

# **ECONOMICS OF INDUSTRIAL ORGANIZATION: AN OVERVIEW**

**Duration: 30 hours**

**Credit: 2 (Two)**

**Economics Department, Presidency University**

**Course Coordinators: Mousumi Dutta & Zakir Husain**

## **MOTIVATION:**

Most economic transactions take place in markets. We will study both classical market structures (e.g., perfect competition, monopoly) and the modern ones (e.g., oligopoly, platforms). Using game-theoretic tools we will develop models to analyze how firms exercise market power and strategically interact with other firms in a variety of settings. The objective of this course is to equip participants with a deep understanding of markets, pricing, and more generally strategic behavior as the foundation for any application to industry.

## **RESOURCE PERSONS:**

**Prof. Arghya Ghosh**, Professor in the Business School, School of Economics, University of New South Wales, Australia.

**Prof. Krishnendu Ghosh Dastidar** Professor of Economics, Centre for Economic Studies and Planning, Jawaharlal Nehru University, New Delhi.

**Dr. Gaurav Jakhu**, Assistant Professor in Economics, Indian Institute of Management Bangalore (IIMB) and IIMB Young Faculty Research Chair.

**Prof. Mousumi Dutta**, Professor, Department of Economics, Presidency University.

**Prof. Zakir Husain**, Professor, Department of Economics, Presidency University.

## **COURSE OUTLINE:**

**Module 1: Conceptual background to market structures [Prof. Arghya Ghosh, UNSW]**

Unit 1: Technology, costs and supply dimensions

Unit 2: An introduction to imperfect competition

**Module 2: Game theory and oligopoly [Prof. Krishnendu Ghosh Dastidar, CESP, JNU]**

Unit 1: Introduction to Game Theory

Unit 2: Static Games of Complete Information

Unit 3: Dynamic Games of Complete Information

**Module 3: Designing strategies to capture market**

Unit 1: Product differentiation [Prof. Arghya Ghosh, UNSW]

Unit 2: Pricing strategies [Prof. Zakir Husain & Prof. Mousumi Dutta, PU]

**Module 4: Network Effects and Digital Markets [Prof. Gaurav Jakhu, IIMB]**

Unit 1: Network effects

Unit 2: Economics of a multi-sided platform

**Wrapping Up [Prof. Arghya Ghosh, UNSW]**

## **TARGET GROUP:**

The program is primarily intended for young faculty, research scholars, postgraduate students and advanced undergraduate students of Economics, Statistics, Engineering and Management.

**PREREQUISITE:**

While there is no strict prerequisite, having attended a preliminary course in Microeconomics and basic knowledge of Game Theory is desirable.

**COURSE DATES & TIMINGS:**

The course will be offered from mid-September 2024, and will end in November 2024. There will not be any lectures during the Durga Puja and Diwali period. Class timings will be weekends (any time) and weekdays (late evenings). A tentative schedule is also given in this brochure.

**APPROACH:**

The program, comprising of 30 hours, will be entirely held online. Lectures will be delivered by experts in the field from India and abroad.

**MODE OF PEDAGOGY:**

The course will be conducted in an online mode. Zoom and Google Meet will be used by the resource persons. The duration of the lectures will be 2 hours.

**EVALUATION:**

Periodic assignments will be held to evaluate the pickup of participants.

**CERTIFICATION**

The course will be treated as a “Non-degree registered course” with 2 credits. On successful completion, participants will be given certificates of completion.

**APPLICATION PROCESS:**

Interested forms should apply by filling in the [Google form](#). The form will be kept open till 23:59 hours on 31.07.2024.

**Link for application:** <https://forms.gle/XDEobsF3RVL93sX29>

Registered persons will be asked to pay the fees of Rs. 7,300/= (inclusive of GST @ 18%) through the SBI Collect portal. The link will be provided in the University portal.

Interested persons may email to [zakir.econ@presiuniv.ac.in](mailto:zakir.econ@presiuniv.ac.in) or [mousumi.econ@presiuniv.ac.in](mailto:mousumi.econ@presiuniv.ac.in) for further information.

**DETAILED SYLLABUS**

Markets facilitate the exchange of goods and services between buyers and sellers. We will consider markets with a large number of non-strategic buyers/consumers and few sellers/firms who can set prices above marginal cost and exercise market power. At one end of the market power spectrum is perfect competition, where firms, like consumers, take prices as given; they have no market power. On the other end lies monopoly, where the sole seller wields market power by deploying various sophisticated pricing strategies to extract the maximum possible rents from consumers. Much of modern industrial organization, however, is devoted to analyzing more realistic, intermediate market structures (between perfect competition and monopoly) where a few firms compete strategically in prices and quantities and other dimensions, including location and quality. After discussing monopoly pricing, strategic interaction between firms, and product differentiation in the first three modules, we turn to digital markets—the marketplace of the 21st century—where network effects and platforms dominate the

discussion.

