Course Instructor: Daniele Tavani, Associate Professor, C310 Clark
email: Daniele.Tavani@colostate.edu
Office Hours: MW 2.30-3.30pm, or by appointment
Class meets: MWF 11-11.50 WAGAR 107B

1 Course Description and Learning Objectives

This course will survey selected contemporary topics in macroeconomic research, treated from a general and rigorously mathematical standpoint. Emphasis will be put on developing analytical and modeling skills that will enable the interested student to approach problems as close as possible to the research frontier, as well as to contribute originally to these research fields, either theoretically or empirically.

The course will focus on the following areas: i) growth theory and policy; ii) growth and inequality; iii) theories of structural and frictional unemployment, unemployment policy, and growth models that account for unemployment. Most of these topics have common methodological features, which are to be found in standard dynamic optimization techniques —optimal control theory and dynamic programming in particular. Therefore, we will pay some attention to developing such techniques in a way that is as rigorous as possible given the time constraints.

2 Texts

Topics will be selected among the following books, and/or journal articles that will be distributed through Canvas. Starred items in the following list feature required readings for the course. Additional lecture notes may be provided through Canvas at the instructor's discretion.

(Recommended) Acemoglu, Daron, 2009 (referred to as A in what follows). *Introduction to Modern Economic Growth*, Princeton.
(REQUIRED) Aghion, Philippe, and Peter Howitt, 2009 (AH). *The Economics of Growth*, MIT Press.
(REQUIRED) Bagliano, F.C., and Bertola, G., 2007 (B). *Models for Dynamic Macroeconomics*, Oxford.
(Recommended) Barro, Robert, and Xavier Sala-i-Martin, 2004 (BSM). *Economic Growth*, MIT Press.
(Recommended) Pissarides, Christopher, 2000 (P). *Equilibrium Unemployment Theory*, MIT Press.

3 Required Work

The final grade will be a weighted average of the score you'll obtain in weekly problem sets (40%), a take–home midterm exam (30%), and an in–class final exam (30%).

The table below lists expectations about the contact hours for the various activities involved in this class.

3.1 Exams

Two midterm exams: 10/13/2017 (20% of the grade) and 11/17/2017 (20% of the grade). An in-class final exam (20% of the grade). According to the University Calendar, the final exam will take place December 14, 4:10-6:10p, in WAGAR 107B. All exams will be open book – open notes.

Activity	Contact Hours/week
Attend class	2.5
Read assigned readings	3.0
Review class notes	2.0
Work on problem sets	3.5
Study for exams	2.0
Total	**11.0**

3.2 Problem Sets

Approximately 9 problem sets that will be posted on Canvas and due at class time by the specified due date (40% of the grade).

Collaboration on the problem sets is allowed. However, free riding on other students' work will be sanctioned.

Tentative problem set due dates (typically Fridays, date changes will be communicated through Canvas):

PSet 1: 9/8	PSet 2: 9/15,	Pset 3: 9/29,	PSet 4: 10/6
PSet 5: 10/20,	Pset 6: 10/27	PSet 7: 11/10,	PSet 8: 12/1
PSet 9: 12/8			

Variations in the due date of the problem sets and/or midterm exams schedule depend on the actual progress made in class, and will be promptly communicated through Canvas.

3.3 Class Participation

This course's nature is that of a seminar class, and students are expected to participate actively to the discussion. Class participation is useful because it raises the level of the interaction, other than inspiring research ideas. It is always a good idea to take a look at the readings before class in order to enhance the learning experience.

4 Make up Policy

You must be able to provide written evidence of any medical or family emergency which causes you to unexpectedly miss either of the midterms or the final exam as scheduled. In case no such evidence is provided, and you miss an exam, you will receive 0 points for it.

Alternative due dates for problem sets can be negotiated in advance with me, but they will apply to the whole class.

5 Academic Integrity

Academic misconduct like cheating, plagiarism, etc., will be taken very seriously in this course, and can lead to an overall F grade. Plagiarism, for instance, includes quoting sources while writing a paper without referencing them. I will strictly follow university policies relating to academic misconduct. See http://www.facultycouncil.colostate.edu/files/manual/sectioni.htm#I.5.

