

# Game Theory and Applications

***ALL DATES AND TIMES IN THIS SYLLABUS ARE ACCORDING TO EASTERN STANDARD TIME (GAINESVILLE TIME.)***

Location: Online Course.

Time: Tuesday & Thursday 1:55PM - 3:50PM (Period 7&8)

## Instructor

- Jay Lee
- jeongwoo@ufl.edu
- Office: Due to Covid-19 related concerns, office hours will be held through Zoom. Zoom link is available on Canvas.
- Office Hours: Monday & Wednesday 9:00AM - 10:00AM or by appointment.

**Course Description** Introduces modern game theory. Topics include Nash equilibrium, simultaneous and sequential move games, repeated games, Bayesian games, and their applications.

## Prerequisites

- Intermediate Microeconomics (ECO 3101)
- Survey of Calculus (MAC 2233) or higher level of math courses.

You are expected to have familiarity with basic calculus. You should be comfortable with drawing and interpreting graphs, taking simple partial derivatives and using algebra to manipulate equations. If you have any questions on this matter, I will be happy to discuss this in the first week of this semester.

## Course Materials

- Required: “Games of Strategy” 5th edition by Dixit, Skeath, and McAdams. 4th edition is also fine.
- Recommended: “Games, Strategies, and Decision Making” 2nd edition by Harrington.

**Evaluation** Your grade will depend on your performance on exams, problem sets, and quizzes. Your final grade will be calculated as follows:

Exam 1	25%
Exam 2	25%
Exam 3	25%
Problem Sets	15%
Quizzes	10%

Your final letter grade<sup>1</sup> will be determined as follows:

93 – 100	<i>A</i>
90 – 92.99	<i>A–</i>
87 – 89.99	<i>B+</i>
84 – 86.99	<i>B</i>
80 – 83.99	<i>B–</i>
75 – 79.99	<i>C+</i>
70 – 74.99	<i>C</i>
65 – 69.99	<i>C–</i>
60 – 64.99	<i>D+</i>
55 – 59.99	<i>D</i>
0 – 54.99	<i>E</i>

### Exam Dates

Exam 1: Thursday, Oct 1st in class.  
 Exam 2: Thursday, Nov 5th in class.  
 Exam 3: Tuesday, Dec 8th in class.

The exams will involve solving for an equilibrium and interpreting results with economic intuition. There will be NO cumulative exams, but you will need to understand the basic concepts in the earlier chapters to proceed to the advanced chapters. You can use a calculator that has NO communication functions. (You are NOT allowed to use the calculator function in your phone.)

**Make-up Exams** If you have an excused conflict (e.g., a religious holiday) with any exam this semester, please email me by the end of the first week of class.

Make-up exams will be administered only on those circumstances in which you cannot take an exam for a valid reason according to UF policy. In that case, you should notify me prior to the start of the examination. In addition, you will need to provide valid documentation (within a week) justifying your absence. Supporting documentation related to excuses for missed exams must include contact information for verification purposes. Failure to comply with these rules will result in a zero score in the missed exam. Providing false documentation or creating a false excuse constitutes cheating under the University guidelines. UF's policy on academic honesty will be strongly enforced.

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<sup>1</sup>More information on grades and grading policies is here: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

**Problem Sets** There will be 6 problem sets. I encourage you to work together, but each student has to submit their own solutions. All problem sets are due the class time before the class starts on the due date. Late submissions will not be accepted and will receive zero credit. The due dates are as follows.

Problem Set 1: Tuesday, Sep 15th in class.  
Problem Set 2: Tuesday, Sep 29th in class.  
Problem Set 3: Tuesday, Oct 20th in class.  
Problem Set 4: Tuesday, Nov 3rd in class.  
Problem Set 5: Tuesday, Nov 24th in class.  
Problem Set 6: Thursday, Dec 3rd in class.

**Quizzes** There will be approximately one quiz for a class. These quizzes will be composed of simple problems that are very similar to the class materials. You are free to refer to the textbook or your notes when you solve these quizzes. These will make sure you understand the ideas in the class, and help you keep pace throughout this online course. These quizzes should be done in 24 hours by yourself after each class. Late submissions will not be accepted and will receive zero credit. At the end of the semester, you can drop a maximum of 5 scores. Each of the remaining scores will be equally weighted to determine your overall quiz average.

