University at Buffalo

Department of Economics

Fall 2020

ECO 609: Macroeconomic Theory I
(SEM, 3 credits)

Class Time: Mon., Wed., Fri. 9:10AM—10AM EST

Recitation Time: Fri. 10:15AM—11:15AM EST

Delivery Mode: Online

Class Location: Zoom Virtual Room, link available on UB Learns

Instructor	Email
Dr. Monica Tran-Xuan	monicaxu@buffalo.edu

Office Location & Hours
Zoom Virtual Room, link available on UB Learns
Mon. 10:15AM—12:15PM EST, or by appointment

(The best way to reach me is via email. Email subject: ECO 609 – your name)

Teaching Assistant: Han Zhang, email: hzhang56@buffalo.edu

Course Description

This course is the first part of the macroeconomics graduate sequence. The sequence aims to help the student develop the analytical and methodological tools to follow and understand modern professional research in macroeconomics. The course assumes that the classical dichotomy holds. It reviews the leading contemporaneous theories of consumption and saving, economic growth, real business cycles, and asset pricing. The course consists of several learning modules. The first module covers concepts of optimality, general equilibrium, and efficiency in a pure exchange economy. The next module presents the neoclassical growth model, the main macroeconomic workhorse model, and the subsequent module shows how to use dynamic programming. The course also covers aggregation methods, economic growth theory, and the overlapping generations model.

Learning Outcomes

Upon successful completion of this course, students are expected to

Learning outcomes	Assessment methods
1. Understand basic macroeconomic facts and the relationship between models and data	Problem set, Exam
2. Learn the thought process and how to speak the language of modern macroeconomic research, including using theoretical tools to formulate and solve standard models, applying concepts to analyze these models, and understanding the economic intuition behind model properties	Problem set, Exam
3. Familiarize with basic macroeconomic computational and data tools	Problem set

Students should be able to apply the knowledge and techniques learnt from this course to conduct future research in macroeconomics, labor, public finance, urban, health, international, and other areas.

This course's learning outcomes are consistent with the goals of the Economics Ph.D. program, which can be found at https://arts-sciences.buffalo.edu/economics/graduate/phd.html

Prerequisites

Students are expected to know multivariate calculus and linear algebra, or equivalents. Real analysis, optimization, and proof techniques will be heavily used throughout the course. Most of these tools are covered in ECO 611. Basic programming skill will be needed in some of the assignments.

Course Materials

I will have slides and some reading materials posted on UB Learns. The following textbooks are optional but very useful for future use:

- Stokey, N. L., R. E. Lucas Jr., and E. C. Prescott (1989). *Recursive methods in economic dynamics*. Harvard University Press.
- Ljungqvist, L., and T. J. Sargent (2012). *Recursive Macroeconomic Theory*. MIT Press, Cambridge.
- Sundaram, R. K. (1996). *A first course in optimization theory*. Cambridge University Press. (a great book on optimization)

Do not worry if they are difficult to read at this point. The goal is to help you understand and use these books for future references. Other study notes that are free online and easier to digest are

- Krueger, D. (2012). *Macroeconomic theory*. Lecture Notes.
- Krusell, P. (2014). *Real Macroeconomic theory*. Lecture Notes.

Course Requirements

There will be six problem sets, one midterm, and one final exam. Students are responsible for materials covered in lectures and recitations.

Problem sets are due at the beginning of the class on the due date. No late assignments are accepted except for special circumstances with official documents (doctor's notes, etc.). Students are encouraged to work together on problem sets, but each student must submit individual solutions and acknowledge whom the students work with on the first page. The solutions can be <u>electronic</u> (using LaTex and its applications such as Overleaf, Lyx, etc.) or <u>handwritten and scanned</u> (some mobile apps, such as CamScanner, allow you to use your phone to scan your work) and uploaded to UB Learns. Tentative problem set schedule:

Problem set	Deadline
Problem set 1	Sep 18
Problem set 2	Oct 2
Problem set 3	Oct 16
Problem set 4	Nov 6
Problem set 5	Nov 20
Problem set 6	Dec 4

Exams: All exams are online, open book, and open note with a time limit. The midterm covers the first half of the class, while the final covers all course materials. Students are required to submit <u>handwritten and scanned</u> answers to exams to UB Learns. There is no make-up exam for the midterm. If you miss the midterm, I will use your grade in the final exam. Make-up final exams will only be scheduled under documented special circumstances (illness, family emergency, athletic conflicts, etc.). Students with final exam conflicts must follow the university guidelines at https://registrar.buffalo.edu/schedules/finalexams.php. Exam schedule:

Exam	Date
Midterm	Oct 23 (tentative)
Final	Dec 16

Teaching Assistant

The TA for this course is Han Zhang. Her email is hzhang56@buffalo.edu. Han will hold a recitation weekly to cover additional materials as well as review solutions to problem sets and exams.

