Status of MA Economics Courses
Post 15 April '26 SCAC Meeting

Table 1 : Courses passed by December 2025

	Course	Type
1	Microeconomics: EC001	Core
2	Mathematical Methods: EC002	Core
3	Statistical Methods: EC003	Core
4	Macroeconomics I: EC004	Core
5	Game Theory: EC005	Core
6	Econometric Methods I: EC006	Core
1	Contemporary Issues in Historical Perspective	Elective
2	Topics in Economic History	Elective
3	History of Economic Analysis	Elective
4	Financial Markets	Elective
5	Law and Economics	Elective
6	Welfare Economics	Elective
7	Agricultural Economics	Elective
8	Political Economic Development of the Global South	Elective
9	Economics of Gender	Elective
10	Inclusive Growth and Convergence	Elective
11	Ethics and Economics	Elective
12	Economics of Discrimination	Elective
13	Behavioural Economics	Elective
14	Research Methodology	Elective
1	Data Visualization	SBC
2	Basics of Programming	SBC
3	Simulation Methods in Finance	SBC

Table 2 : Courses passed by the SCAC in April 2026

	Course	Type
1	Macroeconomics II: EC007	Core
2	Econometric Methods II: EC008	Core
3	Indian Economic Policy: EC009	Core
1	Mathematical Economics	Elective
2	Contract Theory	Elective
3	Advanced Game Theory	Elective
4	Topics in Game Theory	Elective
5	Social Choice Theory	Elective
6	Topics in Economic Theory	Elective
7	International Trade Theory	Elective
8	Economics of Information	Elective
9	Microeconomics of Development	Elective
10	Mathematical Programming	Elective
11	International Macroeconomics	Elective
12	Monetary Theory and Policy	Elective
13	Macroeconomics of Development	Elective
14	Endogenous Growth Theory	Elective
15	Behavioral Macroeconomics	Elective
16	Sectoral Reallocation and Economic Growth	Elective
17	Impact Evaluation Methods	Elective
18	Causal Inference for Policy Evaluation	Elective
19	Time Series Analysis	Elective
20	Forecasting Methods and Applications	Elective
21	Applied Production Analysis	Elective
22	Applied Consumption Analysis	Elective
23	Semi- and Nonparametric Estimation	Elective
24	Topics in Econometrics	Elective

Table 3 : Courses redesigned to reduce overlap

	Course	Type
1	Public Economics: EC010	Core
2	Topics in Public Economics I	Elective
3	Topics in Public Economics II	Elective
4	Advanced Econometric Methods	Elective

Table 4 : Courses modified to include a practical

	Course	Type
1	Computational Macroeconomics	Elective
2	Coding Basics with Economic Applications	Elective
3	Machine Learning Methods for Economics	Elective

Table 5 : LOCF courses proposed

	Course	Type
	Currently taught by faculty	
1	Natural Resource Economics	Elective
2	Topics in Development Economics	Elective
3	Trade and Development	Elective
4	Economics of Health and Education	Elective
5	Industrial Organisation	Elective
6	Economic Theory of the Firm	Elective
7	Topics in Industrial Organisation	Elective
8	Issues in Economic Systems and Institutions	Elective
9	Political Economics	Elective
10	Labour Economics	Elective
	Other LOCF courses	
11	Dynamic Macroeconomics	Elective
12	Corporate Finance	Elective
13	Environmental Economics	Elective
14	Energy Economics	Elective
15	Economics of Regulation	Elective
16	Climate Change Economics	Elective
17	Applied Environmental Analysis	Elective
18	Environment and Development	Elective
19	Economics of Innovation	Elective
20	Economics of Organisation	Elective

Table 6 : Newly proposed elective courses

	Course	Type
1	Experimental and Survey Economics	Elective
2	Derivatives and Risk Management	Elective
3	Climate Finance	Elective
4	Global Issues in Economic Development	Elective
5	The Rural Economy	Elective
6	Network Economics	Elective
7	Competition Economics	Elective
8	Economics of Inequality	Elective

Table 7 : Newly proposed SBCs

	Course	Type
1	Dissemination of Economic Research	SBC
2	Qualitative Methods in Economics	SBC
3	Algorithmic Thinking for Economists	SBC
4	Spatial Data Analysis for Economics	SBC

University of Delhi

Master of Arts (Economics)
Courses Proposed to the SCAC for Approval

April 29, 2026.

2

Contents

1

Core courses

1.1 Macroeconomics II : EC007

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Macroeconomics II	4	3	1	0		

Objectives

This course builds on Macroeconomics I. It extends the deterministic intertemporal models to incorporate stochastic processes. The course also aims to examine the behaviour of money, prices and aggregate output in dynamic general equilibrium models and introduces alternative frameworks for business cycle analyses.

Learning Outcomes

1. Students will understand sources of short-term fluctuations.
2. They will be able to compare New Classical and New Keynesian models of aggregate fluctuations and assess the role of monetary policy in shaping aggregate outcome.

Content

Unit 1 **Tools for stochastic dynamic analyses (9 Hours)**
Stochastic processes; dynamic stochastic models.

Unit 2 **Consumption and investment Under Uncertainty (9 Hours)**
Optimal household decisions on consumption and portfolio allocation under uncertainty. The consumption capital asset pricing model and efficient market hypothesis. Investment decisions and valuation of the firm under uncertainty.

Unit 3 **Money and Prices in general equilibrium (9 Hours)**
The role of money in the economy. Monetary expansion and inflation. The long-run neutrality of money. Optimal monetary policy and the real effects of monetary shocks in a rational expectations equilibrium.

Unit 4 **New classical and New Keynesian models of aggregate fluctuations (18 Hours)**
Imperfect competition and staggered price adjustment. Monetary policy through Taylor-type rules. Unemployment persistence, wage setting, and the Phillips curve. Rules versus discretion in monetary policy. Financial frictions. Monetary policy design under the zero lower bound on nominal interest rate.

Suggested Readings

Alogoskoufis, G. (2019). *Dynamic Macroeconomics*, MIT Press.

Azzimonti, M., Krusell, P., McKay, A., & Mukoyama, T. (2024). *Macroeconomics*. Available at: https://phdmacrobook.org/.

McCandless, G. (2009). The ABCs of RBCs: An Introduction to dynamic macroeconomic models. Harvard University Press.

Tutorial Activities

Group projects, problem-solving exercises.

1.2 Econometric Methods II : EC008

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Econometric Methods II	4	3	1	0		

Objectives

This course introduces students to econometric analysis using panel as well as time series data. Sources of potential endogeneity in the linear model are discussed along with methods to address endogeneity problems and identify causal effects through alternative econometric approaches.

Learning Outcomes:

1. Students will be able to identify possible sources of endogeneity and apply approaches to causal inference in the presence of endogeneity.
2. They will understand the structure of time series data and estimate models based on these data.

Content

Unit 1 **Problems of Endogeneity (10 hours)**
The concept of endogeneity in the linear model. Sources of endogeneity. Common frameworks to study causality - the potential outcomes framework, structural models.

Unit 2 **Techniques to address endogeneity (15 hours)**
Instrumental variables, experiments and quasi-experiments.

Unit 3 **Panel Data (10 hours)**
The panel data structures, assumptions, estimation and diagnostics.

Unit 4 **Introduction to Time Series (10 hours)**
The basic concepts of stationarity and ARMA modelling.

Readings

Greene, William H. (2018): *Econometric Analysis*, Pearson India Education Services.

Hansen, B. (2022): *Econometrics*, Princeton University Press.

Wooldridge, J. M. (2010): *Econometric Analysis of Cross Section and Panel Data*, MIT Press.

Additional Texts

Stock, J. H., & Watson, M. W. (2021). *Introduction to econometrics (4th ed.)*, Pearson.

Wooldridge, J. M. (2025): *Introductory Econometrics: A Modern Approach*, South-Western, 8th ed.

Chernozhukov, V., Hansen, C., Kallus, N., Spindler, M., & Syrgkanis, V. (2024). Applied causal inference powered by ML and AI (available on the internet).

Chernozhukov, V. & Fernandez-Val, I. (2017). Econometrics. 14.382 OCW MIT.

Linton, O. (2024). *Time Series for Economics and Finance*, Cambridge University Press.

Galichon, A. (2026). *Discrete Choice Models: Mathematical Methods, Econometrics, and Data Science*, Princeton University Press.

Tutorial Activities

Group projects, problem-solving exercises.

1.3 Indian Economic Policy : EC009

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Indian Economy Policy	4	3	1	0		

Objectives

This course introduces students to contemporary debates in Indian economic policy through recent research and empirical evidence. It aims to develop analytical understanding of development challenges and policy design using economic theory and applied quantitative methods.

Learning Outcomes:

1. Students will be able to critically evaluate major economic policy interventions in India and interpret empirical research in development economics.
2. They will gain the ability to apply analytical and econometric tools to assess policy effectiveness and economic outcomes.

Content

Unit 1 **Regional development in historical perspective (9 hours)**
Spatial dimensions of development, including agglomeration, industrial concentration, and regional disparities. The historical evolution of regional disparities and the role of infrastructure and place-based policies in shaping economic geography.

Unit 2 **Sectoral policies (18 hours)**
Agrarian change, labor dynamics, and rural development. Theoretical foundations of current policy debates on agriculture, risk, and welfare. Industrial reforms, productivity, and structural change in the Indian economy. Liberalization, industrial performance, and the evolving relationship between policy and growth. Service-led growth in the formal and informal sector.

Unit 3 **Public spending and welfare policies (9 hours)**
Approaches to poverty measurement. Minimum needs and the expansion of public goods. Social protection. Challenges in the provision of health, education and environmental quality. Delivery mechanisms, leakages, and state capacity constraints.

Unit 4 **Environmental sustainability and other contemporary challenges (9 hours)**
The ecological impacts of economic development. Climate adaptation in the Indian context. The benefits and challenges associated with rapid urbanization, mechanization and digitilization.

Readings

Eynde, O. V., L. Wren-Lewis (2021), Complementarities in Infrastructure: Evidence from Rural India. https://shs.hal.science/halshs-03225063v2

Chaurey, R., D. T. Le (2022), Infrastructure maintenance and rural economic activity: Evidence from India, Journal of Public Economics, 214, 104725.

Garg, T., A. Shenoy (2021), The Ecological Impact of Place-Based Economic Policies, American Journal of Agricultural Economics, 103(4), 1239–1250.

Asher, S., T. Garg, P. Novosad (2020), The ecological impact of transportation infrastructure, The Economic Journal, 130(629), 1173–1199.

Kumar, S., M. Khanna (2023), Distributional heterogeneity in climate change impacts and adaptation: Evidence from Indian agriculture, Agricultural Economics.

Liu, M., Y. Shamdasini, V. Taraz (2023), Climate change and labour reallocation: Evidence from six decades of the Indian Census, American Economic Journal: Economic Policy, 15(2), 395–423.

Chateau, J., G. Dang, M. MacDonald, J. Spray, S. Thube (2023), A Framework for Climate Change Mitigation in India, IMF Working Paper WP/23/218.

Kumar, S., S. Managi, R. K. Jain (2020), CO2 mitigation policy for Indian thermal power sector, Energy Economics, 86, 104653.

Aghion, P., R. Burgess, S. J. Redding, F. Zilibotti (2008), The Unequal Effects of Liberalization: Evidence from Dismantling the License Raj in India, American Economic Review, 98(4), 1397–1412.

Bujunoori, R. R., N. Mannil, P. Tantri (2024), Does labor composition impact the transmission of monetary policy to output?, Journal of Development Economics, 67, 103241.

Veeramani, C., P. Banerjee (2022), Exchange rate fluctuations, labour laws, and gender differences in job flows, World Development, 152, 105802.

Martin, L. A., S. Nataraj, A. E. Harrison (2017), In with the big, out with the small, American Economic Review, 107(2), 354–386.

Mukim, M. (2014), Coagglomeration of formal and informal industry, Journal of Economic Geography, 15(2), 329–351.

Ghani, E., A. G. Goswami, W. R. Kerr (2016), Highway to success, The Economic Journal, 126(591), 317–357.

Hasan, R., Y. Jiang, R. M. Rafols (2021), Place-based preferential tax policy and industrial development, Journal of Development Economics, 150, 102621.

Das, A., E. Ghani, A. Grover, W. Kerr, R. Nanda (2024), Infrastructure and Finance, Journal of Urban Economics, 142, 103593.

Lewis, W. A. (1954), Economic Development with Unlimited Supplies of Labour, The Manchester School, 22, 139–191.

Michler, J. (2020), Agriculture in the process of development: A micro perspective, World Development.

Patnaik, P. (2012), The Peasant Question and Contemporary Capitalism, Agrarian South, 1(1), 27–42.

Patnaik, U. (2012), Some Aspects of the Contemporary Agrarian Question, Agrarian South, 1(3), 233–254.

Jha, P. (2024), Growing Restiveness of the Peasantry in Contemporary India, Agrarian South, 13(1), 41–61.

Palmer-Jones, R., K. Sen (2003), What has luck got to do with it?, Journal of Development Studies, 40(1), 1–31.

Basu, K. (1997), Agrarian Economic Relations: Theory and Experience, in Agrarian Questions, Oxford University Press. FAO (2017), Productivity and Efficiency Measurement in Agriculture, Food and Agriculture Organization.

Nirmal, R., S. C. Babu (2021), When Implementation Goes Wrong, IFPRI Discussion Paper 02012. Cole et al. (2013), Barriers to Household Risk Management, AEJ: Applied

Economics.

Varshney, D., D. Roy, J. V. Meenakshi (2020), The Impact of COVID-19 on Agricultural Markets, Indian Economic Review (Special Issue).

Bardhan, P. (1998): *The Political Economy of Development in India*, Oxford.

Banerjee, A.V., Bardhan, P., Somanathan, R., Srinivasan, T.N., (2017): *Poverty and Income Distribution in India*, Juggernaut.

Dreze, J. & Sen, A. (2013): *An Uncertain Glory: India and its Contradictions*, Princeton University Press.

Joshi, V. (2017): *India's Long Road: The Search for Prosperity*, Oxford University Press.

Sundaram, K., & Tendulkar, S. D. (2003): Poverty in India in the 1990s: An analysis of changes in 15 major states, *Economic and Political Weekly*, 1385–1393.

Reading India: Selections from The Economic and Political Weekly (2019), Orient BlackSwan. Multiple volumes.

Deaton, A., & Drèze, J. (2009). Food and Nutrition in India: Facts and Interpretations. *Economic and Political Weekly*, 42-65.

Meenakshi, J. V. (2016). Trends and Patterns in the Triple Burden of Malnutrition in India. *Agricultural Economics*, 47(S1), 115-134.

Kremer, M., Chaudhury, N., Rogers, F. H., Muralidharan, K., & Hammer, J. (2005). Teacher Absence in India: a Snapshot. *Journal of the European Economic Association*, 3(2-3), 658-667.

Laitin, D. D., & Ramachandran, R. (2016). Language Policy and Human Development. *American Political Science Review*, 110(3), 457-480.

Munshi, K., & Rosenzweig, M. (2006). Traditional Institutions Meet the Modern World: Caste, Gender, and Schooling Choice in a Globalizing Economy. *American Economic Review*, 96(4), 1225-1252.

Tutorial Activities

Group projects and presentations.

1.4 Public Economics : EC010

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Public Economics	4	3	1	0		

Course Objectives

This course helps students understand the rationale for government intervention in market economies. It traces the growth of public spending across the world since the early 20th century and shows how governments can use taxation, public spending and regulation to address market failures, deliver public services, and improve welfare. It also considers political and administrative limitations to welfare-improving policies in democracies.

Learning Outcomes

1. Students will understand the role of government spending and regulatory policies on the economy.
2. They will be able to draw upon the results of policy experiments to design welfare-improving government policies.

Content

Unit 1 **The foundations of public economics (10 Hours)**
The size and structure of public spending across countries. The economic rationale for government intervention in markets: public good provision, externalities and redistributive policy. Optimal vs. equilibrium allocations of public and private goods. Taxation.

Unit 2 **Inequality and redistribution (14 hours)** Sources of inequality. Social security. Cash vs. in-kind transfers; policy debates and evidence. The size and structure of redistributive spending across countries.

Unit 3 **Public policy for the social sector (14 Hours)**
The application of analytical tools to major policy domains such as education, health, labor markets and the environment. Evidence on the design of public service delivery; minimum wages, support prices, pensions and child support systems. Lessons for policy design from national and international experience.

Unit 4 **Governance, institutions, and state capacity (7 Hours)** The role of the bureaucracy. Reforms to limit bureaucratic corruption and evidence on their effects. The effects of fiscal decentralization and representation on public goods.

Suggested Readings

Atkinson, A. and Stiglitz, J.E. (2015). Lectures on public economics (Princeton University Press).

Dube, A. (2019), "Impacts of Minimum Wages: Review of the International Evidence, Journal of Economic Perspectives.

Fisman, R., Miguel, E. (2010). Economic Gangsters: Corruption, Violence, and the Poverty of Nations. Princeton University Press.

Gertler, P.; Martinez, S; Premand, P; Rawlings, L.; Vermeersch, C. (2016). Impact Evaluation in Practice, Second Edition. Published by the World Bank. Free copy available online.

Gruber, J. (2022). Public finance and public policy (7th ed.). Worth Publishers.

Institute for Fiscal Studies. Dimensions of Tax Design: The Mirrlees Review. Oxford University Press, 2010. ISBN: 9780199553754.

Myles, G. Public Economics. Cambridge University Press, 1995. ISBN: 9780521497695.

Slemrod, J., and J. Bakija. Taxing Ourselves: A Citizen's Guide to the Debate over Taxes. MIT Press, 2008.

Decet, D. (2024). Organizing fiscal capacity. Working paper, available at https://devisdecet.com/papers/DevisDecet_JMP. pdf.

Ebenstein, A., Fan, M., Greenstone, M., He, G., & Zhou, M. (2017). New evidence on the impact of sustained exposure to air pollution on life expectancy from China's Huai River Policy. Proceedings of the National Academy of Sciences, 114(39), 10384-10389.

Blair, G. et al. (2023). "Does Community Policing Build Trust in Police and Reduce Crime? Evidence from Six Coordinated Field Experiments in the Global South." Science, 374(6571).

Dupas, P., & Jain, R. (2024). Women left behind: gender disparities in utilization of government health insurance in India. American Economic Review, 114(10), 3345-3383.

Tutorial Activities

Group projects and presentations.

2

Elective Courses

2.1 Microeconomics

2.1.1 Mathematical Economics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Mathematical Economics	4	3	1			

Objectives

This course is designed for students who plan to do further graduate level work in economic theory, especially those with a keen interest in creating, as opposed to consuming, pure theory.

Learning Outcomes

1. Students will acquire rigorous exposure to fundamental mathematical tools used in theoretical economics.
2. They will apply these tools to topics including duality theory, game theory, the Arrow–Debreu model, Nash existence, and comparative statics.

Content

Unit 1 **Foundations of mathematical structures (10 hours)**
Set theory; metric spaces; topological spaces and continuous functions; countability and separability; compactness, completeness and connectedness. Topologies on function spaces; weak topologies; convex analysis and separation theorems.

Unit 2 **General equilibrium theory (10 hours)**
Set-valued mappings and fixed point theorems; Arrow–Debreu model: existence and optimality; Debreu–Scarf theorem and core equivalence.

Unit 3 **Duality and game theory foundations (15 hours)**
Duality theory in economic models; Nash's existence theorem and applications in strategic environments.

Unit 4 **Comparative statics and structure of preferences (10 hours)**
Lattices, supermodularity, and monotone comparative statics; applications in economic choice, equilibrium response, and policy analysis.

Suggested Readings

Aliprantis, C., Brown, D. and Burkinshaw, O. (1990): *Existence and Optimality of Competitive Equilibria*, Springer-Verlag.

Berge, C. (1963): *Topological Spaces*, Macmillan.

Debreu, G. (1959): *Theory of Value*, Yale University Press.

Hildenbrand, W. and Kirman, A. (1988): *Equilibrium Analysis*, North-Holland.

