ECON 414
GAME THEORY
Fall 2015

Course Description and Objectives: This course studies the competitive and cooperative behavior that results when several parties with conflicting interests must work together. We will learn how to use game theory to analyze situations of potential conflict. Applications are drawn from economics, business, and political science.

Pre-requisites: Students must have completed ECON326 or its equivalent with a grade of 'C-' or better in order to take ECON414. This course counts as a Quantitative course requirement for Economics majors. Therefore, you can expect that the course will be very math-intensive. The majority of our time will be spent solving problems. I expect students to be comfortable with calculus and probability. If you struggled in calculus or ECON300, I strongly recommend that you consider taking a different course. This is particularly true if you need to pass this course in order to graduate.

Instructor’s Contact Information
- **Office:** Tydings 3127B
- **E-mail:** Moody@econ.umd.edu
- **Office Hours:** Office hours will be announced weekly on ELMS
- **Class Sessions:**
  - 0301 Tuesdays and Thursdays 9:30 – 10:45am in Tydings 2102
  - 0201 Tuesdays and Thursdays 12:30 – 1:45pm in Tydings 1114

Course Website: You must use your directory ID and password to access [www.elms.umd.edu](http://www.elms.umd.edu). Copies of this syllabus, your grades, and many other relevant materials will be made available through the course website. Students are responsible for updating their current email address via [http://www.testudo.umd.edu/apps/saddr/](http://www.testudo.umd.edu/apps/saddr/) AND for paying attention to ELMS messages I send to the class. Failure to check ELMS messages will not excuse a student from missing announcements or deadlines.

E-mail: You are encouraged to contact me by email at Moody@econ.umd.edu, and I will do my best to respond within 36 hours, even on the weekends. I strongly prefer that you do not send me ELMS messages.

Textbooks and other items to purchase:
- The text for the class is *Games, Strategies, and Decision Making* by Joseph Harrington. [Here](http://www.amazon.com) is a link to the book on Amazon. There is an earlier edition of the book available, and it should be similar to the current edition. I do not require that you purchase the textbook, but many students find the text helpful. There are additional examples in the textbook, and many homework problems will come from the end-of-chapter exercises.
- I strongly recommend taking notes and completing assignments in pencil. You will make mistakes that need correcting. You may find one or two colored pencils or pens helpful for taking notes in class, especially early on in the course.
Grades and Assignments: Your grade will be determined by your performance on homework and three exams. Each type of graded activity contributes a specific weight to the calculation of your final grade as indicated below.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Problem sets</td>
<td>20%</td>
</tr>
<tr>
<td>1st Midterm exam</td>
<td>25% (major scheduled grading event)</td>
</tr>
<tr>
<td>2nd Midterm exam</td>
<td>25% (major scheduled grading event)</td>
</tr>
<tr>
<td>Cumulative Final exam</td>
<td>30% (major scheduled grading event)</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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I will drop the lowest problem set from your grade.

Your letter grade for the course will be based on the weighted average of your grades on the four components of the class. I plan to use the following grading scheme:

- 98 – 100 A+
- 92 – 97 A
- 90 – 91 A-
- 88 – 89 B+
- 82 – 87 B
- 80 – 81 B-
- 78 – 79 C+
- 72 – 77 C
- 70 – 71 C-
- 60 – 69 D
- Below 60 F

There is a possibility that I will adjust the scheme downwards, but this is only a possibility. I will not adjust the scheme upward.

Grading Policies:

Problem sets are due at 1:45pm on the due date specified. If you are in the 9:30am section and would like to turn in your homework at the 12:30pm section, you may do so only if you do not disturb the class. Please hand in your homework either before class or immediately after but not during.

I only accept hard copies of homework assignments. E-mailing assignments is not an option. If you are unable to attend class, arrange to send your homework with a classmate.

Plan ahead to complete assignments BEFORE the deadlines. If you wait until too close to the deadline, you will not succeed in this course.

Regarding academic integrity and deadlines/exam dates: The University of Maryland has a nationally recognized Code of Academic Integrity administered by the Student Honor Council. You are responsible for upholding this code as you complete assignments and take exams. You can make yourself aware of the consequences of cheating, fabrication, facilitation, and plagiarism by reading http://osc.umd.edu/OSC/StudentsInfo.aspx In terms of the Code of Academic Integrity, problem sets are deemed “open book, open notes”, which means you are welcome to use the textbook and other course material as you work, and you may ask classmates for assistance. In contrast, exams will be closed book...
events. Any suspected violation of the Code of Academic Integrity during exams will be referred to the Student Honor Council.