Grading Policy

The final total score for the course will be determined as follows:

Problem sets	30%
Midterm	30%
Final	40%

I will follow this grading rubric in determining your final letter grade:

Letter grade	Final total score
A	90-100
A-	85-89
B+	80-84
B	75-79
B-	70-74
C+	65-69
C	60-64
C-	55-59
D+	50-54
D	45-49
F	00-44

Students have a responsibility to participate in the course evaluation process. For the "Incomplete" grade, please refer to the grading procedure at http://grad.buffalo.edu/Academics/Policies-Procedures/Grading-Procedures.html.

Academic Content

This is the list of course topics and relevant reading materials that may be covered in this course. The instructor reserves the right to modify/adjust course materials during the semester.

1. **Pure exchange economy**
   - Krueger (2013), chapter 2
   - Kehoe, T. (1989). *Intertemporal General Equilibrium Models*, in F. Hahn (ed.) The Economics of Missing Markets. Information and Games. Clarendon Press
   - Negishi, T. (1960). *Welfare Economics and Existence of an Equilibrium for a Competitive Economy.* Metroeconomica, 12, 92-97.
2. **Neoclassical growth model**
   - Krueger (2013), chapter 3
   - Krusell (2014), chapter 5
   - Stokey, Lucas, and Prescott (1989), chapter 2
   - Ljungqvist and Sargent (2012), chapter 8
3. **Dynamic programming under certainty and its application**
   - Stokey, Lucas, and Prescott (1989), chapter 3-4 and 6
   - Ljungqvist and Sargent (2012), chapter 3-4
   - Krueger (2013), chapter 4-5
   - Krusell (2014), chapter 3-4
4. **Aggregation methods**
   - Eslami (2019). *Advanced Macroeconomics I*. Lecture Notes, Chapter 1.7
   - Jones (2019). *Macroeconomic Theory: Class Notes I.* Lecture Notes, Chapter 4
5. **Growth theory**
   - Krueger (2013), chapter 9

- Krusell (2014), chapter 8
- N. Kaldor (1961). *Capital Accumulation and Economic Growth*, in F. A. Lutz and D. C. Hague, editors, The Theory of Capital. St. Martin's Press, 177–222.
- Lucas, R. E. Jr. (1990) *Why doesn't capital flow from rich countries to poor countries?* American Economic Review, 80, 92-96.
- Jones (1995). *R&D-Based Models of Economic Growth*. Journal of Political Economy, 103, 759-784.
- Romer (1986). *Increasing Returns and Long Run Growth*. Journal of Political Economy, 94, 1002-1037.

6. **Overlapping generation model**
- Krueger (2013), chapter 8
- Krusell (2014), chapter 7
- Ljungqvist and Sargent (2012), chapter 9
- Kehoe, T. (1989). *Intertemporal General Equilibrium Models*, in F. Hahn (ed.) The Economics of Missing Markets, Information and Games. Claredon Press
- Barro, R. (1974). *Are Government Bonds Net Wealth?* Journal of Political Economy, 82, 1095-1117
- Diamond, P. (1965). *National Debt in a Neo-Classical Growth Model*. American Economic Review, 55, 1126-1150.
- Wallace, N. (1980). *The Overlapping Generations Model of Fiat Money*, in J.H. Kareken and N. Wallace (eds.) Models of Monetary Economies. Federal Reserve Bank of Minneapolis.

Course Website

All recorded lectures, relevant course materials, assignments, and exams will be posted on UB Learns (https://ublearns.buffalo.edu/). Students are expected to submit their works on UB Learns. Please check the website regularly.

Please do not share course documents, links to lectures, office hours, or other course meetings to others who do not officially register with the course without the instructor's approval. If you receive such requests, please forward it to the instructor.

