

# ECO 7404: Game Theory for Economists

## **INSTRUCTOR**

Dr. Thomas Knight

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Office: Matherly Hall 224

## **CLASS MEETINGS AND OFFICE HOURS**

We will meet each Monday and Wednesday, 9:35-11:30am, in Matherly Hall 114.

This is a face-to-face class. Your attendance at live lectures is expected. There are no remote attendance or participation options.

I will hold office hours each Tuesday afternoon, 4:00-5:00pm. Please send me an email in advance if you plan to attend, if possible.

## **REQUIRED AND SUGGESTED MATERIALS:**

- Required: Martin Osborne, *An Introduction to Game Theory* (Oxford University Press; ISBN: 978-0195128956)
- Recommended: Joseph Harrington, *Games, Strategies, and Decision Making, 2<sup>nd</sup> Ed.* (Worth Publishers; ISBN: 978-1429239967)

## **COURSE DESCRIPTION**

This is a half-semester, introductory doctoral course in noncooperative game theory. This course will be taught through the lens of economics, from which all of the applications and examples draw. We will begin by defining the concept of Nash Equilibrium and identifying equilibria in simple setting characterized by discrete strategies and perfect information. We will then consider mixed strategies, subgame perfection (i.e., sequential play), stage games, and Bayesian games.

It is assumed that you are comfortable with differentiation and have experience taking partial derivatives. If this is not the case, please speak to me before the end of the Drop/Add period.

## **CORE REQUIREMENTS**

1. Continued enrollment in this course is equivalent to acceptance of all stated responsibilities, policies, and due dates. If there is anything that is unclear, talk to me *immediately*. Waiting until the end of the term often results in less favorable outcomes.
2. Students are expected to attend all meetings and participate actively. I encourage you to ask questions during these lectures to make the classroom environment as interactive and engaging as possible.
3. Students are expected to complete five analytic problem sets. These problem sets relate to the topics of the preceding lectures, are intended to offer you practice with the relevant solution techniques and should help prepare you for the final exam.
4. There is a cumulative final exam (Monday, December 5) that is required for successful completion of this course. This exam is a closed-book exam, and is to be taken individually. As the course progresses, I will explain the structure and composition of the exam.

## **COURSE COMMUNICATIONS**

Announcements concerning the class will typically be made during class meetings and by email. You are responsible for all information made available through both of these avenues of communication. It is assumed that you are attending each lecture, and that you are regularly monitoring your UF email account (i.e., checking it daily).

I will not use the Canvas messaging feature, nor respond to these messages. I archive all email messages, and Canvas does not generate a usable record of our correspondence. Send all email correspondence to [thomas.knight@ufl.edu](mailto:thomas.knight@ufl.edu).

## **COURSE GRADING POLICY**

Grades are calculated and assigned according to a total point system. There are 100 possible points, and the breakdown is as follows:

- 1) Each of the 5 Problem Sets is worth 10 possible points.
- 2) The Final Exam is worth 50 possible points.

I will use this calculation to determine each student's within class standing and assign final grades based on that information.

Make-up assignments and exams will be arranged *only* for absences that are explicitly covered by the [UF Attendance Policy](#). Whenever possible, you should reach out at least five business days in advance to arrange a make-up assignment or exam. Of course, this will not always be possible. Unforeseen absences and emergencies occur and can be excused without such advance notice. In most cases, you will be asked to provide evidence or documentation of an absence that is explicitly excused by the [UF Attendance Policy](#). Absences related to religious holidays and worship do not require this documentation.

The above grading policies are consistent with UF policies regarding grade determination. This information can be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

## **FINAL EXAM**

The Final Exam will be administered during our final course class meeting at 9:35am on Monday, December 5. This is a closed-book/closed-note exam. All students must compete this exam synchronously (i.e., at the same time) to maintain academic integrity. If you are more than 10 minutes late, you will not be able to complete the exam.

Non-programmable, four-function and scientific calculators are allowed; no other calculators are permitted. You may not use a graphing calculator or any device with communications abilities. The use of cell phones, PDAs, or any other programmable device during an exam is not allowed, and violating this policy constitutes a violation of the University of Florida Student Honor Code.

## **PROBLEM SET GUIDELINES**

There are five problem sets required for successful completion this course. These problem sets are designed to provide you with practice with the theories, models, and analytical tools covered in the course. My hope is that these problem sets will assist you in understanding of the technical content of this course, and in preparing for the final exam.

You must submit a PDF file into Canvas by the deadline. Your scanned submission should be high-quality and professionally presented. Your handwriting must be legible, and graphs must be accurate. If you think this may be a problem, I encourage you to submit typed responses. Responses that are not clearly correct and presented professionally will not earn credit. Late submissions will not be accepted.

When composing your problem set submissions, you should...

- (1) Clearly explain your answers. A lot of (even correct) math without a clear answer and/or explanation is often insufficient.
- (2) Clearly and succinctly state your final answer. That is, make sure that you clearly answer the specific question posed by the problem set.

You may work in groups, but each student is responsible for turning in his or her own work, which must include his or her own individual mathematical derivations and written explanations.

