Centre for the Study of the World Economy (formerly CITD)

School of International Studies

Course (MA/PhD):	**Ph.D.**
Course Code:	**DI 637**
Course Title:	**Themes in Advanced Microeconomic Theory**
Course Type (Core/Optional):	**Core**
Course Teachers:	**Prof. Sangeeta Bansal, Prof. Sushama Murty, Dr. Brishti Guha.**
Credits:	**4**
Contact Hours:	**4 hours per week**

Course Statement

This course builds on the concepts introduced in the MA core courses of Microeconomics I and Introductory Game Theory and is designed to introduce students to recent advances in micro economic theory and equipping them to conduct research in the area. The course may cover select topics under behavioural economics, experimental economics, advanced game theory, information economics, micro-econometrics, applied production analysis, solving sequential decision making problems in economics and others. Students are expected to know masters level microeconomics and introductory game theory.

Course Objectives

- To enhance students' understanding of how and where the paradigm of completely rational economic agents needs to be changed to accommodate factors intrinsic to behavioural economics.
- To introduce students to specialized topics in game theory and decision making when economic agents lack relevant information.

- To introduce students to experimental literature which may either challenge or support existing theories or suggest the need for new ones.
- To provide the basic knowledge of the theory and its applications for several measurement related issues in production economics.
- To provide the basic tools for modelling sequential decision-making problems in economics and solving them for the optimal policies.

Learning Outcomes

On completion of this course students will

- Learn about advanced themes in micro economic theory.
- Get a thorough theoretical grounding in many themes in microeconomics such as behavioural and experimental economics, game theory, information economics, and applied production analysis.
- Develop deep understanding of decision-making processes under behavioural anomalies and asymmetric information.
- Enhance their problem-solving skills through the application of economic theories to complex real-life scenarios.
- Be able to model production relations in diverse real-life contexts for estimation and measurement purposes such as measurement of productivity, technical and allocative efficiency, marginal abatement costs, etc.
- Be able to model and solve, analytically or numerically, sequential decision-making problems in economics using the tools of dynamic programming.
- Be equipped to conduct original research on related themes and pinpoint research gaps in the existing theoretical literature, which would help them identify avenues of potential research.

Evaluation Methods: There will be continuous evaluation through

Assignments

Paper Presentation

Mid-semester examination

End-semester examination

Course Outline

1. **Module I: Topics in behavioural and experimental economics**

   Starting with introducing students to behavioural economics, the course will focus on how insights from behavioural economics can be incorporated into standard theoretical models and applications. It will also include related experimental economics literature that suggests that standard models need to be modified.

2. **Module II: Specialized Topics in Game Theory**

   This module will introduce students to specialized topics in game theory including social interaction and social dilemma, reasonable beliefs and forward induction, trembling hand perfection, correlated equilibrium, evolutionary games, dynamic Bayesian games and perfect Bayesian equilibrium among others.

3. **Module III: Economics of Information**

   This module aims at equipping students to analyze situations of asymmetric information where different economic agents have access to different information. It will provide a formal analysis of the effect of asymmetric information on the efficiency properties of market outcomes, and the kind of institutions and patterns of behavior develop in response to informational asymmetries. It delves with designing of contracts to induce the revelation of private information. Some of the main themes in the field are: principal-agent problems, risk sharing, moral hazard, adverse selection, signaling, and screening. It then studies applications of the theory to other applied fields in economics such as auctions, finance, credit rationing, bank runs, labor market, environmental economics, etc.

4. **Module IV: The Interface between Game Theory and Experiments**

   This includes further study of advanced game theoretic concepts and also includes some experimental studies which verify whether people actually make decisions according to game theoretic predictions.

