Economics 6302.501
Macroeconomics Theory 1

University of Texas at Dallas
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Course Information:
Econ 6302.501
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Wednesday 5:30-8:15pm
CB 1.206

Last updated 7/22/19. Please see the UTD eLearning Page for the most recent version of the syllabus and the class schedule.

I Course Description, Course Materials, and Class Logistics

I.A Course Description

This course is the first in a sequence of core graduate macroeconomic theory courses. The main aim is to introduce students to the methods of deterministic dynamic analyses in economics. The second aim is to employ those methods in understanding aggregate empirical regularities as they pertain to economic growth with standard modern macroeconomic theory. Therefore, primary course aims include a thorough discussion of non-stochastic dynamics and optimization. Next, using these methods, exogenous and endogenous growth applications that illustrate the applied general equilibrium analyses that comprise modern macroeconomic growth theory are discussed. The course concludes with an introduction to non-stochastic overlapping generations models and discusses the role of dynamic efficiency in macroeconomic theory.

As this course covers many advanced aspects of economics and uses advanced quantitative methods, it is highly recommended to actively engage in lectures, think critically, and ASK QUESTIONS.

I.B Course Objectives

This class has five broad objectives

1. First, you will get a broad overview of the basic mathematical tools used in contemporary macroeconomics
2. Second, we will study general equilibrium static models and the effects of policy in static models
3. Third, we will study growth models without and with consumer optimization both in continuous and in discrete time
4. Fourth, we will look at overlapping generations models with potential dynamic inefficiencies
5. Last, but certainly not least: the class will prepare you to pass your macroeconomics PhD Qualifying Exam

I.C Readings and Textbooks

- **Required:** Besides my own lecture notes, the **"Advanced Macroeconomics" textbook by David Romer (R) ISBN# 0072877308** is the main text we will use. Earlier editions of the textbook are also acceptable.

- **Recommended but not required:** If you need additional readings "Growth" topics are very well explained in Barro and Sala-i-Martin's "Economic Growth" ISBN# 0262024594. Some advanced topics are covered in Obstfeld & Rogoff (OR) ISBN# 0262150476 "Foundations of International Macroeconomics." A good reference book for intermediate macroeconomics might also be useful if it has been a couple years since you last took macroeconomics, but it is not required. Even though it is recommended to have access to all these texts, we will only use them occasionally as references. You do not have to purchase the additional books. Other recommended textbooks for reviewing intermediate macroeconomics:

    1. Blanchard, O. and D. H. Johnson, Macroeconomics, (any edition is fine) Prentice Hall. T
    2. Williamson, S , Macroeconomics (any edition), Addison-Wesley.
    3. Abel, A., Bernake, B. and D. Croushore (any edition), Macroeconomics, Addison-Wesley.
    4. Mankiw, G. (any edition), Macroeconomics, Worth Publishers.

If you just need to look up a basic concept outside of class, the library also has a number of textbooks, there are multiple online resources, and I have several textbooks on hand that you can borrow for up to a few day (but might be limited to few hours around exam time).

I.D Office hours

My office hours are Wednesday 2-4pm. Also, feel free to stop by outside my office hours whenever my door is open. However, please note that because this is a graduate class, office hours are not a substitute for attending lectures. Use my office hours as a resource for you to clarify points and possibly elaborate on those concepts we cover in class. If you need to meet outside office hours and need at a specific time, you should email me to make alternative arrangements.

I will start each lecture with a short review of the homework on homework weeks and a short Q&A session about the previous material. This is an advanced class and there is a very large positive externality that comes with asking and answering questions in class. I extremely highly suggest asking question in person during class. Because both answering and asking questions is an integral part of being a professional economist, I expect all of you to both answer and ask question in class. If you ever feel uncomfortable speaking up in class but you believe that everybody could benefit from a clarification at the beginning of class, you can stop by during my office hours or email me and I can answer the questions in class.

I.E Email

Because this is a very equation-focused class and we will also cover graphical problems that are best answered in person, email should mostly be reserved for questions about logistical issues. Email me only to arrange appointments outside office hours or to present documentation to justify a future absence. In addition, I do not believe in providing asymmetric information. Any and all material and logistical announcements pertaining to the course will only take place in class. Do not email attachments unless you are specifically asked to do so. **I do not teach via email.**

Again, there is a very significant "positive externality" to class participation: your comments and questions benefit others when they are made during class time.

I.F Phone policy

No phones. They must be put away at the beginning of class unless I specifically ask you to take your phones out. Your phones will need to be securely put away and out of your during exams.

