

General Course Information

Instructor:	Xiaowen Lei
<i>Email</i>	leix@uoguelph.ca
<i>Office Location</i>	Online
<i>Office Hours</i>	By appointment
<i>Department/School</i>	Department of Economics and Finance

Class Schedule: T/Th 11:30 AM-12:50 PM (1/7/2025 – 4/23/2025)

Pre-requisites: Econ 6020

Restrictions: NA

Course Description

This is the second sequence of the first year Ph.D. macroeconomic theory course, aimed at equipping the students with the tools to analyze dynamic stochastic general equilibrium in macroeconomics. The course starts with the introduction of the real business cycle models. We will then discuss the application of stochastic calculus and stochastic control in continuous time in modern dynamic stochastic general equilibrium models. We will then apply the mathematical tools to the analysis of endogenous growth model and the examining the relationship between macro aggregates and income and wealth distribution. After that, the instructor will introduce incomplete market models, first with idiosyncratic shocks, then with aggregate shocks.. If time left, we will conclude with the New Keynesian model in monetary economics.

Course Learning Outcomes

Upon successfully completing this course, you will:

- *Be able to solve DSGE models analytically and numerically using MATLAB
- *Understand the determinants and time-series properties of business cycles, aggregate price and output, asset prices and income/wealth distribution.

Knowledge and Understanding:

1) Mathematical Methodology: Students are expected to solve dynamic stochastic general equilibrium models with representative and heterogeneous agents. Students need to be equipped with the tools of solving dynamic macro models. Prior knowledge of calculus, probability and statistics, linear algebra, optimal control and dynamic programming is mandatory.

2) Statistical and Econometric Methodology: Students need to know how to use MATLAB for basic vector/matrix operations. Experiences of simulation/calibration of dynamic models are recommended but not mandatory.

3) Macroeconomic Modeling: As the last sequence of grad macroeconomic classes, students are expected to have taken one sequence of graduate macroeconomics (e.g: Econ 6020) before registering in this course.

Summary of Course Content and Materials

Introduction

Part I: Real Business Cycle theory

Reading: [Advanced Macroeconomics \(Romer\)](#)

Cost: 99.95 CAD + tax on Amazon.ca

Part II: Stochastic control and application in HACT models

Part III: R&D endogenous growth theory

Reading: Romer (1990), Jones (1995), Jones and Kim (2018)

Part IV: Incomplete market models

Reading: (Hugget, 1993), (Krussel Smith, 1998)

Course Assessment

			Associated Learning Outcomes	Due Date/ location
Assessment 1:	30%	Homework	Keep up with the lectures	<i>At the end of each parts</i>
Assessment 2:	30%	Midterm	RBC + stochastic control methods	<i>Feb 13th</i>
Assessment 3:	40%	Final	Incomplete markets and New Keynesian models	<i>See exam schedule</i>

100%

Total

Teaching and Learning Practices

Notes **Lectures:** The course will be conducted face to face.
Office Hours: Office hours will be conducted virtually.
Exams: The Midterm date is TBD in class, and the Final date is TBD. Please check the Midterm and Final exam schedule before you register the course. There will be no make-up or deferred exams in this course.

Course Resources

Required Text: NA

Recommended Text: Advanced Macroeconomics (Romer), Monetary Policy, inflation and the business cycle (Gali)

Other Resources: Lecture notes and posted papers

Course Policies

Grading Policies

Unless you have discussed an extension well ahead of the due date with the instructor, late penalties of 30% of the total grade earned will be assigned to any assessment (i.e. deducted from the total mark). Extensions will only be granted on the basis of valid medical or personal reasons, and need to be requested via email to the instructor as soon as possible. Late assignments will not be accepted once graded assignments have been returned officially to the class at large, unless circumstances permit and alternative arrangements have been made.

Students who find themselves unable to meet course requirements by the deadlines or the criteria expected because of medical or personal reasons, should review the regulations on academic consideration in the Academic Calendar and discuss their situation with the instructor, program counselor or other academic counselor as appropriate.

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-grds.shtml>

Missed Assignments:

A grade of zero will be assigned if you fail to submit an assignment, unless you are ill or have other compassionate reasons. Please read your Undergraduate Calendar for the regulations regarding illness and compassionate grounds. Please note, vacation travel, moving house, or outside work commitments will not be accepted as valid reasons for missing deadlines.

If you have religious observances which conflict with the course schedule or if you are registered with

Student Accessibility Services, please contact the course instructor in order to make arrangements for your assessment if appropriate.

University Policies

Academic Consideration

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor in writing, with your name, id#, and e-mail contact. See the academic calendar for information on regulations and procedures for Academic Consideration:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community, faculty, staff, and students to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring.

University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection. Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The Academic Misconduct Policy is detailed in the Undergraduate Calendar:

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Accessibility

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact Student Accessibility Services as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email sas@uoguelph.ca or see the website: <https://wellness.uoguelph.ca/accessibility/>

Course Evaluation Information

Please refer to the [Blue by Explorance system](#).

Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Drop date

The last date to drop one-semester courses, without academic penalty, is **Friday April 4, 2025**. For regulations and procedures for Dropping Courses, see the Academic Calendar:
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>