Munkres, J. (1975): *Topology: A First Course*, Prentice-Hall.

Podczeck, K., & Yannelis, N. C. (2024). Existence of Walrasian equilibria with discontinuous, non-ordered, interdependent preferences, without free disposal, and with an infinite-dimensional commodity space. Economic Theory, 78(2), 389-401.

Reny, P. J. (2016). Nash equilibrium in discontinuous games. Economic Theory, 61(3), 553-569.

Tutorial Activities

Problem-solving exercises.

2.1.2 Contract Theory

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Contract Theory	4	3	1			

Objectives

Contracts are the bedrock for the functioning of market as well as nonmarket economic systems. This course examines the incentives and outcomes under a variety of contractual settings in market as well as non-market economic systems.

Learning Outcomes

1. Students will be able to develop formal analytical frameworks to study contracts and incentive structures for firms and individuals.

2. They will be able to draw policy conclusions about optimal contracts in various settings.

Content

Unit 1 **Decision making under uncertainty and hidden information (15 hours)**
The Expected Utility theorem. Money Lotteries. Risk aversion. Insurance.

Unit 2 **Hidden Action, Moral Hazard and Related Extensions (10 hours)**
The first-best versus the second-best in presence of informational asymmetries. Single-crossing conditions and the monotonicity of choice. The Revelation Principle. Relational contracts.

Unit 3 **Competition and Moral Hazard in Teams (10 hours)**
Competition among agents; aymmetric and asymmetric competitions. Relative performance evaluation. Multi-agent moral hazard, moral hazard in teams, the firm as a team.

Unit 4 **Incomplete Contracts (10 hours)**
Verifiability. The hold-up problem and its consequences. Procurement contracts for public goods, short-term versus long-term procurement contracts, public versus private ownership; public-private partnerships.

Suggested Readings

Bolton, P. and Dewatripont, M. (2005): *Contract Theory*, MIT Press.

Hart, O. (1995): *Firms, Contracts and Financial Structure*, Oxford University Press.

Laffont, J. and Martimort, D. (2002): *The Theory of Incentives*, Princeton University Press.

Mas-Collel, A.; Whinston, M. and Green, J. (1995): *Microeconomic Theory*, Oxford University Press.

Singh, R. (8): 'Public-private Partnerships vs. Traditional Contracts for Highways', *Indian Economic Review*, Vol. 2, 29-6.

Georgiadis, George. Contracting with moral hazard. Elgar Encyclopedia on the Economics of Competition, Regulation and Antitrust (2024): 24-37.

Cheng, Chen. Moral hazard in teams with subjective evaluations. The RAND Journal of Economics 52.1 (2021): 22-48.

Tutorial Activities

Problem-solving exercises.

2.1.3 Advanced Game Theory

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Game Theory	4	3	1			

Objectives

The primary objective of this course is to make the student familiar with some of the core ideas, methods and results of non-cooperative game theory at a high level of mathematical rigour. A secondary objective is to show the theory in use in substantive economic applications.

Learning Outcomes

1. Students will understand the formal language, concepts, and foundational theorems of non-cooperative game theory, including equilibrium notions and extensive vs. normal form representations.
2. They will use game theoretic tools to model and analyze strategic interactions in economic applications such as oligopoly, auctions, regulatory settings, and mechanism design.

Content

Unit 1 **Representation of games (10 hours)**
Extensive form representation; information sets; pure, mixed and behavioural strategies; Kuhn's theorem and equivalence of mixed vs. behavioural strategies; normal form and agent-normal form; interpretation and economic meaning of mixed strategies.

Unit 2 **Equilibrium concepts and refinements (15 hours)**
Dominant strategy equilibrium; iterated dominance and rationalisability; Nash equilibrium and Nash's existence theorem; subgame perfect equilibrium; perfect information and constant-sum games.

Unit 3 **Comparative statics and game structure (10 hours)**
Supermodular games and monotone comparative statics; applications to economic environments with strategic complementarities.

Unit 4 **Games with incomplete information and applications (10 hours)**
Incomplete information games; mechanism design and implementation theory; revelation principle; applications including oligopoly, dynamic strategic interaction, auction theory, and regulation theory.

Readings

Fudenberg, D. and Tirole, J. (1991): *Game Theory*, MIT Press.

Mas-Colell, A., Whinston, M. and Green, J. (1995): *Microeconomic Theory*, Oxford University Press.

Myerson, R. (1991): *Game Theory: Analysis of Conflict*, Harvard University Press.

Osborne, M. and Rubinstein, A. (1994): *A Course in Game Theory*, MIT Press.

Vives, Xavier, and Orestis Vravosinos. "Strategic complementarity in games." Journal of Mathematical Economics 113 (2024): 103005.

Carroll, Gabriel. "Robustness in mechanism design and contracting." Annual Review of Economics 11.1 (2019): 139-166.

Tutorial Activities

Project activity, problem solving exercises

2.1.4 Topics in Game Theory

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Game Theory II	4	3	1			

Objectives

The objective is to discuss selected topics in game theory in some depth. These can vary across different years, depending upon the instructor's choice. They may include, but are not restricted to, the topics listed below.

Learning Outcomes

1. Students will gain in-depth understanding of selected advanced topics in game theory, along with their economic applications (such as auctions, bargaining, matching, mechanism design, repeated and global games).
2. They will develop an understanding of how these topics are interrelated, for example, how mechanism design frameworks can unify analysis across auctions, matching and related environments.

Content

Unit 1 **Strategic Allocation and Exchange (10 hours)**
Auction Theory and Applications; Bargaining Theory and Applications.

Unit 2 **Matching and Mechanism Design Frameworks (15 hours)**
Matching Theory and Applications; Mechanism Design and Applications.

Unit 3 **Dynamics of Strategic Interaction (10 hours)**
Repeated Games and Applications; Global Games and Applications.

Unit 4 **Behavior, Learning, and Beliefs in Games (10 hours)**
Evolutionary Game Theory; Epistemic Game Theory.

Readings

Relevant papers will be an important part of the references in any given year. In addition, the following books and materials are good sources.

Battigalli, P. (2018): *Analysis of Strategic Thinking - Part I*, didattica.unibocconi.edu.

Borgers, T. (2015): *An Introduction to the Theory of Mechanism Design*, Oxford University Press.

Krishna, V. (2009): *Auction Theory*, Elsevier-Academic Press.

Mailath, G. and Samuelson, L. (2006): *Repeated Games and Reputations*, Oxford University Press.

Milgrom, P. (2017): *Discovering Prices: Auction Design in Markets with Complex Constraints*, Cambridge University Press.

Morris, S. and Shin, H. (2003): "Global Games: Theory and Applications," in *Advances in Economics and Econometrics*.

Muthoo, A. (1999): *Bargaining Theory with Applications*, Cambridge University Press.

Roth, A. and Sotomayor, M. (1990): *Two-sided Matching*, Cambridge University Press.

Sandholm, W. (2010): *Population Games and Evolutionary Dynamics*, MIT Press.

Vulkan, N., Roth, A. and Neeman, Z. (2013): *The Handbook of Market Design*, Oxford University Press.

Tutorial Activities

Project activity, problem solving exercises

2.1.5 Social Choice Theory

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Social Choice Theory	4	3	1			

Objectives

Social choice theory studies group decisions that are achieved by aggregating individual preferences. Aggregations may be guided by notions of justice, fairness and efficiency,

which are also subjects of political philosophy, making this topic inherently interdisciplinary. The subject has evolved in economics by the systematic modelling of individual preferences and axiomatic structures, and more recently by using Game theory to provide a framework for considering strategic interactions and information revelation in this context. The goal of this course is to introduce students to basics of social choice theory and mechanism design.

Learning Outcomes

1. Students will have a set of formal tools with which to analyze economic and social outcomes, including preference aggregation, fairness, axiomatic bargaining, cost/surplus allocations, matching, measures such as inequality, poverty, mobility and vulnerability.
2. They will be familiar with ongoing work on mechanism design or design of institutions to implement social choice functions, including strategy proof mechanism, Nash and Bayes-Nash implementation, auction, regulation.

Content

Unit 1 **Preference Aggregation and Fairness (15 hours)**
Preference aggregation: Arrow's impossibility theorem; Welfare functional; Utilitarianism; Liberal paradox.
Fairness: Rawlsian justice; Capability; Equality of opportunity; Envy freeness.

Unit 2 **Axiomatic Approaches and Matching (10 hours)**
Axiomatic bargaining, Axiomatic cost/surplus allocations, Matching.

Unit 3 **Measures of Distribution and Welfare (10 hours)**
Measures: Inequality; Poverty; Mobility; Vulnerability.

Unit 4 **Mechanism Design (10 hours)**
Strategy proof mechanism, Nash and Bayes-Nash implementation, Auction, Regulation.

Suggested Readings

Krishna, V. (2009): *Auction Theory*, Elsevier.

Mas-Colell, A.; Whinston, M. and Green, J. (1995): *Microeconomic Theory*, Oxford University Press.

Moulin, H. (2004): *Fair Division and Collective Welfare*, MIT Press.

Sen, A. (1999): *Choice, Welfare and Measurement*, Harvard University Press.

Roth,Alvin E. "Marketplaces, markets, and market design." American Economic Review 108.7 (2018): 1609-1658.

Thomson, William. "On the axiomatic theory of bargaining: a survey of recent results." Review of Economic Design 26.4 (2022): 491-542.

Tutorial Activities

Problem solving exercises

2.1.6 Topics in Economic Theory

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Topics in Economic Theory	4	3	1			

Objectives

This course discusses some special topics in economic theory in depth. The focus will be on dynamic models in both micro- and macro- economics.

Learning Outcomes

1. Students will be familiar with the economics and mathematics of recursive models.
2. They will be familiar with their economic applications.

Content

Unit 1 **Metric Spaces, Contraction Methods and Dynamic Programming (15 hours)**
Metric spaces. Contraction mapping theorem. Correspondences. Theorem of the maximum. Blackwell's conditions for a contraction. Dynamic programming and applications from job search, theory of investment, growth.

Unit 2 **Repeated Games and Applications (10 hours)**
Repeated games with perfect and imperfect monitoring. Repeated moral hazard and adverse selection.

Unit 3 **Behavioural Models of Time Discounting (10 hours)**
Behavioural models of time discounting and applications: Time inconsistency. Hyperbolic discounting model. Dual-self model. Applications: consumption-saving choices. Behavioural industrial organisation applications.

Unit 4 **Other Applications of Dynamic Models (10 hours)**
Examples of these are collusive repeated oligopoly, relational labour contracts.

Readings

Dhami, S. (2016): *The Foundations of Behavioural Economic Analysis*, Oxford University Press.

Mailath, G. and Samuelson, L. (2006): *Repeated Games and Reputations*, Oxford University Press.

Stokey, N.; Lucas, R. and Prescott, E. (1989): *Recursive Methods in Economic Dynamics*, Harvard University Press.

Tutorial Activities

Problem solving exercises

2.1.7 International Trade Theory

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
International Trade Theory	4	3	1			

Objectives

This course is designed to make familiarise students with discussions in the area of international trade and trade policy, reviewing traditional theories of international trade and recent developments in the economic literature based on the New trade theory and on the analysis of FDI and global production chains.

Learning Outcomes

1. Students will be able to analyze historical as well as contemporary issues in trade theory and policy using a variety of lenses provided in the course: classical theories of comparative advantage, imperfect competition, political economy of trade agreements and protectionism.
2. They will apply analytical tools relating to the issues of migration, trade and capital formation.

Content

Unit 1 **Classical and Specific Factors Approaches (10 hours)**
Classical trade theories on comparative advantage (Ricardo and Heckscher-Ohlin frameworks), gains from trade, international equilibrium with continuum.
Specific factor models, empirical approaches, HOV and paradox.

Unit 2 **Intermediate Inputs, Tasks and Wages (10 hours)**
Trade in intermediate inputs and wages: outsourcing, trade in tasks and submodularity.

Unit 3 **Imperfect Competition in Trade (10 hours)**
Imperfect Competition:
Imperfect competition, homogeneity: Krugman, Brander-Spencer models.
Monopolistic competition, heterogeneity.
Generalised oligopoly framework, heterogeneity.

Unit 4 **FDI, Political Economy, Growth, and Migration (15 hours)**
FDI and global production, FDI vs. exports.
Political economy of trade agreements and upcoming issues of protections.
Trade and growth; immiserizing growth; endogenous growth with homogeneity and heterogeneity.
Migration, international trade and capital formation.

Readings

Antras, P. (2016): *Global Production: Firms, Contracts, and Trade Structure*, Princeton University Press.

Dornbusch, R.; Fischer, S. and Samuelson, P. (1977): Comparative advantage, trade, and payments in a Ricardian model with a continuum of goods, *American Economic Review* 67, 823-39.

Dornbusch, R.; Fischer, S. and Samuelson, P. (1980): Heckscher-Ohlin trade theory with a continuum of goods, *The Quarterly Journal of Economics* 95, 203-224.

Feenstra, R. (2015): *Advanced International Trade: Theory and Evidence*, Princeton University Press.

Feenstra, R. (2010): Measuring the gains from trade under monopolistic competition, *Canadian Journal of Economics*, 1-28.

Feenstra, R. (2016): Gains from trade under monopolistic competition, *Pacific Economic Review* 21.

Felbermayr, G.; Grossmann, V. and Kohler, W. (2015): Migration, international trade, and capital formation: Cause or effect?, in R. Barry, Chiswick, P. Miller (eds.), *Handbook of the Economics of International Migration*, North Holland.

Freund, C. and Ozden, C. (2008): Trade policy and loss aversion, *American Economic Review* 98, 1675-1691.

Gopinath, G.; Helpman, E. and Rogoff, K. (2014) (eds.): *Handbook of International Economics*, Vol. 4, Elsevier.

Gopinath, G.; Helpman, E. and Rogoff, K. (2022). Handbook of International Economics. Vol. 5. Amsterdam: Elsevier.

Gopinath, G.; Helpman, E. and Rogoff, K. (2022). Handbook of International Economics. Vol. 6. Amsterdam: Elsevier.

Limao, N. and Tovar, P. (2011): Policy choice: Theory and evidence from commitment via international trade agreements, *Journal of International Economics* 85, 186-205.

Tutorial Activities

Problem solving exercises

2.1.8 Economics of Information

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Economics of Information	4	3	1	0		

Objectives

This graduate course provides a rigorous, game-theoretic analysis of how information structures, asymmetry, and uncertainty impact economic behavior, market efficiency, and institutional design. Students will master core models of adverse selection, moral hazard, and modern information design. :contentReference[oaicite:1]index=1

Learning Outcomes

1. Students will construct and solve static and dynamic economic models involving asymmetric information (adverse selection, moral hazard, signaling, and cheap talk) using foundational solution concepts such as Bayes-Nash and Perfect Bayesian Equilibrium.
2. They will critically evaluate and apply advanced concepts in information design, particularly Bayesian persuasion, and explain the principles governing the trade and aggregation of information in market contexts.

Content

Unit 1 **Preliminaries (10 hours)**
risk and uncertainty, von Neumann-Morgenstern utilities, stochastic dominance; Bayesian games: Bayes-Nash and perfect Bayesian equilibria with refinements

Unit 2 **Classic applications (15 hours)**
static and dynamic models of adverse selection and moral hazard; signalling and cheap talk

Unit 3 **Information design (10 hours)**
Bayesian persuasion and Bayes-correlated equilibrium

Unit 4 **Information Markets (10 hours)**
trade of information and experiments, aggregation of predictions

Readings

Mas-Colell, A., Whinston, M. D., Green, J. R. : *Microeconomic theory.* Oxford University Press (1995)

Myerson, R. B.: *Game Theory: Analysis of Conflict.* Harvard University Press; Myerson, R. B. (2013)

Bolton, P., Dewatripont, M.: *Contract theory.* MIT press (2004)

Crawford, V. P., Sobel, J.: Strategic information transmission. *Econometrica*, 1431-1451 (1982)

Farrell, J., Rabin, M.: Cheap talk. *Journal of Economic Perspectives*, 10(3), 103-118 (1996)

Kamenica, E., Gentzkow, M.: Bayesian persuasion. *The American Economic Review*, 101(6), 2590-2615 (2011)

Bergemann, D., Morris, S.: Information design: A unified perspective. *Journal of Economic Literature*, 57(1), 44-95 (2019)

Bergemann, D., Ottaviani, M.: Information markets and nonmarkets. In *Handbook of Industrial Organization* (Vol. 4, No. 1, pp. 593-672). Elsevier (2021)

Tutorial Activities

Project activity, Research cum presentation

2.1.9 Microeconomics of Development

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Microeconomics of Development	4	3	1	0		

Objectives

This course provides microeconomic frameworks used to study poverty, household decision-making, market failures, and institutional constraints, role of social norms and networks in developing economies. It discusses key theoretical contributions as well as empirical challenges.

Learning Outcomes

1. Students will be able to apply theoretical models to analyse and understand the challenges to development.
2. They will be able to measure and assess the effectiveness of development interventions in areas such as education, health, credit, agriculture, gender, and technology adoption.

Content

Unit 1 **Markets, Institutions, and Market Failures(12 hours)**
This unit examines the functioning of key markets, namely, credit, insurance, labour, and land in developing countries. Students learn how asymmetric information, contract enforcement issues, and social norms creates developmental bottlenecks.

Unit 2 **Poverty and Inequality (12 hours)**
This unit focuses on microeconomic models of poverty trap and inequality. Emphasis is placed on understanding how constraints such as capital, liquidity, information, and behavioural biases shape economic choices in low-income environments.

Unit 3 **Family and Social Norms(12 hours)**
This unit examines the role of family and social norms on development through models of intra household bargaining, social network and cultural transmission.

Unit 4 **Public Policies (9 hours)**
This unit introduces various public policy challenges in developing countries like taxation, industrialization strategies and design of welfare programs.

Readings

Banerjee, Abhijit (2010). Contracting Constraints, Credit Markets and Economic Development, In M. Dewatripont, L.P. Hansen and S. J. Turnovsky (eds.) Advances in Economics and Econometrics, ed. by , Cambridge University Press.

Bardhan, P. and C. Udry (1999). Development Microeconomics, Oxford University Press.

Basu, K. (2006). Gender and Say: A Model of Household Behavior with Endogenously Determined Balance of Power, Economic Journal, Vol. 116, pp. 558-580.

Besley, T. and R. Kanbur (1991). The Principles of Targeting. In Balasubramanyam, V.N. and S. Lall (eds) Current Issues in Development Economics. Palgrave.

Bisin, A. and T. Verdier (2001). The Economics of Cultural Transmission and the Dynamics of Preferences, Journal of Economic Theory, Vol. 19, pp. 298-319.

Dasgupta, P. and D. Ray (1986). Inequality as a Determinant of Malnutrition and Unemployment, The Economic Journal, Vol. 96, pp. 1011-1034.

Mirrlees, J. (1971). An Exploration in the Theory of Optimum Income Taxation, Review of Economic Studies, Vol. 38, pp. 175-208.

Mookherjee, D. and D. Ray (2002). Contractual Structure and Wealth Accumulation, American Economic Review, Vol. 92. pp. 818-849.

Kremer, M., G. Rao, and F. Schilbach (2019). Behavioral Development Economics, In Handbook of Behavioral Economics, Ch. 5, Vol. 2., North Holland.

Lundberg, S. and R. Pollak (1993). Separate Spheres Bargaining and the Marriage Market, Journal of Political Economy, Vol. 101, 988-1010.

Tutorial Activities

Group project activity, research cum presentation.

2.1.10 Mathematical Programming

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Mathematical Programming	4	3	1			

Objectives

This course equips students with advanced mathematical programming techniques, including graph theory, convex analysis, and linear/integer programming. Students will apply these methods to solve foundational economic problems such as resource allocation, network optimization, duality, and stable matching.

Learning Outcomes

1. Students will solve complex optimization problems using discrete mathematical techniques from graph theory, linear programming, and convex programming.
2. They will apply principles of discrete analysis and advanced discrete concepts (e.g., lattice theory, matroids) to model efficient resource allocations, stable matchings and cooperative game theory concepts like the Core.

