University of Pennsylvania
Department of Economics

Syllabus for Economics 35
Industrial Organization, Section 1, Fall 2014

Professor Uri Spiegel　　　　　　　　　　　**Classes: MW 9-10:30**
Rm 334, McNeil Building　　　　　　　　　　　　**Office Hours: Mon 11-13**
Tel: 8-5178　　　　　　　　　　　　　　　**(and by appointment)**
Email: uspiegel@econ.upenn.edu

Course Description and Objective

This is an advanced course in microeconomics.   Theories of various industrial organizational structures and problems are developed, including monopoly, oligopoly, Nash Equilibrium nonlinear pricing and price discrimination. These theories are then applied to the study of various industries, antitrust cases, and regulatory issues, and may be extended to Bundling and Debundling issues, Deal prone and other intertemporal issues. During classes we may discuss the implications of firm policies on consumers and the society welfare and the regulation actions of policy makers.

Prerequisites: Economics 1. Economics 2 is recommended. Knowledge of calculus is strongly advised.

There are no make-up examinations in this course. Students are expected to come to each and every class. Students are expected to schedule their time so that they will be present during the review sessions, if offered.

Text:

Industrial Organization: Contemporary Theory and Practice, (PRN) Fourth Edition, by Lynne Peppall, Daniel J. Richards and George Norman, South Western.

Other Texts

The Economics of Price Discrimination, (EPD), by Louis Phlips, Cambridge University Press, reprinted 1989.

The Theory of Industrial Organization, by Jean Tirole, The MIT Press, 1988.

Industrial Organization: Theory and Applications, by Oz Shy, The MIT Press, 1996.

Requirements: Your grade will be based upon one midterm examination and a final.

Problem sets: There will be 5 problem sets assigned during the semester. They are designed to give you the opportunity to review and practice the material learned in class. We recommend working in small study groups. No credit to the problem sets. The final grade is based on midterm and final scores.

A Tentative Reading List Subject to Changes (based on PRN)

Introduction	Chapters 1-2
Technology, Costs, and Market Structure	Chapters 3-4
Basic Monopoly Pricing and Product Strategies	Chapters 5-6
Price Discrimination of first, second and third degree,	EPD
Two-Part Tariff policy pricing	EPD
Product and Pricing Strategies for the Multi-product Monopolist	Chapter 7-8
Theories of Business Strategy in Oligopoly Markets	Chapter 9-11
Monopoly Power and Predatory Conduct	Chapter 12-13
Collusion and Cartels (optional)	Chapter 14-15
Mergers	Chapters 16-17
Advertising (optional)	Chapter 20-21
Current Critical Issues**:** (optional)	
Bundling and Debundling, Network Externalities,	EPD and Tirole
Transportation Costs (optional)	EPD and Tirole

Concentration

There are no make up examinations in this course.
Information about the TA and Review Sessions: TBA

Before the midterm and the final: Review Sessions, Tentative Days, subject to changes: TBA

Exercises

QUESTION 1
A monopoly produces product X according to the following cost function:
$TC = 1200 + 20X$
The monopoly faces the demand curve of the market:

$D: \quad P_X = 100 - X$

a. Find the equilibrium values of the monopoly case in terms of P$_x$, X, TR, TC, II

   and $C.S.$

b. Is the competitive equilibrium feasible? Why?

c. The monopoly gains pure economic profit and produces too little, therefore the

   "regulator" imposes a price ceiling and considers two possibilities.

   I.   Price ceiling at the points where AR=AC.

   II.   Price ceiling at the points where AR=MC combined with a subsidy.

   Discuss both possibilities from the welfare point of view.

QUESTION 2
A single producer of good X faces the following cost function in $ terms and the market
demand is as follows:
$TC = 1000 + 6X^2$.
D: $P_X = 280 - X$
   a. For a simple monopoly determine the producer's revenues, costs and profits.

   b. An economist who examines the results claims that the monopoly cannot survive

      in the long run. Is he right?

   c. The economist suggests a second degree price discrimination policy. What are

      the price quantities, revenues, costs and profits?

   d. From the consumer and welfare point of view is the solution of item c preferable?

   e. Repeat items (a)-(d) assuming a new cost function: $TC = 3000 + 6X^2$.

QUESTION 3

a. In a competitive market N identical firms produce item Q according to the

following cost function of each firm: $TC_i = 400 + 20q_i + q_i^2$ (for $i = 1...N$)

The market demand for Q is: $D = P = 140 - \dfrac{Q}{100}$

Find the long run market equilibrium of the following values:

$P_E=$_____ $q_i=$_____ $Q_E=$_____ TR of each firm=_____
TVC of each firm= _____ N= _____ (Economic profits) $\Pi=$_____
Consumer Surplus: _____, Social Welfare: _____

b. The market demand is multiplied such that for every market price the new

quantity demanded by the whole market is doubled. Find the short-run

equilibrium, assuming no entry of new firms into the industry, for all the

terms mentioned in (a).

c. Find the new long-run equilibrium for all the terms mentioned in (a) assuming

free entry of new firms into the industry.

