ECON 480: Industrial Competition & Monopoly, Spring 2024

Sections: A3/A4 : TR 9:30 am- 10:50 am, Room: 215B DKH

Sections: B3/B4 : TR 11:00 am- 12:20 pm, Room: 215B DKH

[The course outline Download The course outline:](UPDATED: 04/27/2023- 4:35 pm)

The course outline indicates the dates on which each topic has been covered up to this point.

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Office location and Phone: 205C DKH, (217)333-6777

Course Site: https://canvas.illinois.edu/ Lecture notes and other supporting materials are available on Canvas and students are expected to check this site for announcements and materials on a regular basis.

Office hours: MW 3:00 pm-4:00 pm or by appointment.

- In order to make it easier for you to ask questions I have created a discussion board in Canvas with the following forums:

1. a forum for your feedbacks about the lectures and for answering questions regarding the lectures. I welcome any suggestions about improving the lectures.
2. a forum to answer question about assignment and exams.
3. The best way to ask a question is to post it in the discussion board.

Prerequisites: I do not recommend you take this course unless you know:

- *Microeconomics:* at the intermediate level
- *Calculus*: differentiation & unconstraint optimization

Attendance:

- Attendance is required. I usually take attendance at the beginning of the lecture. Please try to be on time. In case you are late, take the first available seat and try not to disrupt the class.
- Except for an emergency, you are not allowed to leave the lecture before it ends. In case there is something important, that makes you to leave the lecture early, please tell me about it before the beginning of the lecture.
- **PLEASE TURN OFF YOUR CELL PHONE DURING LECTURE.**

Text: The following textbook is required:

"**_Introduction to Industrial Organization_**" By Luis M. B. Cabral 2nd Ed, MIT press

Textbook Link: https://mitpress.mit.edu/books/introduction-industrial-organization-second-edition

Author's website: http://luiscabral.net/economics/books/iio2/

Grading:

3 credit hours: Grades will be based on homework assignments (20%) & three exams: midterm1 (20%), midterm 2 (25%) and a cumulative final exam (35%).

4 credit hours: Grades will be based on homework assignments (20%) & three exams: midterm1 (15%), midterm 2 (20%) and a cumulative final exam (30%) plus a paper (15%).

I will adjust the average determined above to take into consideration the trend of your performance in the course.

Grade Scale: Letter grades will be assigned only at the end of the semester based on the overall score for the course. A +/- scale will be used. The cut-offs for +/- are as follows:

A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-
≥97%	≥93%	≥89.5%	≥87%	≥83%	≥79.5%	≥77%	≥73%	≥69.5%	≥67%	≥63%	≥59.5%

Assignments:

- The assignment with the lowest grade will be dropped.
- Assignments should contain the following information on the ***right-hand corner*** of the page: your name, assignment identification and date.
- I will post the assignments on the course Canvas site. For each assignment a deadline will be announced. You must upload your solution in Canvas. Any solutions submitted after the deadline will not be graded.

Exams: In addition to the final exam, there will be two midterm exam. The final exam is cumulative.

- You can use a simple calculator.
- There are to be no books, papers other than the exam itself.
- **No cell-phone use is allowed during the exam**. Students found to be using unapproved items are in violation of the Academic Integrity policy of the University and will be subject to disciplinary action.
- If an extreme circumstance occurs (e.g., illness), notify me prior to the exam and provide appropriate documentation. Otherwise, there will be no make-up exams.

Exam Dates

- *Midterm I:* Thursday February 22 During the class time
- *Midterm II:* Thursday April 11 During the class time
- *Final Exam:*
  - Combined Exam: 7:00-10:00 p.m., Tuesday, May 7 in room: TBA
  - Conflict Exam: 7:00-10:00 p.m., Thursday, May 9 in room: TBA

Final Exam Conflict Policy: From the University's final exam policy:

- Any student having more than two consecutive final examinations is entitled to rescheduling as follows if he or she takes the following action no later than the last day of classes:

- The student must investigate whether a conflict examination is being held at another time for any of the examinations involved.
- If a conflict examination has been scheduled for any of the courses, the student must take one or more of these conflict examinations. If conflict examinations are offered for more than one course, the student must take the conflict for the course that has the largest number of students.
- If no conflict examinations have been scheduled, the student must contact the instructor of the course having the largest number of students. The contact must be made no later than the last day of classes, and that instructor must provide a makeup examination.