Content

1. **Graph Theory (12 hours)**
   Graphs and their basic properties; minimum cost spanning tree problem; network flows and matching
2. **Convex sets (11 hours)**
   Separating hyperplane theorem, Farkas' Lemma, Core of cooperative games
3. **Linear Programming (11 hours)**
   Simplex method, duality theorems, integer programming, assignment problem
4. **Other topics (11 hours)**
   Lattice and supermodularity, stable matchings, matroids, efficient allocation with indivisible goods

Readings

Vohra, R. V.: Advanced mathematical economics. Routledge Vohra, R. V. (2004)

Chvátal, V. : Linear programming. W. H. Freeman and Company (1983)

Bollobás, B. : Modern graph theory (Vol. 184). Springer Science & Business Media (1998)

Ahuja, R. K., Magnanti, T. L., Orlin, J. B. Network flows: Theory, algorithms, and applications. Prentice Hall (1993)

Cormen, T. H., Leiserson, C. E., Rivest, R. L., Stein, C. : Introduction to algorithms (4th ed.). MIT Press (2022)

Topkis, D. M. : Supermodularity and complementarity. Princeton university press (1988)

Schrijver, A. : Combinatorial optimization: Polyhedra and efficiency (Vol. 1). Springer (2003)

Tutorial Activities

Group project activity, research cum presentation.

2.2 Macroeconomics

2.2.1 International Macroeconomics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
International Macroeconomics	4	3	1	0		

Objectives

The course is aimed at providing students with a comprehensive knowledge of modern macroeconomic theory in the context of open economy framework. This is the study of how trade between countries in goods, services, and assets changes over time, both over the business cycle and in the long run. The course teaches concepts, empirical facts, and puzzles in international macroeconomics and builds models to make sense of them.

Learning Outcomes

1. Students will identify key concepts, theories and models of macroeconomics in open economy environment.
2. They will apply macroeconomic tools to the analysis of a variety of real world events, empirical trends and policy.

Content

Unit 1 **Preliminaries and Basic Models (11 hours)**
Global business-cycle facts and benchmark small open economy models—endowment economy, with capital accumulation, Real Business Cycle and New Keynesian frameworks.

Unit 2 **Business Cycles, Trade, Exchange Rates, and Unemployment (12 hours)**
Drivers of business cycles - productivity shocks and financial frictions especially in emerging economies. Terms of trade, real exchange-rate movements, and the role of nominal rigidities in shaping trade flows and unemployment dynamics.

Unit 3 **Policy and Crises in Open Economies (11 hours)**
Exchange-rate regimes and the use of capital controls and macroprudential tools. External borrowing, sovereign default, and sovereign debt crises.

Unit 4 **Current Account and Real Exchange Rate Dynamics (11 hours)**
Joint behavior of the current account and real exchange rate using intertemporal models and modern currency paradigms.

Readings

Gopinath, G.; Helpman, E. and Rogoff, K. (2014) (ed.): *Handbook of International Economics*, Vol. 4, Elsevier.

Gopinath, G.; Helpman, E. and Rogoff, K. (2022). Handbook of International Economics. Vol. 5. Amsterdam: Elsevier.

Gopinath, G.; Helpman, E. and Rogoff, K. (2022). Handbook of International Economics. Vol. 6. Amsterdam: Elsevier.

Schmitt-Grohe, S.; Uribe, M. and Woodford, M. (2022): *International Macroeconomics: A Modern Approach*, Princeton University Press.

Uribe, M. and Schmitt-Grohe, S. (2017): *Open Economy Macroeconomics*, Princeton University Press.

Tutorial Activities

Group project activity, problem set assignments, research cum presentation

2.2.2 Monetary Theory and Policy

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Monetary Theory and Policy	4	3	1	0		

Objectives

This course aims to acquaint the student with the role played by monetary policy and the impact of introducing money in standard economic theory models. The course covers money-in-the-utility function model and the New Keynesian model of monetary policy. The course also includes a discussion on the role played by monetary policy in the open economy context. The course also delves on discretionary policy vs rules and monetary policy strategies.

Learning Outcomes

1. Students will understand and analyse monetary models, transmission mechanisms, and the effects of monetary policy (including in open economy settings), as well as monetary rules, discretion, and policy strategies.
2. They will compare and evaluate the impact of monetary policy frameworks, including MIU and New Keynesian models, rules vs discretionary policy, inflation targeting, and central bank communication strategies.

Content

Unit 1 **Money-in-the-Utility and New Keynesian Models (10 hours)**
MIU model; steady state equilibrium; nonsuperneutrality; dynamics. Basic New Keynesian model; monetary policy analysis in the New Keynesian model.

Unit 2 **Monetary Policy in Open Economies (10 hours)**
Two-country model; policy coordination; small open economy models.

Unit 3 **Rules, Discretion and Policy Frameworks (10 hours)**
Policy objectives; targeting rules; Taylor principle; inflation targeting framework; commitment vs discretion.

Unit 4 **Operational and Communication Strategies in Monetary Policy (15 hours)**
Instruments and goals; effects of operating procedures; policy measures; role and strategies of central bank communication in monetary policy; forward guidance; unconventional monetary policy.

Readings

Gali, J. (2015): *Monetary Policy, Inflation, and the Business Cycle*, Princeton University Press.

Walsh, C. (2017): *Monetary Theory and Policy*, MIT Press.

Woodford, M. (2003): *Interest and Prices: Foundations of a Theory of Monetary Policy*, Princeton University Press.

Bianchi, F. and Melosi, L. (2018): Constrained discretion and central bank transparency. *Review of Economics and Statistics*, 100(1), 187–202.

Hansen, S., McMahon, M. and Tong, M. (2019): The long-run information effect of central bank communication. CEPR Discussion Paper 13438.

Tutorial Activities

Group project activity, research cum presentation

2.2.3 Macroeconomics of Development

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Macroeconomics of Development	4	3	1	0		

Objectives

This course provides students with an understanding of why growth trajectories vary so widely across countries and of the policies that can help low-income economies transition to high-growth paths. It moves beyond the standard neoclassical model with perfect markets, drawing on alternative frameworks that capture the structural constraints and complexities of real-world development.

Learning Outcomes

1. Students will develop an understanding of the pathways through which institutional and social characteristics of an economy contribute to persistent underdevelopment and divergent macroeconomic trajectories.
2. They will be able to analyse and compare policies towards attenuating the impact of these factors.

Content

Unit 1 **Technology adoption & diffusion (10 hours)**
Skill formation and skill-technology complementarity. Distance to the frontier and technology diffusion. Directed technological change. Appropriate versus inappropriate technologies.

Unit 2 **Market failures (10 Hours)**
Credit market imperfection and non-convex technologies. Non-homothetic preferences. Informal markets and risk-sharing.

Unit 3 **Government failures (10 Hours)**
Political economy of taxation and public good provision. Democracy versus Oligarchy. Corruption. Coordination failure.

Unit 4 **Culture, climate and other non-economic forces (15 Hours)**
Role of culture in households' risk preference and patience. Intergenerational transmission and persistence of cultural traits. Climate and work habits. Geography and occupation choice.

Readings

Acemoglu, Daron (2008), Oligarchic versus Democratic Societies. Journal of the European Economic Association 6: 1-44.

Acemoglu, Daron, and Fabrizio Zilibotti (1997), Was Prometheus Unbound by Chance? Risk, Diversification and Growth. Journal of Political Economy 105: 709-751.

Acemoglu, Daron, Philippe Aghion, and Fabrizio Zilibotti (2006), Distance to Frontier, Selection, and Economic Growth. Journal of the European Economic Association 4(1): 37-74.

Acemoglu, Daron, and Pascual Restrepo (2018), "The Race between Man and Machine: Implications of Technology for Growth, Factor Shares, and Employment", American Economic Review, 108, 1488-1542.

Adsera, Alicia and Debraj Ray (1998), "History and Coordination Failure", Journal of Economic Growth, 3, 267-276.

Alesina, Alberto, and Dani Rodrik (1994), Distributive Politics and Economic Growth. Quarterly Journal of Economics 109: 465-490.

Banerjee, Abhijit V. and Andrew F. Newman (1993): "Occupational Choice and the Process of Development", Journal of Political Economy, 101, 274-298.

Bisin, Alberto and Thierry Verdier (2001): "The Economics of Cultural Transmission and the Dynamics of Preferences", Journal of Economic Theory, 97(2), 298-319.

Bourguignon, Francois, and Thierry Verdier (2000), Oligarchy, Democracy, Inequality and Growth, Journal of Development Economics, 62: 285-313.

Doepke, Matthias and Fabrizio Zilibotti (2008), "Occupational Choice and the Spirit of Capitalism", The Quarterly Journal of Economics, 123 (2), 747-793.

Tutorial Activities

Group projects, term papers and presentations.

2.2.4 Endogenous Growth Theory

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Endogenous Growth Theory	4	3	1	0		EC004

Objectives

This course aims to provide a rigorous foundation in endogenous growth theory. It aims to equip students with the analytical tools to evaluate the role of learning-by-doing, human capital accumulation, government provision of services and innovation driven by purposive R & D as endogenous drivers of long-run economic growth.

Learning Outcomes

1. Students will understand how constant returns to reproducible factors generates endogenous growth.
2. They will understand how R & D and diffusion of knowledge generate endogenous growth.

Content

Unit 1 **Review of neo-classical growth theory (5 Hours)**
Recap of Solow and RCK models; diminishing returns to capital and exogenous growth; conditional convergence; setting the stage for endogenous growth

Unit 2 **One-sector and two-sector models of endogenous growth (16 hours)**
Constant returns to capital and the AK model; models with learning-by-doing and knowledge spillovers; public goods and congestion models of productive government services; human capital accumulation; interaction between physical and human capital

Unit 3 **Models with an expanding variety of products (12 Hours)**
Monopoly power, R & D and innovation; Romer's model of technological change; models with an expanding variety of producer products; models with an expanding variety of consumer products; erosion of monopoly power

Unit 4 **Schumpeterian models of quality ladders (12 Hours)**
Quality ladders in production; creative destruction and the incentive to innovate; improvement in quality as a source of endogenous growth; entry-exit dynamics and innovation-driven growth

Readings

Barro RJ and Sala-i-Martin X (2004), Economic Growth, Second Edition, MIT Press

Acemoglu D (2009), Introduction to Modern Economic Growth, Princeton University Press

Aghion P and Howitt P (2019), The Economics of Growth, MIT Press

Tutorial Activities

Problem sets, group presentations, etc.

2.2.5 Behavioral Macroeconomics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Behavioral Macroeconomics	4	3	1	0		

Objectives

The course introduces behavioral economics into macroeconomic analysis. It explains of why standard rational-agent models often fail to explain real-world phenomena and how psychological biases, imperfect information, and non-rational expectations shape aggregate outcomes.

Learning Outcomes

1. Students will understand how behavioral biases and information frictions lead to deviations from traditional rational expectations models.
2. They will be able to analyse the implications of behavioral biases for monetary and fiscal policies.

Content

Unit 1 **Foundations of behavioral economics for macro analyses (10 Hours)**
Limits of rationality in economic decision-making process. Bounded rationality. Prospect theory. Present bias. Hyperbolic discounting and endogenous time preference. Mental accounting.

Unit 2 **Behavioral consumption, saving, and labor market outcomes (13 Hours)**
Buffer-stock saving and bounded rationality. present-biased consumption and savings choices. fair-wage models and wage rigidity. Search frictions and behavioral unemployment.

Unit 3 **Behavioral New Keynesian models of business cycles (12 Hours)**
Myopia and behavioral New Keynesian models. Sentiments, narratives, and belief-driven cycles. Multiple equilibria and coordination failures.

Unit 4 **Policy implications and macro-financial behavior (10 Hours)**
Monetary policy under bounded rationality. Behavioral fiscal policy and tax salience. Bubbles, financial cycles, and macro-financial instability.

Readings

Akerlof, G. A., & Yellen, J. L. (1990). The fair wage–effort hypothesis and unemployment. Quarterly Journal of Economics, 105(2), 255–283.

Angeletos, G.-M., & La'O, J. (2013). Sentiments. Econometrica, 81(2), 739–779.

Angeletos, G.-M., & Lian, C. (2018). Forward guidance without rational expectations. American Economic Review, 108(9), 2471–2512.

Bordalo, P., Gennaioli, N., & Shleifer, A. (2018). Diagnostic expectations and credit cycles. Journal of Finance, 73(1), 199–227.

Carroll, C. D. (1997). Buffer-stock saving and the life cycle/permanent income hypothesis. Quarterly Journal of Economics, 112(1), 1–55.

De Grauwe, P. (2012). Booms and busts in economic activity: A behavioral explanation. Journal of Economic Behavior & Organization, 83(3), 484–501.

Gabaix, X. (2020). Behavioral New Keynesian economics. American Economic Review, 110(8), 2271–2327.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. Econometrica, 47(2), 263–291.

Laibson, D. (1997). Golden eggs and hyperbolic discounting. Quarterly Journal of Economics, 112(2), 443–477.

Lorenzoni, G. (2009). A theory of demand shocks. American Economic Review, 99(5), 2050–2084.

Shiller, R. J. (2003). From efficient markets theory to behavioral finance. Journal of Economic Perspectives, 17(1), 83–104.

Thaler, R. H. (1985). Mental accounting and consumer choice. Marketing Science, 4(3), 199–214.

Tutorial Activities

Class tests, term papers and presentations.

2.2.6 Sectoral Reallocation and Economic Growth

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Sectoral Reallocation and Economic Growth	4	3	1	0		

Objectives

This course examines sectoral reallocation as a key driver of long-run economic growth. It examines how increasing returns, coordination failures, trade and innovation shape sectoral reallocation and development trajectories. It models aggregate productivity, spillovers and spatial dynamics within general equilibrium frameworks.

Learning Outcomes

1. Students will understand how increasing returns, coordination failures, and endogenous specialization generate multiple equilibria and structural traps.
2. They will be able to assess the role of innovation policy and place-based interventions in shaping long-run development and regional divergence.

Content

Unit 1 **Structural change and long-run growth (18 hours)**
Structural change in long-run development, sectoral reallocation and productivity growth; increasing returns and coordination failures; trade, comparative advantage and endogenous specialization, premature deindustrialization and structural traps

Unit 2 **Sectoral policies in general equilibrium (14 hours)**
Industrial policy as equilibrium selection; production networks and general equilibrium spillovers; scale economies and trade; export-led industrialization in comparative perspective; empirical evaluation of sectoral industrial policies

Unit 3 **Innovation, public R & D and long-run growth (7 hours)**
Schumpeterian growth and creative destruction; competition and innovation; Public R&D and knowledge spillovers; state-led innovation strategy

Unit 4 **Geography, place-based policy and persistent Effects (6 hours)**
Economic geography and agglomeration; regional divergence and spatial persistence; place-based industrial policy; developmental state experiences.

Readings

Aghion, P. and Howitt, P. (2019): *The Economics of Growth*, MIT Press.

Aghion, P., Cai, J., Dewatripont, M., Du, L., Harrison, A., Legros, P. (2015): Industrial policy and competition. *American Economic Journal: Macroeconomics*, 7(4): 1–32.

Murphy, K. M., Shleifer, A., Vishny, R. W. (1989): Industrialization and the big push. *Journal of Political Economy*, 97(5): 1003–26.

Krugman, P. (1987), "The narrow moving band, the Dutch disease, and the competitive consequences of Mrs. Thatcher: Notes on trade in the presence of dynamic scale economies", *Journal of Development Economics*, 27(1-2): 41-55.

Krugman, P. (1991): Increasing returns and economic geography. *Journal of Political Economy*, 99(3): 483–499.

Matsuyama, K. (1992): Agricultural productivity, comparative advantage and economic growth. *Journal of Economic Theory*, 58(2): 317–34.

Hausmann, R., Rodrik, D. (2003): Economic development as self-discovery. *Journal of Development Economics*, 72(2): 603–33.

Harrison, A., Rodríguez-Clare, A. (2010): Trade, foreign investment, and industrial policy for developing countries. In *Handbook of Development Economics*, Vol. 5, Elsevier.

Rodrik, D. (2016): Premature deindustrialization. *Journal of Economic Growth*, 21(1): 1–33.

Criscuolo, C., Martin, R., Overman, H. G., Van Reenen, J. (2019): Some causal effects of an industrial policy. *American Economic Review*, 109(1): 48–85.

Juhász, R., Lane, N., Rodrik, D. (2023): The new economics of industrial policy. *Annual Review of Economics*, 16.

Bartelme, D., et al. (2025): The textbook case for industrial policy: Theory meets data. *Journal of Political Economy*, 133(5): 1527–1573.

Lashkaripour, A., Lugovskyy, V. (2023): Profits, scale economies, and the gains from trade and industrial policy. *American Economic Review*, 113(10): 2759–2808.

Liu, E. (2019): Industrial policies in production networks. *Quarterly Journal of Economics*, 134(4).

Tutorial Activities

Paper review and presentations, group discussion, etc.

2.2.7 Computational Macroeconomics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Computational Macroeconomics	4	3		1		

Objectives

The objective is to teach the analytical and numerical tools for solving dynamic macroeconomic models. This course will explore state-of-the-art computational methods used in macroeconomics to answer questions about innovation and technological transformation over the long run and about business cycle fluctuations. This course will introduce you to computational methods for solving and simulating economic models with applications to innovation.

Learning Outcomes

1. Students will understand recursive methods for expressing dynamic macro models and have facility in solving them numerically (using a software package, MATLAB).
2. They will be familiar with the formulation and solution of general equilibrium models, and their estimation techniques and gain practical proficiency in programming within established macroeconomic dynamic models.

Content

Unit 1 **Neoclassical growth model (10 hours)**
discretisation, value function iteration, Howard's improvement algorithm, interpolation: linear, cubic spline, shape-preserving spline, Chebyshev polynomials

Unit 2 **Dynamic Programming (15 hours)**
Function approximation (The interpolation and collocation methods to solve functional equations approximately), Discrete time, discrete state dynamic models.

Numerical solution algorithms: Backward recursion, function iteration, and policy iteration. Simulation and analysis)

Unit 3 **Dynamic General Equilibrium Approach and Perturbation methods (12 hours)**
Application of RBC and New Keynesian models and simulation, and Bayesian Estimation of DSGE Models Using Dynare.

Unit 4 **Heterogeneous agents (8 hours)**
Aiyagari: finding the stationary distribution

Readings

Judd, Kenneth L., 1998, Numerical Methods in Economics, Cambridge: MIT Press.

Hommes, Cars and LeBaron, Blake (2018), Handbook of Computational Economics, Vol 4, Elsevier.

Miao, Jianjun (2013), Economics Dynamics: A Discrete Time, Boston University

Mario Miranda and Paul Fackler. 2002. Applied Computational Economics and Finance, MIT Press.

Tutorial Activities

Group project activity, problem set assignments, research cum presentation

2.2.8 Dynamic Macroeconomics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Dynamic Macroeconomics	4	3	1	0		

Objectives

The course introduces contemporary theories and applications of macro dynamics. It includes complete and incomplete markets, including business cycles and labour market frictions. It explains the applications of advanced theoretical tools for macro dynamics.

Learning Outcomes

1. Students will apply dynamic programming methods to analyse contemporary macroeconomic problems.
2. They will formulate dynamic models and use them to analyse the short-run and long-run implications for more complex macroeconomic issues and policies.

Content

Unit 1 **Tools for Dynamic Macroeconomies (12 hours)**
Stochastic Processes ; Makov decision process model, Egrodic theory and stationary process, Dynamic Optimisation; Linear-Quadratic Model; Control under Partial Information

Unit 2 **Incomplete Markets Model (13 hours)**
Complete Markets; sequential trading and Arrow securities; Markov Process under incomplete markets

Unit 3 **Labour Market Frictions and Business Cycles (10 hours)**
Search, Matching and Unemployment McCalls model of intertemporal job search, A lake model, A model of career choice, Jovanovic's matching model

Unit 4 **Advanced Topics of Macro Dynamics (10 hours)**
Applications of Reccurssive Utility, Dynamic Games and Recurssive Contracts; Heterogeneous agents models

Readings

Adda, J. and R. Cooper: Dynamic Economics: Quantitative Methods and Applications, MIT Press, 2003

Miao, J. (2020). Economic dynamics in discrete time. MIT Press.