II Grading and Grading Policies

II.A Class Attendance

This is a graduate class and it is therefore both very quantitative and very fast-paced. In addition, because we only meet once a week, missing one lecture is equivalent to missing two lectures in a class that meets twice a week. Therefore, attendance is very important. You may be absent without providing a reason a maximum of one (1) time. Every subsequent unexcused absence will reduce your final grade by 3%.

The only excused reasons for absences will be medical absences, absences due to UTD sanctioned events (participation in a varsity event, ROTC, or other UTD sanctioned events), and absences because of visa/ green card/ citizenship interview/ court dates/ jury duty where you have to attend but you have no control over the scheduled date. You will need to provide official documentation for all excused absences.

II.B Assignments and Grading

There will be five homework assignments, a midterm exam and a final exam. Because the goal of the class is to prepare you for the qualifying examination, the final will be cumulative and it will receive comparatively more weight. The exams will typically consist of 3-5 questions and will be graded on a 0-100 point scale. Each question on the exams will have points clearly indicated on the exam itself.

Please note that the grade scale below is only an approximation. I may curve the raw scores at the very end of the semester. However, I will do that for the entire class. Because this is a required class for all PhD students, I will be using the exact same grading scale and exact same weights for all students and I will not offer extra credit opportunities during the semester or after

the semester ends. Collaborating on exams is strictly prohibited and any instances of academic integrity violations will be immediately reported.

The homework assignments will give you some extra practice with the models we cover in class. The homework will be graded on the “check-/ check/ check +” basis which corresponds to 60/80/100%.

- A check + means that you got all or almost of the assignment right, and there are only minor issues. A check + is equal to 100% and indicates high quality work that does not have many errors beyond minor algebraic mistakes.
- A check means that there were multiple errors on your assignment or you skipped one question and is equal to 80%.
- A check – means that there are multiple serious errors in all questions on your assignment, or you skipped multiple parts of the assignment. A check – is equal to 60%.
- All missed assignments will get a zero score.
- Assignments that are turned in late without arranging an extension will be subject to a 20% per day late submission penalty.
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I will also provide some additional practice questions before the final exam. Discussing and collaborating on the homework questions is permitted and highly encouraged, collaborating on exams is strictly prohibited (please see the academic dishonesty section for more details).

The weights for each assignment and the due dates are as follows

	Weight	Due date
Assignment 0	1%	Beginning of **second** class
Homework 1	4%	Beginning of **third** class
Homework 2	5%	Beginning of **fourth** class
Homework 3	5%	Beginning of **fifth** class (tentative)
Midterm (25%)	25%	Week 6 (tentative)
Homework 4	5%	TBA (Week 8 tentative)
Homework 5	5%	TBA
Final 50%	50%	TBA

In the interest of good course organization and fairness to all students, I try to follow clear procedures for submissions, deadlines, and extensions. Please read the following policies carefully and resolve any questions that you have early in the semester.

The late submission penalty is 20% per day.

Assignments 4 and 5 will be longer assignments. They may or may not incorporate parts that are based on current events and comparing current events to the predictions from our models. Depending on what is going on in the world October-December, the due dates for Homework 4 through Homework 5 might be pushed back by a few days, if there are big events happening contemporaneously that are related to the material covered in class. You should operate under the assumption that the due dates for all assignments are fixed. If I decide to push a due date back, you will be notified ahead of time. The due dates will never be earlier than the tentative due dates.

Because you will be taking your exams on paper, all assignments will also need to be turned in as hard copies. All assignments are due at the beginning of class as a hard copy. They can be typed or hand-written. Typed assignments are always acceptable. Questions that ask you to make a table or plot data will need to be typed. Each assignment will specify what parts need to be typed and what parts can be hand-written.

All assignments are due at the beginning of class. You will need to obtain my approval to be able to turn in an assignment by email. If you need to turn an assignment by email, I will reply to confirm that I have received your assignment within 24 hours. If you do not hear back from me, please email me again and forward your original email, or come and talk to me in person. If you need to email an assignment to me because of extenuating circumstances, the emailed assignment will need to be turned as a **typed single PDF file**. Other formats will not be accepted.

If you want to type out the assignments, I suggest using a Tex editor. Most economics papers are written using a Tex editor and you will need to learn how to use one at some point during your graduate career. I use TexWorks and Lyx but there are many other good editors. However, you do not have to use a Tex editor for this class if you don't want to commit to learning how to use one yet. Most Mac, Windows, and Linux word processors have acceptable equation editors and the ability to convert word documents to pdf with a single click (all you have to do in most word processors is select to save the file as a pdf when you save it). If you are not sure how to convert files to pdf on your computer, please stop by during my office hours and I will be happy to help you.

The homework assignments will be available at least a week before the due date.

The dates for the midterm and the final will be announced at least two weeks before the exam date.

Make sure to check the UTD website for the date for the final before you make any travel plans for winter break. I do not set the date for the final exam myself; they are set by the registrar.