The University's final exam policy is available at: https://studentcode.illinois.edu/article3/part2/3-201/

Emergency Response Recommendations: The university maintains guidelines for emergency responses. A list of recommendations when to evacuate and when to find shelter are available at:

https://police.illinois.edu/em/run-hide-fight/

Statement on Disability Accommodations: To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources Educational Services (DRES) as soon as possible. To contact DRES you may visit 1207 S. Oak Street, Champaign, call 333-4603 (V/TTY), or email a message to disability@illinois.edu.

Academic Integrity: "The University has the responsibility for maintaining academic integrity so as to protect the quality of education and research on our campus and to protect those who depend upon our integrity. *Expectations of Students*. It is the responsibility of each student to refrain from infractions of academic integrity, from conduct that may lead to suspicion of such infractions, and from conduct that aids others

in such infractions. Students have been given notice of this Part by virtue of its publication. Regardless of whether a student has actually read this Part, a student is charged with knowledge of it. Ignorance is not a defense."

The University's full academic integrity policy is available at: https://studentcode.illinois.edu/article1/part4/1-401/

Community of Care: As members of the Illinois community, we each have a responsibility to express care and concern for one another. If you come across a classmate whose behavior concerns you, whether in regards to their well-being or yours, we encourage you to refer this behavior to the Student Assistance Center (217-333-0050 or http://odos.illinois.edu/community-of-care/referral/). Based on your report, the staff in the Student Assistance Center reaches out to students to make sure they have the support they need to be healthy and safe. Further, we understand the impact that struggles with mental health can have on your experience at Illinois. Significant stress, strained relationships, anxiety, excessive worry, alcohol/drug problems, a loss of motivation, or problems with eating and/or sleeping can all interfere with optimal academic performance. We encourage all students to reach out to talk with someone, and we want to make sure you are aware that you can access mental health support at the Counseling Center (https://counselingcenter.illinois.edu/) or McKinley Health Center (https://mckinley.illinois.edu/).

For mental health emergencies, you can call 911 or walk into the Counseling Center, no appointment needed.

Disruptive Behavior: Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students' ability to learn and an instructor's ability to teach. A student responsible for disruptive behavior may be required to leave class pending discussion and resolution of the problem and may be reported to the Office for Student Conflict Resolution for disciplinary action.

Religious Observances: The Religious Observance Accommodation Request form is available at https://odos.illinois.edu/community-of-care/resources/students/religious-observances/. Submit the form to the instructor and to the Office of the Dean of Students (helpdean@illinois.edu) by the end of the second week of the course; in the case of exams or assignments scheduled after this period, students should submit the form to the instructor and to the Office of the Dean of Students as soon as possible.

Family Educational Rights and Privacy Act (FERPA): Any student who has suppressed their directory information pursuant to Family Educational Rights and Privacy Act (FERPA) should self- identify to the instructor to ensure protection of the privacy of their attendance in this course. See: https://registrar.illinois.edu/academic-records/ferpa/ for more information on FERPA. Student information and records will not be released to anyone other than the student unless the student has provided written approval or as required by law.

Sexual Misconduct Reporting Obligation: The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the University's Title IX and Disability Office. In turn, an individual with the Title IX and Disability Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options. A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here: http://www.wecare.illinois.edu/resources/students/#confidential.

Other information about resources and reporting is available here:http://wecare.illinois.edu/

Student Support

The Counseling Center is committed to providing a range of services intended to help students develop improved coping skills in order to address emotional, interpersonal, and academic concerns. Please visit their website to find valuable resources and services: http://counselingcenter.illinois.edu/

Counseling Center Information: Location & Phone: Room 206, Student Services Building (610 East John Street, Champaign IL); 217-333-3704

McKinley Mental Health Information: Location and Phone: 3rd Floor McKinley Health Center 1109 South Lincoln, Urbana, IL, 217-333-2705

