Instructor: Abigail Devereaux, abigail.devereaux@gmail.com
Term: Fall 2017
Office Hours: Thursday 4:30pm – 6:30pm, Buchanan Hall D167-1 (Economics Department) and by appointment
Classroom: Music (MTA) 1006, Fairfax Campus
Class Website: Blackboard (mymasonportal.gmu.edu)

ECON 412: Game Theory and Institutions

Summary: Can we plan for the future and act in the present without rules of private property? How do social norms guide action and strategic decision-making? Rules and strategies of behavior are the means by which agents achieve their ends, but agents do not act in a vacuum. Agents follow rules and engage in strategic behavior on a social landscape, where they operate within particular social configurations and are both subject to and benefit from institutions that guide and restrict behavior. In this course, we contextualize and broaden agent behavior by understanding how strategic behavior and social landscapes affect behavior, trade and coordination.

Basic Expectations: This is a class for advanced undergraduates. The goal of this course is to prepare you for research work, whether in industry, government, or applied to a future graduate program. You are expected to be thoroughly literate in intermediate macro and micro using basic calculus and probability. I expect students to keep up with all readings and assignments, to attend all classes (unless in case of emergency), and to present research on a topic in which you are interested by the end of the course.

Software Tools: NetLogo 5+ (required)

Books:
   Required
      1. Tadelis, S. (2013). *Game theory: an introduction*. Princeton University Press.
      2. Excerpts from Axelrod's *The Evolution of Cooperation*:
         http://www2.econ.iastate.edu/tesfatsi/Axelrod_Evol_of_Coop_excerpts.pdf
   Recommended
      1. Wilensky, U., & Rand, W. (2015). *An introduction to agent-based modeling: modeling natural, social, and engineered complex systems with NetLogo*. MIT Press.

Final Project: Each student must develop and present a final project. Students may team up with <u>one</u> other student if they wish. The project consists of four parts, due during the second half of the course: (1) a general topic (ex., "Game Theory and Bitcoin Transactions") accompanied by a five-article literature review (scholarly articles only), (2) a proposal with a long abstract, hypotheses, and method, (3) a presentation, to be given during the last class, and (4) a 15-page (not including references) paper, due by the end of our class's final exam period.

Grading: Homework counts for 35% of your total grade, dispersed over 3-4 assignments. The final project is worth a total 60%, composed of topic and literature review (15%), proposal (15%), in-class presentation (15%), and paper (15%). Attendance and participation is worth 5%. Each student's grade is a reflection of his/her own knowledge and effort and not of class-wide performance.

Grading Scale:
A: 93-100   A-: 90-92   B+:85-89   B: 80-84   B-:75-79   C+:70-74
C: 67-69   C-: 64-66   D: 60-63   F: <60

Late homework/projects: Late homework is accepted but will have a letter grade deducted for each day it is late. Teaming up to go through the homework is fine, but each student's work must be his/her own. A late (1) project presentation and/or (2) project paper will not be accepted.

Additional Information:
Honor Code: Students must adhere to the honor code of George Mason University. Cheating will not be tolerated in this class. George Mason University has an Honor Code, which requires all members of this community to maintain the highest standards of academic honesty and integrity. Cheating, plagiarism, lying, and stealing are all prohibited. All violations of the Honor Code will be reported to the Honor Committee.

Disability Resource Center: If you are a student with a disability and you need academic accommodations, please see me and contact the Disability Resource Center (DRC) at 703-993-2474. All academic accommodations must be arranged through that office.

FALL 2017 COURSE SCHEDULE
(subject to change)

PART I: The Mathematical Foundations of Game Theory

WEEK 0 – Introduction and Review of Rational Choice

Depending on your level, you may need to catch up to the content level of the course by reviewing **Tadelis, Chs 1-2**. Please take a look at the Mathematical Appendix (**Tadelis, Chapter 18**) to make sure that you can handle the level of math expected in the course.

WEEK 1 – Normal-form Games, Matrix Representations, and Solution Concepts

Readings: Tadelis, Ch 3
WEEK 2 – Rationality and Common Knowledge

Readings: Tadelis, Ch 4
Homework 1: Exercises from Chs 3-4, due Week 4

WEEK 3 – Nash Equilibrium

Readings: Tadelis, Ch 5

WEEK 4 – Mixed Strategies

Readings: Tadelis, Ch 6
Due: Homework 1
Homework 2: Exercises from Chs 5-6, due Week 6

WEEK 5 – Games that Unfold Over Time

Readings: Tadelis, Ch 7

WEEK 6 – Credibility and Sequential Rationality

Readings: Tadelis, Ch. 8
Due: Homework 2
Homework 3 and 4: Exercises from Chs 7-9, due Week 8

WEEK 7 – Multistage Games

Readings: Tadelis, Ch. 9

WEEK 8: GUEST LECTURE

Readings: TBA
Homework 5 (ungraded): Install NetLogo, complete NetLogo tutorial. Due Week 9.

PART II: Multi-agent Games and the Emergence of Institutions

WEEKS 9-10 – Introduction to Multi-Agent Systems

Readings:
Axelrod, Chs 1, 2, 9

Schelling 1971:
https://www.stat.berkeley.edu/~aldous/157/Papers/Schelling_Seg_Models.pdf
Arthur 1994: http://tuvalu.santafe.edu/~wbarthur/Papers/El_Farol.pdf

NetLogo:
1. File -> Models Library -> Social Science -> Segregation
2. File -> Models Library -> Social Science -> unverified -> PD Basic Evolutionary
3. File -> Models Library -> Social Science -> El Farol

Project Part 1: Project topic and literature review, due Week 10.
Project Part 2: Project proposal, due Week 12
Due: Project Part 1 (Project topic and literature review)

WEEK 11 – Games on Networks, and the Emergence of Institutions Through Gameplay

Readings:
Axelrod (1986): http://www-personal.umich.edu/~axe/Axelrod%20Norms%20APSR%201986%20(2).pdf
Ostrom (2010): https://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/2009/ostrom_lecture.pdf
Selections from Jackson and Zenou (2014): TBA

NetLogo:
1. File -> Models Library -> Social Science -> Language Change
2. TBA

Project Part 3: Project presentation, due Week 14

WEEK 12 – NO CLASS: WORK ON PROJECT
Due: Project Part 2 (Project proposal)

WEEK 13 – Simple Learning and Multi-Agent Learning (MAL)

Readings: TBA

WEEK 14 – Student Presentations
Due: Project Part 3 (Project presentation)

FINAL PROJECT PAPER: Due by the end of the final exam period.