Game Theory

BT-436 A, Spring 2023

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Office Hours: Monday 09:00-11:00 (or by appointment via Zoom)

Meetings
Time: Monday, Friday 15:00-16:15

- Monday, February 20 - President's Day - No Classes.
- Wednesday, February 22 - Monday Class Schedule.
- Monday, March 13 - Friday, March 17, 2022 - Spring Recess - No Classes.
- Friday, April 7 - Good Friday - No Classes.
- Thursday, May 4 - Friday Class Schedule

Place: Morton 205

Course Website
A copy of this syllabus, class notes, handouts, homeworks, solutions to exam problems, grades and other course materials will be accessible at

`https://sit.instructure.com/courses/64860`

You will need your Stevens student ID and password to log in.

Prerequisites
BT-244, BT-221 or QF-112
Students must have successfully completed BT-244 (Microeconomics) as well as BT-221 or QF-112 in order to register for this course. The statistics requirement may be waived at the professor's discretion.

Grades
Grades depend on your performance as measured by:

1. **4 exams**. 12.5, 17.5, 22.5, and 27.5 per cent, respectively. Exams will comprise of exercises similar to those from the homework assignments and exercises solved in class.
2. **Class Participation**. 10 per cent
   Class participation is not equivalent to class attendance! There will be a good amount of in-class problem solving and discussions that you should actively engage in to earn class participation points.
3. **Problem Sets**. 10 per cent (4×2.5).
4. **Extra credit assignments**. 0.1 GPA each

Suggested Readings ANY "Game Theory" textbook
The textbook I will closely follow:

Game Theory for Applied Economists, by R. Gibbons, Princeton University Press, 1992.

Other useful textbooks:

- Game theory: An Introduction, by Steve Tadelis, Princeton University Press, 2013. *A very good alternative to Gibbons.*
- The Art of Strategy: A Game Theorist's Guide to Success in Business and Life, by Avinash Dixit and Barry Nalebuff, Norton, 2010. *Lots of applications.*
- Games of Strategy, by A. Dixit and S. Skeath, Norton, 1999. *A bit "chatty."*
- Thinking Strategically, by Avinash Dixit and Barry Nalebuff, Norton, 1993. *very non-technical.*
- Playing for Real, by Ken Binmore, Oxford Press, 2007.

Additional Readings available at `https://sit.instructure.com/courses/64860` through Canvas course shell.

Course Description
Game Theory is an upper division undergraduate course in microeconomic theory. The goal is to give a rigorous introduction to the main concepts of game theory: strategy, solution concepts for games, strategic behavior, commitment, cooperation, and incentives. The course emphasizes the applications of the theory as much as the theory itself. Most of the applications will focus on economics and finance, for example: corporate finance, oligopoly theory, bargaining, strategy, and contract theory.

Course Objectives

- Understand and be able to use game theory terminology.
- Use strategic reasoning to understand and explain economic and financial events, and other social phenomena.
- Use basic calculus to solve optimization problems faced by economic agents.
- Understand how strategic behavior influence the decisions about which goods and services to produce, how to produce them, and who gets them.
- Understand how government policies affect the allocation of resources in a market economy.
- Understand how market structure (perfect competition, monopoly, duopoly and oligopoly) influences the allocation of resources.
- Use economic reasoning to explain the strategic choices of individuals or organizations.

Course Learning Outcomes
At the end of the course, the students should be able to i) model common economic and finance environments using the tools of game theory, ii) understand standard economic and financial models based on simple game theory, iii) apply standard solution concepts to static games, dynamic games, repeated games and games of incomplete information.

Learning Accommodations
Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. The Office of Disability Services (ODS) works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, psychiatric disorders, and other such disabilities in order to help students achieve their academic and personal potential. They facilitate equal access to the educational programs and opportunities offered at Stevens and coordinate reasonable accommodations for eligible students. These services are designed to encourage independence and self-advocacy with support from the ODS staff. The ODS staff will facilitate the provision of accommodations on a case-by-case basis.

Undergraduate Honor System
Enrollment into the undergraduate class of Stevens Institute of Technology signifies a student's commitment to the Honor System. Accordingly, the provisions of the Stevens Honor System apply to all undergraduate students in coursework and Honor Board proceedings. It is the responsibility of each student to become acquainted with and to uphold the ideals set forth in the Honor System Constitution. More information about the Honor System including the constitution, bylaws, investigative procedures, and the penalty matrix can be found online at `http://web.stevens.edu/honor/`.
The following pledge shall be written in full and signed by every student on all submitted work (including, but not limited to, homework, projects, lab reports, code, quizzes and exams) that is assigned by the course instructor. No work shall be graded unless the pledge is written in full and signed.

"I pledge my honor that I have abided by the Stevens Honor System."

Disability Services Confidentiality Policy
Student Disability Files are kept separate from academic files and are stored in a secure location within the Office of Disability Services. The Family Educational Rights Privacy Act (FERPA, 20 U.S.C. 1232g; 34CFR, Part 99) regulates disclosure of disability documentation and records maintained by Stevens Disability Services. According to this act, prior written consent by the student is required before our Disability Services office may release disability documentation or records to anyone. An exception is made in unusual circumstances, such as the case of health and safety emergencies.

Anonymous Feedback
Please share your comments, complaints, suggestions at

`https://www.surveymonkey.com/r/M2TKZQH`

Tentative **Course Outline** (last updated February 3, 2023):
The weekly coverage might change as it depends on the progress of the class.

Week	Content
Week 1	• Syllabus, Intro to the Subject, Static Games of Complete Information (sl. 1-20)
Week 2	• Static Games of Complete Information (sl. 21-47) • Static Games of Complete Information (sl. 48-70)
Week 3	• **HW 1 and Practice Exam 1 posted!** • Static Games of Complete Information (sl. 70-88) • Static Games of Complete Information (sl. 88-91)
Week 4	• *Review for Exam 1 (No class meeting - video lecture)* • **Friday, February 10 Exam 1**
Week 5	• Dynamic Games of Complete Information (sl. 1-37) • Dynamic Games of Complete Information (sl. 38-39)
Week 6	• **Monday, February 20 - President's Day - No Classes.** • **Wednesday, February 22 - Monday Class Schedule.** • Dynamic Games of Complete Information (sl. 40-61) • Dynamic Games of Complete Information (sl. 62-76)
Week 7	• *Review for Exam 2* • **Friday, March 3 Exam 2**
Week 8	• Static Games of Incomplete Information (sl. 1-27) • Static Games of Incomplete Information (sl. 28-41)
Week 9	• **March 13 - March 17, 2022 - Spring Recess - No Classes.**
Week 10	• Static Games of Incomplete Information (sl. 42-63) • Static Games of Incomplete Information (sl. 64-72)
Week 11	• Static Games of Incomplete Information (sl. 73-86) • *Review for Exam 3*
Week 12	• **Monday, April 3 Exam 3** • **Friday, April 7 - Good Friday - No Classes**
Week 13	• Dynamic Games of Incomplete Information (sl. 1-10) • Dynamic Games of Incomplete Information (sl. 10-21)
Week 14	• Dynamic Games of Incomplete Information (sl. 22-35) • Dynamic Games of Incomplete Information (sl. 36-43)
Week 15	• Dynamic Games of Incomplete Information (sl. 43-46) • Dynamic Games of Incomplete Information (sl. 47-50)
Week 16	• *Review for Exam 4* • **Thursday, May 4 - Friday Class Schedule** • **Thursday, May 4 Exam 4**