6 Accomodation for Disability

Reasonable requests for accomodation to disabilities will be entertained. However, students are responsible for requesting accommodations in a timely manner and must be recognized as eligible for the accommodation through Resources for Disabled Students (RDS). For more information see http://rds.colostate.edu/index.asp.

7 Title IX Information

CSUs Discrimination, Harassment, Sexual Harassment, Sexual Misconduct, Domestic Violence, Dating Violence, Stalking, and Retaliation policy designates faculty and employees of the University as "Responsible Employees. This designation is consistent with federal law and guidance, and requires faculty to report information regarding students who may have experienced any form of sexual harassment, sexual misconduct, relationship violence, stalking or retaliation. This includes information shared with faculty in person, electronic communications or in class assignments. As "Responsible Employees, faculty may refer students to campus resources (see below), together with informing the Office of Support and Safety Assessment to help ensure student safety and welfare. Information regarding sexual harassment, sexual misconduct, relationship violence, stalking and retaliation is treated with the greatest degree of confidentiality possible while also ensuring student and campus safety.

- Any student who may be the victim of sexual harassment, sexual misconduct, relationship violence, stalking or retaliation is encouraged to report to CSU through one or more of the following resources:
  - Emergency Response 911
  - Deputy Title IX Coordinator/Office of Support and Safety Assessment (970) 491-1350
  - Colorado State University Police Department (non-emergency) (970) 491-6425

For counseling support and assistance, please see the CSU Health Network, which includes a variety of counseling services that can be accessed at:http://www.health.colostate.edu.And, the Sexual Assault Victim Assistance Team is a confidential student resource that does not have a reporting requirement and that can be of great help to students who have experienced sexual assault. The web address is http://www.wgac.colostate.edu/need-help-support.

8 Topics

Below you will find a tentative (but extremely ambitious) list of topics. Some topics will likely take more than a week, and therefore it may be difficult to get to cover all the topics listed. Also, please note that the following list is tentative. Thus, topics may be changed and/or dropped according to how the class progresses, and according to students' interest.

Part 1. Economic Growth

Topic 1. Stylized facts of economic growth. World income distribution (A 1-4, AH Introduction, BSM Introduction and Chapter 1). Readings:

Jones, Charles, and Paul Romer (2010). "The New Kaldor Facts: Ideas, Institutions, Population, and Human Capital," forthcoming, *American Economic Journal*, Macroeconomics.

Jones, Charles (1997), On The Evolution of the World Income Distribution, *Journal of Economic Perspectives* vol. 11, pp. 19-.

Acemoglu, D., and Ventura, J., 2002. "The world income distribution". *Quarterly Journal of Economics*, 117: 659-694.

Topic 2. Review of Dynamic Optimization in continuous time: Optimal Control Theory. The basic Neoclassical Growth model as an example (AH Appendix of Chapter 1, A 5, 7.5, 8, BSM 2, Appendix A.3). Systems of Differential Equations. Linearization. Stability.

Topic 3. Toward Endogenous Growth: AK, Human Capital. (A 13, 14, AH 13, BSM 4, 5.). Reading: Lucas, Robert 1988. 'On the Mechanics of Economic Development'. Journal of Monetary Economics.

Topic 4. Endogenous Technical Change I: Expanding Product Variety. (A 13, AH 3, BSM 6).

Topic 5. Endogenous Technical Change II: Expanding Product Quality (A 14, AH 4). Reading:

Segerstrom, Paul [1998], Endogenous Growth without Scale Effects, *American Economic Review*, December, pp. 1290-1310.

Topic 6. Credit Constraints, Inequality and Growth (AH 6). Readings:

Galor, Oded, and J. Zeira (1993) 'Income Distribution and Macroeconomics. *Review of Economic Studies* 6- No.1: 35-52.

Alesina, Alberto, and Dani Rodrik (1994) 'Distributive Policies and Economic Growth'. *Quarterly Journal of Economics* 109:465-490.

Jones, Charles (2015) Pareto and Piketty: The Macroeconomics of Top Income and Wealth Inequality. Journal of Economic Perspectives, Winter Volume 29 (1), pp. 29-46.