5. **Module V: Modelling and Solving Sequential Decision-Making Problems in Economics**

   This module will introduce students to the tools of dynamic programming that are used to model and solve problems in Economics (both microeconomics and macroeconomics) involving sequential decision making over time and under uncertainty to determine optimal decision rules in deterministic and stochastic environments. Topics covered will include the basic finite and infinite horizon sequence problems (both stationary and non-stationary versions), the principle of optimality, the Bellman equation, functional operators, iterative solutions for the Bellman equation, the contraction mapping theorem, and the Blackwell's Theorem. It will study applications of the theory to the topic of economic growth. An exposure to solving such problems numerically using computer software such as MATLAB will also be given.

6. **Module VI: Applied Production Analysis in Microeconomics**

   This module will apply duality approaches to production theory to study methods for measuring elasticity of substitution, productivity, and efficiency in multi-output firms. Econometric, index number, and mathematical-programming methods will be examined. Topics covered will include dual representations of multi-output production technologies; structure of production functions – homothetic production functions, separability; specification of functional forms – from early vintage such as Cobb Douglas, Leontief, Constant Elasticity of Substitution (CES) to flexible functional forms based on second-order approximations such as translog, quadratic, generalised Leontief; Morishima elasticity of substitution versus the Hicks-Allen elasticity of substitution; modelling technologies that produce bad outputs; index number theory; measuring productivity, technical efficiency, and firm-level and sectoral marginal abatement costs.

Readings

Module I

Essential Reading

- Kahneman, D. and Tversky, A. (1979) "Prospect Theory", *Econometrica* 47:263-291.

- Kahneman, D., Knetsch, J., and Thaler, R. (1990) "Experimental Tests of the Endowment Effect and the Coase Theorem", *Journal of Political Economy* 98:1325-1348.
- Huang, P.H and Wu, H.M (1992) "Emotional responses to litigation", *International Review of Law and Economics* 12. 31-44.
- Darley, J.M and B. Latane (1968) "Bystander intervention in emergencies: diffusion of responsibility", *Journal of Personality and Social Psychology* 8,377-383.
- Rabin, Matthew. (1993). "Incorporating Fairness Into Game Theory and Economics." *The American Economic Review.*83, 1281-1302.
- Dasgupta, P. and Maskin, E (2005) "Uncertainty and Hyperbolic Discounting", *American Economic Review* 95, 1290-1299.
- Fox, C. and A. Tversky (1995) "Ambiguity Aversion and Comparative Ignorance," QJE, 110: 585-603.

Additional Readings

- Thaler, R. (2015) *Misbehaving: the making of Behavioral Economics* W.W. Norton & Company, U.S.A (Chapters 4, 16).
- Mas Colell, A., Whinston, D., and Green J. (1995) *Microeconomic Theory*, Chapter 6 (on the Ellsberg Paradox). Oxford University Press, New York.

Module 2

Essential Readings

- Mas Collel Whinston and Green (1995), Microeconomic Theory (MWG), Oxford University Press. Chapters 8 and 9.
- Osborne, M. and Rubinstein, A. (1994) *A Course in Game Theory.* MIT Press, Cambridge. Chapters 3,7, 12, 15.
- Tadelis, Stevens, (2013), *Game Theory*, Princeton University Press.

Additional Readings

- Samuel Bowles (2004), Microeconomics, Behavior, Institutions and Evolution, Princeton University Press.
- Cooper, D.J. and R.A Weber (2020), "Recent advances in experimental coordination games," *Handbook of experimental game theory,* 149-183.

- Fudenberg and Tirole (1991), *Game Theory*, chapters 4, 5.
- Ambec, S. and P. De Donder (2022), Environmental policy with green consumerism, *Journal of Environmental Economics and Management*, 111: 102584.

Module 3

Essential Reading

- Ines Macho-Stadler and J. David Perez-Castrillo, (2001), An Introduction to the Economics of Information: Incentives and Contracts, Oxford University Press. Chs 1-3.
- P. Bolton and M. Dewatripont, Contract Theory, (2005), MIT Press. Chs 1- 4.
- Adverse selection Akerlof, G. A. "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism." *Quarterly Journal of Economics* 84, no. 3 (1970): 488-500.
- Rothschild, M., and J. Stiglitz. "Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information." *Quarterly Journal of Economics* 90, 4 (1976): 629-649.
- Spence, A. M. (1973) "Job Market Signaling." *Quarterly Journal of Economics* 87 (3) 355-374 .

