COURSE AND CONTACT INFORMATION
Course: ECON 6395 Game Theory
Section 15 (CRN XXXXX)
Semester: Fall 2017
Time: Tuesday 6:10 pm – 8:40 pm
Location: TBD

INSTRUCTOR
Name: Dr. Elena S. Patel
Campus Address: Department of Economics
Monroe 340
2115 G St., NW, Washington, DC 20052
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Office hours: Tuesday 4:30 – 6:00 pm, by appointment

COURSE DESCRIPTION
Game Theory is a fundamental tool used to analyze situations in which multiple agents interact strategically. This course focus on several equilibrium concepts, each of which is based on the Nash Equilibrium, named after John Nash, who won the Nobel Prize in 1994. We apply these concepts to many applications including oligopolistic markets, long-term relationships in repeated games, auctions, reputation formation, and others. Students will develop a thorough understanding of the foundation of game theoretic models and their applications across a variety of social sciences.

COURSE PREREQUISITE(S)
All students should have taken intermediate microeconomics and at least one semester of calculus at the undergraduate level. Please email me directly if you are interested in taking this course but do not otherwise meet the prerequisites.

TEXTS

Carl P. Simon and Lawrence E. Blume, *Mathematics for Economists*, W.W. Norton & Company (For those students in need of a mathematics refresher)

In addition, we will work from various outside readings from the academic literature. Students are expected to complete all assigned readings before each class

ADDITIONAL RELATED TEXTS
Osborne, *An Introduction to Game Theory*, Oxford University Press
Fudenberg and Levine, *Game Theory*
LEARNING OUTCOMES
As a result of completing this course, students will:
1. be familiar with the rigorous treatment of Game Theory, as it is used in both academia as well as in a variety of applied economic situations
2. develop and intuition for the strategic behavior of agents and firms
3. interact these tools with applied econometric research

AVERAGE MINIMUM AMOUNT OF INDEPENDENT, OUT-OF-CLASS, LEARNING EXPECTED PER WEEK
In a 15-week semester, including exam week, you should expect to spend a minimum of 4 hours a week for each hour of instruction. For a 2 ½ hour course, this means that you should expect to study a minimum of 10 hours outside of class each week. In addition, you should plan to spend at least two hours working on each reading assignment.

GRADING
- Midterm Examination 20%
- Final Examination 30%
- In-Class Quizzes 15%
- Short Research Paper 15%
- Problem Sets 10%
- Class Participation 10%

Note: In accordance with University policy, the final exam will be given during the final exam period and not the last week of the semester.

Sketch of Topics
Below is an outline of the topics that we will cover. Minor modifications might be possible as the course progresses. A detailed course schedule is available on blackboard, and you should expect that this will be updated along the way.

Topic 1: Static Games with Complete Information
- Strategic Form Representation of a Game
- Nash Equilibrium
- Choice under Uncertainty
- Nash Equilibrium in Mixed Strategies

Topic 2: Dynamic Games with Complete Information
- Extensive Form Representation of a Game
- Backwards Induction
- Subgame Perfect Equilibrium
- Repeated Games

Topic 3: Static Game with Incomplete Information
- Bayesian Game
- Bayesian Nash Equilibrium
- Auctions
Topic 4: Dynamic Game with Incomplete Information
  • Perfect Bayesian Equilibrium
  • Signaling
  • Reputation
Topic 5: Matching
  • Gale-Shapley Mechanism in Matching Doctors with Hospitals
CLASS POLICIES

Before The First Class
Please write a few paragraphs telling me: (1) why you are enrolled in the MA Applied Economics program, (2) what was your undergraduate major and why you chose it, (3) your career goals, (4) what you hope to get out of this Game Theory Economics course, and (5) anything else you’d like to tell me about yourself. Please bring a copy to the first class.

