COURSE OUTLINE

Class schedule: Tuesday 2.30-4.50
Room MNT 204

Professor’s office hours: Tuesday 10.00-12.00
Friday 11.30-12.30
Office FSS9039
Phone 613 562 5800 ext. 7066

E-mail: aggey.semenov@uottawa.ca

Teaching assistants: Name @uottawa.ca Office hours

Any questions sent by email should receive a response within two business days or during the following class if taken place within the 48 hours following receipt of the email. Note that the professor reserves the right not to answer an email if the level of language used is inadequate.

OFFICIAL COURSE DESCRIPTION

A course of applied mathematical economics for 1st year Ph.D students. This course is equivalent to ECON 6019 at Carleton University.

GENERAL COURSE OBJECTIVES

The course covers the mathematical tools needed to understand the core microeconomics and macroeconomics PhD courses and be able to carry out research in economics.

SPECIFIC COURSE OBJECTIVES

We will emphasize the theory and economic applications of the following topics: matrices and linear algebra, differentiation and integration, differential equations, optimization.

The required textbook for the course is “Further Mathematics for Economic Analysis,” by Knut Sydsaeter, Peter Hammond, Atle Seierstad, and Atle Strom, Prentice Hall, 2005

The supplementary textbooks are
1. Essential Mathematics for Economic Analysis by Knut Sydsæter, Peter Hammond

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

ASSESSMENT METHODS
There will be 3 assignments that will count for 45% of the final grade. The final exam will be cumulative and will count for 55% of the final grade. Students are encouraged to work in teams for the assignments. However, a copy from each student must be handed back.

**Policy on language quality and late submissions**

Class attendance is necessary to successfully complete this course.

You will also be judged on your writing abilities. It is recommended to take the appropriate measures to avoid mistakes such as spelling, syntax, punctuation, inappropriate use of terms, etc. You may be penalized up to 15%, to the professor’s discretion.

Late submissions are not tolerated. Exceptions are made only for illness or other serious situations deemed as such by the professor. There will be a penalty for late submissions. University regulations require all absences from exams and all late submissions due to illness to be supported by a medical certificate.

Absence for any other serious reason must be justified. 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.) Online DFR forms must be completed for both midterms and final exams. The online form can be obtained at https://socialsciences.uottawa.ca/students/undergraduate-forms. A copy of the supporting documentation must be joined to your request in order for you to submit the online form. All requests must be submitted within five working days of the exam. The request must respect all the conditions of Academic Regulation 19.5 (https://www.uottawa.ca/administration-and-governance/academic-regulation-9-evaluation-of-student-learning). The date of the deferred final exam is **January 4th, 2019**.

For your information: use as needed

A penalty of 5% will be given for each subsequent day following the due date (weekends not included). This goes for assignments submitted through e-mail as well, and, in this case, the time that the e-mail was received will be counted as the time of submission of the document.

We suggest that you advise your professor as early as possible if a religious holiday or a religious event will force you to be absent during an evaluation.

The University of Ottawa does not tolerate any form of sexual violence. Sexual violence refers to any act of a sexual nature committed without consent, such as rape, sexual harassment or online harassment. The University, as well as student and employee associations, offers a full range of resources and services allowing members of our community to receive information and confidential assistance and providing for a procedure to report an incident or make a complaint. For more information, visit www.uOttawa.ca/sexual-violence-support-and-prevention
SCHEDULE

I. Introduction: definitions, basic theorems – 0.5 lecture
   a. Sets, vector spaces
   b. Functions, limits
   c. Topology and correspondences

II. Matrices and linear algebra – 1.5 lectures Assignments 1

III. Multivariable calculus and integrals - 2 lectures
    a. Differentiation
    b. Riemann integral
    c. Theory of measure

IV. Differential equations - 2 lectures Assignments 2
    a. Ordinary DE
    b. PDE

V. Optimization – 6-7 lectures Assignment 3
    a. Static optimization
    b. Calculus of variations
    c. Optimal control
    d. Dynamic programming – discrete time optimization
Resources for you

**FACULTY MENTORING CENTRE** - [http://socialsciences.uottawa.ca/mentoring](http://socialsciences.uottawa.ca/mentoring)

The goal of the Mentoring 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 Mentoring Centre is there to help students continue on their path to success.