Taylor, John B. and Uhlig, Harald (2016): Handbook of Macroeconomics, North-Holland: Elsevier

Ljungqvist, L., & Sargent, T. J. (2018). Recursive macroeconomic theory. MIT Press.

Bagliano, F. C., & Bertola, G. (2004). Models for dynamic macroeconomics. OUP Oxford.

Campante, F., Sturzenegger, F., & Velasco, A. (2021). Advanced macroeconomics: an easy guide,. LSE Press.

Weber, T. A. (2011). Optimal control theory with applications in economics. MIT Press.

Tutorial Activities

Group project activity, problem set assignments, research cum presentation

2.3 Econometric Methods and Applications

2.3.1 Impact Evaluation Methods

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Impact Evaluation Methods	4	3	1	0		

Objectives

This course focuses on quantitative empirical research. Mastering causal inference techniques to rigorously estimate the effects of policy interventions. Students will gain practical skills in designing and applying experimental and quasi-experimental evaluation methods. The ultimate goal is to produce methodologically sound evidence for informed economic and social policy decisions.

Learning Outcomes

1. Students will be able to identify, isolate and measure the causal effects of experimental and non-experimental interventions
2. They will be familiar with modern causal identification techniques and their applications (STATA/R).

Content

Unit 1 **Basic concepts (9 hours)**
This unit revisits some basics of OLS, and then introduces students to Potential outcomes framework, Selection Bias, Treatment Effect, Randomization, Causal Diagrams (DAGs)

Unit 2 **Research Design, Randomization and Matching Methods (12 hours)**
This unit focuses on Model- vs. Design-Based Inferences. Randomized Experiments, various Matching Methods

Unit 3 **Instrumental Variable, Regression Discontinuity Design Methods (12 hours)**
This unit focuses on the Identification of causal effects using instrumental variables. Local average treatment effects (LATE), Bartik (Shift-share) IV, Judge (Examiner's Leniency) IV, Heckman Selection Model. Sharp and Fuzzy RDD.

Unit 4 **Difference in Difference (12 hours)**
This unit explores the special techniques that exploit panel data structure for causal inference. It also explores modern methods of panel estimations, difference-in-difference, event studies, synthetic controls.

Readings

Cunningham, S., 2021. Causal Inference: The Mixtape. Yale University Press.

Angrist, J. and Pischke, J., 2009. Mostly Harmless Econometrics. Princeton University Press.

Wooldridge, J., 2010, Econometric Analysis of Cross-Section and Panel Data. MIT Press.

Nick Huntington-Klein, 2025, The Effect: An Introduction to Research Design and Causality. Taylor & Francis.

Tutorial Activities

Group project activity, research cum presentation

2.3.2 Causal Inference for Policy Evaluation

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Causal Inference for Policy Evaluation	4	3	1	0		

Objectives

This course aims to familiarize the students with causal inference techniques and identification strategies, using experiments, and quasi-experiments for rigorous policy evaluation. It would cover key identification methods such as randomized control trials, difference-in-differences, instrumental variable estimation, regression discontinuity design, and propensity score matching.

Learning Outcomes

1. Students will be able to evaluate validity of empirical strategies by assessing assumptions, threats to identification, robustness, and external validity
2. They will be able to apply causal inference and identification strategies to estimate policy impact using real-world data

Content

Unit 1 **Causal inference and identification (10 hours)**
Violation of assumptions; threats to identification; issues on selection bias; unobserved heterogeneity; internal and external validity.

Unit 2 **Experiments and randomized control trials (10 hours)**
Design and implementation of experiments; sampling design; randomization methods; non-compliance issues; contamination; analysis of experimental data.

Unit 3 **Quasi-experiment methods (15 hours)**
Differences-in-differences; instrumental variable estimation; regression discontinuity design, propensity score matching.

Unit 4 **Policy evaluations (10 lectures)**
Empirical findings; policy interventions; policy evaluation; ethics in policy evaluation.

Readings

Ding, P. (2024). A first course in causal inference. Chapman and Hall/CRC.

Angrist, J. D., & Pischke, J. S. (2009). Mostly harmless econometrics: An empiricist's companion. Princeton university press.

List, J. A. (2025). Experimental economics: Theory and practice. University of Chicago Press.

Duflo, E., & Banerjee, A. (Eds.). (2017). Handbook of field experiments (Vol. 1). Elsevier.

Wooldridge, J. M. (2010). Econometric analysis of cross section and panel data. MIT press.

Goldberg, J., Macis, M., & Chintagunta, P. (2023). Incentivized peer referrals for tuberculosis screening: Evidence from India. American Economic Journal: Applied Economics, 15(1), 259-291.

Levine, R. (2017). What the moral case for evidence means for impact evaluation. Hewlett Foundation.

Tutorial Activities

Group discussions, presentations, and research projects

2.3.3 Time Series Analysis

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Time Series Analysis	4	3	1			

Objectives

This course familiarizes students with advanced modelling techniques using time series data. The course primarily focuses on acquainting students with technical skills along with implementation of time series models using software. Students can apply time series econometrics to a wide variety of macro and financial data problems.

Learning Outcomes

1. Students will understand key concepts and modelling approaches in time series econometrics and apply them to empirical contexts using appropriate software tools.
2. They will evaluate real-world macroeconomic and financial problems by formulating, estimating, and interpreting suitable time series models.

Content

Unit 1 **Unit Roots, Cointegration and Panel Extensions (15 hours):**
Deterministic and stochastic trend; Trend stationary vs difference stationary processes; Random walk model; Testing for unit roots (including multiple and seasonal unit roots) and structural change; Cointegration and error correction; Testing for cointegration; ARDL Bounds Testing Approach; Panel data unit root tests; Panel data cointegration tests; FMOLS and DOLS estimation.

Unit 2 **Box-Jenkins Methodology (10 hours):**
Stationarity and invertibility; Autoregressive, moving average, and ARMA models; Identification, estimation and diagnostic checking; Forecasting.

Unit 3 **ARCH/GARCH Models (10 hours):**
ARCH and GARCH processes; ARCH-M and GARCH-M models.

Unit 4 **Vector Autoregression (VAR) Models (10 hours):**
Estimation and identification; Impulse response functions; Variance decomposition.

Readings

Box, G., Jenkins, G.M. and Reinsel, G.C. (2008): *Time Series Analysis: Forecasting and Control*, 4th Edition, John Wiley.

Enders, W. (2015): *Applied Econometric Time Series*, 4th Edition, John Wiley.

Greene, W. (2018): *Econometric Analysis*, 8th Edition, Pearson.

Pesaran, M. H. (2015): *Time Series and Panel Data Econometrics*, Oxford University Press.

Pindyck, R. and Rubinfeld, D. (2000): *Econometric Models and Economic Forecasts*, 4th Edition, McGraw-Hill.

Rao, B. Bhaskara (2007): *Cointegration for the Applied Economist*, 2nd Edition, Palgrave Macmillan.

Tsay, R. (2010): *Analysis of Financial Time Series*, 3rd Edition, Wiley.

Elliott, G., & Timmermann, A. (2016). Economic forecasting. Princeton University Press.

Tutorial Activities

Project activity, problem solving exercises

2.3.4 Forecasting Methods and Applications

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Forecasting Methods and Applications	4	3	1			

Objectives

This course covers various quantitative and judgmental techniques used in economic and business forecasting. The course also examines techniques for the evaluation of performance of forecasting methods and combination of forecasts. Practical applications of forecasting using forecasting/econometric software packages are undertaken.

Learning Outcomes

1. Students will understand qualitative and quantitative methods for forecasting in business and economics, apply time series econometric forecasting methods, and use standard econometric/forecasting software.
2. They will work on real world forecasting applications, including forecast evaluation, combination of forecasts, univariate and multivariate forecasting models, and judgmental forecasting approaches.

Content

Unit 1 **Overview of Forecasting and Forecast Evaluation (10 hours)**
Applications of forecasting; Forecasting methods and forecast horizons; Nowcasting and backcasting; Measures and tests of accuracy; Choosing between forecasting methods; Unbiasedness and Rationality.

Unit 2 **Combination of Forecasts and Univariate Models (15 hours)**
Combination of Forecasts: Forecast Encompassing; Optimal combining weights.
Univariate Models: Smoothing Techniques and Box-Jenkins Methodology — Averaging methods; Exponential smoothing methods; Decomposition methods; Unit roots; Autoregressive models; Moving average models; Mixed autoregressive and moving average models; Identification, estimation, diagnostic checking; Forecast function.

Unit 3 **Multivariate Models (10 hours)**
Regression Models, Simultaneous Equations Models, VAR models.
Multivariate regression model; Implications of violation of OLS assumptions for forecasting; Observational Equivalence, reduced form representation; Estimation, forecasting and simulation with simultaneous equation models; VAR models; Cointegration.

Unit 4 **Judgmental Forecasting (10 hours)**
Jury of executive opinion; Delphi approach; Sales force composite methods; Anticipatory surveys and market research-based assessments.

Readings

Box, G.E.P., Jenkins, G.M., and Reinsel, G.C. (2008): *Time Series Analysis: Forecasting and Control*, 4th Edition, John Wiley Sons Inc.

Brooks, C. (2019): *Introductory Econometrics for Finance*, 4th Edition, Cambridge University Press.

Diebold, F.X. (2006): *Elements of Forecasting*, 4th Edition, South-Western Publishers.

Diebold, F.X. (2017): *Forecasting: Economics, Business, Finance and Beyond.* `https://www.sas.upenn.edu/fdiebold/Teaching221/Forecasting.pdf`

Delurgio, S.A. (1998): *Forecasting Principles and Applications*, McGraw-Hill Publishers.

Enders, W. (2015): *Applied Econometric Time Series*, 4th Edition, John Wiley Sons, Inc.

Hanke, J.E. and Wichern, D. (2008): *Business Forecasting*, 9th Edition, Pearson Publishing.

Makridakis, S.G.; Wheelwright, S.C.; and Hyndman, R.J. (1998): *Forecasting: Methods and Applications*, 3rd Edition, John Wiley Sons, Inc.

Newbold, P. and Bos, T. (1994): *Introductory Business Economic Forecasting*, 2nd Edition, South-Western Publishers.

Pesaran, M.H. (2015): *Time Series and Panel Data Econometrics*, Oxford University Press.

Pindyck, R.S. and Rubinfeld, D.L. (1997): *Econometric Models and Economic Forecasts*, 4th Edition, McGraw-Hill.

Tutorial Activities

Project activity, problem solving exercises

2.3.5 Applied Production Analysis

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Applied Production Analysis	4	3	1			

Objectives

This course will equip students with relevant skills and competences to analyse production technologies and producer behaviour with appropriate economic methodologies.

Learning Outcomes

1. Students will develop a thorough understanding of production theories and dual/primal representations of producer behaviour.
2. They will understand and apply econometric and frontier-based techniques for efficiency and productivity measurement.

Content

Unit 1 **Primal and Dual Approaches in Production Economics (15 hours)**
Primal approaches - theory and econometric estimation. Dual approaches – cost minimization and cost function; profit maximization and profit function: theory and econometric estimation.

Unit 2 **Multi-output Production Technologies (10 hours)**
Multi-output technologies and their estimation: input, output and directional distance functions.

Unit 3 **Functional Forms in Applied Production Analysis (10 hours)**
Cobb–Douglas, translog, quadratic and other flexible functional forms.

Unit 4 **Efficiency and Productivity Analysis (10 hours)**
Concepts and measurements including stochastic frontier analysis (SFA), data envelopment analysis (DEA) and related approaches.

Readings

Chambers, R. (1988): *Applied Production Analysis: A Dual Approach*, Cambridge University Press.

Färe, R.; Grosskopf, S. and Primont, D. (2007): *Aggregation, Efficiency and Measurement*, Springer.

Färe, R. and Primont, D. (1995): *Multi-Output Production and Duality: Theory and Applications*, Kluwer Academic Publishers.

Grifell-Tatjé, E.; Lovell, C. Knox and Sickles, R. (2018): *The Oxford Handbook of Productivity Analysis*, Oxford University Press.

Kumbhakar, S.; Wang, H.-J. and Horncastle, A. (2014): *A Practitioner's Guide to Stochastic Frontier Analysis*, Cambridge University Press.

Moreover, readings in the form of journal articles and working papers.

Tutorial Activities
Group projects, problem-solving exercises

2.3.6 Applied Consumption Analysis

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Applied Consumption Analysis	4	3	1			

Objectives

The objective of this course is to familiarize students with analyzing issues related to consumer demand using appropriate econometric tools.

Learning Outcomes

1. Students will analyze demographically-extended and dynamic demand systems.
2. They will apply maximum likelihood and nonparametric estimation techniques within demand system modeling.

Content

Unit 1 **Foundational Concepts in Demand Analysis (10 hours):**
Review of Theory: Duality and Separability Concepts; Theoretical Restrictions.

Unit 2 **Single-Equation Demand and System Estimation Approaches (10 hours):**
Single-equation approaches: Engel functions; Demand for durable goods.
System Estimation: Functional forms; Estimation procedures; Assumptions about error structures; Testing.

Unit 3 **Dynamic and Demographically-Extended Demand Systems (10 hours):**
Dynamic Demand Systems: Habit formation models; Modelling changes in taste.
Demographically-Extended Demand Systems: Translation and scaling approaches.

Unit 4 **Nonparametric Approaches and Applications of Demand Analysis (15 hours):**
Non-parametric (Regression) Approaches.
Applications of Demand Analysis: Food and Nutrition; Demand for non-marketed goods; Welfare applications.

Readings

Deaton, A. and Muellbauer, J. (1980): *Economics and Consumer Behaviour*, Cambridge University Press.

Deaton, A. (1997): *Analysis of Household Surveys: A Microeconometric Approach to Development Policy*, The John Hopkins University Press.

Hardle, W. (1992): *Applied Nonparametric Regression*, Cambridge University Press.

Pollak, R. and Wales, T. (1992): *Demand System Specification and Estimation*, Oxford University Press.

Philips, L. (1983): *Applied Consumption Analysis*, North Holland.

Tutorial Activities

Project activity, problem solving exercises

2.3.7 Semi- and Nonparametric Estimation

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Semi- and Nonparametric Estimation	4	3	1			

Objectives

This course is aimed at giving a brief introduction to the statistical theory of nonparametric density and regression function estimation. The focus is on kernel-based nonparametric estimation and inference. This includes nonparametric kernel density estimation, tests associated with densities, nonparametric kernel regression, tests for correct specification of functional forms, nonparametric sieve estimation, and semi-parametric estimation of single-equation models (including partially linear models, single-index models, additive models, etc.). Several statistical and econometric applications with cross-sectional data will be discussed. A brief discussion of nonparametric and semi-parametric estimation of panel data models will be touched upon.

Learning Outcomes

1. Students will acquire understanding and skills in nonparametric estimation, including density estimation, kernel methods, nonparametric regression, sieve estimation, and semi-parametric single-equation models.
2. They will understand empirical applications such as conditional average treatment effects, regression discontinuity models, sample selection models, and extensions to panel-data settings.

Content

Unit 1 **Foundations of Nonparametric Estimation (10 hours)**
Parametric vs. nonparametric statistical models. The histogram and the kernel density estimator.
Statistical properties of the kernel density estimator. Bias-variance tradeoff.

Unit 2 **Bandwidth, Kernel Choice, and Multivariate Estimation (10 hours)**
Further statistical properties. Bandwidth choice in theory and practice. Kernel choice.
Multivariate kernel density estimator. Curse of dimensionality.
Some direct statistical applications of kernel density estimation.

Unit 3 **Nonparametric Regression and Series Estimation (15 hours)**
Nonparametric regression: kernel estimator (Nadaraya-Watson) and local linear regression estimator.
Statistical properties of the Nadaraya-Watson and local linear regression estimator.
Series estimation.
Some direct applications of nonparametric regression.

Unit 4 **Applications of Semi- and Nonparametric Methods (10 hours)**
Application: estimating conditional average treatment effects.
Application: estimating regression discontinuity models.
Application: estimating sample selection models.

Readings

Abrevaya, J.; Hsu, Y.C. and Lieli, R. (2015): Estimating conditional average treatment effects, *Journal of Business and Economic Statistics* 33, 485–505.

Cattaneo, M. D., Idrobo, N., & Titiunik, R. (2019). A practical introduction to regression discontinuity designs: Foundations. Cambridge University Press.

Cattaneo, M. D., Idrobo, N., & Titiunik, R. (2024). A Practical Introduction to Regression Discontinuity Designs: Extensions. Cambridge University Press.

Das, M.; Newey, W. and Vella, F. (2003): Nonparametric estimation of sample selection models, *Review of Economic Studies* 70, 33–58.

Hansen, B. (2022). Econometrics. Princeton University Press.

Li, Q., & Racine, J. S. (2007). Nonparametric econometrics: theory and practice. Princeton University Press.

Pagan, A. and Ullah, A. (1999): *Nonparametric Econometrics*, Cambridge University Press.

Silverman, B. (1986): *Density Estimation for Statistics and Data Analysis*, Chapman and Hall.

Su, L. (2011): *A Brief Introduction to Nonparametric Econometrics*, Lecture notes, Singapore Management University.

Wasserman, L. (2006). All of nonparametric statistics. New York, NY: Springer New York.

Tutorial Activities

Project activity, problem solving exercises

2.3.8 Topics in Econometrics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Topics in Econometrics	4	3	1	0		

Objectives:

This course aims to acquaint students with relatively advanced econometric techniques, which would help them in understanding advanced empirical research, and improve their ability to use these techniques for empirical analysis.

Learning outcomes:

1. Students would be acquainted with advanced estimation techniques. They would understand how nonlinear estimation algorithms work
2. They would be able to distinguish long-term from short-term behaviour. They would be able to apply these techniques to real world data

Content

Unit 1: Nonlinear Models and Methods (10 hours)

Intrinsically nonlinear regression models, and some techniques for estimating them. Logit model; Probit model; Poisson model; Negative binomial model; Newton-Raphson algorithm; Gauss-Newton algorithm; Steepest Ascent algorithm.

Unit 2: Dynamic and Time Series Models (15 hours)

Core distributed lag models, their autoregressive representation, consequences for estimation, and estimation issues; Koyck scheme; Adaptive expectations; Partial adjustment; Pascal scheme; Estimation.
Stationary and Non-stationary processes, Non-stationarity tests, Cointegration, Forecasting; Dickey-Fuller test, Augmented Dickey-Fuller test, Phillips-Perron test; Error-correction mechanism; AR, MA, ARMA and ARIMA models; Box-Jenkins methodology; ARCH, GARCH; VAR.

Unit 3: Panel Data Models (10 hours)

Dummy variable approach; Within-effects and Between effects variation; Fixed effects models; Random effects models; Hybrid approach.

Unit 4: Randomised and Natural Experiments (10 hours)

Randomised Controlled Trials; Average Treatment Effect; Differences estimator; Natural Experiments; Diffs-in-diffs estimator; Regression Discontinuity Design; Critique.

Readings:

Stock, J. H., & Watson, M. W. (2011). *Introduction to econometrics* (3rd ed.). Pearson.

Wooldridge, J. M. (2013). *Introductory econometrics: A modern approach* (5th ed.). Cengage Learning.

Johnston, J., & DiNardo, J. (1997). *Econometric methods* (4th ed.). McGraw-Hill.

Davidson, R., & MacKinnon, J. G. (2004). *Econometric theory and methods*. Oxford University Press.

Maddala, G. S. (1992). *Introduction to econometrics* (2nd ed.). Macmillan.

Greene, W. H. (2003). *Econometric analysis* (5th ed.). Pearson.