## **Module 1: Conceptual background to market structures**

Unit 1: Technology, costs, and supply dimensions

Unit 2: An introduction to imperfect competition

*We begin with the role of markets and firms in modern economics. We illustrate how most economic problems, especially the ones faced by consumers and producers, can be cast as optimization problems with constraints. We set up a firm's constrained optimization problem – maximize profits/ minimize costs subject to production technology – and embed that in two classical market structures: perfect competition and monopoly. The module ends with a discussion on the limitations of these two market structures in capturing reality and prepares the stage for Module 2 which provides the toolkit for modeling strategic interaction among firms.*

## **Module 2: Game theory and oligopoly**

Unit 1 Introduction to game theory

Unit 2: Static Games of Complete Information: Normal form representation of games; Idea of domination - dominance solvable games; Nash Equilibrium - Cournot and Bertrand Equilibrium; Location choice voting games (Hotelling).

Unit 3 Dynamic Games of Complete Information: Extensive form representation of games; Games of perfect information; Backward induction outcomes - Stackelberg equilibrium; Games of imperfect information - Subgame perfect equilibrium - Simple examples of two-stage oligopoly games.

*Game theory, a powerful tool for understanding strategic interactions, is widely used in economics. It provides a framework for analyzing situations where multiple agents' actions affect each other's well-being. This approach has been successfully applied in various economic fields, including macroeconomics, industrial organization, and public economics, making it a crucial skill for future economists.*

*This module is designed to introduce game theory and oligopoly theory to students who will later use such models in applied fields within economics. We will emphasize conceptual analysis, keeping the mathematics level to a minimum, especially at a level acceptable to the average student (at the advanced undergraduate level or the Masters level). Yet, one should bear in mind that this still implies that one should be at ease with basic probability theory, real analysis, and calculus, and more importantly, one should be used to thinking in mathematical terms. A brief module outline is given below, along with some suggested readings.*

## **Module 3: Designing strategies to capture market**

Unit 1: Product differentiation: horizontal differentiation, Hotelling line, Salop's circular city, vertical differentiation (e.g., quality), minimum and maximum differentiation

*Competition among firms typically lowers prices and profits. To soften price competition, firms continually strive to differentiate their products. Before engaging in price/quantity competition, two firms can choose products with different qualities and/or different attributes (e.g. different locations in the physical space or the product space). We say that two products A and B are horizontally differentiated when, at the same prices, some prefer to buy A while others prefer to buy B. On the other hand, A and B are vertically differentiated when all consumers prefer buying A to B at the same prices (e.g. when A has a higher quality than B). We discuss prominent horizontal and vertical differentiation models and explore whether the market provides too much or too little differentiation.*

Unit 2: Pricing strategies: Personalized pricing, Product versioning, Group pricing and other forms of consumer sorting; Nonlinear pricing; Packaged products.

*Consumers are not homogenous but may differ in their preferences and willingness to pay for a product or service. Given the limited information available about consumers and their preferences to the firm,*

a “one size fits all” uniform price is generally assumed to be the optimal policy. In this unit, we will analyze how firms adopt different strategies that allow firms to segment the market into distinct groups with each segment sharing some common characteristics and correlated willingness to pay. Such strategies discriminate between consumers using price as an instrument. The form and effectiveness of such forms of pricing strategies depend upon the extent of information possessed by the firm about the market. It is also possible to go beyond price discrimination, and increase profit by using other tariff instruments.

## Module 4: Network Effects and Digital Markets

Unit 1 Network Effects: Definition of network effects; Impact of network effects on market demand; How firms can utilize network effects

Unit 2 Economics of Multi-Sided Platforms: Definition of a multi-sided platform; Pricing strategies for monopoly platforms; Non-pricing competitive strategies for platforms

*This module explores the economics of markets with network effects, focusing on two sessions that examine the workings of digital markets. In Unit 1, we will examine network effects, a fundamental concept in today’s digital markets. We will define network effects and analyze their consequences for market demand. Additionally, we will investigate how firms can leverage network effects to improve profits. Unit 2 shifts our focus to multi-sided platforms, an increasingly prevalent business model in the digital age. We will explore the nature of these platforms, understand pricing strategies employed by monopoly platforms, and discuss non-pricing strategies that platforms can use to gain a competitive edge. By the end of this module, students will have an understanding of how network effects shape market behaviors and how platform businesses can exploit network effects.*

## Module 5: Wrapping Up

*Summarizing the lessons learned from the modules, the course will end with a discussion on competition policy (e.g., mergers) and innovation (e.g., R&D, patents) which play key roles in determining the market power of modern firms.*

## Tentative schedule

This is a tentative schedule and modifications may be made to it, depending upon the availability of the resource persons.