**Course Communications** While this course is delivered online, there will be several synchronous activities, including exams. These activities will take place during our assigned class time. You are expected to be available during those times. You should confirm your availability before the end of Drop/Add Week and adjust your schedule accordingly.

Additionally, please keep in mind that all times listed on this syllabus and announced in class are according to Eastern Standard Time, i.e., Gainesville time. If you are not located in the Eastern Standard Time zone, you should adjust all times for synchronous activities and due dates accordingly.

Most of our one-on-one communication will occur via email. There are two important course policies regarding email: 1) I expect that you are reading your email at least once per day, and 2) All emails that you send must follow basic rules for professional correspondence. If you are unsure of what constitutes professionalism, feel free to ask... or simply err on the side of caution.

You are responsible for all information made available through classes and Canvas. Please check Canvas frequently. I will not use the Canvas messaging feature, nor respond to these messages. You can communicate with me via email or come to my office hour.

**Class Attendance** Class attendance is expected. Excused absences are consistent with university policies in the undergraduate catalog<sup>2</sup> and require appropriate documentation.

**Students with Disabilities** Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting

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<sup>2</sup><https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

**Course Evaluation** Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

**University Honesty Policy** UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code.” On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code<sup>3</sup> specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor in this class.

**Counseling and Wellness Center** Contact information for the Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc/Default.aspx>, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

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<sup>3</sup><https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>

## Course Outline

### 1. Introduction to Game Theory

- Week 1: [Simultaneous Move Game and Nash Equilibrium]
- Week 2: [Strict and Weak Dominance and Best Response]
- Week 3: [Extensive Form Games and Subgame Perfection]
- Week 4: [Relationship between Normal form and Extensive form]
- Week 5: [Exam 1]

### 2. Mixed Strategies, Continuous Strategies, and Repeated Games

- Week 1: [Mixed Strategies]
- Week 2: [Continuous Strategies 1]
- Week 3: [Continuous Strategies 2]
- Week 4: [Repeated Games]
- Week 5: [Exam 2]

### 3. Incomplete Information and Applications

- Week 1: [Bayesian Games]
- Week 2: [Applications to Bayesian Games]
- Week 3: [Applications to Specific Strategic Situations 1]
- Week 4: [Applications to Specific Strategic Situations 2]
- Week 5: [Exam 3]

## Week-by-Week Checklist

DSM : “Games of Strategy” 5th edition by Dixit, Skeath, and McAdams.

H : “Games, Strategies, and Decision Making” 2nd edition by Harrington.

Dates	Required Readings	Recommended Readings	Important Dates
Aug 31 - Sep 4	[DSM] 1, 2 and 4.	[H] 1, 2 and 3.	
Sep 7 - Sep 11	[DSM] 4.	[H] 4.	
Sep 14 - Sep 18	[DSM] 3 and 8.	[H] 8.	Sep 15th: Problem Set 1 Due
Sep 21 - Sep 25	[DSM] 6.		
Sep 28 - Oct 2			Sep 29th: Problem Set 2 Due Oct 1st: Exam 1
Oct 5 - Oct 9	[DSM] 7.	[H] 7.	
Oct 12 - Oct 16	[DSM] 5.	[H] 6.	
Oct 19 - Oct 23	[DSM] 5.	[H] 6.	Oct 20th: Problem Set 3 Due
Oct 26 - Oct 30	[DSM] 10.	[H] 13 and 14.	
Nov 2 - Nov 6			Nov 3rd: Problem Set 4 Due Nov 5th: Exam 2
Nov 9 - Nov 13	[DSM] 9 and 13.	[H] 9 and 10.	
Nov 16 - Nov 20	[DSM] 14 and 15.	[H] 11.	
Nov 23 - Nov 27	[DSM] 11 and 12.		Nov 24th: Problem Set 5 Due
Nov 30 - Dec 4	[DSM] 16 and 17.	[H] 16 and 17.	Dec 3rd: Problem Set 6 Due
Dec 7 - Dec 9			Dec 8th: Exam 3

\*Faculty Course Evaluation Start Date November 24.

All problem sets are due the class time before the class starts on the due date. Late submissions will not be accepted and will receive zero credit.