Johnston, J. (1984). *Econometric methods* (2nd ed.). McGraw-Hill.

Tutorial Activities

Project activity, problem solving exercises

2.3.9 Advanced Econometric Methods

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Advanced Econometric Methods	4	3	1	0		EC006

Objectives

This course provides the theoretical underpinnings for conducting applied econometric studies. It provides the conceptual framework on which such analyses are based, supplemented by illustrative empirical applications drawn from various fields of Economics

Learning Outcomes At the end of this course, students will be able to

1. Students will develop the ability to conduct empirical analyses and data analytics, including formulating and evaluating economic hypotheses.
2. They will gain the conceptual foundation necessary to understand existing econometric methods and to independently learn more advanced techniques in the future.

Content

Unit 1 **Extremum Estimators with Examples (15 hours)**
Cover several important classes of Extremum Estimators, especially GMM and M-Estimators to give an unifying perspective to the apparently diverse set of Estimators. In the process will talk about commonly used cases: Linear Instrumental Variable Models, DSGE Models, Discrete Choice Models and Demand Estimation, Panel Data, Conditional Distribution and Quantiles, etc.

Unit 2 **Large Sample Estimation and Hypothesis Testing(15 hours)**
Properties of Consistency, Asymptotic Normality, Efficiency in the context of GMM and M-Estimators would be discussed. Students will be able to construct point and interval estimates for many types of applications.

Unit 3 **Inference in High Dimensional Settings(5 hours)**
Inference in High Dimensional Settings with Many Parameters and/or Moments would be discussed. An important concept is Double/debiased machine learning (DML) methods via Neyman Orthogonality condition

Unit 4 **Selected topics (10 hours)**
Resampling Methods, Bayesian Methods, Computational aspects (Optimization, Integration, Simulation, etc.)

Readings

Belloni, A., Chernozhukov, V., Chetverikov, D., Hansen, C., & Kato, K. (2018). High-dimensional econometrics and regularized GMM. arXiv preprint arXiv:1806.01888.

Cameron, A. C. (2005). Microeconometrics: methods and applications. Cambridge University.

Chernozhukov, V. & Fernandez-Val, I. (2017). Econometrics. 14.382 OCW MIT.

Chernozhukov, V., Hansen, C., Kallus, N., Spindler, M., & Syrgkanis, V. (2024). Applied causal inference powered by ML and AI. arXiv preprint arXiv:2403.02467.

Galichon, A. (2026). Discrete Choice Models: Mathematical Methods, Econometrics, and Data Science. In Discrete Choice Models. Princeton University Press.

Hansen, B. (2022). Econometrics. Princeton University Press.

Hayashi, F. (2011). Econometrics. Princeton University Press.

Herbst, E. P., & Schorfheide, F. (2016). Bayesian estimation of DSGE models. Princeton University Press.

Ho, K., Hortacsu, A., & Lizzeri, A. (2021). Handbook of industrial organization (Vol. 4, 5). Elsevier.

Linton, O. (2019). Time Series for Economics and Finance. Cambridge University Press.

Mikusheva, A. (2013). Time Series Analysis. 14.384 OCW MIT.

Newey, W. K., & McFadden, D. (1994). Large sample estimation and hypothesis testing. Handbook of econometrics, 4, 2111-2245.

Tutorial Activities

Group project activity, research cum presentation.

2.3.10 Coding Basics with Economic Applications

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Coding Basics with Economic Applications	4	3		1		

Objectives

This course introduces students to the fundamentals of coding using the R programming language and its application in econometric analysis. The course emphasises the use of large scale secondary datasets widely used in economic research in India such as the National Sample Survey (NSS), Periodic Labour Force Survey (PLFS), National Family Health Survey (NFHS), and Annual Survey of Industries (ASI).

Students will learn how to import, clean, manage, and analyse large micro datasets using R. The course introduces essential programming concepts such as data types, loops, functions, conditional statements, and data manipulation. It also familiarises students with commonly used R libraries for econometric analysis and data visualisation.

The course further develops skills in applied econometrics using secondary datasets. Emphasis will be placed on empirical economic applications such as labour market analysis, health outcomes, household consumption, and industrial productivity using real survey datasets.

Learning Outcomes

1. Students will develop basic programming skills in R for data management and statistical analysis.
2. They will be able to handle large secondary datasets used in economic research and apply econometric methods to real world economic data.

Content

Unit 1 **Introduction to R and Data Handling (15 hours)**
Introduction to R and RStudio environment. Data types, vectors, matrices, lists, and data frames. Basic programming structures including loops, conditional statements, and functions. Importing and exporting datasets in different formats such

as CSV, Excel, and STATA files. Data cleaning and transformation. Handling missing values. Introduction to important R libraries including dplyr, tidyr, readr, haven, ggplot2 etc.

Unit 2 **Data visualization using R (10 Hours)**
Introduction to data visualisation and its role in economic analysis. Development of graphical representations of economic data using R packages such as ggplot2, plotly, lattice, and ggpubr. Visual presentation and interpretation of patterns and trends in secondary datasets.

Unit 3 **Introduction to large scale secondary datasets (10 Hours)**
Introduction to working with large scale secondary datasets such as NSS, PLFS, NFHS, and ASI.

Unit 4 **Advanced econometric analysis with R (10 Hours)**
Advanced econometric analysis with R programming using large scale secondary datasets. Application of limited dependent variable models including logit, probit, tobit, and Poisson. Time series and panel data analysis using R.

Readings

Wooldridge, J. M. (2019): Introductory Econometrics: A Modern Approach, South-Western.

N. Gujarati and D. C. Porter, Basic Econometrics , McGraw Hill, New York 2008

Venables, W. N., Smith, D. M., and R Core Team. An Introduction to R: Notes on R A Programming Environment for Data Analysis and Graphics. Version 4.5.3, 11 March 2026. https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf

Kleiber, Christian, and Achim Zeileis. Applied Econometrics with R. Springer, 2008.

Ministry of Statistics and Programme Implementation. NSS, PLFS and ASI Survey Reports and Unit Level Data Documentation. Government of India, various rounds and years.

International Institute for Population Sciences. National Family Health Survey Reports and Fact Sheets. Various rounds.

Reserve Bank of India. Database on Indian Economy(DBIE). Reserve Bank of India. https://www.rbi.org.in

Tutorial Activities

Project activity, problem solving exercises

2.3.11 Machine Learning Methods for Economics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Machine Learning Methods for Economics	4	3	0	1		

Objectives

The course will show students how machine learning methods can help economists make better predictions with high-dimensional data. It will apply these methods to several types of data including text, satellite and other imagery and videos.

Learning Outcomes

1. Students will be familiar with the general principles and basic methods of machine learning.
2. They will apply ML methods to practical problems.

Content

Unit 1 **Basic ML methods (9 hours)**
High dimensional linear regression models (lasso, ridge, elastic net, lava, etc.). Modern nonlinear regression (tree-based methods, neural networks). Applications would involve simple datasets whose variables have a numeric representation.

Unit 2 **ML methods on unstructured datasets (12 hours)**
Generalise the approach in Unit 1 to allow using unstructured data - such as text, document image scans, satellite and other imagery, videos, and audio. Applications include classification, document digitization, record linkage, and methods for data exploration in massive scale text and image depositories.

Unit 3 **Statistical Inference in High-Dimensional Settings (12 hours)**
Double Lasso Method; Neyman Orthogonality Property, Double/debiased machine learning (DML) methods.

Unit 4 **Applications (12 hours)**
Applying ML tools to different methods of impact evaluation, feature engineering and its applications, reinforcement learning and its applications

Readings

Athey, S., and Imbens, G. W. (2019). Machine Learning Methods that Economists Should Know About. Annual Review of Economics, 11(1), 685-725.

Chernozhukov, V., Hansen, C., Kallus, N., Spindler, M., and Syrgkanis, V. (2024). Applied Causal Inference Powered by ML and AI. arXiv preprint arXiv:2403.02467. https://causalml-book.org/

Chernozhukov, V., and Fernández-Val,I. (2017). 14.382 Econometrics. Spring 2017. Massachusetts Institute of Technology: MIT OpenCourseWare, https://ocw.mit.edu. License: Creative Commons BY-NC-SA.

Hansen, B. (2022). Econometrics. Princeton University Press.

Hastie, T., Tibshirani, R., Friedman, J., and Franklin, J. (2009). The Elements of Statistical Learning: Data Mining, Inference and Prediction, Latest Edition, Springer.

Tutorial Activities

Project activity, data analysis, research cum presentation.

2.3.12 Experimental and Survey Economics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Experimental and Survey Economics	4	3	1	0		

Objectives

This course intends to acquaint students with the methods as well as topics that experiments and surveys in economics address.

Learning Outcomes

1. Students will be able to understand the philosophical, methodological and statistical issues pertaining to experiments and surveys.
2. They will understand the numerous topics and instances where experiments and surveys are applied in economics.

Content

Unit 1 **Experimental and Survey Methodology (9 hours)**
Methodological and ethical issues pertaining to experiments and surveys.

Unit 2 **Statistical Issues(12 hours)**
Statistical Issues pertaining to experiments and surveys in economics.

Unit 3 **Lab and Field Experiments(15 hours)**
Specific instances and topics where lab and field experiments are applied.

Unit 4 **Survey and Information Provision Experiments (9 hours)**
Specific instances and topics where surveys and survey experiments are applied.

Readings

Coibion, O., & Gorodnichenko, Y. (2026). Expectations matter: the new causal macroeconomics of surveys and experiments. In Expectations Matter. Princeton University Press.

Duflo, E., & Banerjee, A. (Eds.). (2017). Handbook of field experiments (Vol. 1 & 2). Elsevier.

Duffy, J. (2024). Lecture Notes in Experimental Economics (Vol. 21). World Scientific.

Fréchette, G. R., & Schotter, A. (Eds.). (2015). Handbook of experimental economic methodology. Oxford University Press.

Haaland, I., Roth, C., Stantcheva, S., & Wohlfart, J. (2025). Understanding economic behavior using open-ended survey data. Journal of Economic Literature, 63(4), 1244-1280.

Haaland, I., Roth, C., & Wohlfart, J. (2023). Designing information provision experiments. Journal of economic literature, 61(1), 3-40.

Holt, C. A. (2019). Markets, games, and strategic behavior: An introduction to experimental economics. Princeton University Press.

Holt, C. A., & Sprott, E. (2025). The Economic Experience: An Introduction Through Experiments. Princeton University Press.

Kagel, J. H., & Roth, A. E. (Eds.). (2016). The handbook of experimental economics, volume 2. Princeton university press.

Roth, A. E., & Kagel, J. H. (Eds.). (1995). The handbook of experimental economics (Vol. 1). Princeton, NJ: Princeton university press.

List, J. (2026). Experimental Economics: Theory and Practice

Lusk, J. L., & Shogren, J. F. (2007). Experimental auctions. Cambridge Books.

Robbett, A. (forthcoming). Behavioral Economics. MIT Press.

Snowberg, E., & Yariv, L. (Eds.). (2025). Handbook of Experimental Methodology. Netherlands: Elsevier Science.

Stantcheva, S. (2023). How to run surveys: A guide to creating your own identifying variation and revealing the invisible. Annual Review of Economics, 15(1), 205-234.

Tutorial Activities

Group project activity, research cum presentation.

2.4 Finance: Theory, Institutions and Modelling

2.4.1 Corporate Finance

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Corporate Finance	4	3	1			

Objectives

The course will mainly focus on the interaction of firms and financial markets, and corporate governance. The study of corporate finance focuses on how firms raise finance and structure their liabilities. In the presence of agency problems, raising finance is fraught with moral hazard and adverse selection problems. The course will study different aspects of lender-borrower relationships and their market outcomes. Theoretical models will be taught to the students with the help of game theory and information economics. The course would have journal articles and some textbooks as readings.

Learning Outcomes

1. Students will get familiar with the advanced theoretical foundations of corporate finance.
2. They will understand practices and institutional aspects related to corporate financial decisions.

Content

Unit 1 **Credit and Capital Decisions (15 hours):**
Credit rationing; Capital structure; Capital acquisition and initial public offering.

Unit 2 **Payouts and Market Discipline (10 hours):**
Dividend policy; Market for corporate control.

Unit 3 **Corporate Restructuring and Intermediation (10 hours):**
Takeovers and acquisitions; Financial intermediation.

Unit 4 **Governance Structures (10 hours):**
Corporate governance and corporate board.

Readings

Amaro de Matos, J. (2001): *Theoretical Foundation of Corporate Finance*, Princeton University Press.

Freixas, X. and Rochet, J. C. (2008): *Microeconomics of Banking*, MIT Press.

Tirole, J. (2006): *The Theory of Corporate Finance*, Princeton University Press.

Tutorial Activities

Project activity, research cum presentation, problem solving exercises

2.4.2 Derivatives and Risk Management

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Derivatives and Risk Management	4	3	1	0		

Objectives

Risk is intrinsic to financial systems, arising from movements in prices, interest rates, exchange rates, and credit conditions. This course examines the management of such risks through financial derivatives. It covers the pricing and applications of instruments such as options, futures, forwards, swaps, and credit derivatives. Emphasis is placed on their use in hedging and speculative strategies by market participants.

Learning Outcomes

1. Students will develop a comprehensive understanding of the pricing and valuation of financial derivatives.
2. They will critically evaluate the role of derivatives in financial markets, assessing their benefits and systemic risks with reference to episodes such as the Global Financial Crisis.

Content

Unit 1 **Types of derivatives (10 hours)**
Forwards and Futures, Trading and Settlement, Margins, Marking to Market, Open Interest Commodity Futures Hedging, Speculation, Arbitrage with commodity futures, Pricing of forward and futures, Normal Backwardation Convergence, Basis risk, optimal hedge ratio.

Unit 2 **Currency Forwards and Futures (10 Hours)**
Foreign Exchange Markets, and Rates, Hedging with Forwards, Non-Deliverable Forwards, Currency Futures, Pricing Currency Futures, Hedging, Speculation, and Arbitrage with Currency Futures. Interest Rate Derivatives (Black's Model and applications) Caps, Floor, Collars, Swaptions, Options on Bonds, Options on futures, Interest rate futures.

Unit 3 **Stock and Index Futures (5 Hours)**
Trading of Index Futures, Pricing, Risk Adjustment, Hedging, Speculation, and Arbitrage with Index Futures

Unit 4 **Options (20 hours)**
Basics of call and put options, their payoffs, Intrinsic value and time value, American and European options, At the money, out of money and in the money options, Bounds to option pricing, Arbitrage based price limits, put call parity, Option Pricing Binomial Option Pricing model, Risk Neutral valuation, Black Scholes option pricing model and assumptions, Interpretation of Black Scholes model.

Reading

Srivastava R. (2015). Derivatives and Risk Management. Oxford University Press, 2nd Edition. NY.

Hull JC (2013). Options, Futures, and Other Derivatives. 7th Edition. Pearson Education. London.

Kolb R. (2011). Futures Options and Swap. Blackwell Publishing. NY.

Redhead K (1992). Financial Derivatives. Prentice Hall. New Delhi.

Strong RA. (1995). Derivatives; an Introduction. Thomson. SW.

Wimott, P. (2012). Quantitative Finance. Wiley & Sons. NY.

Jarrow, R. & Stuart, T. (1995). Derivative Securities. Thompson SW.

Chance, D.M., & Brooks, R. (2008). Derivatives and Risk Management Basics. Cengage Learning India.

Pliska, S. (1997). Introduction to Mathematical Finance. Wiley-Blackwell Publishing.

Tutorial Activities

Group projects and presentations, problem-solving exercises.

2.4.3 Climate Finance

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Climate Finance	4	3	1	0		

Objectives

This course introduces the economics and finance of climate change, focusing on how physical and transition risks shape asset prices, credit markets, corporate behavior, and household decisions. It integrates insights from recent empirical and theoretical research to equip students with tools to evaluate climate risk, measure financial exposures, and assess how capital markets influence real climate outcomes.

Learning Outcomes

1. Students will quantify climate risk in real estate, municipal bonds, insurance and corporate finance and evaluate climate-related disclosures, exposures and investor responses.
2. They will interpret empirical evidence from leading climate finance studies and understand financial institutions' role in climate transition and impact creation.

Content

Unit 1 **Foundations of Climate Economics and Risk (9 hours)**
Physical vs. transition risks; externalities and the commons; welfare and discounting; climate damage functions; adaptation and mitigation. Overview of foundational frameworks based on climate–economy interactions.

Unit 2 **Climate Risk in Asset and Credit Markets (12 hours)**
Pricing physical risk in residential real estate and municipal bonds; salience and mispricing; climate exposure measures; market reactions to climate disasters; climate risk in insurance and mortgage markets.

Unit 3 **Corporate Climate Risk, Disclosures, and Sustainable Investment (12 hours)**
Firm-level climate exposures; climate risk disclosure and institutional investor response; corporate commitments and climate alliances; ESG investing, impact channels, and real-economy transmission.

Unit 4 **Climate Finance and Household & Institutional Behavior (12 hours)**
Household investment under climate risk; ESG preferences; hedging climate news; climate risk and financial institutions; transition plans and regulatory frameworks; impact investing and sustainable finance mechanisms.

Readings

Caporale, G. M. (Eds.) (2026). Handbook of Climate Change and Financial Markets. Edward Elgar Publishing.

Dees, S., & Ozyurt, S. (1945). Climate Economics and Finance. American history, 1861(1900).

Fernandes, N. (2023). Climate Finance. NPV Publishing.

Hanley, N., & Owen, A. D. (2004). The economics of climate change (Vol. 3). Routledge.

Krosinsky, C., & Purdom, S. (Eds.). (2016). Sustainable Investing: Revolutions in theory and practice. Taylor Francis.

Markandya, A., Galarraga, I., & Rübbelke, D. (Eds.). (2017). Climate finance: theory and practice (Vol. 2). World Scientific.

Moshirian, F., & Park, C. Y. (Eds.). (2023). Climate Change and Climate Finance: Current Experience and Future Directions. Asian Development Bank.

Nordhaus, W. (2013). The climate casino: Risk, uncertainty, and economics for a warming world. Yale University Press.

Shukla, S., Dhuri, M., Sinha, R., & Shivdas, A. Climate Risk and Sustainable Finance: Analysis of Emerging Policy Framework of Central Banks in Select European and Asian Economies. In Global Environmental, Social and Governance Policy (pp. 112-137). Routledge.

Stern, N. (2007). The economics of climate change: The stern review. Cambridge University Press.

Tutorial Activities
Empirical replication exercises, climate-risk measurement labs, policy brief presentations.

2.5 Public Policy: Theory and Institutions

2.5.1 Topics in Public Economics I

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Public Economics I	4	3	1			

Objectives

This course will focus on three major areas in public economics: the provision of public goods, regulation in the presence of externalities and redistributive policy. For the first two of these topics, it will build upon the treatment in the core Public Economics course by studying optimal policy in the presence of limited information about consumer preferences, producer production costs and the state of nature. It will study the welfare basis for redistributive policy and examine whether and when there are trade-offs between efficiency and redistribution. Finally, it will examine how voter preferences and information are aggregated in democracies to determine policy choice.

Learning Outcomes

1. Students will learn how to compare regulatory instruments in real-world policy contexts.
2. They will be able to link public policy to voter preferences.

Content

Unit 1 **The provision of public goods (12 hours)**
Efficiency in the provision of public goods. Samuelson's optimality conditions in a multi-person, multi-good economy. Subscription equilibria and the underprovision of public goods. Preference revelation through auctions and other mechanisms; the VCG mechanism and its applications and real-world use in natural resource and other auctions.

Unit 2 **Externalities and their regulation (12 hours)**
The reciprocal nature of social costs and benefits. Externalities, their sources, relationship to contracts and markets. Mechanisms for regulation. Price vs. quantity regulation and its relation to the properties of marginal benefit and marginal cost functions.

Unit 3 **Inequality, Justice, and Redistribution (12 hours)**
Theories of justice and distributive fairness; discrimination and public policies addressing group inequalities; frameworks for redistribution and equality of opportunity.

