
Department of Economics

Fall 2021

# ECO 609: Macroeconomic Theory I

(SEM, 3 credits)

**Class Time:** Tue Thu 11:10AM—12:25PM EST

**Recitation Time:** Fri 12:30PM—1:30PM EST

**Delivery Mode:** In Person

**Class Location:** Fronczak 424


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

**Office Location & Hours**
Fronczak 425
Tue Thu 9:00AM—10:00AM EST

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

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

Office Hour: Wed 12:30PM - 1:30PM EST

Office Location: Fronczak 414


## 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 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 submitted via UB Learns and 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 electronic (using LaTex and its applications such as Overleaf, Lyx, etc.) or handwritten. Tentative problem set schedule:

| **Problem set** | **Deadline** |
|---|---|
| Problem set 1 | Sep 16 |
| Problem set 2 | Sep 30 |
| Problem set 3 | Oct 14 |
| Problem set 4 | Nov 4 |
| Problem set 5 | Nov 18 |
| Problem set 6 | Dec 2 |

*Exams:* All exams are closed books, closed notes, and have a time limit. The midterm covers the first half of the class, while the final covers all course materials. Students are required to submit handwritten answers to exams. 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** | **Time** | **Location** |
|---|---|---|---|
| Midterm | Oct 21 (tentative) | 11:10AM - 12:25PM | Fronczak 424 |
| Final | Dec 14 | 11:45AM - 2:45PM | Fronczak 424 |

**Teaching Assistant**

The TA for this course is Han Zhang. Her email is hzhang56@buffalo.edu. She 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 | 93-100 |
| A- | 87-92 |
| B+ | 80-86 |
| 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. **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.
5. **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 relevant course materials, assignments, and exams will be posted on UB Learns (https://ublearns.buffalo.edu/). Please check the website regularly.

Please do not share course documents, course links, 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 or drinking during class times. Masks must be worn in the classroom. 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 UB's public health guidelines available at https://www.buffalo.edu/coronavirus/latest-update.html. Masks must be worn in the classroom. 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 16 |
| 4 | Neoclassical growth model (characterization) | | |
| 5 | Dynamic programming (intro) | Problem set 2 | Sep 30 |
| 6 | Dynamic programming (theorems) | | |
| 7 | Dynamic programming (application) | Problem set 3 | Oct 14 |
| 8 | **Review & Midterm Exam** | | **Oct 21** |
| 9 | Dynamic programming (convergence) | | |
| 10 | Growth (intro) | Problem set 4 | Nov 4 |
| 11 | Growth (exogenous) | | |
| 12 | Growth (endogenous) | Problem set 5 | Nov 18 |
| 13 | OLG (intro, characterization) | | |
| 14 | OLG (efficiency) | Problem set 6 | Dec 2 |
| 15 | OLG (money) & Review | | |
| Final | **Final Exam** | | **Dec 14** |