Course Description:
This class follows the first year PhD macro sequence, Econ 501 and 502, and the class on advanced quantitative methods in economics, Econ 5121. The goal of this course is to (1) introduce the students to modern quantitative macroeconomics, and (2) prepare students to solve recent quantitative model in macroeconomics. Applications include models with rich heterogeneity across agents and firms, aggregate fluctuations, and transitional dynamics. This course will require intensive computational work by students. Although this is not a programming class, some knowledge of computer programming is necessary. If you do not know how to program you will need to work harder. You are free to use whatever programming language you feel comfortable with.

Text(s): We will use several lecture notes available online. However, a good reference is the book Dynamic “General Equilibrium Modeling: Computational Methods and Applications,” by Burkhard Heer and Alfred Maussner.

Grade Distribution: Your grade will be based on your grades in the homework assignments and a short final project.

Course Policies:
• Labs and Assignments
  – Students are expected to work independently. Offering and accepting solutions
from others is an act of plagiarism, which is a serious offense and all involved parties will be penalized according to the Academic Honesty Policy. Discussion amongst students is encouraged, but when in doubt, direct your questions to the professor, tutor, or lab assistant.

- No late assignments will be accepted under any circumstances.

- Attendance and Absences
  - Attendance is expected at each class.
  - Students are responsible for all missed work, regardless of the reason for absence. It is also the absentee’s responsibility to get all missing notes or materials.

Tentative Course Outline:
The weekly coverage might change as it depends on the progress of the class.

<table>
<thead>
<tr>
<th>Week</th>
<th>Content</th>
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| Jan 17 | • Why we do quantitative macroeconomics.  
         • Discussion of Final Projects.  
         • Solving the deterministic Growth Model.  
         • Extended Path Method.  
         • Transitions: Hansen and Prescott (2002). |
| Jan 24 | • Business Cycles.  
         • Investment-Specific Technological Progress. Greenwood, Hercowitz, and Huffman (1988).  
         • Discrete-State-Space Dynamic Programming Problem.  
         • Computing the model’s statistics |
| Jan 31 | • Households Heterogeneity in Macroeconomics. Why?  
         • Data sets. |
         • Solving the Household’s Problem under Uncertainty.  
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<tr>
<th>Date</th>
<th>Topics</th>
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| Feb 14     | • Computing the Stationary Distribution and GE  
• Monte Carlo and the invariant density function.  
• Aiyagari. Solving for $r^*$.  
• Hansen and Imrohoroglu (1992)                   |
| Feb 21     | • Recent models of debt and default  
  – Unsecured debt.  
  – Mortgages.  
  – Sovereign default.                             |
| Feb 28     | • Idiosyncratic and Aggregate Risk.  
• “MIT shocks”.  
• Krusell and Smith (1998)                         |
| March 7    | • Firms Heterogeneity in Macroeconomics.  
| March 21   | • Firms, Finance, and Default.  
• Gomes (2001).  
• Hennessy and Whited (2007).  
• Gomes and Schmid (2010), Arellano, Bai, and Zhang (2012). |
| March 28   | • Firms and Contracts  
• Albuquerque and Hopenhayn (2004)  
• Clementi and Hopenhayn (2006)  
• Cole, Greenwood, Sanchez (2016)               |
| April 4    | • Firms and Aggregate Fluctuations.  
• Khan, Senga, and Thomas (2013).  
• Clementi and Palazzo (2016).                  |
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<th>April 11</th>
<th>• Review Session.</th>
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<tr>
<td>April 18</td>
<td>• Presentation of Final Projects I.</td>
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<tr>
<td>April 25</td>
<td>• Presentation of Final Projects II.</td>
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