Research Paper Assignment
Students will prepare one short research paper (see course schedule for due date). This paper will be modeled on academic style economic research and will include a model that is based in game-theoretic behavior. The paper should motivate a particular economic question, describe the related literature, and motivate and undertake an empirical analysis. A critical component of the evaluation of this paper will include its feasibility. Students will present their research paper to the class on the last meeting for the term. The paper and presentation will contribute 15% of the total course grade.

Quiz and Exam Policy
There will be 6 quizzes administered throughout the semester (see course schedule). Quizzes will be administered during the first thirty minutes of class time. These quizzes will relate to previously discussed course material and problem sets. They are intended to provide ample opportunity to practice problem solving in preparation for the midterm and final exam. The midterm exam will be administered in-class and will include all relevant cumulative course material. Because economics is a progressive subject, all course material builds upon previous work. For this reason the final exam will also be cumulative in nature, although questions will be more heavily focused on the second half of the course.

Problem Sets
Each topic will include a problem set, to be completed in the week after a topic is discussed. We will solve a limited number of these problems together as a class at the start of each course meeting. Students should be prepared to discuss their solutions and any difficulties they may have encountered. An answer key will be posted to the course website after the class in which the assignment was due. For this reason, late problem sets are not accepted. Problem sets will be graded on a completion basis only: 100% (✔️+) indicates the assignment is complete and well-done, 90% (✔️) indicates that all questions were seriously attempted, 70% (✔️-) means that not all questions were seriously attempted. You may drop your lowest problem set score. I encourage you to work together on problem sets, however each student must upload their problem set to blackboard by the start of the class in which the problem set is due.
**Readings:** In addition to the problem sets, you must complete weekly readings that illustrate an application of the economic concept related to the previous week’s lecture. A weekly reading schedule is provided at the end of the syllabus. These readings generally come from the applications in the text and demonstrate an application of the economic theory. Students will sign up to present two reading assignments to the class throughout the course, and students who are not presenting will pose questions. You will be graded on your presentation and on the questions that you ask when you are not presenting.

**Attendance**
Each class will be centered on a discussion of the week’s assigned readings and problem sets. Students are expected to complete the readings and problem sets before coming to class and should plan to participate actively in class discussion. Participation in class discussions and reading presentations will contribute 10% of the total course grade.

**Make Up Exam Policy**
The lowest quiz score will be automatically dropped in calculating your final grade. For this reason, no make-up quizzes will be offered. If you are unable to attend class on the midterm examination date, your final exam will contribute 60% to your total course grade. There will be no make-up final exam offered.

**Teaching Assistants and Office Hours**
Office hours and labs held by the TAs will occur at the following times

[INSERT RELEVANT TIMES]

**UNIVERSITY POLICY ON RELIGIOUS HOLIDAYS**
1. Students should notify faculty during the first week of the semester of their intention to be absent from class on their day(s) of religious observance;
2. Faculty should extend to these students the courtesy of absence without penalty on such occasions, including permission to make up examinations;
3. Faculty who intend to observe a religious holiday should arrange at the beginning of the semester to reschedule missed classes or to make other provisions for their course-related activities

For GW’s teaching policies, see [http://www.gwu.edu/~academic/Teaching/main.htm](http://www.gwu.edu/~academic/Teaching/main.htm)

**ACADEMIC INTEGRITY**
I personally support the GW Code of Academic Integrity. It states: “Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, submitting the work of others in whole or part without crediting them and without appropriate authorization, and the fabrication of information.” Please note that allowing another student to copy your work is defined as cheating under the Academic Integrity code.

- Examples of academically dishonest behavior include, but are not limited to:
  1) Cheating
  2) Fabrication
  3) Plagiarism
4) Falsification and forgery of University academic documents
5) Facilitating academic dishonesty

Sanctions range from failure of the assignment, to failure of the course, to suspension or expulsion from the University.