Unit 4 **Collective Choice and Public Decision-Making (9 hours)**
Preference aggregation and democratic processes; how societies determine provision without full knowledge of preferences; voting systems, public debate, and information aggregation.

Readings

Allen, Danielle, and Rohini Somanathan (2020) Difference without Domination: Pursuing Justice in Diverse Democracies (University of Chicago Press)

Atkinson, A. and Stiglitz, J. E. (2015): *Lectures on Public Economics*, Princeton University Press.

Coase, Ronald H (1960) 'The problem of social cost.' In 'Classic Papers in Natural Resource Eco- nomics' (Springer) pp. 87–137

Dasgupta, Partha, and Eric Maskin (2004) 'The fairest vote of all.' Scientific American 290(3), 92– 97

Krishna, Vijay (2009) Auction theory (Academic press)

Lindert, P. (2006): *Growing Public: Volume 1, The Story: Social Spending and Economic Growth since the Eighteenth Century*, Cambridge University Press.

Loury, Glenn C. (2002) The Anatomy of Racial Inequality (Cambridge, Massachusetts: Harvard University Press)

Loury, G. (1994): "Self-Censorship in Public Discourse: A Theory of Political Correctness and Related Phenomena," *Rationality and Society*, 6(4): 428–461.

Nozick, R. (2013): *Anarchy, State, and Utopia*, Basic Books.

Ostrom, Elinor (1990) Governing the commons: The evolution of institutions for collective action (Cambridge university press)

Guido Tabellini and Torsten Persson (2002) Political Economics: Explaining economic policy (MIT press)

Piketty, T. (2014): *Capital in the Twenty-First Century*, Harvard University Press.

Rawls, J. (2001): *Justice as Fairness: A Restatement*, Harvard University Press.

Roemer, J. (2009): *Equality of Opportunity*, Harvard University Press.

Roughgarden, T. (2016) *Twenty Lectures on Algorithmic Game Theory*, Cambridge University Press.

Salanie, B. (2011) *The economics of taxation*, (MIT press)

Sandel, M. J. (2020) *The tyranny of merit: What's become of the common good?*, Penguin.

Scanlon, T. (2018) *Why Does Inequality Matter?*, OUP.

Scanlon, T. (2003) *The difficulty of tolerance: Essays in political philosophy*, Cambridge University Press.

Schelling, Thomas C. (1978) *Micromotives and Macrobehavior*, W.W. Norton.

Weitzman, Martin L (1974) 'Prices vs. quantities.' *The review of economic studies*, 41(4), 477–491.

Tutorial Activities

Group projects and presentations, problem-solving exercises.

2.5.2 Topics in Public Economics II

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Public Economics II	4	3	1			

Objectives

This course draws upon the mathematical tools of economic analysis (optimization theory, game theory and information economics), to explore several topics in public economics at an advanced level. Topics include taxation, land markets, the procurement of public Goods and public vs. private organizations.

Learning Outcomes

1. Students will develop the ability to construct formal analytical frameworks to examine the topics covered in the course.
2. They will understand incentive structures for individuals and firms, and derive policy implications in these areas.

Content

Unit 1 **Taxation and fiscal policy (10 hours):** Direct tax and optimal taxation; property and wealth taxes; stamp-duty tax; indirect tax and goods and services Tax (GST); taxation in India; tax evasion and black income; income inequalities.

Unit 2 **Land and property markets (15 hours):** Land as a factor of production; markets in land property; anticommons and land assembly problem; compensation–efficiency paradox; economics and politics of land acquisition; land supply regulations.

Unit 3 **Public Goods, Procurement, and Partnerships (10 hours):** Public Goods; Public versus Private Provisions and Investments; Procurement Contracts; Public–Private Partnerships (PPPs) versus Privatization; Incentives and Outcomes under PPP Contracts; Theories of Neighborhood Development.

Unit 4 **Public and Private Organizations (10 hours):** Basics of Contract Theory; Risk Allocation and Moral Hazard; Incentives in Private and Public Organizations; Bureaucrats versus Managers; Multi-Task Settings and Organizational Design.

Suggested Readings

Bolton, P. and Dewatripont, M. (2005): *Contract Theory*, MIT Press.

Stiglitz, J. and Rosengard, J. (2015): *Economics of the Public Sector*, 4th Edition, W. W. Norton and Company.

Salanié, B. (2011): *Economics of Taxation*, 2nd Edition, MIT Press.

Mirrlees, J. et al. (2011): *Tax by Design*, Oxford University Press. Available at `https://www.ifs.org.uk/publications/5353`.

Miceli, T. J. (2012): *The Economic Theory of Eminent Domain: Private Property, Public Use*, Cambridge University Press.

Atkinson, A. B. and Stiglitz, J. E. (2015): *Lectures on Public Economics - Updated Edition*, Princeton University Press.

Schäfer, H.B. and Singh, R. (2018). Takings of Land by Self-interested Governments: Economic Analysis of Eminent Domain, *Journal of Law and Economics*, 61(3), 2018, pp. 427-459

Singh, Ram (2025). Do the Wealthy Underreport Their Income? Using General Election Filings to Study the Income-Wealth Relationship in India, *Review of Income and Wealth*, Vol 72, 2025, pp 1-48.

Tutorial Activities

Group project activites, presentations, problem-solving exercises.

2.5.3 Natural Resource Economics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Natural Resource Economics	4	3	1	0		

Objectives

This course provides an economic perspective on environmental systems and the problems associated with the use, misuse, and overuse of natural and environmental resources. This objective entails examining the allocation of renewable and non-renewable resources over time from both positive and normative perspectives and analyzing the role of markets and institutions in this process.

Learning Outcomes

1. Students will understand how to analyze optimal resource extraction using theoretical and empirical tools.
2. They will understand role of natural resource in long-run economic growth.

Content

Unit 1 **Mathematical Preliminaries (6 hours)**
Dynamic Optimization techniques used for solving deterministic and stochastic (discrete-time and continuous-time) models.

Unit 2 **Renewable Resources(15 hours)**
Optimal management of fisheries under open and regulated access regimes and its extensions to a stochastic framework. Optimal stopping rules -single rotation, Faustmann rotation, and Hartman rotation for the optimal usage of forests as a resource.

Unit 3 **Non-renewable Resources(14 hours)**
Hotelling's rule of extraction under different market structures and its key extensions, including exploration, uncertainty in demand and reserves, entry and exit, backstop technology, extraction under different tax structures. Empirical evidence on Hotelling's rule.

Unit 4 **Economic Dynamics of Natural Resources (10 hours)**
Key concepts and measures of resource scarcity, the basics of natural resource accounting, and the role of natural resources in shaping different aspects of economic growth.

Tutorial Activities

Group project activities, problem sets, research presentations.

Readings

Phaneuf, D. and T. Requate (2016): *A Course in Environmental Economics: theory, policy and practice*, Cambridge University Press.

Larry, K.(2017): *Natural resources as capital*, MIT Press.

Conrad, J.M. and C. W. Clark (1987): *Natural Resource Economics: Notes and Problems*, Cambridge University Press.

Conrad, J.M. (2010): *Resource Economics*, 2nd edition, Cambridge University Press.

Conrad, J.M. and D. Rondeau (2020): *Natural Resource Economics: Analysis, Theory, and Applications*. Cambridge University Press.

2.5.4 Environmental Economics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Environmental Economics	4	3	1			

Objectives

The objective of this course is to present an economic approach to environmental problems such as air and water pollution. Alternative methods of addressing pollution, namely, direct regulation and market-based instruments (taxes and tradable permits) are compared and contrasted, especially in the presence of asymmetric information. This is followed by techniques for measuring the benefits of environmental improvements and their applications.

Learning Outcomes

1. Students will develop an understanding of the reasons for environmental problems.
2. They will apply economic theory to environmental issues with a view to developing effective environmental policies.

Content

Unit 1 **Externalities, Public Goods and Corrective Mechanisms (10 hours)**
Externalities and public goods as related to the environment. Corrective mechanisms in the form of taxes, subsidies, permits, etc.

Unit 2 **Regulation and Information Problems (10 hours)**
Regulation in the presence of informational problems resulting from moral hazard and adverse selection.

Unit 3 **Valuation of Non-market Goods and Amenities (15 hours)**
Valuation of non-market goods and amenities: overview and basic theory.
Revealed preference (indirect market methods); health valuation; constructed markets (direct market methods).

Unit 4 **Cost-benefit Analysis and Environmental Policy Assessment (10 hours)**
Cost-benefit analysis: measuring the cost of environmental policy; estimation of abatement cost functions; damage function assessment; discounting.

Suggested Readings

Mäler, K. G. and Vincent, J. (2005): *Handbook of Environmental Economics*, Elsevier.

Phaneuf, D. and Requate, T. (2017): *A Course in Environmental Economics: Theory, Policy and Practice*, Cambridge University Press.

Freeman, A. M., Herriges, J. A. and Kling, C. L. (2014): *The Measurement of Environmental and Resource Values: Theory and Methods*, 3rd ed., RFF Press/Routledge.

Baumol, W. and Oates, W. (1988): *The Theory of Environmental Policy*, Cambridge University Press.

Champ, P. A., Boyle, K. J. and Brown, T. C. (2003): *A Primer on Nonmarket Valuation*, Springer.

Articles from journals and working papers.

Tutorial Activities

Project activity (group), Research cum presentation, Group discussion, Problem Solving exercises

2.5.5 Energy Economics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Energy Economics	4	3	1			

Objectives

This course would explore theoretical and empirical perspectives on the topics related to energy demand, energy supply, energy markets, environmental consequences of energy use, and policies and regulatory mechanism for the sector. Main topics of the course would be illustrated with the relevant global regulatory experiences of the energy sector.

Learning Outcomes

1. Students will understand theoretical and empirical perspectives on energy demand, energy supply, energy markets, energy–environment interactions, regulations and governance, and energy efficiency and innovations.

2. They will apply economic tools to evaluate environmental consequences of energy use, regulatory mechanisms, and global policy experiences in the energy sector.

Content

Unit 1 **Energy Demand, Supply and Markets (15 hours)**
Energy demand analysis and forecasting.
Economics of energy supply.
Energy markets.

Unit 2 **Energy–Environment Interaction (10 hours)**
Economics of energy–environment interaction.

Unit 3 **Regulation and Governance (10 hours)**
Regulation and governance of energy sector.

Unit 4 **Efficiency and Innovation (10 hours)**
Energy efficiency and innovations.

Suggested Readings

Bhattacharyya, S. (2011): *Energy Economics*, Springer.

Hunt, L. and Evans, J. (eds.) (2011): *International Handbook on the Economics of Energy*, Edward Elgar.

Kneese, A. and Sweeney, J. (eds.) (1993): *Handbook of Natural Resource and Energy Economics*, Vol. III, Elsevier.

Shogren, J. (2013): *Encyclopaedia of Energy, Natural Resource, and Environmental Economics*, Newnes.

Moreover, readings in the form of journal articles and working papers.

Tutorial Activities

Project activity (group), Research cum presentation, Group discussion

2.5.6 Economics of Regulation

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Economics of Regulation	4	3	1	0		

Objectives

This course provides microeconomic frameworks used to study poverty, household decision-making, market failures, institutional constraints and the role of social norms and networks in developing economies. It discusses key theoretical contributions as well as empirical challenges.

Learning Outcomes

1. Students will apply theoretical models to analyse and understand the challenges to market failure under different circumstances.
2. They will measure and assess the effectiveness of regulatory interventions in areas such as network industries (public utility service), natural monopolies and technology adoption.

Content

Unit 1 **Foundations: Markets and Market Failures (12 hours)**
This unit examines the functioning of key markets, foundations of regulation and competition policy, theories of regulation

Unit 2 **Natural Monopolies (12 hours)**
This unit focuses on microeconomic models of the problems of sustainability of natural monopolies and contestability, theory of regulatory policy solutions (under asymmetric information). Pricing strategies, rate structure (RoR, RPI-X), peak load pricing.

Unit 3 **Alternative to regulatory mechanisms (12 hours)**
This unit examines franchise bidding for public utility services. Auction design and spectrum allocation in telecommunications. Regulation of innovation & patents.

Unit 4 **Case Studies in Regulated Markets (9 hours)**
This unit introduces various public policy challenges – Public vs Private Enterprises; Nationalization of private firms; Privatisation of nationalized firms. Regulation of the energy market (e.g., electricity, crude oil, natural gas)

Readings

Viscusi, John M. Vernon, and Joseph E. Harrington, *Economics of Regulation and Antitrust*, 4th Edition", 2005, MIT Press

Joskow, Paul, 2006, "Regulation of Natural Monopolies", Handbook of Law and Economics.

Armstrong, Mark and David Sappington, 2003. *Recent Developments in the Theory of Regulation.*

Laffont, J.J., Martimort, D., 2001. *The Theory of Incentives: The Principal-Agent Model.* Princeton University Press.

Bolton, P. & Dewatripont, M., 2005. *Contract Theory.* MIT Press.

Tutorial Activities

Group project activity, research cum presentation.

2.5.7 Climate Change Economics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Climate Change Economics	4	3	1			

Objectives

The objective of this course is to analyse climate change from an economic perspective. The problem is characterised as one of regulating a global stock externality in an intertemporal setting and in the presence of uncertainty and irreversibility.

Learning Outcomes

1. Students will develop a logical, coherent and sensible understanding of the reasons for (and solutions to) climate change, including scientific basics, IAMs, discounting, technological change, Stern Review foundations, tipping points, mitigation, adaptation, green paradox, carbon leakage, and environmental treaties.
2. They will develop the ability to apply economic theory to climate issues with a view to developing effective and rational policies to address climate change, using tools such as carbon pricing, tradable permits, game theory for treaties, and intertemporal policy evaluation.

Content

Unit 1 **Climate science, global response and integrated assessment (10 hours)**
Basics of climate science; international response to climate change.
Integrated Assessment Models (IAMs) and the social cost of carbon; choice of discount rate for climate policy; declining discount rate (DDR).

Unit 2 **Technical change, energy use and IAM foundations (15 hours)**
Technical change and fossil energy consumption: responses to climate change in an endogenous growth model with clean and dirty technologies; implications of a transition to clean technologies in an IAM.
Stern Review on the economics of climate change: analytical foundations, findings and policy implications.

Unit 3 **Tipping points, non-linearities and risk (10 hours)**
"Tipping points" and non-linearities in the climate system and their role in formulating climate policy: fat-tail probability distributions and Weitzman Dismal Theorem.

Unit 4 **Policy instruments, international issues and strategic interaction (10 hours)**
Mitigation (tradable permits and carbon taxes); economic impacts and adaptation. green paradox and carbon leakage.
Environmental treaties; applying non-cooperative and co-operative game theory.

Readings

Ackerman, F. and Stanton, E. (2013): *Climate Economics: State of the Art.* Routledge.

Nordhaus, W. (2008): *A Question of Balance.* Yale University Press.

Acemoglu, D.; Aghion, P.; Bursztyn, L. and Hemous, D. (2012): "The environment and directed technical change," *American Economic Review* 102(1): 131–166.

Weitzman, M. L. (2009): "On modeling and interpreting the economics of catastrophic climate change," *Review of Economics and Statistics* 91(1): 1–19.

Articles from journals and working papers.

Tutorial Activities

Project activity, research cum presentation, group discussion

2.5.8 Applied Environmental Analysis

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Applied Environmental Analysis	4	3	1			

Objectives

This course focuses on empirical applications in environmental and natural resource economics. It focuses on dynamic optimization problems and shows students how dynamic models can be estimated using different types of datasets.

Learning Outcomes

1. Students will become familiar with the tools and techniques used in environmental and natural resource economics, including non-market valuation, quasi-experimental methods, firm-level and macro-level environmental valuation.

2. They will understand how to use dynamic and computational models and econometric methods to solve problems in environmental and natural resource economics.

Content

Unit 1 **Valuation and quasi-experimental methods (10 hours)**
Non-market valuation techniques: revealed and stated preferences. Quasi-experimental methods in environmental economics.

Unit 2 **Firm-level and macro-level environmental valuation (15 hours)**
Environmental valuation at firm level: environment as an input in production; multi-output production technologies; emission generating production technologies. Environmental valuation at the macro level: reduced form and computable general equilibrium models.

Unit 3 **Environment, technological progress and dynamic ppplications (10 hours)**
Environment and technological progress: econometric studies. Dynamic applications: renewable and non-renewable resources; stock pollutants.

Unit 4 **Empirical and econometric tools in environmental analysis (10 hours)**
Applied optimal control and dynamic optimization. Computable general equilibrium (CGE) models. Applied econometrics: cross section, panel data (static, dynamic and non-linear models), discrete choice (limited dependent variable) models.

Readings

Angrist, J. and Pischke, J.-S. (2016): *Mastering Metrics: The Path from Cause to Effect*, Princeton University Press.

Conrad, J. (2010): *Resource Economics*, 2nd ed., Cambridge University Press.

Färe, R. and Primont, D. (1995): *Multi-output Production and Duality: Theory and Applications*, Kluwer.

Phaneuf, D. and Requate, T. (2016): *A Course in Environmental Economics: Theory, Policy and Practice*, Cambridge University Press.

Moreover, readings in the form of journal articles and working papers.

Tutorial Activities

Project activity, problem solving exercises

2.5.9 Environment and Development

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Environment and Development	4	3	1	0		

Objectives

This course examines the complex relationship between environment and development. It explores the dynamics of poverty, population, and sustainability. It also examines the environmental impacts of growth and the difficulty of achieving cooperation to mitigate global environmental problems.

Learning Outcomes

1. Students will be able to see interconnections between economic development, environmental quality, and poverty.
2. They will be able to evaluate institutional and policy responses to environmental challenges such as deforestation, water management and climate change.

Content

Unit 1 **Overview (9 hours)**
Basic theoretical concepts. Derivation of market from individual demand curves for public and private goods, and of supply curves. The Pareto criterion. The pros and cons of the Modified Pareto Criterion.

Unit 2 **Economic growth and environment (12 hours)**
Correlation between economic growth and environmental degradation. Valuation of Environmental Benefits and Damages. Incorporating environmental goods into growth models.

Unit 3 **Institutions and Instruments for Regulations (12 hours)**
Formal and informal institutions for the management of common pool natural resources; applications in the context of deforestation and water. The relative advances of price vs. quantity instruments in the face of uncertainty.

Unit 4 **Global public goods (12 hours)**
Different types of global public goods. The evidence on climate changes. International treaties. Environmental justice.

Readings

Stevenson, G.G. (1991): *Common Property Economics: General Theory and Land Use Applications*, Cambridge University Press.

Baland, J-M. and Platteau, J-P. (1996): *Halting Degradation of Natural Resources: Is there a Role for Rural Communities?* Clarendon Press, Oxford.

Greenstone, M., and Jack, B. (2015): "Envirodevonomics: A research agenda for an emerging field", *Journal of Economic Literature*, 53(1), 5-42.

Ostrom, E. (2000): "Collective Action and the Evolution of Social Norms", *Journal of Economic Perspectives*, 14(3): 137-158.

Perman, R., Ma, Y., McGilvray, J. and Common, M. (2013): *Natural Resource and Environmental Economics*, Pearson, 4th edition.

Articles from journals and working papers.

Tutorial activities
Problem solving exercises, group discussions and presentations on environmental issues.

2.6 Development Economics

2.6.1 Topics in Development Economics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Topics in Development Economics	4	3	1			

Objectives

This course aims to acquaint students with issues in development economics that aid our understanding of poverty and unemployment. These relate to the broad areas of the domestic labour market, domestic rural informal credit market, and socio-economic inequality.

Learning Outcomes

1. Students would understand the nature of unemployment (specifically whether it is employer-driven or employee-driven), the functioning of domestic credit markets in rural versus urban areas, and the importance of redistributive policies in ameliorating poverty as opposed to the phenomenon of trickle-down.