Class Policies

Students are encouraged to actively participate in class discussions and respect the instructor, the TA, and other students. There should be no eating during class times. Any student found disturbing the academic environment in the class would be asked to leave. Reentry into the class will be permitted at the discretion of the instructor.

Academic Integrity

Academic integrity is critical to the learning process. It is your responsibility as a student to complete your work in an honest fashion, upholding the expectations your individual instructors have for you in this regard. The goal is to ensure that you learn the content in your courses in accordance with UB's academic integrity principles, regardless of whether instruction is in-person

or remote. Please refer to (http://grad.buffalo.edu/succeed/current-students/policy-library.a-to-z.html#academic-integrity) for more details.

Students are expected to have appropriate citation of sources used, acknowledgment of collaboration and help in your work, and no communication with others during exams. Failure to abide by such policies will result in a failing grade of the course.

Proper citation is one of the most important aspects of academic writings, and it can be challenging for students who are new to this. UB Library provides useful resources at https://research.lib.buffalo.edu/citingsources/home.

Thank you for upholding your own personal integrity and ensuring UB's tradition of academic excellence.

Health and Safety Guidelines

While your attendance and participation are essential components of this course, it is critical that you follow public health guidelines. Social Distancing is required when meeting in person to comply with university social distancing policies. Any student exhibiting COVID-19 symptoms should not come to campus to participate in coursework. If you need to miss assignment deadlines due to illness, you must notify the instructor by email as soon as possible and no later than 24-hours after. At that time, you are also expected to make arrangements to complete missed work. In addition, all students must complete the daily mandatory health check at https://buffalo.edu/health-check.

Accessibility Resources

If you have any disability which requires reasonable accommodations to enable you to participate in this course, please contact the Office of Accessibility Resources in 60 Capen Hall, 716-645-2608 and also the instructor of this course during the first week of class. The office will provide you with information and review appropriate arrangements for reasonable accommodations, which can be found at http://www.buffalo.edu/studentlife/who-we-are/departments/accessibility.html.

Critical Campus Resources

Sexual Violence

UB is committed to providing a safe learning environment free of all forms of discrimination and sexual harassment, including sexual assault, domestic and dating violence and stalking. If you have experienced gender-based violence (intimate partner violence, attempted or completed sexual assault, harassment, coercion, stalking, etc.), UB has resources to help. This includes academic accommodations, health and counseling services, housing accommodations, helping with legal protective orders, and assistance with reporting the incident to police or other UB officials if you so choose. Please contact UB's Title IX Coordinator at 716-645-2266 for more information. For confidential assistance, you may also contact a Crisis Services Campus Advocate at 716-796-4399.

Mental Health

As a student you may experience a range of issues that can cause barriers to learning or reduce your ability to participate in daily activities. These might include strained relationships, anxiety, high levels of stress, alcohol/drug problems, feeling down, health concerns, or unwanted sexual experiences. Counseling, Health Services, and Health Promotion are here to help with these or other issues you may experience. You can learn more about these programs and services by contacting:

Counseling Services:

120 Richmond Quad (North Campus), 716-645-2720

202 Michael Hall (South Campus), 716-829-5800

Health Services:

Michael Hall (South Campus), 716-829-3316

Health Promotion:

114 Student Union (North Campus), 716-645-2837

Tentative Course Schedule

Week	Topic	Assignment	Deadline/ Date
1	Intro, Pure exchange economy (static)		
2	Pure exchange economy (dynamic)		
3	Neoclassical growth model (intro)	Problem set 1	Sep 18
4	Neoclassical growth model (characterization)		
5	Dynamic programming (intro)	Problem set 2	Oct 2
6	Dynamic programming (theorems)		
7	Dynamic programming (application)	Problem set 3	Oct 16
8	**Review & Midterm Exam**		**Oct 23**
9	Dynamic programming (convergence)		
10	Aggregation, Growth (intro)	Problem set 4	Nov 6
11	Growth (exogenous, endogenous)		
12	Growth (endogenous)	Problem set 5	Nov 20
13	OLG (intro, characterization)		
14	OLG (efficiency)	Problem set 6	Dec 4
15	OLG (money) & Review		
Final	**Final Exam**		**Dec 16**