A student may choose to visit the Mentoring 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 Mentoring 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 WRITING HELP CENTRE** - [http://www.sass.uottawa.ca/writing/](http://www.sass.uottawa.ca/writing/)

At the AWHC you will learn how to identify, correct and ultimately avoid errors in your writing and become an autonomous writer. In working with our Writing Advisors, you will be able to acquire the abilities, strategies and writing tools that will enable you to:

- Master the written language of your choice
- Expand your critical thinking abilities
- Develop your argumentation skills
- Learn what the expectations are for academic writing


There are many reasons to take advantage of the Counselling Service. We offer:

- Personal counselling
- Career counselling
- Study skills counselling

**HUMAN RIGHTS OFFICE** - [https://www.uottawa.ca/respect/en](https://www.uottawa.ca/respect/en)

**Mandate:**
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

**ACCESS SERVICE** - [http://sass.uottawa.ca/en/access](http://sass.uottawa.ca/en/access)

The University has always strived to meet the needs of individuals with learning disabilities or with other temporary or permanent functional disabilities (hearing/visual impairments, sustained health issues, mental health problems), and the campus community works collaboratively so that you can develop and maintain your autonomy, as well as reach your full
potential throughout your studies. You can call on a wide range of services and resources, all provided with expertise, professionalism and confidentiality.

If barriers are preventing you from integrating into university life and you need adaptive measures to progress (physical setting, arrangements for exams, learning strategies, etc.), contact the Access Service right away:

- in person at the University Centre, Room 339
- online
- by phone at 613-562-5976

**Deadlines for submitting requests for adaptive measures during exams**

- midterms, tests, deferred exams: seven business days before the exam, test or other written evaluation (excluding the day of the exam itself)
- final exams:
  - November 15 for the fall session
  - March 15 for the winter session
  - Seven business days before the date of the exam for the spring/summer session (excluding the day of the exam itself).

**CAREER DEVELOPMENT CENTRE -** [http://www.sass.uottawa.ca/careers/](http://www.sass.uottawa.ca/careers/)

Career Development Centre offers various services and resources in career development to enable you to recognize and enhance the employability skills you need in today’s world of work.


The Student Resources Centres aim to fulfill all sorts of student needs.

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**Beware of Academic Fraud!**

Academic fraud is an act committed by a student to distort the marking of assignments, tests, examinations, and other forms of academic evaluation. Academic fraud is neither accepted nor tolerated by the University. Anyone found guilty of academic fraud is liable to severe academic sanctions.

**Here are a few examples of academic fraud:**

- engaging in any form of plagiarism or cheating;
- presenting falsified research data;
- handing in an assignment that was not authored, in whole or in part, by the student;
- submitting the same assignment in more than one course, without the written consent of the professors concerned.

In recent years, the development of the Internet has made it much easier to identify academic plagiarism. The tools available to your professors allow them to trace the exact origin of a text on the Web, using just a few words.

In cases where students are unsure whether they are at fault, it is their responsibility to consult the “*Writing and Style Guide for University Papers and Assignments.*” It can be found at: [http://socialsciences.uottawa.ca/undergraduate/writing-style-guide](http://socialsciences.uottawa.ca/undergraduate/writing-style-guide)
Persons who have committed or attempted to commit (or have been accomplices to) academic fraud will be penalized. Here are some examples of the academic sanctions, which can be imposed:

- a grade of “F” for the assignment or course in question;
- an additional program requirement of between 3 and 30 credits;
- suspension or expulsion from the Faculty.


and Academic Integrity Website (Office of the Vice-President Academic and Provost) [http://web5.uottawa.ca/mcs-smc/academicintegrity/home.php](http://web5.uottawa.ca/mcs-smc/academicintegrity/home.php)