Additional Readings

- Ambec, S. and J. Coria (2021), The information value of environmental taxes, *Journal of Public Economics*, 199: 104439.
- Baron, D.P. and Myerson, R.B. (1982), Regulating a Monopolist with Unknown Costs, *Econometrica,* 50(4), 911-930.
- Mussa, Michael and S. Rosen (1978), "Monopoly and product quality", *Journal of Economic Theory* 18, 301-317.
- Diamond, Douglas W & Dybvig, Philip H (1983). "Bank Runs, Deposit Insurance, and Liquidity," Journal of Political Economy, University of Chicago Press, vol. 91(3), 401-419.
- Dosis, A. (2018), On signalling and screening in Markets with Asymmetric Information, *Journal of Mathematical Economics* 75, 140-149.
- Beth Hayes (1984), Unions and Strikes with Asymmetric Information, *Journal of Labor Economics* Vol. 2 (1) 57-83.
- Phillipe Mahenc, (2008), Signaling the Environmental Performance of Polluting Products to Green Consumers, *International Journal of Industrial Organization* 26(1):59-68

Wu Xiaodong, (2003). Pollution Havens and the Regulation of Multinationals with Asymmetric Information, *The B.E. Journal of Economic Analysis & Policy*, De Gruyter, vol. 3(2), pages 1-27.

Module 4

Essential Readings

- Brocas, I. and Carrillo, J.D (2022) "The development of randomization and deceptive behavior in mixed strategy games", *Quantitative Economics* 13, 825-862.
- Eyster, E. and M. Rabin (2005) "Cursed Equilibrium", *Econometrica* 1623-1672.

Additional Readings

- Aumann, R. (1987) "Correlated Equilibrium as an Expression of Bayesian Rationality", *Econometrica* 1-18.
- Forgo, F. (2010) "A generalization of correlated equilibrium: a new protocol", *Mathematical Social Sciences* 60, 186-190.

Module 5:

Essential Readings

- Stokey, N.L. and R. E. Lucas Jr. (with E. C. Prescott) (1989), "Recursive Methods in Economic Dynamics," Harvard University Press, Cambridge, Massachusetts, Chapters 1 to 10
- D. Acemoglu (2009), "Introduction to Modern Economic Growth," Princeton University Press, Princeton and Oxford, Chapters 6, 16, 17
- Dynamic Programming, Lecture Notes 7, Fabrice Collard, Free Online Resource: http://fabcol.free.fr/pdf/lectnotes7.pdf

Additional Readings

- Ljungqvist, L. and T. J. Sargent (2012), Recursive Macroeconomic Theory, The MIT Press, Cambridge, Massachusetts, London, England, Chapters 3 to 6.
- Stachurski, J. (2022), "Economic Dynamics: Theory and Computation," Second Edition, The MIT Press, Chapters 10 and 12.

Module 6:

Essential Readings

- Chambers, R. G. (1988), Reprinted 2000, "Applied Production Analysis: A dual approach," Cambridge University Press, Cambridge, Chapters 1 to 7.
- Russell, R. R. (1998), "Distance functions in consumer and producer theory," in: R. Färe, S, Grosskopf, R. R. Russell (eds.) "Index numbers: Essays in honor of Sten Malmquist", (1998) Kluwer, Boston, Chapter 2.
- Ray, S. C., R. G. Chambers, S. C. Kumbhakar (2020), "Handbook of Production Economics," Volume 1, Editors: Springer, Chapters 1 to 12.

Additional Readings

- Ray, S. C., R. G. Chambers, S. C. Kumbhakar (2020), "Handbook of Production Economics," Volumes 2 to 3, Editors: Springer, Chapters 8, 9, 10, 21, 26.