Persson, T., and Tabellini, G. (1994)'Is Inequality Harmful for Growth?' *American Economic Review* 84: 600-621.

Topic 7. Directed Technical Change I: Early models. Readings:

Drandakis, E.M, and Edmund Phelps [1965]. 'A Model of Induced Invention, Growth and Distribution'. *The Economic Journal*, Vol. 76, No. 304: 823-840.

Kennedy, Charles [1964] 'Induced Bias in Innovation and the Theory of Distribution'. *Economic Journal*, Vol. 74: 541-47.

Nordhaus, William [1967]. 'The Optimal Rate and Direction of Technical Change', in Shell, Karl, ed. *Essays on the Theory of Optimal Economic Growth*. Cambridge, MA: The M.I.T. Press.

Nordhaus, William [1973] 'Some Skeptical Thoughts on the Theory of Induced Innovation'. *Quarterly Journal of Economics*, Vol. 87, No. 2: 208-219.

Topic 8. Directed Technical Change II: Contemporary Models: Labor and Capital, Heterogeneous Labor (A 15, AH 8, SP3). Readings:

Acemoglu, Daron (2003) Labor- and Capital-Augmenting Technical Change *Journal of the European Economic Association*, 1, 1-37.

Acemoglu, Daron (2002) Directed Technical Change *Review of Economic Studies*, 69, 781-810.

Topic 9. Institutions and Growth (AH 11, A 22). Readings:

Acemoglu, D., Johnson, S., Robinson, J., 2001. "The colonial origins of comparative development: an empirical investigation". *American Economic Review*, 91: 1369–1401.

Acemoglu, D;, Johnson, S., Robinson, J., 2005. "Institutions as the fundamental cause of long–run growth". In Aghion, P., and Durlauf, S. (eds.) *Handbook of Economic Growth*. Elsevier.

Acemoglu, D;, Johnson, S., Robinson, J., 2005. "The rise of Europe: Atlantic trade, institutional change and economic growth". *American Economic Review* 95: 546-579.

Topic 10. (as time permits) Population and Growth. Economic Growth and Demographic Change. The Demographic Transition. Human capital-based Models of Population and Growth (G 1-3, 5). Additional readings: TBA.

Topic 11. (as time permits) Life and Growth. Jones, C., 'Life and Growth'. Journal of Political Economy, April 2016, Vol. 124 (2), pp. 539-578.

Topic 12. (as time permits) The diffusion of technology (A 18, BSM 3.3 and 8). Additional Readings:

Krugman, Paul (1979). A Model of Innovation, Technology Transfer, and the World Distribution of Income, *Journal of Political Economy* 87, 253-66.

Part 2. Dynamic Models of Investment

Topic 13. Optimal investment decisions by firm. Tobin's q. Phase diagram and adjustment paths. Valuation of capital stock. Dynamic IS-LM models (B 2).

Part 3. Equilibrium Unemployment

Topic 14. Equilibrium Unemployment Theory I: Efficiency Wages. Reading:

Shapiro, Carl, and Joseph Stiglitz (1984). Equilibrium Unemployment as a Workers Discipline Device. *American Economic Review* Vol. 74, No. 3: 433- 444.

Topic 15. Equilibrium Unemployment Theory II: Matching Models (B4, P 1-3)

Topic 16. (as time permits) Endogenous Job Destruction. Long-Run Equilibrium and Balanced Growth with Unemployment (P2,3). Additional Readings:

Aghion, P. and P. Howitt (1994), Growth and Unemployment, *Review of Economic Studies* 61: 477-94.

Mortensen D. and C. Pissarides (1998), Technological Progress, Job Creation and Job Destruction, *Review of Economic Dynamics* 1: 733- 753.

Part 4. Coordination Problems and Externalities in Macroeconomics

Topic 17. (as time permits) Trading externalities and multiple equilibria: the Diamond (1982) model of equilibrium search. Money in search equilibrium: the Kyotaki–Wright (1993) model (B5). The Cooper and John (1988) model of coordination problems in Macroeconomics.