For the remainder of the code, see: http://www.gwu.edu/~ntegrity/code.html

SUPPORT FOR STUDENTS OUTSIDE THE CLASSROOM

DISABILITY SUPPORT SERVICES (DSS)
Any student who may need an accommodation based on the potential impact of a disability should contact the Disability Support Services office at 202-994-8250 in the Rome Hall, Suite 102, to establish eligibility and to coordinate reasonable accommodations.
For additional information please refer to: http://gwired.gwu.edu/dss/

UNIVERSITY COUNSELING CENTER (UCC) 202-994-5300
The University Counseling Center (UCC) offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems. Services for students include:
- crisis and emergency mental health consultations
- confidential assessment, counseling services (individual and small group), and referrals
  http://gwired.gwu.edu/counsel/CounselingServices/AcademicSupportServices

SECURITY
In the case of an emergency, if at all possible, the class should shelter in place. If the building that the class is in is affected, follow the evacuation procedures for the building. After evacuation, seek shelter at a predetermined rendezvous location.

AVERAGE MINIMUM AMOUNT OF INDEPENDENT, OUT-OF-CLASS, LEARNING EXPECTED PER WEEK
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(Tentative) COURSE SCHEDULE

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Relevant Deadlines</th>
<th>Topics Covered</th>
<th>Assigned Readings</th>
</tr>
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</table>
| Week 1 | 8/29/2017 | Normal-Form Games  | Normal-Form Games
Nash Equilibrium                                        | Ch 1.1 – 1.2     |
|        |           |                    |                                                       |                  |
| Week 2 | 9/5/2017  |                    | Mixed Strategies                                        | Ch 1.3           |
|        |           |                    |                                                       |                  |
| Week 3 | 9/12/2017 | Quiz #1            | Dynamic Games
Complete and Perfect Information                        | Ch 2.1           |
|        |           |                    |                                                       |                  |
| Week 4 | 9/19/2017 |                    | Dynamic Games
Subgame Perfect Nash Equilibrium                          | Ch 2.2           |
|        |           |                    |                                                       |                  |
| Week 5 | 9/26/2017 | Quiz #2            | Dynamic Games
Repeated Games                                            | Ch 2.3 – 2.4     |
|        |           |                    |                                                       |                  |
| Week 6 | 10/3/2017 | Quiz #3            | Static Games of Incomplete Information
Bayesian Nash Equilibria                                    | Ch 3.1           |
<p>| | | | | |
|        |           |                    |                                                       |                  |
| Week 7 | 10/10/2017| NO CLASS           |                                                       |                   |
|        |           |                    |                                                       |                   |
| Week 8 | 10/17/2017| In Class Midterm   |                                                       |                   |</p>
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<tr>
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<th>Topics Covered</th>
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<tr>
<td>10</td>
<td>10/24/2017</td>
<td>Research Topic Due</td>
<td>Static Games of Incomplete Information Applications</td>
<td>Ch 3.2-3.4</td>
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<td>11</td>
<td>10/31/2017</td>
<td>Quiz #4</td>
<td>Dynamic Games of Incomplete Information Perfect Bayesian Equilibrium</td>
<td>Ch 4.1</td>
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<tr>
<td>12</td>
<td>11/7/2017</td>
<td></td>
<td>Dynamic Games of Incomplete Information Signaling Games</td>
<td>Ch 4.2</td>
</tr>
<tr>
<td>13</td>
<td>11/14/2017</td>
<td>Quiz #5</td>
<td>Cheap-Talk Games</td>
<td>Ch 4.3</td>
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<td>14</td>
<td>11/21/2017</td>
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<td>Matching</td>
<td>Outside Reading</td>
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<td>15</td>
<td>11/28/2017</td>
<td>Quiz #6</td>
<td>Mechanism Design</td>
<td>Outside Reading</td>
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<tr>
<td>16</td>
<td>12/5/2017</td>
<td>Research Paper Due</td>
<td>Research Presentations</td>
<td></td>
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