ECO 437H1S Quantitative Macroeconomics SYLLABUS

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Objectives: This course is intended for undergraduate students who intend to go to graduate school or work in academically oriented research departments. It teaches numerical methods for computing dynamic general equilibrium models to answer questions in macroeconomics. The students will learn computational techniques and programming in MATLAB (a widely used mathematical programming language) and use these techniques to solve optimization problems of economic agents, simulate their economic decisions, and find equilibrium of macroeconomic models. The central workhorse for the course will be the Neo-classical Growth Model, which will be solved in different variants.

Lectures: Thursdays 12-2 in SS1085. M1 in SS1085 will be used for make-ups.

Office Hours: My office hours are on Tuesdays 2:00pm-3:00pm in my office. Outside my office hours you can contact me via e-mail at burhan.kuruscu@utoronto.ca, *although* at busy times you will get a prompter response if you stop by during the office hours.

Required Material: You are required to purchase student version of **MATLAB**, which is available at $30.00 at the following links:

http://sites.utoronto.ca/ic/software/detail/matlabStudent.html

https://software.utoronto.ca/

E-mail list: You are automatically added to the class email list if you are registered for this course. This email list will be the main way I will make announcements and communicate with the class.

Blackboard: Please check the blackboard frequently for course materials and announcements.

Course Requirements and Grading

Two projects: The first project will be 15%, the second will be 30%, the final one will be 50% of the final grade. The first project can be done in groups of 2 or 3.

Class Participation: 5% of the final grade. You are required to bring your laptop Matlab installed to every class and replicate programs we study in the class.

You should feel comfortable to ask any questions if you cannot follow my lectures or you do not understand something.

Make-up: If a student misses a project deadline because of sickness, I will give them an extension by the number of sick days. However, students are required to a copy of a University of Toronto Medical certificate, stating the nature of the illness and the fact that the individual was too ill to work on the project. A copy of this certificate is available from your college registrars, health services or on the following website:

http://www.healthservice.utoronto.ca/pdfs/medcert.htm

Academic Integrity: Academic integrity is an essential part of education. Students should not conduct any scholastic dishonesty that will violate academic integrity. Scholastic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, falsifying academic records, and any act designed to give unfair academic advantage to the student, or the attempt to commit such an act.

Students with Disabilities: I will provide necessary accommodation to students with disabilities subject to university guidelines.

Tentative Schedule:

- Dynamic Programming and Analytical Solution Method
  - Cake eating problem
  - Finite Horizon Consumption-Saving Problem
  - Infinite Horizon Consumption-Saving Problems
  - Simple example using LOG utility

- Numerical Solution Method: Brute Force Discrete Space Dynamic Programming Method
  - Finite Horizon Consumption-Saving Problem
  - Infinite Horizon Consumption-Saving Problems
  - Simple example using LOG utility

- Non-stochastic Neo-Classical Growth Model
  - Planner's problem

- Stochastic Neo-Classical Growth Model
  - Discretizing an AR(1) process
  - Planner's problem

- Models with Heterogeneity and Incomplete Insurance Markets
  - Huggett, M. "The risk free rate in heterogeneous-agents, incomplete insurance economies," Journal of Economic Dynamics and Control, 1993, 17 (5/6), 953-970.
  - Aiyagari, S. R. "Uninsured idiosyncratic risk, and aggregate saving." Quarterly Journal of Economics, 1994, Vol 109, 659—684.

- Interpolation and optimization algorithms (if we have time)