QUESTION 4

A Penn airline uses an airplane with 120 seats and sells flight tickets to faculty members
(F) and students (S). The demand of each group is as follows:
$D_F: \quad P = 200 - T_F$
$D_S: \quad P = 160 - 0.25T_S$
The flight cost per customer is $20. The fixed cost is $1000.

a. How does the airline allocate seats between faculty members and students if price

discrimination is prohibited?

b. How does the airline allocate seats between faculty members and students if the

airline discriminates between the two groups?

c. Compare prices, revenues, and profits of the airline for each case.

d. How would you change your answer to (a)-(c) if the university decides to

subsidize student flights by $40 per ticket?

e. The university signs a contract with a big airline with unlimited number of airplanes and seats, such that each flight per customer costs the airline $20 as before. The airline introduces a new fare system for faculty members where T_F^1 tickets will be sold for the price of P_1 and additional T_F^2 ticket will be sold for a lower price of P_2. Help the airline to determine the optimal values that maximize profits. Compare the results of this price discrimination (second degree) to the case where only one optimal price is offered the faculty member.

f. Optional question. Three prices

g. Optional question. Price discrimination of the third degree.

QUESTION 5
The market demand for Honey, H, is as follows:
$D: \quad P = 260 - H$
In the market there is only one monopoly (beehive keeper) producer whose production cost of honey is $20 for each unit of H.
   a. Find the total revenue, cost, and profit of the monopoly.

   b. Find the consumer surplus and the DWL (Deadweight Loss).

   c. The government supports the entry of another honey producer (beehive keeper) with the same production cost who produces the same honey (identical in quality terms, etc). Find the new price level, quantities produced by each producer, total revenue, costs and profits (Cournot).

   d. How does the entry of another producer affect the consumer surplus and Deadweight Losses?

e. The original producer becomes the "Leader" (the smart long sight producer) and the new firm stays myopic or the "follower". Answer items (c) and (d) based on the new solution (Stacklberg).

QUESTION 6

The demand for beer, b, during two periods 1 and 2 is as follows:
$$b_1 = 120 - P_1$$
$$b_2 = 120 + 0.5b_1 - P_2$$

a. The beer producer maximizes profits at each period ignoring intertemporal effect (he is myopic). The total cost function for each period is as follows:

$$TC_1 = 20b_i \qquad i = 1, 2$$

b. After learning at Penn he became a long-sight "planner" and decided to maximize total profit from the output of the two periods (assume an interest rate 0f zero).

c. Compare pricing policies, quantities, revenues, and profits for the two cases discussed at items (a) and (b).

d. How does the beer producer utilize the addiction effect of beer drinking?

QUESTION 7

A monopoly faces two demand curves of individual 1 and individual 2 as follows:
$$D_1 : \quad P_1 = 150 - X_1$$
$$D_2 : \quad P_1 = 120 - X_2$$

The cost function is:
$$TC_i = 30X_i \qquad i = 1, 2$$

a. Determine price quantities and profit for the case of a simple monopoly.

b. Determine price quantities and profit for the case of a discriminating monopoly of the first order.

c. The monopoly sets a two-part tariff policy with no discrimination. Determine price, quantities and profit.

d. The same as item (c) but the monopoly sets a two-part tariff discriminating policy.

e. Optional: Answer item (a) and/or (c) when the monopoly faces the following different demand curves:

$$D_1: \quad P_1 = 150 - X_1$$
$$D_2: \quad P_2 = 70 - 0.25 X_2$$

Midterm Exam
ECON 35
Professor Uriel Spiegel

Question 1

A monopoly produces good X facing the following market demand:

D: $P = 220 - X$

The cost function that the firm faces is as follows:

$TC = 1000 + 40X$

a) Find the values of price, P, quality; X, total revenue; TR, total cost; TC, profits; II, and deadweight loss, DWL, at equilibrium that are determined by the monopoly.

b) Due to high monopoly pure economic profits, the government allows another <u>identical</u> firm to join the market and compete with the monopoly according to Cournot's model. Give (answer?) the new values of item (a) above for each firm and find the new value of the DWL.

c) Prove that perfect competition equilibrium cannot exist.

d) How many more identical firms do you recommend to allow entry into the industry/market to maximize the total social welfare? If you have difficulties in calculation it, explain it in your own words without exact calculation.

e) The scenario is changed and we now assume that the monopoly is facing an entry of additional firms that are not identical to the monopoly, but the goods they are selling are substitutes (but <u>not perfect</u> substitutes!). As a result the monopoly facing a shift of the demand – parallel downwards shift of the demand, until <u>all</u> pure economic profits are eliminated. We call this scenario equilibrium of a "Monopolistic Competition".

f) Determine price, quantity demand, total revenue, and cost. Do not forget that the pure economic profit is zero!

