School of Economics

Academic Year 2020-21
Term 2B

COMPUTATIONAL MACROECONOMICS: ECON 690

Class Time and Venue	: Tuesday 8:30am-11:45am, Venue TBA
Instructor Name	: Ismail Baydur
Email	: ismailb@smu.edu.sg
Tel	: 6828 0095
Office	: SOE 5074
Office Hours	: Thursday 2:00pm-4:00pm

COURSE DESCRIPTION

This course equips students with powerful computational tools to be used in macroeconomic analysis. Students learn how to solve macroeconomic models using computational methods, calibrate these models, and use calibrated models to address interesting questions in macroeconomics. While students are exposed to some basic macro models throughout the course, the main objective is computer implementation of these models, possibly with real data.

This course is part of the MSE QE track. Econ PhD students and non-Econ PhD students can enroll in this course. Econometrics 1, 2, and Macro 1 are NOT prerequisite.

I strongly recommend you to come to the class with your laptop for implementing in-class demonstrations.

ASSESSMENT METHODS

Class Participation	: 10%
Assignments	: 40%
Final Examination	: 50%
Total	**: 100%**

I will assign you four group assignments throughout the semester. Group sizes can be either two or three. The assignments will require the use of a programming language. You can choose one of the following programming languages- GNU Octave, MATLAB, Fortran, Julia, and R. I strongly recommend you to start with either GNU Octave or MATLAB, especially if this is your first experience with programming. I will also provide solutions to the assignments written in GNU Octave and MATLAB.

There is also take-home final examination. Different from the assignments, the final exam will be more comprehensive requiring you to use various tools developed throughout the semester. Note that there is a great support for all of these languages available online (e.g., www.stackoverflow.com). I encourage you to use these resources. We will also be covering topics in macroeconomics for which there are many well-written codes available. Please DO NOT use these outside sources without consulting me. I consider such actions as plagiarism and handle such cases accordingly. For details, please refer to the Academic Integrity section below.

ACADEMIC INTEGRITY

All acts of academic dishonesty (including, but not limited to, plagiarism, cheating, fabrication, facilitation of acts of academic dishonesty by others, unauthorized possession of exam questions, or tampering with the academic work of other students) are serious offences.

All work (whether oral or written) submitted for purposes of assessment must be the student's own work. Penalties for violation of the policy range from zero marks for the component assessment to expulsion, depending on the nature of the offense.

When in doubt, students should consult the instructors of the course. Details on the SMU Code of Academic Integrity may be accessed at http://www.smuscd.org/resources.html.

ACCESSIBILITY

SMU strives to make learning experiences accessible for all. If students anticipate or experience physical or academic barriers due to disability, please let the instructor know immediately. Students are also welcome to contact the university's disability services team if they have questions or concerns about academic provisions: included@smu.edu.sg.

Please be aware that the accessible tables in the seminar room should remain available for students who require them.

CLASS TIMINGS

Class sessions are of 3-hour duration per week. Each session will involve a lecture and a discussion of assignments and readings.

In addition to class sessions, you are encouraged to visit me during my consultation hours. I will be available in my office on Thursdays from 2:00pm to 4:00pm.

RECOMMENDED TEXT AND READINGS

There is no required textbook. I will provide my own lecture notes. You may find the following textbooks useful. I have placed a copy of each of them on reserve.

1- Recursive Macroeconomic Theory (2004) by Ljungqvist and Sargent, The MIT Press, 2nd Edition. (You may obtain the newer version.)
2- Applied Computational Economics and Finance (2002) by Miranda, The MIT press.
3- Numerical Methods in Economics (1998) by Judd, The MIT Press.

You may also read related articles and news reports in newspapers or magazines, e.g., Financial Times, Wall Street Journals, The Economist. For a broader and deeper analysis on current economic situation, you may read World Economic Outlook and Global Financial Stability Report published online by the World Bank and International Monetary Fund. *These reports are very helpful to find good research topics for your dissertation.*

WEEKLY LESSON PLAN (TENTATIVE)

Week		Topic
1		• Introduction to Quantitative Macro: Estimation vs. Calibration • Computation Basics
2		• Root Finding • Discretization *Assignment 1: Calibrating the basic DMP model and the volatility puzzle*
3		• Differentiation • Integration • (Un)constrained Optimization *Assignment 2: Application to a simple OLG model*
4		• Perturbation methods, linearization, and Dynare *Assignment 3: Application to a representative agent RBC model*
5		• Value/Policy function iteration *Assignment 4: Neoclassical growth model*
6		• Value/Policy function iteration with heterogeneous agents and incomplete markets • Speeding up with MATLAB executable (mex) files *Final Exam: TBA*