)
- Mashkawaziwogamig: [Indigenous Resource Center](#)
- [University of Ottawa’s Human Rights Office](#) including [policies on accessibility](#).