## **PROBLEM SET SCHEDULE**

<u>Problem Set</u>	<u>Opening Date</u>	<u>Due Date</u>
Problem Set 1	Monday, Oct. 17 @ 11:30am	Monday, Oct. 24 @ 9:30am
Problem Set 2	Monday, Oct. 24 @ 11:30am	Wednesday, Nov. 2 @ 9:30am
Problem Set 3	Wednesday, Nov. 2 @ 11:30am	Wednesday, Nov. 9 @ 9:30am
Problem Set 4	Wednesday, Nov. 9 @ 11:30am	Wednesday, Nov. 16 @ 9:30am
Problem Set 5	Wednesday, Nov. 16 @ 11:30am	Wednesday, Nov. 30 @ 9:30am

## **ACADEMIC HONESTY**

You may collaborate on the Problem Sets, but you should turn in your own submission that represents your own efforts and analyses. The final exam is taken individually, and collaboration or communication with anyone aside from Professor Knight is prohibited.

You are expected to abide by the University's rules for academic honesty. These rules are available for your review at <https://sccr.dso.ufl.edu/process/honor-code/>. I take these rules very seriously and am committed to upholding the policies and integrity of the University of Florida and the Ph.D. in Economics program. Cheating, plagiarism, or any other behavior that violates these rules will be prosecuted to the fullest extent.

## **SPECIAL NEEDS AND GENERAL COMMENTS ON WELLNESS**

If you are a student with special needs and you require additional resources to participate successfully in this course, please contact me during the first week of classes. The Disability Resource Center may provide reasonable accommodations to support your success. Once you

obtain documentation from the DRC, please forward it to me, and accommodations can be arranged.

Graduate School is an exciting learning experience and a unique opportunity for personal growth. It can, however, also be a stressful and difficult transitional period. If you are ever having general issues with your coursework *in any course* or trouble in your personal life, please seek help from myself or another faculty member. I also encourage you to utilize the *FREE* and *ANONYMOUS* services of the UF Counseling and Wellness Center.

### **NOTE ON END-OF-TERM COURSE EVALUATIONS**

At the end of each term, you have the ability to evaluate the quality of each of your courses and the effectiveness of your instructors. I encourage you to take this opportunity seriously and to provide serious and informative feedback. Personally, I am always trying to improve my courses – tweaking them bit-by-bit each term – and student feedback is essential to making real improvements. As the term nears an end, I will discuss this opportunity in lecture, as I believe the high quality of your education depends on your constructive criticism and affirming support. You can access end-of-term course evaluations at:

<https://ufl.bluera.com/ufl/>

### **HEALTH COUNSELING AND EMERGENCIES**

#### **U Matter, We Care:**

If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) or 352 392-1575 so that a team member can reach out to the student.

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

#### **Sexual Assault Recovery Services (SARS)**

Student Health Care Center, 392-1161.

**University Police Department** at 392-1111 (or 9-1-1 for emergencies), or

<http://www.police.ufl.edu/>.

## COURSE SCHEDULE

<u>Monday, Oct. 17</u>	Syllabus and Introduction to Games and Strategies Reading: Syllabus, Chapters 1 and 2 (O), Chapters 1 and 2 (H) Problem Set 1 opens @ 11:30am
<u>Wednesday, Oct. 19</u>	Dominant Strategies, Dominance Solvability, and Nash Equilibrium* Reading: Chapter 2 (O), Chapters 3 and 4 (H)
<u>Monday, Oct. 24</u>	Expected Utility and Mixed Strategies Reading: Chapter 4 (O), Chapter 7 (H) Problem Set 1 due @ 9:30am Problem Set 2 opens @ 11:30am
<u>Wednesday, Oct. 26</u>	(Simultaneous-Play) Continuous Strategies Reading: Chapter 3 (O), Chapter 6 (H)
<u>Monday, Oct. 31</u>	NO CLASS
<u>Wednesday, Nov. 2</u>	Extensive Form and Sequential Play Reading: Chapter 5 (O), Chapter 8 (H) Problem Set 2 due @ 9:30am Problem Set 3 opens @ 11:30am
<u>Monday, Nov. 7</u>	Applications and Extensions of Sequential Play Reading: Chapter 6 (O), Chapter 8 (H)
<u>Wednesday, Nov. 9</u>	Stage Games* Reading: Chapter 7 (O) Problem Set 3 due @ 9:30am Problem Set 4 opens @ 11:30am
<u>Monday, Nov. 14</u>	Repeated Play Reading: Chapters 14 and 15 (O), Chapters 13 and 14 (H)
<u>Wednesday, Nov. 16</u>	(Simultaneous- and Sequential-Play) Games of Incomplete Information* Reading: Chapters 9 and 10 (O), Chapters 9 and 10 (H) Problem Set 4 due @ 9:30am Problem Set 5 opens @ 11:30am
<u>Monday, Nov. 21</u>	(Simultaneous- and Sequential-Play) Games of Incomplete Information Reading: Chapters 9 and 10 (O), Chapters 9 and 10 (H)
<u>Wednesday, Nov. 23</u>	NO CLASS: THANKSGIVING HOLIDAY
<u>Monday, Nov. 28</u>	(Simultaneous- and Sequential-Play) Games of Incomplete Information Reading: Chapters 9 and 10 (O), Chapters 9 and 10 (H)
<u>Wednesday, Nov. 30</u>	Exam Review Problem Set 5 due @ 9:30am
<u>Monday, Dec. 5</u>	Final Exam (@ 9:30am)