

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	30%
Quantitative Exercises:	20%
In Class Exam	30%
Class Participation	20%

Please note part of your final grade will depend on an interactive game regarding the final exam. In the past some students have found this to be socially stressful. If you are very socially uncomfortable engaging with your classmates in such a setting, you should speak with me before enrolling in this course.

## **Study Guide and Course Outline**

### **August 27<sup>th</sup> 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)

Movie: Dark Knight and Dark Knight Rises

## **Part I: Competitive Pricing**

#### Readings:

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

### **September 1<sup>st</sup> Session 2 Sequential Games and Price Predation Strategies**

#### Questions:

**What are Ryan Air Options?  
Options for British Air?**

### **September 3<sup>rd</sup> Session 3: Backward Induction: Pricing Strategies and Credibility**

#### Readings:

**Sequential Entry (9-190-102)**

#### Questions:

1. How many firms will enter the industry?

2. How much will each firm spend on advertising?

What will be the firms' profits?

Is the British Air threat credible?

What should the Ryan Brothers do now?

#### Sept. 8<sup>th</sup> **Session 4: Deep Pockets and Last Man Standing**

##### 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\*

#### Sept. 10<sup>th</sup> **Session 5: Fog of Business and Mental Models**

##### 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,

Now how should Ryan Air think about British Air's likely strategy?

## Part II Market Entry and Structure

### **Sept. 15<sup>th</sup> Session 6: Judo Economics and Market Structure**

#### 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 entrants 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 cost. 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?

### **Sept. 17<sup>th</sup> Session 7: Product Differentiation and Proliferation**

#### Readings

Competition and Product variety (9-190-100)

Product Proliferation and Preemption (9-190-117)

#### Questions

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

Sept. 22<sup>nd</sup> Session 8: Organizational Capabilities and Sunk Costs

Readings

Structure and Evolution of the Management Consulting Industry

## **Part III: Applied Mixed Strategies**

Sept. 24<sup>th</sup> Session 9: Mixed 1-Mixed Strategies and Pricing

Readings:

Simultaneous Move Games with Mixed Strategies

Sept 29<sup>th</sup> Session 10: Mixed Strategies and Capacity

Readings:

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

Oct. 1<sup>st</sup> Session 11: Mixed Strategies and Product/Product Segmentation

**Readings:**

**Movie Release Dates**

## **Part IV    Signaling Price, Cost, Quality**

## **Oct. 6<sup>th</sup> Session 12: Signaling Information: Cost and Quality**

### 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.

## **Oct. 13<sup>th</sup> Session 13 Signaling Quality in a Job Market Tournament**

### Readings:

TBA

## **Oct. 15<sup>th</sup> Session 14 : The Secret to Trust, Love, Marriage, Happiness as Repeated Games**

### Readings:

## **Due Dates for Quantitative Exercises**

**Sept. 3<sup>rd</sup> Sequential Entry**

**Or**

**Sept. 8<sup>th</sup> Deep Pockets**

**Sept. 10<sup>th</sup> Fog of Business**

**September 15<sup>th</sup> Judo Economics**

**Or**

**September 17<sup>th</sup> Product Differentiation**

**Sept. 24<sup>th</sup> Mixed Strategies**

# Oct. 6<sup>th</sup> Signaling Cost

## 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, and 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: Oct 22<sup>nd</sup>

## 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.

Examples 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 4<sup>th</sup> 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)