Emergency Dean: The Emergency Dean may be reached at (217) 333-0050 and supports students who are experiencing an emergency situation after 5 pm, in which an immediate University response is needed and which cannot wait until the next business day. The Emergency Dean is not a substitute for trained emergency personnel such as 911, Police or Fire. If you are experiencing a life threatening emergency, call 911. Please review the Emergency Dean procedures: https://odos.illinois.edu/community-of-care/emergency-dean/

Lecture	Date	Topics Covered
1	January 16	**Introduction: What is IO?** Industry, Market power, Oligopoly, imperfect competition, marginal cost, Chicago school, **Acquiring market power**: legal protection, firm strategy **Implications of market power**: transfer from consumers to firms, Allocative inefficiency Productive inefficiency Rent seeking
2	January 18	**Public Policy:** Regulation, Antitrust, Industrial policy **Derivation of demand**: Maximizing utility subject to budget constraint ➔ **Demand** $q^*(P, P_O, Y)$: is function of its price P, price of other things P_O and income (Q on vertical axis and P on horizontal axis). **Importance of relative prices** (or real prices = nominal prices – inflation): Change relative price leads to change in consumer behavior. **Inverse demand:** price on the left-hand side ➔ gives willingness to pay for a fixed quantity of a good (P on vertical axis and Q on horizontal axis). *Movement along demand curve* versus *shift in demand curve* **Consumer Surplus**: Area under inverse demand above the price ➔ is used the measure the net benefit consumer receives from engaging in a transaction.
3	January 23	**Elasticity**: Definition in general **Price elasticity of demand** Elastic, inelastic and unit elastic demand Price elasticity depends on: Availability of substitutes, income, and duration of time. *Formula*: $\Delta R/R = (\Delta P/P)(1+E)$ **Cross price elasticity of demand**: substitute, complement and independent goods

		Income elasticity of demand: inferior, normal, necessity and luxury goods.
4	January 25	How to estimate price and income elasticity of demand? *Formula*: $\Delta q/q = E_P(\Delta P/P) + E_Y(\Delta Y/Y)$ **Technology:** production function, Total factor productivity **marginal product** of labor and of capital, Codd-Douglas production function, additive production function
Assignment	**Sunday Jan 28**	**HW1 due by midnight**
5	January 30	**Returns to scale:** CRS, DRS, IRS **Cost:** Cost function: fixed cost, variable cost, Average cost, marginal cost MC and AC curves intersect at the minimum of AC
6	February 1	Duality between cost function and production function Firm's decisions: Stay in the market? As long as $P \geq AC$ (in SR $P \geq AVC$) How much to produce> $P = MC$ If firm is price taker: SR: if $P >$ min AVC produce where $P = MC$ LR: if $P >$min AC produce where $P = MC$. **Thus the supply function for price taker firm is:** SR: Portion of MC above min AVC LR: portion of MC above min AC In the long run $P = MC = AC$ **Pricing for firm with market power** (faces a downward demand): trade off between Q & P

		Decision how much to produce: Maximize profit. It happens where MR = MC Perfect competition: for price taking firm MR = P thus it produces where P = MC. Firm with market power MR = P $(1 + 1/\varepsilon)$ thus it produces where $P(1 + 1/\varepsilon) = MC$ OR $(P - MC) / P = -1/\varepsilon$. Measure of concentration: Lerner, $L = (P - MC) / P = -1/\varepsilon$ Measure of concentration: markup, $K = (P - MC) / MC$ $L = K/(1+K)$
7	February 6	Do firms maximize profit? Shareholders: collective action problem+ Agency problem: Principal(shareholders)-agent(managers): asymmetric information, risk neutral, risk averse high powered versus low powered compensation schemes: (Max risk + Max incentive): unification of ownership and management (Min risk + Min incentive): separation of management and ownership = fixed salary Labor market discipline, product market discipline, capital market discipline, Firm's boundaries: horizontal extension, vertical integration, specific asset, hold up problem, tapered integration, franchising, Why are firms different? Unique resources, causal ambiguity, history, firm strategy
8	February 8	Perfect Completion, **Assumptions:** price taking behavior, homogenous products, perfect information, Free entry and exit (all firms have access to the same technology), No externality, no increasing returns to scale technology

