Wharton School

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MGMT 784: Managerial Economics and Game Theory

MGMT 784 is a short elective course in Game Theory and Strategy.   The purpose of this mini-course is to develop students' abilities to apply game theory to managerial decision-making. While the course does help students understanding of some core theoretical concepts such as simultaneous, sequential, mixed, and incomplete information games, the emphasis is instead on application to situations involving market entry, market deterrence, pricing, product differentiation, and yield/revenue management. The course will make extensive use of Game Theory not only in business strategy but also include examples from popular culture including movies, television shows and literature. This is a very applied course and will have very limited theoretical treatment of the topics. Students wishing a more theoretical treatment should consider other courses.

Prerequisites

It is expected that students have been introduced to some basic game theory. There will be a quick review of the basics and some recommended supplemental readings for those who have little or no background in game theory.

Materials

Managerial Economics: Theory, Applications, and Cases
By Allen, Doherty, Weigelt, and Mansfield
Course-pack from Study net

Grading

Written Analysis	40%
Quantitative Exercises:	20%
In Class Exam	40%

Study Guide and Course Outline

August 28th h Session 1 – Introduction to Games of Strategy

Strategic games, timing, information, players, strategies, and payoffs

Readings:

Making Game Theory work for Managers, McKinsey Quarterly
Games of Strategy: An Introduction (HBS # 9-187-159)
Game Theory and Business Strategy (9-705-471)
Managerial Economics, Chapter 11
Introduction to Competitive Dynamics: Strategy and Tactics (9-707-475)
Decision Trees (9-205-060)
Decision Trees for Decision Making

Movie: Dark Knight and Dark Knight Rises

September 4th : Session 2 Sequential Games

Readings**:**
Managerial Economics: Chapter 12

September 9th   Session 3 : Game Theoretic Examination of Ryan Air

Readings:

Dogfight over Europe: Ryan air (A) (HBS# 9-700-115), Ryan air (B) (HBS # 9-700-116)

September 11th : Session 4 Sequential Entry Game

Readings**:**

Sequential Entry (9-190-102)

Questions**:**

1. How many firms will enter the industry?

2. How much will each firm spend on advertising?

3. What will be the firms' profits?

September 16th : Session 5– Deep Pockets

Readings
Deep Pockets (9-190-101)

Questions for the Readings

1. As a potential entrant into the industry how do you assess the possible reaction of the incumbent firm to your entry? Do you expect to be accommodated?

** Assume that the entrant must show a profit by/in quarter 12*

September 18th: Session 6   Fog of Business

Readings:

Fog of Business (5-795-169)

Questions:

1. Draw the game in extensive form. Begin with E1's decision whether to enter or not.
2. Determine the payoffs and Nash Equilibrium for the game
3. Should player E1 enter market 1?

Briefly discuss what assumptions are you making as what E1 believes- about the players' rationality, about what the players believe about one another's rationality,

September 23rd : Session 7: Judo Economics

Readings:

Judo Economics (9-794-103)

Questions for Judo Economics

1. Suppose that: (a) each buyer has a willingness-to-pay of $200 for one unit of either the incumbent's or the entrant's product; and (b) both incumbent and entrant have a $100 unit cost of serving buyers. Formulate a strategy for the entrant. How much money can the entrant make?

2. Now suppose that: (a) each buyer has a willingness-to-pay of $200 for one unit of the incumbent's product and $160 for one unit of the entrant's product, and (b) the incumbent has a $100 unit cost and the entrant a $120 unit cots. Formulate a strategy for the entrant. How much money can the entrant make?

3. Finally, suppose that: (a) each buyer has a willingness-to-pay of $200 for one unit of either the incumbent's or the entrant's product; and (b) the incumbent has a $120 unit cost and the entrant an $80 unit cost. Formulate a strategy for the entrant. How much money can the entrant make this time?

September 25th: Session 8: Product Differentiation
<u>Readings</u>

Competition and Product variety (9-190-100)
Product Proliferation and Preemption (9-190-117)

<u>Questions</u>

1. Which product types will managers at firms A and B decide to manufacture? State the logic underlying your beliefs?

2. Assume that firm A enters the market first. If A's managers wish to deter entry by B, which products should they produce and why?

3. Assume A has a monopoly position. What products should A's managers produce and why? Do A's managers want to serve the entire market?

Hint: Remember that the model is symmetric since demand is uniform. That is the prices

September 30th Session 9: Mixed 1-Mixed Strategies and Promotional Pricing

<u>Readings:</u>

Simultaneous Move Games with Mixed Strategies

October 2nd Session 10: Mixed Strategies 2: Yield Management

Readings:

The Mother of All Price Wars (KEL006-PDF-ENG)

October 7th: Session 11: Signaling Information: Education and Quality

Readings: To be distributed in the prior class meeting

October 9th Session 12 Signaling and Information

Readings:

Signaling Costs (9-793-125)

1. Might player A want to try to signal its cost position to player B?
2. Is there a way for it to do so? In answering, pay particular attention to the question of the credibility of any signal that A might send B.

October 14th : session 13: Repeated Games

Readings:

Managerial Economics, Chapter 12

October 16th : In Class Examination

Instructions for Written Analysis:

The written analysis should be based on a strategic situation of your choice. Your chosen situation must be one where payoffs are interactive. That is the payoff to one player depends on the strategic choice of other players. The paper should develop a game/decision tree to depict the situation, and then use the tree to analyze the relevant strategies.

Your decision tree should show some of the following

Players
Strategic options
Order of moves (i.e., sequential or simultaneous)
Time period (i.e., one shot or repeated)
Information of the players (i.e., asymmetric, incomplete)
Payoffs

Your paper should also include the following

General background: 1-2 pages: You should provide some general description of the key players. You should also describe the strategic choices (e.g., price, market entry, new products, advertising) available to the players.

5-6 pages of analysis of strategic decisions made in light of your game tree

Suggested Paper Length including all exhibits: 6-8 pages, doubled spaced, 12 point font, One inch margin, header (team member names)

Date Due: by 5pm, October 23rd

Payoffs:

It is not expected that teams obtain primary financial/performance data.   In order to determine payoffs, any of the following are acceptable

1. Easily or readily obtained primary data (e.g., internet searches)
2. Algebraic Values
   Payoffs for a player/firm usually functions of price, variable costs, market share, and fixed costs.   Thus best strategies are a function of these values.
3. Plausible values

Delivery Instructions: Students should post their papers to web café no later than the due date. Pdf format preferred.

Example of Prior paper topics.   Some prior papers are also available on web café

Pre-nuptial Agreements

Labor v Management collective bargaining
        NFL, NBA, MLB

Sporting Events
        New England Patriots v Indianapolis Colts on 4th down, November 2009

Card/Board Games
        Texas Hold' Em
        Risk
        Go

Reality TV shows
        Survivor
        Real Housewives
        Ru Paul's Drag Race
        Jersey Shore

Android entry in to smart phone market

India response to Pakistan orchestrated Mumbai attacks

Exploding Job Offers

Dating, Marriage, Divorce

ON line Auctions

Military Strategy
US Elections (Presidential, Party Primaries)

Quantitative Exercises

Each student must submit any two of the following five exercises. The completed
exercises are due at the beginning of class. Exercises submitted after class has started
will NOT be accepted.
The questions for each exercise are given in the course syllabus
Problem set exercises and due dates

Sequential Entry	Session 4	September 11th
Deep Pockets	Session 5	September 16th
Fog of Business	Session 6	September 18th
Judo and Entry	Session 7	September 23rd
Product Differentia on	Session 8	September 25th