Week	Tentative dates	Day	Topics	Instructor
<b>Week 1</b>	21 & 22 September	Saturday & Sunday	Module 1	AG
<b>Week 2</b>	28 & 29 September	Saturday & Sunday	Module 2	KGD
<b>Week 3</b>	26 & 27 October	Saturday & Sunday	Module 2	KGD
<b>Week 4</b>	2 & 3 November	Saturday & Sunday	Module 3	AG
<b>Week 5</b>	11 & 13 November	Monday & Wednesday	Module 3	MD and ZH
<b>Week 6</b>	16 & 17 November	Saturday & Sunday	Module 4	GJ
<b>Week 7</b>	23 & 24 November	Saturday & Sunday	Wrapping up	AG

## ABOUT THE RESOURCE PERSONS

**Prof. Arghya Ghosh** is a Professor in the Business School, School of Economics, University of New South Wales, Australia. He is a graduate from Presidency College, Kolkata. He is an applied theorist with research interests in industrial organization and international trade. Competition among firms and its implications for consumers and society underpin a large body of his work. Currently, he is investigating the impact of growing market power of firms on labor mobility, training, and more generally, consumers' and workers' welfare. His work on entry, alliances, innovation, and trade policy have appeared in outlets including *The RAND Journal of Economics*, *Economic Theory*, *European Economic Review*, and *Journal of Economic Behavior and Organization*. Prof. Ghosh has held visiting positions at Indian Statistical Institute, Hitotsubashi, Penn State, Syracuse, and Stanford. He is an Associate Editor at *Journal of Economic Behavior and Organization* and an affiliated member of Digital Economy Research Network (DERN) based at Monash University.



**Prof. Krishnendu Ghosh Dastidar** is a Professor of Economics at the Centre for Economic Studies and Planning, Jawaharlal Nehru University, New Delhi. His areas of specialization are oligopoly theory and auction theory. He was educated at Presidency College, Kolkata and Jawaharlal Nehru University, New Delhi. He pursued his Post-Doctoral research in 1997–98 as a visiting fellow, Department of Economics, Harvard University, USA (with a Ford Foundation Post-Doctoral Fellowship). He has been a visiting research scholar at the Institute of Social and Economic Research, Osaka University, Japan during April-July, 2010 and during the academic year 2013-14. He is an expert in game theory, oligopoly and auction theory and has published in leading economics journals such as the *Journal of Economic Theory*, *Economic Theory*, *International Journal of Economic Theory*, *European Economic Review*, and *Games and Economic Behavior*. He is on the editorial board of *International Journal of Economic Theory*, *Journal of Quantitative Economics* and *Arthaniti (Economics)*.



**Dr. Gaurav Jakhu** is an Assistant Professor in the Economics area at the Indian Institute of Management Bangalore (IIMB) and IIMB Young Faculty Research Chair. He has a Ph.D. in Economics from Indian Statistical Institute, Masters in Economics from Delhi School of Economics, and a Bachelor of Arts in Economics from Sri Ram College of Commerce. Before his doctoral studies, he analysed econometric and statistical evidence for the competition cases. His research areas are Industrial Organization, Antitrust Economics, and Information Economics. Dr. Jakhu's current research focuses on antitrust and regulatory issues in the digital markets. He uses game-theoretic modelling as an analytical tool to understand the economic behaviour of online firms.



**Prof. Zakir Husain** is a Professor of Economics in Presidency University. He is a Graduate from Presidency College, after which he completed his post-graduation in Calcutta University. Prof. Husain has undertaken his Ph.D. from Calcutta University, working on community resource management. He has worked in Institute of Economic Growth, Delhi and Indian Institute of Technology Kharagpur and with the Prime Minister's High Level Committee. Prof. Husain has completed studies funded by The World Bank, Cancer Research UK, The International Growth Center, No Leprosy Remains Netherlands, and other funding organisations. He has also prepared background papers for the long term state plan of the Kerala government, and undertaken studies commissioned by the Ministry of Health and Family Welfare, Govt. of India and Department of Madrasah Education, Govt. of West Bengal. At present he is working on intimate partner violence, climate change, and mental health.



**Prof. Mousumi Dutta** is a Professor of Economics in Presidency University. Prof. Dutta is a Gold Medalist and Ph.D. from Calcutta University. In her doctoral research, Prof. Dutta examined the economics underlying the conservation of built heritage with reference to Kolkata. She has lectured in Johannes Gutenberg University, Corvinus University, Winchester University, Leeds University, Liverpool University, Cardiff University, Shanghai University, Shiv Nadar Institution of Eminence, Indian Statistical Institute Delhi and BIT Mesra. She specializes in Econometrics. Prof. Dutta has published extensively in journals like *Tourism Management*, *Food Policy*, *Sustainable Development*, *Journal of Mental Health*, *Journal of International Development*, *Journal of Interpersonal Violence* and others. She has undertaken research funded by The International Growth Center, Indian Council of Social Science Research, University Grants Commission and Neeti Ayog. Currently, she is working in the areas of reproductive health, gender and mental health.