		SR: number of firms fixed, produce where P = MC, shut down threshold is min AVC, profit could be positive or negative,
		LR: number of firm such that P = MC = min AC (profit = 0)
		Movement along the demand curve versus shift in demand curves
		Comparative statics
Assignment	**Sunday Feb 11**	**HW2 due by midnight**
9	February 13	Examples on perfect competition:
		-number of firms in the LR
		-Equilibrium with CRS technology: price is equal to the MC of the firm with lowest cost + either the firm with lowest cost satisfies the demand or if all firms have the same cost, each satisfy a share of the demand.
		-Competitive equilibrium with IRS technology does not exist.
		- Tax incidence
		- Toughness of the competition: Elasticity of demand facing the firm determines the toughness of competition, even if the market demand is "inelastic", the firm can face a very "elastic" residual demand.
10	February 15	First welfare theorem: under certain assumptions the competitive equilibrium is efficient, i.e., it maximized total social welfare (CS + PS, where PS = R – VC)
		The competitive equilibrium is both allocative efficient + production efficient ➜ No deadweight loss
		What are the assumptions? Price taking, homogenous goods, perfect information, no increasing return to scale, no externality, no public goods.
		Predictions of competitive model:
		- No simultaneous entry or exit
		- size distribution of firms in an industry either single values or indeterminate.
		- No persistence difference in profit in the LR.

		Real world observations: - simultaneous entry or exit - size distribution is not single valued or inseminate and shows a regular pattern across countries. - Persistent difference in profit rates, - firms that either exit or enter are small size. **Competitive selection model:** To address the above stylized facts, we have to make changes in the perfect competition model: *The assumptions that do not change*: Price taking behavior, Homogenous goods, perfect information. *The new assumptions*: All firms do not have access to the same technology, each firm is uncertain about its productivity (***Use this new assumption to explain the stylized facts***). **Monopolist competition:** we drop the assumption of homogeneity of goods and assume that the products are differentiated ➔ the firms face downward sloping firm. The number of firms adjust such that in the LR profit is zero (a variety of goods are in the market). THE LR equilibrium is not efficient (P >MC and P > min AC) but the variety in products create some value for consumers.
11	February 20	Sources of market power: Increasing returns on the supply side: IRS technology, learning by doing Increasing return on the demand side ➔ network externalities, multiple equilibrium, critical mass Sunk expenditure & product differentiation: switching cost, brand loyalty Intellectual property right: patent, copy right *Monopoly and efficiency*:

		allocative inefficient ➔ deadweight loss Production inefficient Rent seeking *Monopoly and fairness*: Might be considered unfair by some because part of CS is transferred to firms.
Assignment	**Tuesday Feb 20**	**HW3 due by midnight**
Exam	**Thu Feb 22**	**Midterm1-During Class time**
12	February 27	Market share not a good measure of market power: boundaries of market? + importance of elasticity of demand Cartel (number of firm exogenous): firms collude to maximize joint profit: F.O.C. is $MR(Q) = MC(q_i)$ Cartel is not stable: every firm has incentive to cheat (Prisoner's dilemma situation) Multiplant monopoly (number of plants is endogenous): Determine number of plants such that: 1) The total profit is maximized (like in cartel): $MR(Q) = MC(q_i)$ 2) Each plant produces at its efficient scale(Min AC) where $AC(q_i) = MC(q_i)$
13	February 29	Regulations: Types of regulation: market, entry, firm, social theories of regulation: Market failure theory, capture theory, special interest: concentrated benefit, diffused costs Firm regulation: Cost based pricing: marginal cost pricing, Average cost pricing or rate of return regulation Problems with cost-based pricing: in general no incentive to reduce costs (Low powered incentive mechanism) MC pricing results in negative profit, subsidize? Taxes might create more distortion, lobby government