2. They would understand the disruptive effect of inequality vis-à-vis economic growth.

Content

Unit 1 **Wage Rigidity and Unemployment (15 hours)**
Theory of implicit cooperation; the labour turnover model; the nutrition-based efficiency theory of wages

Unit 2 **Rural Informal Credit Markets (10 hours)**
Lender's risk hypothesis; (traditional) monopolistic markets; all-or-nothing monopoly; implicit interest charges; credit as insurance; micro-finance

Unit 3 **Interlinkage across Rural Markets (10 hours)**
Potential risk in the rural economy; rural credit–output interlinkage; rural credit–land interlinkage; rural credit–labour interlinkage

Unit 4 **Inequality and Development (10 hours)**
Effect of inequality on development – theoretical arguments and empirical studies

Readings

Basu, Kaushik, 2003, *Analytical development economics: The less developed economy revisited*, MIT Press, Cambridge.

Osmani, S.R., 1991, Wage labour in rural labour markets: The theory of implicit cooperation, *Journal of Development Economics*, 34(1–2), 3–23.

Basu, K., 1984, "Implicit interest rates, usury and isolation in backward agriculture," *Cambridge Journal of Economics*, 8(2), 145–159.

Morduch, Jonathan, 1999, "The Microfinance Promise," *Journal of Economic Literature*, 37(4), 1569–1614 (omit sections 5.2, 6, 7).

Alesina, A. and R. Perotti, 1996, "Income Distribution, Political Instability, and Investment," *European Economic Review*, 40, 1203–1228.

Persson, T. and G. Tabellini, 1994, "Is Inequality Harmful for Growth?", *American Economic Review*, 84(3), 600–621 (omit parts I and II).

Tutorial Activities

Group discussion, paper writing

2.6.2 Trade and Development

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Trade and Development	4	3	1	0		

Objective:

Flow of international trade and capital can create employment, enhance access to technology and knowledge, raise productivity, increase the variety and quality of goods available to consumers, stimulate capital inflows, increase foreign exchange earnings, and generate resources for sustainable development and poverty reduction. However, this positive relationship is not automatic and does not necessarily take place in all countries and contexts. This course is designed to make students familiar with application of the existing trade theories and policies on the emerging debates in relation to the growth and development. Specifically, the impact of trade policies on welfare gains, employment, pro-poor growth, inequality and environment would be discussed along with role of WTO.

Learning Outcomes:

1. Students will be exposed to standard empirical tools applied for estimating welfare gains from trade, gravity modelling, productivity analysis and pro-poor growth.

2. They will understand the effects of tariffs and subsidies on trade patterns and the welfare of trading nations, explain how international negotiations and agreements have promoted world trade as well as identify and measure the sources of economic growth using conventional and advanced methods.

Content

1. **Trade policies, institutions and modelling approach (15 Hours)**
   Trade policies (tariff and non-tariff barriers) and implications. Analytical Approaches to Global Institutions (Public and Private) and Trade Policy

2. **Political economy and WTO (10 hours)**
   Political economy of trade agreements and role of WTO

3. **Trade, Welfare and Growth (12 hours)**
   Issues in Trade, Welfare and Growth – Trade - gains and methods – Trade, FDI and growth (immiserating growth, spillovers, competition effects) – Trade, inequality, distributive conflict, pro-poor growth Fair trade and industrial policy - labour standards, environment

4. **Labour Mobility, Global Production and Development Issues (8 hours)**
   Emigration, trade and development. Global production and issues

Tutorial Activities

Case study discussions, research cum presentation.

Readings

Bagwell, K. and Staiger, R.W. (2018): Handbook of Commercial Policy, Vol 1A and 1B, North-Holland: Elsevier.

Irwin, Douglas (2015): Free Trade Under Fire, Princeton University Press.

Feenstra, Robert C. (1992):" How Costly is Protectionism?" The Journal of Economic Perspectives 6(3): 159-78.

Baldwin, Robert E. (1989):" The Political Economy of Trade Policy." The Journal of Economic Perspectives 3(4) : 119-35.

Krugman, Paul R. (1987):" Is Free Trade PassAl'?" ˜ The Journal of Economic Perspectives 1(2): 131-44.

Brown, Drusilla, Alan Deardorff, and Stern, Robert (2012):" Issues of Environmental and Labor Standards in the Global Trading System." In Black, Stanley W. (ed.) Globalization, Technological Change, and Labor Markets, Springer.

Costinot A., and A. Rodriguez-Clare (2013): "Trade Theory with Numbers: Quantifying the Consequences of Globalization." NBER Working Paper no. 18896

Anderson, James E, and Van Wincoop (2004):" Trade Costs." Journal of Economic Literature 42 : 691-751.

Grossman,G. and Helpman, E. (1994):" Protection for Sale "American Economic Review 84(4): 833-50.

Bagwell, Kyle, and Staiger, R. W. (1999):" An Economic Theory of GATT." American Economic Review 89(1) : 215-48.

Grossman, G., and E. Helpman. (1995):" Trade Wars and Trade Talks." Journal of Political Economy 103, 675-708. (NBER Working Paper no. 4280)

Maggi, G., and A. RodrA˜ guez-Clare (1998):" The Value of Trade Agreements in the Presence of Political Pressures." Journal of Political Economy 106(3) : 574-601.

Horn, Henrik, G. Maggi, et al. (2010):" Trade Agreements as Endogenously Incomplete Contracts." American Economic Review 100(1) : 394-419.

Feenstra, Robert C. (2015): Advanced International Trade: Theory and Evidence. Princeton University Press Falkner, Robert (ed.) (2016): The Handbook of Global Climate and Environment Policy, Cheltenham: John Wiley and Sons.

Harman, Sophie and Williams, David (eds), Governing the World? Cases in Global Governance, London: Routledge, .

2.6.3 Economics of Health and Education

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Economics of Health and Education	4	3	1	0		

Objectives

Education and health are two critical aspects of well-being. The objective of this course is to explore how these are determined and related to other features of a society. This involves thinking about the proper measurement of outcomes in these areas, modelling individual, community and government decisions and evaluating public policy programs.

Learning Outcomes

1. Students will be able to develop microeconomic models that relate family and neighbourhood composition to health outcomes and schooling choices.
2. They will also be able to estimate treatment effects in order to evaluate public programs.

Content

Unit 1 **Measurement and trends, institutional design (12 hours)**
Correlation between alternative measures of well-being. The spread of education across the world. Budgetary allocations across space and time. Alternative systems for service delivery. The role of imperfect information, incentives and contracts.

Unit 2 **Discrimination and inequality, environmental health (12 hours)**
Models of preference-based and statistical discrimination. Effective policies to address historical inequalities. Estimating impact and designing appropriate regulation to regulate social damages through environmental externalities.

Unit 3 **The political economy of public policy (12 hours)**
The role of community structure in determining the distribution of public goods. Models of voting and collective action.

Unit 4 **Evaluating policy impact (9 hours)**
The estimation of treatment effects in randomized experiments and in observational data.

Readings

Banerjee, A. and Somanathan, R. (2007): "The Political Economy of Public Goods: Some Evidence from India." Journal of Development Economics, 82(2), 542-559.

Becker, G. (1962): "Investment in Human Capital: a Theoretical Analysis." The Journal of Political Economy, 70(5), 9-49.

Benabou, R. (1993): "Workings of a City." Quarterly Journal of Economics, 108(3), 619-652.

David Cutler and Grant Miller (2005): "The Role of Public Health Improvements in Health Advances: The Twentieth-Century United States." Demography 42(1), 1-22.

Angus Deaton (2013): The Great Escape: Health, Wealth and the Origins of Inequality, Princeton University Press.

Robert Fogel (2004): "Health, nutrition and economic growth." Economic Development and Cultural Change, 52(3), 643-658.

Galanter, M. (1984): "Competing Equalities: Law and the Backward Classes in India," University of California Press.

Loury, G. (2002): The Anatomy of Racial Inequality. Harvard University Press.

Preston, S. (1996): "American Longevity: Past, Present and Future." Distinguished Lecture in Aging, Syracuse University.

Sethi, R. and Somanathan, R. (2004): "Inequality and Segregation", Journal of Political Economy, 112(6), 1296-1321.

Spence, M. (1973): "Job Market Signaling." Quarterly Journal of Economics, 87(3), 355-374.

Tiebout, C. (1956): "A pure theory of local expenditures." Journal of Political Economy 64(5), 416-424.

Wooldridge, J.: Econometric analysis of cross section and panel data. MIT press (2010).

Tutorial Activities

Project activity, research cum presentation, group discussion

2.6.4 Global Issues in Economic Development

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Global Issues in Economic Development	4	3	1			

Objectives

This course aims to acquaint students with some important issues in economic development that span across the developing and developed worlds. These relate to the broad areas of international debt transactions, intellectual property rights, and climate and environmental issues.

Learning Outcomes

1. Students would become acquainted with issues in international debt, IPRs, and climate change; understand the pros and cons of taking international debt and advise accordingly; understand the factors driving innovation and how strong IP rights should be.
2. They would understand the economic impact of climate change, and suggest ameliorative policy.

Content

Unit 1 **International Debt: Theoretical Issues (10 hours)**
Two-gap models; the transfer problem; loan pushing; debt forgiveness; loan buybacks; debt-equity swaps.

Unit 2 **International Debt: Empirical Issues (10 hours)**
Impact of international debt on domestic investment; impact of debt on foreign borrowing; impact of debt on international credit rating; impact of debt on domestic growth.

Unit 3 **Intellectual Property Rights and Piracy (15 hours)**
TRIPs Agreement; instruments of protection; innovation systems; Positive Effects of IPR – technology transfer via licensing, (high-tech) exports, foreign direct investment; Negative Effects of IPR: inadequate patent disclosure; sleeping patents; patent thickets; patent costs; high drug prices.
Intellectual Property Piracy: software piracy and intellectual property reform; software piracy and the Special 301 process.

Unit 4 **Climate Change and Development (10 hours)**
Economic effects of climate change; effect on agricultural productivity and production; effect on morbidity and health; effect on incomes and welfare.

Readings

Basu, Kaushik, 2003, *Analytical Development Economics: The Less Developed Economy Revisited*, MIT Press, Cambridge, chs. 5, 6.

Maskus, Keith E., 2000, *Intellectual Property Rights and the Global Economy*, Institute for International Economics, Washington, D.C., chs. 2, 3.

Kanwar, Sunil, 2012, "Intellectual Property Protection and Technology Licensing: The Case of Developing Countries," *Journal of Law and Economics*, 55(3), 539–564.

Javorcik, Beata S., 2004, "The Composition of FDI and Protection of Intellectual Property Rights: Evidence from Transition Economies," *European Economic Review*, 48(1), 39–62.

Watal, Jayashree, 2000, "Pharmaceutical Patents, Prices and Welfare Losses: Policy Options for India Under the WTO TRIPS Agreement," *World Economy*, 23(5), 733–752.

Tol, Richard S.J., 2009, "The Economic Effects of Climate Change," *Journal of Economic Perspectives*, 23(2), 29–51.

Tutorial Activities

Group discussion, paper writing

2.6.5 The Rural Economy

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Rural Development Economics	4	3	1	0		

Objectives

This course examines the economic, social, and institutional foundations of rural development in India. It analyses agrarian structures, rural labour markets, and livelihood diversification through both theoretical perspectives and empirical evidence. Additionally, the course evaluates key policies, programmes, and institutions that shape ongoing processes of rural transformation in the country.

Learning Outcomes

1. Students will be able to critically analyse rural development issues using economic theories, empirical data, and field-based evidence.
2. They will understand the functioning of rural markets, institutions, and policies, and evaluate their implications for poverty, inequality, and broader processes of structural change.

Content

Unit 1 **Concepts, Theories, and Rural Transformations (18 Hours)**
This unit introduces definitions and indicators of rural development and examines processes of structural transformation through key theoretical perspectives, including Lewis, Chayanov, and institutional and political economy approaches. It also explores rural–urban linkages and the evolution of agrarian relations.

Unit 2 **Agrarian Structure, Production, and Rural Labour (9 Hours)**
This unit provides an overview of land relations, agricultural growth, technology, productivity, and risk, followed by a detailed examination of rural labour markets, migration, informalisation, and wage dynamics.

Unit 3 **Rural Markets, Livelihoods, and Non-Farm Economy (9 Hours)**
This unit examines rural credit, input and output markets, self-help groups, and microfinance. It also covers rural non-farm employment, enterprises, and livelihood diversification, along with major social protection programmes such as MGNREGA, PDS, and NRLM.

Unit 4 **Institutions, Governance, and Rural Development Policies (9 Hours)**
This unit offers a brief discussion of Panchayati Raj, decentralisation, collective action, and the governance of commons, a detailed study of infrastructure, public goods, climate change, and sustainability. It further examines cooperatives, FPOs, value networks, digitalisation, and contemporary policy debates shaping rural development.

Readings

Given the nature of the course, readings may be updated annually.

Bardhan, P. (1984). Land, labor and rural poverty. Columbia University Press.

Breman, J. (1996). Footloose labour: Working in India's informal economy. Cambridge University Press.

Drèze, J., & Sen, A. (2013). An uncertain glory: India and its contradictions. Princeton University Press.

Harriss-White, B. (2023). Awkward classes and India's rural development. The Indian Economic Journal, 71(1), 56–77.

Himanshu, Jha, P., & Rodgers, G. (Eds.). (2016). The changing village in India: Insights from longitudinal research. Oxford University Press.

Himanshu, Lanjouw, P., Murgai, R., & Stern, N. (2013). Nonfarm diversification, poverty, economic mobility, and income inequality: A case study in village India. Agricultural Economics, 44(4–5), 461–473.

Patnaik, U. (2007). The republic of hunger and other essays. Three Essays Collective.

Tutorial Activities

Project activity, research cum presentation, book review, paper writing and group discussion.

2.7 Industrial Economics

2.7.1 Industrial Organisation

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Industrial Organisation	4	3	1	0		

Objectives

This is a course in applied micro-economics, which will deal with game-theoretic models of strategic behaviour by oligopolistic firms. There will be some applications to competition (antitrust) policy in the form of theoretical models. The course will build on the game-theoretic models of compulsory course on Game Theory. This course will serve as a foundation for an advanced course on Industrial Organisation. The course will also cover applications in Mathematica.

Learning Outcomes

1. Students will be able to apply game-theoretic tools to oligopolistic markets.
2. They will evaluate market structure and firm conduct and solve foundation models in Mathematica.

Content

Unit 1 **Oligopoly Theory (12 hours)**
This unit introduces students to competition models, mainly, price (Bertrand) and quantity (Cournot) competition. Some of the models covered are Price Competition with Capacity Constraint, Hoteling Model, Salop Model, Singh & Vives Model, free entry equilibrium.

Unit 2 **Tacit Collusion(12 hours)**
This unit focuses on tacit collusion between firms where firms interact over an infinite horizon.

Unit 3 **Entry Models(12 hours)**
This unit analyses the strategy of the incumbent firm when accommodating/deterring the entry of the entrant firm. Some topics covered are: Fudenberg & Tirole Model, Salo & Schafmann model, brand proliferation, bundling, switching cost, limit price models.

Unit 4 **Vertical Structures (9 hours)**
This unit explores the vertical structures between the firms. Some of the topics covered are double marginailsation, vertocal intergation, RPM, Chicago's Critique, Aghion & Bolton Model, Exclusive Dealing Contracts.

Tutorial Activities

Group project activity, research cum presentation.

Readings

Belleflamme, P., & Peitz, M. (2010). Industrial organization: Markets and strategies. Cambridge University Press.

A. Mas-Colell, M. Whinston and J. Green (MWG), Microeconomic Theory (1995)

Tirole, J. (1988). The theory of industrial organization. MIT Press.

2.7.2 Economic Theory of the Firm

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Economic Theory of the Firm	4	3	1	0		

Objectives

The firm is the fundamental unit of production and distribution in an economy. This course examines the determinants of firm boundaries, with particular emphasis on vertical integration and horizontal expansion, as well as the design of internal organizational structures and managerial incentive systems. A central focus is the role of firms in shaping competition, innovation, and market structure.

Learning Outcomes

1. Students will be able to develop a solid understanding of the nature of the firm and its governance mechanisms.
2. They will understand strategic considerations that drive managerial decision-making.

Content

Unit 1 **Theories of the firm (11 hours)**
Boundaries and nature of the firm

Unit 2 **Vertical and Horizontal Integration (12 hours)**
Vertical and horizontal integration, make or buy decisions, strategic outsourcing, and vertical relations.

Unit 3 **Delegation and Competition (11 hours)**
Managerial behaviour and incentive contracts.

Unit 4 **R&D and Innovation (11 hours)**
Technology, innovation and efficiency.

Readings

Belleflamme, P., & Peitz, M. (2015). Industrial organization: Markets and strategies (2nd ed.). Cambridge University Press.

Tirole, J. (1988). The theory of industrial organization. MIT Press.

Shy, O. (1996). Industrial organization: Theory and applications. MIT Press.

Armstrong, M., & Porter, R. (Eds.). (2007). Handbook of industrial organization (Vol. 3). Elsevier–North Holland.

Tutorial Activities

Group project activity, research cum presentation.

2.7.3 Topics in Industrial Organisation

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Topics in Industrial Organisation	4	3	1	0		

Objectives

This course will deal with some recent advances in the field of Industrial Organisation Theory. Keeping in view how the different market imperfections are created and perpetuated by firms in an economy, the course will focus on the modern tools to analyse those market imperfections and industrial organisations. The advanced game-theoretic tools will be used for examining different aspects of the field.

Learning Outcomes

1. Students will be able to analyse tools and techniques for analysing the functioning of the market and corporate strategies in modern industries.
2. They will also analyse the multi-sided markets and platform economics.

Content

Unit 1 **Ownership and market structure (11 hours)**
Common and cross ownership; anti-competitive effects; efficiency and welfare; corporate control and delegation; multimarket contact and collusion.

Unit 2 **Tying and Bundling (11 hours)**
Strategic reasons for tying and bundling, efficiency, market structures and outcomes

Unit 3 **Network goods with switching costs (11 hours)**
Competition with switching costs, market with network goods, network effect, switching costs, markets for several network goods, oligopoly pricing

Unit 4 **Platform economics (12 hours)**
Markets with intermediated goods, intermediaries as dealers, intermediaries as match makers, intermediaries as two-sided platforms, intermediation and information, information overload, intermediation and reputation

Readings

Belleflamme, P., & Peitz, M. (2015). Industrial organization: Markets and strategies (2nd ed.). Cambridge University Press.

Tirole, J. (1988). The theory of industrial organization. MIT Press.

Shy, O. (1996). Industrial organization: Theory and applications. MIT Press.

Armstrong, M., & Porter, R. (Eds.). (2007). Handbook of industrial organization (Vol. 3). Elsevier–North Holland.

Tutorial Activities

Project activity (group), Research cum presentation, Group discussion.

2.7.4 Economics of Innovation

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Economics of Innovation	4	3	1	0		

Objectives

During the last 40 years or so, the Economics of Innovation has become an independent field of enquiry for the growth and development of society. The process of innovation is a very complex phenomenon and thus, on the one hand, it requires proper organisational design to encourage and incentivise, and on the other, it requires awarding appropriate property rights for management and transfer of the innovation towards the greater social good. Technological progress is an endogenous process and largely determined by the interplay of different organisational and legal structures of an economy. The course will focus on different aspects of static and dynamic aspects of technology creation and technology transfer, both from a theoretical and empirical perspective.

Learning Outcomes

1. Students will think about technology and technological progress using the tools of economics, gaining an understanding of what goes into the making of technological advancement and success for an economy.

2. They will develop an integrated understanding of incentives, intellectual property rights, innovation management, technology diffusion, technology transfer, and innovation-related public policy.

Content

Unit 1 **Incentives and Management of Innovation (15 hours)**
Incentives and management of innovation; Intellectual property rights; sequential and complementary innovation; network effects and standards.

Unit 2 **Patents and R&D (10 hours)**
Patents and R&D; patents and litigation; patent pool; R&D tournaments; race and R&D organization.