Question 2

Explain the importance of the Lerner Index and illustrate very briefly why it is not always so reliable.

Question 3

Consider an industry of 10 firms that are sharing their revenues. One firm earns $900 and nine other firms earn <u>all together</u> a total of $100.

a) Calculate the HHI (Herfindahl-Hirschman Index) that is discussed in ch. 3 of your book.

b) Plot the Lorenz Curve and "estimate" the "Gini coefficient" value.

c) If we face a different industry where again the total revenue is $1000, but now 2 firms gain $450 each and additional 18 firms earn (all together) a total of $100, can you verify which industry demonstrates a higher degree of a market concentration?

Question 4

The demand for alcoholic beverage of young people depends on price, as well as the history of drinking, indicating the phenomenon of "intertemporal effect" that you can have a good term in English: ………. Write the term on the questionnaire!

The demand at the first period, 1, is:

D_1 : $P_1 = 100 - X_1$ where P_1 is the price in $ terms and X_1 number of bottles the young drink in the first period

The demand at the second period, 2, is:

D_2 : $P_2 = 100 + 0.5 X_1 - X_2$ where P_2 is the price in $ terms and X_2 number of bottles the young drinks in the first period, where the production cost of each bottle is $20.

a) Find the pricing policy of a myopic monopoly producer of the beverage.

b) Find the pricing policy of a long-sight monopoly producer.

c) Compare profits of each policy.

Final Exam
ECON 35 – December, 2012
Professor Uriel Spiegel

Question 1

The demand market of Disneyland can be decomposed into two groups:

(1) Children, C, and (2) Adults, A.

The demand of children C, to Disneyland Park facilities, X_C, is

D_C: $P = 160 - X_C$

The demand of parents (Adults), A, for Disneyland Park facilities, X_A, is

D_A: $P = 130 - X_A$

The cost per use of each facility by each person is $10:

g) What is the optimal price discrimination of the first degree of Disneyland owner?

h) Based on what you have studied in the course suggest three different policies that may increase revenues.

   (i)   Third degree price discrimination with <u>two</u> different prices for each group.

   (ii)   Two-part tariff policy with no discrimination.

   (iii)   Two-part tariff policy allowing price discrimination.

In each policy solve the prices, total revenues and compare profits.

Question 2

The customers of Penn Bookstore are non-homogeneous and the table below

represents the reservation prices R,P, for two kinds of books: X_1 and X_2.

RP of Individual	RP$_1$	RP$_2$	RP$_3$	RP$_4$	RP$_5$	RP$_6$
X$_1$	5	4	3	5	7	0
X$_2$	5	6	7	3	1	8

a) Find the optimal single price on each book. How many books will be sold and what is the total revenue?

b) Find the maximum revenues the bookstore may gain under complete price discrimination. How many books of each kind will be sold?

i) The bookstore makes a "clearance" and sells the books "bundled". There is *no* sale of a single book. What is the optimal bundled price? What are the revenues?

j) Optional: A mixed strategy is officered so each consumer can buy the "bundled" at price, P$_B$= ___ and P$_{1=}$___ and P$_2$= ___ for a sale of each separated book. How close are the new revenues to the revenue the bookstore gains at item (b)?

Question 3

a) What are the conditions for price discrimination?

b) Give an example of debundling policy that increases profits.

Question 4

An airline holds one aircraft with 90 available seats. The flight from Airport A to Airport B costs $1000 regardless of how many passengers are taking the flight. The daily demand for flight (one flight per day!) of market 1 is:

D: $P_f = 120 - S$ where S - number of seat tickets or passengers

and P_f - the airfare in $ terms for each seat

a. As a simple monopoly airline, determine how many passengers will take the flight and what is the optimal fare, P_f, revenues, cost and losses? How many seats will be occupied every day?

b. Because of the losses the airline decides on a new policy of selling "first" S_2 seats in price P_f^2 and additional S_1 seats will be sold for a <u>higher</u> price, P_f^1. What are the values of P_f^1, P_f^2, S_1 and S_2? Total revenues, total costs and profits? How do you define this kind of price discrimination? (Remember! $S_1 + S_2 \le 90$).

c. Since the airline found that some seats are still available (how many?) the airline honor extends the price discrimination and decides on three different fares where $S_1 + S_2 + S_3 = 90$.

d. Compare revenues and profits at item (a), (b) and (c).

e. A new market is opened to the airline where the airline can sell each seat for $70 and there is *no limit* of number of seats at this price (elastic demand). How does the airline sell seats if the airline is not allowed to discriminate between market 1 and the new market?

f. The same situation as item (e) above, but price discrimination is possible.

g. Compare profits and price elasticities in items (e) and (f).

GOOD LUCK!