		Price cap (high powered incentive mechanism): there is incentive to reduce cost provided the regulator's promise is credible.
14	March 5	Regulation (Continued): essential facility: Access price, Efficient component pricing rule **Price discrimination**: can increase firm profit: transfer + efficiency enhancing Needs market power + no arbitrage + information about type of customers Law of one price
15	March 7	**Perfect price discrimination (1st degree PD or individual pricing):** Charge each customer a separate price equal to their WTP ➔ Capture all CS, efficient outcome, customers market **Selection by indicators (3rd degree PD or group pricing):** recognize customer by some observable characteristics like location, gender, occupation, age. F.O.C: $MR_1 = MR_2 = MC$ or $(P_i - MC)/P_i = -1/\varepsilon_i$ ➔ higher price in market with relatively less elastic demand.
Assignment	**Thursday March 7**	**HW4 due by midnight**
Spring Break	**March 12**	**No Class**
Spring Break	**March 14**	**No Class**
16	March 19	Two example **PD by selection (2nd degree PD or menu pricing):** self-selection, Versioning: participation constraint, incentive compatibility constraint, Non-linear pricing: two-part tariff (Identical customers) Pure and mixed bundling Two-part pricing
17	March 21	Examples on Price discrimination Two-part tariff with multiple type customers

		Coupons
Assignment	**Sunday March 24**	**HW5 due by midnight**
18	March 26	Oligopoly: Strategic interaction, Game theory: non-cooperative static games with complete information Game with Simultaneous move: Equilibrium in dominant strategies Equilibrium by iterated elimination of dominated strategies Nash equilibrium Example: Moral hazards in teams
19	March 28	Games with continuous strategies: Team with synergy Games with multiple equilibrium: pure coordination games, Battle of sexes, focal points Games with no (Pure) strategy NE: mixed strategies Sequential games: subgame perfect equilibrium (NE + credibility)
20	April 2	Subgames, backward induction, Finite Repeated games, Infinite repeated games: SPE in trigger strategies, provided discount factor is sufficiently high.
21	April 4	Application of game theory: Bertrand model: best response functions positively sloped (strategic complement), Bertrand trap, Ways to escape the trap: leader in cost, capacity constraint, Cournot model: best response functions negatively sloped (strategic substitute)
22	April 9	Example on Cournot model Cournot model with N firms: as N increase price approaches MC, total quantity approaches the competitive output and social welfare increases(firm's profit and DWL approaches zero but CS increased➔ redistribution form firms to consumers + gain in efficiency)

		Measuring market share in an Oligopoly, HH index of concentration
Assignment	**Tuesday April 9**	**HW6 due by midnight**
Exam	**Thu April 11**	**Midterm2-During Class time**
23	April 16	I4 measure of concentration, comparing I4 and IHH, Relationship between market power and market concentration, Parametric models and comparative statics: counterfactual, calibration, pass through rate,
24	April 18	Collusion: repeated interaction can support high prices if firms follow price war for ever as punishment for cheating and in addition have high discount factor Why collusion is NOT so widespread? In industries with limited growth and high probability of bankruptcy cheating is more probable. Oscillation in prices: why? Two models: 1) fluctuations are not observable ➔ the equilibrium supports low prices for a period T and then reverting back to high prices. Price change is pro cyclical 2) Fluctuations are observable ➔ set a lower price when there is high demand to reduce the incentive to cheat. Price change is counter cyclical. Both models are relevant and explain the behavior in some industries.
25	April 23	Factors that facilitate collusion: concentrated industries, similar firms, higher possibility of collusion when firms compete in different markets, sometimes more transparency leads to more collusion Product differentiation: vertical, horizontal, A model of vertical differentiation: Two firms producing goods with different qualities, consumers are ranked based on their preference for quality, the firms compete over prices (Bertrand Model): the equilibrium price will be higher than MC.

Assignment	Tuesday April 23	HW7 due by midnight
26	April 25	Hotelling location model: horizontal differentiation Exogenously given locations: equilibrium price is greater than MC. "The principal of minimum differentiation": The firms can increase their profit by moving towards the center. (However, as they get closer the price competition becomes tougher and moves them apart.)
27	April 30	Example on location models Example: two stage game, the firms choose location in the first stage and then compete over price in the second stage. Example on parametric models: showing advertisement expenditure to sales ratio is equal to (advertisement expenditure elasticity of demand) divided (- price elasticity of demand)
Assignment	Wed May 1	HW8 due by midnight (optional)
Assignment	Wed May 1	Paper (4 credit hour students)
Final Exam:	Combined	Tuesday May 7, 7:00 – 10:00 pm
Final Exam:	Conflict	Thursday May 9, 7:00 – 10:00 pm