Department of Economics, Boston College
140 Commonwealth Avenue, Chestnut Hill, MA 02467

Course Syllabus

ECON 3393: Computational Methods in Macroeconomics

Spring 2026

Course Information

Course Title: Computational Methods in Macroeconomics

Course Number: ECON 3393

Instructor: Paul D. McNelis, S.J. ('70–MCAS)

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Office: O'Neill 563 (South end; enter door 528, turn left at the first corridor, office at the end on the right)

Office Hours: Monday and Wednesday, 3:30–5:30 PM

Graduate Assistant: Rodolfo Lazaro (lazaroro@bc.edu)

Class Time: Tuesday and Thursday, 9:00–10:15 AM

Class Location: Campion 236

First Class: January 13, 2026

Last Class: April 30, 2026

Spring Break: March 3 and 5 (no class)

Note: No class on April 3 (Holy Thursday) and April 21 (Monday class schedule followed)

Final Project Due: May 10, 2026

Course Description

This course examines familiar macroeconomic models in a computational setting, including the Keynesian IS-LM model of a closed economy, the Dornbusch model of exchange rates, and both classical and new growth models. We also explore the Romer model of growth and William Nordhaus's DICE (Dynamically Integrated Climate Economy) model.

Required Textbook

Bongers, A., Gomez, T., and Torres, J.L. (2019). *An Introduction to Computational Macroeconomics.*
Available at: Amazon
Throughout the course, we refer to this textbook as **BGT**.

Key Questions

The central focus of this course is: *What can we learn, and learn more sharply, from models once we calibrate them and run them on a computer?* In other words, we want to subject these familiar models to "computational experiments." In particular, do the models help us understand familiar patterns in macroeconomic data? Can these models help us assess the macroeconomic effects of counterfactual policies? We are learning to do theory on the computer.

Models, of course, are used for forecasting—that is the domain of econometrics. We will examine data, even large datasets, but we want to explain patterns and discuss policy, not forecast or assess statistical significance of coefficients. We also need to remember that macroeconomics is a *data-challenged* discipline. Most macro datasets are quarterly or monthly. For the Euro Area, for example, there are only 24 years of quarterly or monthly data since the Euro started in 2000. Would the NIH take any research seriously if medical procedures were proposed on the basis of 100 quarterly observations? Bottom line: we are a *data-challenged* discipline, and we need to examine the implications of different models for policy formulation.

Course Objectives

By the end of this course, students will have developed:

- The ability to implement and extend familiar macroeconomic models in a computational setting
- An understanding of how political and economic structures interact through comparing models with the experience of different countries
- The ability to present computational experiment results with visual graphics for enhanced understanding
- The ability to collaborate in class subgroups to develop clear, concise presentations
- An appreciation for collaborative research and group learning—economics is, after all, a *social* science

Coding and Computational Tools

- In class, I will demonstrate examples using Excel, the simplest method, but students are free to use other programming languages and tools.
- The world of computational macroeconomics has become polyglot. Tools like ChatGPT can assist with coding, making the technical barriers less daunting. To keep things accessible, we will start with Excel. Students who wish to use other tools are welcome to consult with me or the graduate assistant.
- This is **not** a course in coding. As AI develops, tools like ChatGPT and Copilot will increasingly handle coding tasks. There is no need to be anxious about Julia, MATLAB, Python, or Stata.
- The key skills are identifying the issues we bring to computational experiments and interpreting the results.

Course Policies

Attendance

- Class participation is essential for making this course work well for you.
- I understand that students may need to miss class for religious observances or illness. All classes will be recorded.
- Except in last-minute emergencies, cultivate the professional habit of notifying your "team leader" if you cannot make it to meetings (or class).
- Students should arrive prior to the start of class. Occasional late arrivals are understandable, but chronic tardiness can be distracting to fellow students.

Class Decorum

- Drinking coffee or soft drinks is permitted, but please do not use class as a mealtime. Eating in class is a distraction to other students. (Or bring enough to share with everyone!)
- Electronic notebooks are recommended, but should be used only for accessing classroom material. Engaging in social texting or internet browsing during class is distracting to others.

Late Work

- Meeting deadlines is important in the real world. Students are expected to complete their projects on time, except for reasonable mitigating circumstances.
- If a deadline cannot be met, students should request an extension *in writing*. This is professional etiquette.

Academic Integrity

- Using ChatGPT or similar tools to help with coding or finding references (if properly verified) is encouraged.
- The write-up of results should be original work with proper citations. Remember that ChatGPT is subject to AI *hallucination*.
- For the full university academic integrity policy, see: BC Academic Integrity Policies

Disability Accommodations

All students are welcome in this class. If you require accommodations, please contact the Office for Student Services.

Course Requirements and Grading

Written Assignments (80%)

There will be three essays, each 5–10 pages, presenting the results of "computational experiments" with the models we analyze (or alternative models).

- Assignments may be co-authored with up to two other students (groups of three maximum).
- **First Assignment (20%):** Due February 26, 2026
  - Short précis due February 21, 2026
- **Second Assignment (30%):** Due March 31, 2026

  - Short précis due March 24, 2026

- **Final Assignment (30%):** Due May 10, 2026
  - Short précis due May 3, 2026

For the final assignment, students have the option of using the Macromodelbase for online macro-model comparison. This project can compare one model under a monetary or fiscal change under two policy rules, or two models for one policy change and one policy rule. The Macromodelbase project is supported by the Sloan Foundation and based at the Goethe Institute in Frankfurt. It is frequently used by European Central Bank (ECB) policy advisors.

Class Participation (20%)

Class participation includes regular submission of progress reports on the three written assignments. Progress reports should include data sources and key questions being investigated. When assignments are submitted, there will be opportunities to critique and learn from one another's work. Students are encouraged to discuss their progress with me or the graduate assistant.

Note on Assignments

- If working in a group, only one student should submit the assignment, but ensure all names appear at the top.
- Give your assignments interesting, descriptive titles—not simply "Assignment 1."
- **Never copy and paste raw spreadsheet results.** That is like showing your dirty pots and pans to a dinner guest! Make your essays informative, interesting, and visually appealing.
- While most assignments will address topics discussed in class, students with special interests may discuss alternatives with me. However, avoid wandering too far from the material covered. The purpose is to assess the usefulness of the models for policy, which means working *with* the models.

Course Outline (Tentative)

Classes 1–2: Introduction to Models (**BGT** Ch. 1)

Classes 3–6: The IS-LM Model (**BGT** Ch. 2)

Classes 6–14: Dornbusch Model of Exchange Rate Instability (**BGT** Ch. 3, plus lecture and Jupyter notebook)

First Assignment Due: February 26

Classes 12–16: Consumption-Saving Decision (**BGT** Ch. 3–5)

Classes 17–20: Fiscal Policy (**BGT** Ch. 6)

Classes 21–22: Tobin's Q and Investment (**BGT** Ch. 7)

Second Assignment Due: March 31

Classes 22–24: Growth, Optimal Growth, and Environment (**BGT** Ch. 8–9)

Classes 24–28: Summary of Modeling Strategies and Insights

Final Assignment Due: May 10

Alternative Computational Codes

In addition to the spreadsheets used in class, I will post alternative coding methods for many topics on my GitHub page: github.com/mcnelis-cmml. These codes make use of both Dynare and Julia with Jupyter notebooks. Using these codes is purely optional. While such coding may initially appear daunting, we are living in the age of AI, with tools like ChatGPT and Claude.ai to help us along.

Welcome to ECON 3393! I look forward to an engaging semester of computational exploration in macroeconomics.