III Academic Dishonesty

III.A UTD Guidelines

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends on the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrates a high standard of individual honor in his or her scholastic work.

Academic dishonesty can occur in any relation to any type of work submitted for academic credit or as a requirement for a class. It can include individual work or a group project. Academic dishonesty includes plagiarism, cheating, fabrication and collaboration/ collusion. In order to avoid academic dishonesty, it is important for students to fully understand the expectations of their professors. This is best accomplished by asking clarifying questions if an individual does not completely understand the requirements of an assignment.

Additional information related to academic dishonesty and tips on how to avoid dishonesty may be found here: http://www.utdallas.edu/deanofstudents/maintain

III.B Class specific guidelines collaboration on homework assignments

Collaboration and discussion are **permitted and encouraged.** However, students have to turn in individual assignments and need to disclose that they collaborated.

Disclosure should be included at the beginning of each assignment and should include the names of the collaborators. 1-2 sentences are more than sufficient. Examples include but are not limited to:

- On this assignment I collaborated with Jose Ruiz and Jane Smith. We discussed Questions 5 and 6 and we worked together on Question 2. All of the work I am turning is my own work.
- On this assignment I collaborated with Bob Doe, Nidhi Pande, and Li Zeng. We compared out answers to question 3. All of the work I am turning in is my own work.

III. C Exams

Collaboration and discussion during exams is **prohibited**. All exams are closed book closed notes. The use of cell phones, laptops, smart watches, or any electronic devices is explicitly prohibited unless prior arrangements have been made for students with a verified disability. Using unauthorized materials, writing on body parts, gesturing with classmates, sharing exam information, questions, or answers with other students are forms of academic dishonesty.

Comet Creed:

This creed was voted on by the UT Dallas student body in 2014. It is a standard that comets choose to live by and encourage others to do the same.

"As a Comet, I pledge honesty, integrity, and service in all that I do"

IV Course Outline and Tentative Course Schedule

The course outline is tentative. Since this is an advanced class, I reserve the right to amend the schedule. Any changes to the schedule will be announced in class.

1. Logistics and Review **(Class notes Part 1 Preliminaries)**
    a. Overview of the Syllabus and the class goals
    b. Review of basic macroeconomic definitions
    c. Review of basic macroeconomic data patterns
    d. Brief review of U.S. historical patterns: business cycles and growth

2. Mathematical Tools **(Class notes: Part 1 Preliminaries)**
    a. Difference equations and steady states
    b. Differential equations and steady states
    c. Unconstrained and constrained optimization
    d. Comparative Statics

3. Review of a static model with consumer optimization **(Class notes: Part 1 Preliminaries)**
    a. Consumers, utility functions, and labor supply
    b. Firms, profit maximization, and labor demand
    c. Competitive equilibrium and Pareto Optimum
    d. Changes in government spending:
        i. Graphical analysis
        ii. Comparative statics
4. Growth models without optimization **(Class notes: Part 1 Preliminaries + Romer Ch 1)**
    a. Production function properties and intensive form
    b. Evolution of capital and steady state determination
    c. Introducing technological progress
    d. Comparative statics: the effects of the savings rate on the steady states
    e. Speed of convergence to the steady state
    f. FYI detour: absolute and conditional convergence
    g. Extensions
        i. Discrete time
        ii. FYI: Overview of a Harrod Domar Model
        iii. FYI: Poverty trap model
    h. Critique of the Solow model: how well does it match the data?
5. Endogenous growth without optimization **(Class notes: Part 1 Preliminaries + Romer Ch 3)**
    a. AK model
    b. Human capital model

6. Consumer optimization **(Understanding Consumption and Savings Notes)**
    a. More on utility functions and important examples of utility functions and their properties, Lifetime utility: lifespan uncertainty, income uncertainty
    b. Dynamic optimization and Euler equations (Notes+ Romer Ch 7)
        i. 2 period Fisher model
        ii. Interest rates and consumption
        iii. Multi-period Fisher model: Euler equations and basics of Bellman equations

   c. Fisher model in continuous time
      i. Setting up and solving a Hamiltonian
   d. Fisher model in discrete time: more on Euler equations and the basics of Bellman equations

7. Growth models with consumer optimization **(Understanding Growth Notes+ Romer)**
   a. Cass/ Ramsey model
      i. Consumers
      ii. Firms
      iii. Steady states
      iv. Effects of government purchases
   b. Discrete time models and Bellman equations
      i. CE vs PO
      ii. Guess and verify method
      iii. Differentiable value functions
   c. Discrete time model with population growth
   d. Human capital growth model
   e. Human and physical capital growth model

8. Overlapping generations model **(Understanding Growth Notes + Romer)**