GECO 6202: Advanced Macroeconomics 1
Syllabus for Tutorial Sessions ("labs")

Teaching Assistant:
Anthony Bonen
bonea539@newschool.edu

Office hours:
Room: D-1129A
Friday, 2:00-4:00pm

Time & Location:
Fridays 6:00-8:50pm
Room D-902

Overview:
This tutorial session is structured to complement, but not overlap, with the Advanced Macroeconomic I lecture. Focus will be on comprehension of the theory and modeling in Taylor's *Reconstructing Macroeconomics* [*RM*] through the use, primarily, of ordinary differential equations (ODEs) and simple systems of ODEs. Dynamic optimization will be studied via the Ramsey model. Systems of difference equations will also be covered, along with an introduction to dynamic programming.

Attention will also be paid to Social Accounting Matrices and growth accounting. An effort will be made to connect, as much as possible, the aforementioned mathematical concepts with the critical analysis of *RM*. The final weeks will focus on the application of the mathematical techniques learned to the structuralist proposals in the final four chapters of *RM*.

Math Background:
Despite the technical focus of the tutorial students *require* knowledge only of basic calculus and some matrix algebra (e.g., determinants, inversion, row reduction, etc).

Note on course rearrangement:
The TA will be away the week of October 7-11th. Dr. Vellupillai will hold a lecture during the lab slot on Friday, 11 October. During the lecture slot the following week (16 Oct.) a review class (if desired) will be held by the TA in preparation for the midterm on 18 October.

Course Grading:
45% - Final Exam
25% - Midterm Exam
20% - Lab Assignments
10% - Participation

Assignments:
There will be four assignments given throughout the semester. Each will be graded out of 20. The total weight in your final grade for the course of these 4 assignments will be 20%. So long as you submit your assignment will *attempted* answers to each question you will be guaranteed 10/20 on the assignment. Assignments will be due in the labs (Friday evenings). Late assignments will not be accepted.

Required Text:

[RM]
Taylor, Lance (2004). *Reconstructing Macroeconomics: Structuralist Proposals and Critiques of the Mainstream*. Harvard University Press.

Recommended Mathematical Texts:

Boyce, William and Richard DiPrima (2009). *Elementary Differential Equations and Boundary Value Problems, 9th Edition*. John Wiley & Sons.

Chiang, Alpha & Kevin Wainright (2004). *Fundamental Methods of Mathematical Economics, 4th Edition*. McGraw-Hill.

Gandolfo, Giancarlo (2010). *Economic Dynamics, 4th Edition*. Springer.

Hirsch, Morris, Stephen Smale and Robert Devaney (2004). *Differential Equations, Dynamical Systems and an Introduction to Chaos, 2nd Edition*.

Medio, Alfredo and Marji Lines (2001). *Nonlinear Dynamics: A Primer*. Cambridge University Press.

Shone, Ronald (2002). *Economic Dynamics: Phase Diagrams and their Economic Application, 2nd Edition*. Cambridge University Press.

Mathematical Appendix to:
Barrow, Robert and Xaviar Sala-i-Martin (2004). *Economic Growth, 2nd Edition*. MIT Press.

Outline

1. Social Accounting Matrices and Stock-Flow Consistency
   [30 Aug 2013]
   - Chapter 1 of *RM*

2. Price Systems and Growth Accounting
   [6 Sept 2013]
   - Sections 1-7 in Chapter 2 of *RM*

3. Ordinary Differential Equations (ODE): Introduction, Solving methods, Nonlinearities and Linearization
   [20 Sept 2013]
   - No readings from *RM*
   - Read a math text introducing differential equations (e.g. Chiang & Wainwright, ch. 15; Shone ch. 2)
   - **Assignment 1 Due**

4. ODE II: Higher Order ODEs, Systems of ODEs (simultaneous equations), Eigenvalues, Eigenvectors and Dynamics
   [27 Sept 2013]
   - Read math text on Systems of ODEs (e.g. Shone, ch. 4; Barro & Sala-i-Martin mathematical appendix, section A.1)

5. Optimal Control Theory
   [4 Oct 2013]
   - Sections 5-7 in Ch. 3 of *RM*
   - Read math text on Optimal Control Theory (e.g. Shone, ch. 6; Barro & Sala-i-Martin mathematical appendix, section A.2)

6. Midterm Review Class
   [16 Oct 2013 – during lecture slot: Wed. 4-5:50pm]
   - No Readings – email questions ahead of time
   - **Assignment 2 Due**

MIDTERM
[18 Oct 2013]

7. Difference Equations and Systems of Difference Equations
   [25 Oct 2013]
   - No readings from *RM*
   - Read math text on solving 1^{st}-, 2^{nd} -order difference equations and basic systems (e.g. Shone, ch. 3; Chiang & Wainwright, ch. 17)

8. Math Review Class
   [1 Nov 2013]
   - *Suggested*: Chapter 6 of *RM*, "Chicago, Monetarism, New Classical Macro and Mainstream Finance"
   - Covering material from previous 4 Labs
   - Discussing midterm (assuming it is corrected by this point)

Exact Content of Sessions 9-12 TBD

9. Genus of Cycles
   [8 Nov 2013]
   - Chapter 9 of *RM*
   - **Assignment 3 Due**

10. Model Closures
    [15 Nov 2013]
    - Chapter 5 of *RM*

11. Effective Demand and the Distribution Curve
    [15 Nov 2013]
    - Chapter 7 of *RM*

12. Structuralist Finance and Money
    [22 Nov 2013]
    - Chapter 8 of *RM*
    - **Assignment 4 Due**

13. Course Review Class
    [6 Dec 2013]
    - No Readings – email questions ahead of time

FINAL EXAM
[13 Dec 2013]

Other Options:

More on Optimal Control III: Discrete Time Systems and an Introduction to the Bellman Equation
- Sections 7-8 in Ch. 6 of *RM*, "Chicago, Monetarism, New Classical Macro and Mainstream Finance"

An Introduction to Chaos Theory
- Math texts (e.g. Shone ch. 7)