All three exams are designated as “major scheduled grading events”. Students are required to take all three. Make-up exams will be granted only to those students whose excuse complies with University policy. The four valid excuses according to University policy are: illness (of student or a student’s dependent), religious observance, participation in University events at the request of University authorities, and compelling circumstances beyond your control. University policy requires that you provide appropriate documentation before you can be considered eligible for a make-up exam. See http://www.umd.edu/catalog/index.cfm/show/content.section/c/27/ss/1584/s/1540 for more detail on the University’s policy regarding attendance and assessments. If you miss an exam and cannot document a valid excuse, your grade will be recorded as a zero. Make-ups will be scheduled for 8 AM on Mondays, Wednesdays or Fridays unless you have another course that meets during that hour. If you believe you need a make-up exam, please inform me as far in advance as possible by email and at a minimum the day of the exam. Do not wait until afterwards to tell me you are sick. In the case of illness, ask your health care provider to verify dates of treatment and indicate the time frame that you are unable to meet academic responsibilities. No diagnostic information needs to be included. Students who are registered with the University’s Disability Support Services (DSS) office and who provide me with an updated DSS form will be accommodated for the exams. I am not able to accommodate students who are not registered with DSS or who do not provide me with the documentation in advance of exams.

Department of Economics’ policy on grading requires instructors to use the grading system announced at the beginning of the semester in all cases and with no exceptions. There will be absolutely zero opportunities to earn extra credit after the final exam.

**Expectations of Students:** Attend all lectures, and ask questions whenever you find something confusing or problematic. Complete problems sets before they are due, making sure you leave yourself enough time to get answers to any questions you might have. To prepare for exams, you should (a) find a study partner or group and meet regularly to talk about the concepts covered in the class; (b) practice examples from class (c) practice extra examples from the book and (d) practice homework examples. (In short, practice practice practice!!)

If you miss any lectures, you are still responsible for the material that was covered. The material we cover each week builds on the content of the previous weeks. You should try to catch up right away; if you do not, you will find yourself slipping further and further behind. Get notes from a classmate and thoroughly review the relevant section of the text. After going through these steps, if you have questions, then see me during office hours.

I look forward to receiving your feedback on the course, both during and at the end of the semester. In particular, your participation in the evaluation of courses through CourseEvalUM is a responsibility you hold as a student member of our academic community. Your feedback is confidential and important to the improvement of teaching and learning at the University.

Please contribute to a positive learning environment. Students are expected to treat each other, the teaching assistants, and the instructor with courtesy and respect. Cell phones should be set to silent, and laptops in class should be used for taking notes, not for surfing the internet or for viewing entertainment. Disruptive behavior will be referred to the Office of Student Conduct or the Campus Police.
Course Outline

- **Static Games of Complete Information**
  - Definition of a Game
  - Definition of a Strategy
  - Prisoner’s Dilemma
  - Pure Strategy Nash Equilibrium
  - Dominant Strategies
  - Iterated Elimination of Strictly Dominated Strategies
  - Mixed Strategy Nash Equilibrium
  - Cournot Model of Duopoly
  - Bertrand Model of Duopoly

- **Dynamic Games of Complete Information**
  - Definition of a Strategy
  - Actions versus Strategies
  - Backwards Induction
  - Subgame Perfect Nash Equilibrium
    - Sequential Games
      - Backwards Induction
      - Stackelberg Model of Duopoly
    - Finitely Repeated Games
      - Backwards Induction
      - Finitely Repeated Cournot and Bertrand Games
    - Infinitely Repeated Games
      - Discounting
      - Infinite Geometric Series
      - Grim Trigger Strategies
      - Tit-for-Tat Strategies
      - Infinitely Repeated Cournot Game

- **Static Games of Incomplete Information**
  - Bayesian Nash Equilibrium
  - Cournot Model with Uncertain Costs
  - Auctions
    - English Auction
    - Dutch Auction
    - Ascending Clock Auction
    - Second Price Sealed Bid
- Optimal Bid Function
- First Price Sealed Bid
- Optimal Bid Function

• Dynamic Games of Incomplete Information
  o Perfect Bayesian Nash Equilibrium
  o Bayes’ Rule
  o Signaling Games
    ▪ Pooling Equilibria
    ▪ Separating Equilibria
    ▪ Hybrid Equilibria
  o Job Market Signaling
    ▪ Pooling Equilibria
    ▪ Separating Equilibria
    ▪ Hybrid Equilibria