Unit 3 **Diffusion and Transfer of Innovation (10 hours)**
Diffusion of innovation; technology transfer and licensing.

Unit 4 **Innovation and Public Policy (10 hours)**
Government policies encouraging innovation and technology diffusion, competition policy, and regulation for the digital market.

Readings

Scotchmer, S., (2004), Innovation and Incentives, MIT Press.

Swann, G.M. P., (2014), The Economics of Innovation: An Introduction, Edward Elgar.

Hall, B. H., and Rosenberg, N., (2010), Handbook of the Economics of Innovation, Volume 1 & 2, Elsevier.

Tutorial Activities

Project activity (group), Research cum presentation, Group discussion.

2.7.5 Network Economics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Network Economics	4	3	1	0		

Objectives

Network effects are ubiquitous in a society. This course introduces students to the foundational concepts of social network and networked markets such as peer network, caste network, financial networks, and platform markets. It develops new tools, both theoretical and empirical to analyse and model network effects.

Learning Outcomes

1. Students will be able to identify, isolate and measure network effects.
2. They will construct and analyse simple theoretical models of network formation, adoption and diffusion.

Content

Unit 1 **Basics of Network (9 hours)** This unit introduces students to network through real life examples and various ways of representing and measuring networks. This unit also briefly discusses some basic concepts of graph theory.

Unit 2 **Models of Network Formation (12 hours)** This unit focuses on two important types of models of network formation, namely, random graph models and strategic network.

Unit 3 **Impact of Network (12 hours)** This unit analyses the impact of network on society and economy, such as information diffusion, learning and spillovers.

Unit 4 **Network Markets (12 hours)** This unit explores the special structure of modern networked markets like financial markets and platform markets. It also explores how social network affects the labour market outcomes through migration and informal insurance.

Readings

Jackson, M. O. (2008). *Social and Economic Networks*, Princeton University Press.

Newman, M.E.J. (2010). *Network, An Introduction*, Oxford University Press.

Easley D. and J. Kleinberg (2010). *Networks, Crowds, and Markets*, Cambridge University Press.

Barabási, A.L. (2014). *Network Science*, licensed under a Creative Commons: CC BY-NC-SA 2.0. PDF V26, 05.09.2014.
Goyal, S. (2023). *Networks: An economics approach.* MIT Press.

Tutorial Activities

Project activity (group), Research cum presentation

2.7.6 Competition Economics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Competition Economics	4	3	1	0		

Objectives

The course studies various aspects of imperfectly competitive markets and the competition involving business strategies of firms and their conduct. It focuses on the analysis of market inefficiencies in the absence of perfect competition and strategic manipulation by firms. Competition policies related to antitrust issues, merger control, cartels, and abuse of dominance will be discussed. The course also focuses on the innovative ways of regulating anti-competitive practices in an evolving digital market.

Learning Outcomes

1. Students will be able to analyze the competitive strategies and forces in different market environments
2. They will analyze how different regulations can help improve the efficiency and competition in the market

Content

Unit 1 **Competition and market power (11 hours)**
Perfect and imperfect competition; efficiency and welfare

Unit 2 **Market Manipulation (12 hours)**
Abuse of dominance, anti-competitive agreements, vertical contracts, and foreclosure.

Unit 3 **Regulation of Combinations (11 hours)**
Amalgamation; Takeovers and acquisitions; foreign acquisition; policies on combinations.

Unit 4 **Network Goods Market (11 hours)**
Network externalities, competition, and compatibility; regulating big-tech firms

Readings

The Competition Act, 2002 (Act No. 12 of 2003).

Motta, M. (2004). Competition policy: theory and practice. Cambridge university press.

Cabral, L. M. B. (2017). Introduction to industrial organization (2nd ed.). MIT Press.

Viscusi, W. K., Harrington, J. E., Jr., & Sappington, D. E. M. (2018). Economics of regulation and antitrust. MIT Press.

Tutorial Activities

Group project activity, research cum presentation.

2.8 General

2.8.1 Issues in Economic Systems and Institutions

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Issues in Economic Systems and Institutions	4	3	1			

Objectives

Even relatively unregulated market economies do not operate in a vacuum. Transactions and contracts arise in a specific institutional setting, encompassing the legal and political system, corporate and social structure as well as cultural norms. Many relevant decisions are not mediated through a price system, e.g. allocations within a firm, verdicts delivered by a jury, job references provided by professors, etc. The way these systems and institutions are designed may affect resource allocation and outcomes significantly. The purpose of this course is to examine the linkage between institutions and economic performance.

Learning Outcomes

1. Students will analyze diverse institutional and systemic economic issues—such as incentives, communication, coordination, and reputation—through a unified theoretical framework based on game theory, especially under incomplete information.
2. They will develop the ability to connect institutional design, norms, and historical context with economic performance and resource allocation outcomes in real-world settings.

Content

Unit 1 **Incentives and Motivation (10 hours)**
Moral hazard in teams; leadership; multi-tasking; counterproductive monetary incentives; intrinsic motivation and virtue-signaling.

Unit 2 **Communication (10 hours)**
Cheap talk; honesty and delegation; multi-dimensional and multi-agent cheap talk; rights as self-interested gifts; strategic disclosure of verifiable evidence; unravelling results.

Unit 3 **Norms, Expectations, Coordination and Reputation (15 hours)**
Repeated interaction and self-enforcing social norms; social capital; opinion herding; political correctness; group reputation, discrimination and affirmative action.

Unit 4 **Information Aggregation (10 hours)**
Social learning; information cascades and the madness of crowds; strategic voting models; Condorcet's Jury Theorem and the wisdom of crowds.

Suggested Readings

The course is based on papers drawn from a variety of economic contexts. A sample follows.

Holmström, B. (1982): "Moral Hazard in Teams," *Bell Journal of Economics*, 13(2), 324–340.

Hermalin, B. (1998): "Toward an Economic Theory of Leadership: Leading by Example," *American Economic Review*, 88(5), 1188–1206.

Benabou, R. and Tirole, J. (2003): "Intrinsic and Extrinsic Motivation," *Review of Economic Studies*, 70(3), 489–520.

Crawford, V. and Sobel, J. (1982): "Strategic Information Transmission," *Econometrica*, 50(6), 1431–1451.

Greif, A. (1993): "Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition," *American Economic Review*, 83(3), 525–548.

Ghosh, P. and Ray, D. (1996): "Cooperation in Community Interaction without Information Flows," *Review of Economic Studies*, 63(3), 491–519.

Morris, S. and Shin, H. (1998): "Unique Equilibrium in a Model of Self-Fulfilling Currency Attacks," *American Economic Review*, 88(3), 587–597.

Morris, S. (2001): "Political Correctness," *Journal of Political Economy*, 109(2), 231–265.

Acemoglu, D., Johnson, S. and Robinson, J. (2001): "The Colonial Origins of Comparative Development: An Empirical Investigation," *American Economic Review*, 91(5), 1369–1401.

Banerjee, A. and Iyer, L. (2005): "History, Institutions and Economic Performance: The Legacy of Colonial Land Tenure Systems in India," *American Economic Review*, 95(4), 1190–1213.

Tutorial Activities

Project activity (group), Research cum presentation, Group discussion, Problem Solving exercises

2.8.2 Political Economics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Political Economics	4	3	1	0		

Objectives

Political Economics covers topics at the interface of political science and economics. This course explores how political institutions shape and are shaped by economic factors. It investigates classic issues of political economy with the tools and models of economic theory.

Learning Outcomes

1. Students will use political economic framework to understand issues like underdevelopment, inequality, corruption etc.
2. They will use mathematical techniques to develop rigorous models of political institutions.

Content

Unit 1 **Development and Institutions (9 hours)** This unit discusses the role of political institutions in shaping the modern world, comparative study of democracy and non-democracies, and evolution of institution.

Unit 2 **Institutions in a Democracy (12 hours)** This unit focuses on institutions like political parties, election, judiciary, media, and bureaucracy.

Unit 3 **Distortions (12 hours)** Populism, corruption, criminalization, special interests can distort public policies. This unit examines the root causes of these problems.

Unit 4 **Conflict (12 hours)** This unit introduces students to causes and effects of conflicts, such as ethnic conflict, class conflict, resource curse etc.

Readings

Acemoglu et. Al (2019). Democracy Does Cause Growth, Journal of Political Economy, Vol. 127, pp. 47-99.

Acemoglu D. and J. Robinson (2006). De Facto Political Power and Institutional Persistence, American Economic Review, Vol. 96, pp. 325-330.

Bentzen et. Al (2017). Irrigation and Autocracy, Journal of European Economic Association, Vol. 15, pp. 1-53.

Dal Bo et Al (2009). Political Dynasties, Review of Economic Studies, Vol 76, pp. 115-142.

Esteban J. and D. Ray (2008). On the Salience of Ethnic Conflict, American economic Review, Vol. 98, pp. 2185-2202.

Ferraz C. and F. Finan (2011). Electoral Accountability and Corruption: Evidence from the Audits of Local Governments, American Economic Review, Vol. 101, pp. 1274-1311.

Glaeser E.L. (2005). The Political Economy of Hatred, Quarterly Journal of Economics, Vol. 120, pp. 45-86.

Grossman G. M. and E. Helpman (1996). Electoral Competition and Special Interest Politics, The Review of Economic Studies, Vol. 63, pp. 265-286.

Khwaza A.I. and A. Mian (2005). Do Lenders Favor Politically Connected Firms? Rent Provision in an Emerging Financial Market, The Quarterly Journal of Economics, Vol. 120, pp. 1371-1411.

Makin E. and J. Tirole (2004). The Politician and the Judge: Accountability in Government, American Economic Review, Vol. 94, pp. 1034-1054.

Padro I Miquel G. (2007). The Control of Politicians in Divided Societies: The Politics of Fear, Review of Economic Studies, Vol. 74, pp. 1259-1274.

Persson et. Al. (1997). Separation of Powers and Political Accountability, , Quarterly Journal of Economics, Vol. 112, pp. 1163-1202.

Yanagizawa-Drott D. (2014). Propaganda and Conflict: Evidence from the Rwandan Genocide, Quarterly Journal of Economics, Vol. 129, pp. 1947-1994.

Tutorial Activities

Group project activities, problem-solving exercises.

2.8.3 Labour Economics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Labour Economics	4	3	1			

Objectives

The objective of this course is to introduce the student to labour economics with an emphasis on microeconomic theory and empirics. The material covered would help the student to understand real world issues pertaining to labour markets and also to assess related public policy measures.

Learning Outcomes

1. Students will understand the fundamental economic forces behind employment, wages, and labour market dynamics, including supply, demand, education and skill formation, discrimination, and migration.
2. They will develop the ability to evaluate labour market imperfections, public policy measures such as minimum wages and unemployment insurance, and their implications for labour welfare and efficiency.

Content

Unit 1 **Labour Supply and Demand (10 hours):** Choice between consumption and leisure; household production and decisions; labour demand function; competitive equilibrium; compensating wage differentials and hedonic theory of wages.

Unit 2 **Human Capital and Job Search (10 hours):** Investment in education; theory of human capital; education as a signalling device; returns to education; job search models and matching processes.

Unit 3 **Labour Market Disparities and Institutions (15 hours):** Theories and measurement of discrimination; affirmative action; collective bargaining and labour unions; minimum wage and employment; unemployment insurance; job security regulations.

Unit 4 **Incentives, Efficiency, and Mobility (10 hours):** Incentives and agency problems; efficiency wage theories; migration and its determinants; effects of labour mobility on markets and welfare.

Suggested Readings

Cahuc, P., Carcillo, S. and Zylberberg, A. (2014): *Labor Economics*, MIT Press.

Ehrenberg, R. G. and Smith, R. S. (2018): *Modern Labor Economics: Theory and Public Policy*, Routledge.

Borjas, G. J. (2010): *Labor Economics*, McGraw-Hill/Irwin, Boston MA (5th edition).

Card, D. and Ashenfelter, O. (2011): *Handbook of Labor Economics*, Vol. 4A & 4B, Elsevier.

Card, D. and Ashenfelter, O. (2024): *Handbook of Labor Economics*, Vol. 5, Elsevier.

Card, D. and Ashenfelter, O. (2025): *Handbook of Labor Economics*, Vol. 6, Elsevier.

Hainmueller, J., Hangartner, D., & Ward, D. (2019). The effect of citizenship on the long-term earnings of marginalized immigrants: Quasi-experimental evidence from Switzerland. Science advances, 5(12), eaay1610.

Articles from journals and working papers.

Tutorial Activities

Project activity (group), Research cum presentation, Group discussion

2.8.4 Economics of Organisation

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Economics of Organisation	4	3	1	0		

Objectives

The study of the Economics of Organisation pertains to the existence, nature, design, and performance of organisations. It deals with coordination and interactions both within and across firms. In particular, it would focus on decision-making in organisations, agency problems, social relations, and contracts. The course would study, in an oligopolistic market environment, the relevant issues from the perspective of internal organisation and interactions between firms. The foundation of the theory is based on empirical observations in different market contexts. Finally, the interplay of policy, institutions, and organisations will be studied.

Learning Outcomes

1. Students will analyse factors determining the different characteristics of organisations, and how organisational structure affects market performance efficiency.
2. They will be able to critically analyze organisational design and incentive structures using modern tools.

Content

Unit 1 **Nature of Firm (12 hours)**
Boundaries of firms; transaction cost economics; property rights, and incentives; firm hierarchy, authority, leadership and efficiency.

Unit 2 **Organisation Design (11 hours)**
Agency and incentive problems in organisational design, Formal and relational contracts

Unit 3 **Vertical and Lateral Relation (11 hours)**
Vertical and horizontal relations between firms, outsourcing and in-house productions, delegation and incentives

Unit 4 **Organisation and corporate policy (11 hours)**
Corporate social responsibility, economics of non-profit organisations, lobbying and corruption, regulation and public policy.

Readings

John Roberts and Robert Gibbons, (2012), The Handbook of Organizational Economics, Princeton University Press.

Barron, D. V., Gibbons, R. S., & Powell, M. L. (2026). Organizational Economics: Foundations and Applications. Princeton University Press.

Tutorial Activities

Project activity (group), Research cum presentation, Group discussion.

2.8.5 Economics of Inequality

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Economics of Inequality	4	3	1	0		

Objectives

This course examines the measurement, drivers, and consequences of economic inequality and opportunity disparities. It critically analyses the role of state capacity in terms of the provision of public goods such as health and education. It uses datasets to test models and formulate evidence-based policies for equitable growth in a globalised economy.

Learning Outcomes

1. Students will learn how to measure inequality using axiomatic approaches and empirical methods
2. They will analyse opportunity inequality and assess state capacity using models and RCT evaluations.

Content

1. **Measurement and Trends (12 hours)**
   Gini coefficients, Lorenz curves, Atkinson indices. The Kuznets hypothesis. Empirical metrics. Biases in survey data (NSS, AIDIS). Comparative trends using tax data; India's post-1991 inequality surge.
2. **Opportunity and Mobility (11 hours)**
   Theoretical Frameworks: Roemer's circumstances vs. effort; ex-ante/ex-post justice. Human Opportunity Index. The Great Gatsby curve. Decompositions. Intergenerational correlations and mobility by caste, gender and region. The Opportunity Kuznets curve. Mobility trends in India.
3. **Health and Education (12 hours)**
   Health Disparities; nutrition and maternal care gaps. Inequalities in educational quality. Universal vs. targeted programs. Indian case studeies (e.g., JSY, RTE)

4. **State Capacity and Redistribution(10 hours)**
   Models of government and taxation. Political instability. Progressive taxes and transfers as policy instruments. Data-driven strategies. Addressing corruption in India.

Tutorial Activities

Group project activities, research paper writing

References

Alvaredo, F., Chancel, L., Piketty, T., Saez, E., & Zucman, G. (2017). Global inequality dynamics: New findings from WID. world. American Economic Review, 107(5), 404-409.

Asher, Sam et al. (2021): Intergenerational Mobility in India: Estimates from New Methods and Administrative Data, Quarterly Journal of Economics, 136(3), 1425-1485.

Atkinson, Anthony B. (2015): Inequality: What Can Be Done?, Harvard University Press.

Banerjee, Abhijit et al. (2010): Pitfalls of Participatory Programs: Evidence from a Randomized Evaluation in Education in India, American Economic Journal: Economic Policy, 2(1), 1-30.

Banerjee, A., Niehaus, P., & Suri, T. (2019). Universal basic income in the developing world. Annual review of economics, 11(1), 959-983.

Becker, Gary S. (1964): Human Capital: A Theoretical and Empirical Analysis, University of Chicago Press.

Besley, Timothy and Persson, Torsten (2010): State Capacity, Conflict, and Development, Econometrica, 78(1), 1-34.

Bhalotra, Sonia et al. (2021): Maternal and Child Health in India: New Evidence from a Sanitation Intervention, Review of Economics and Statistics, 103(4), 621-637.

Bharti, et al. (2024). "Income and Wealth Inequality in India, 1922-2023: The Rise of the Billionaire Raj." World Inequality Lab Working Paper No. 2024/09, March 18, 2024.

Bharathi, Naveen et al. (2023): Status Inequality and Public Goods, American Economic Review, 113(6), 1523-1560.

Chetty, Raj et al. (2014): Where is the Land of Opportunity? The Geography of Intergenerational Mobility in the United States, Quarterly Journal of Economics, 129(4), 1553-1623.

Cowell, Frank A. (2011): Measuring Inequality, Oxford University Press.

Deshpande, Ashwini (2011): The Grammar of Caste: Economic Discrimination in Contemporary India, Oxford University Press.

Emran, M. Shahe and Shilpi, Forhad (2015): Gender, Geography, and Generations: Intergenerational Educational Mobility in Post-Reform India, Review of Economics and Statistics, 97(2), 339-357.

Ferreira, Francisco H.G. et al. (2025): Economic Development and Inequality of Opportunity, UNU-WIDER Working Paper.

Grossman, Michael (1972): On the Concept of Health Capital and the Demand for Health, Journal of Political Economy, 80(2), 223-255.

Helpman, Elhanan (2018): Globalization and Inequality, Harvard University Press.

International Monetary Fund (2023): Inequality and Poverty in India: Impact of COVID-19 Pandemic and Policy Response, IMF Working Paper, WP/23/147.

Iyer, Lakshmi (2010): Direct versus Indirect Colonial Rule in India: Long-Term Consequences, Review of Economics and Statistics, 92(4), 693-713.

Milanovic, Branko (2016): Global Inequality: A New Approach for the Age of Globalization, Belknap Press.

Muralidharan, Karthik and Sundararaman, Venkatesh (2011): Teacher Performance Pay: Experimental Evidence from India, Quarterly Journal of Economics, 126(3), 993-1032.

Muralidharan, Karthik et al. (2022): Improving Public Sector Management at Scale? Experimental Evidence on School Governance in India, American Economic Review, 112(10), 3237-3275. (

Olken, Benjamin A. (2007): Monitoring Corruption: Evidence from a Field Experiment in Indonesia, Journal of Political Economy, 115(2), 200-249.

Piketty, Thomas (2014): Capital in the Twenty-First Century, Belknap Press.

Roemer, John E. and Trannoy, Alain (2015): Equality of Opportunity, in Handbook of Income Distribution, Elsevier.

Saez, Emmanuel and Zucman, Gabriel (2016): Wealth Inequality in the United States since 1913, Quarterly Journal of Economics, 131(2), 519-578.

Savoia, Antonio et al. (2010): Inequality, Democracy, and Institutions: A Critical Review of Recent Research, World Development, 38(2), 201-216.

Topalova, Petia (2010): Factor Immobility and Regional Impacts of Trade Liberalization: Evidence on Poverty from India, American Economic Journal: Applied Economics, 2(4), 1-41.

Wagstaff, Adam et al. (2014): Progress on Global Health Goals: Are the Poor Being Left Behind?, The World Bank Research Observer, 29(1), 1-29.

World Bank (2022): State of Inequality in India Report, Economic Advisory Council to the Prime Minister.

Note: Due to the dynamic nature of the course, readings may be updated annually.

3

Skill Based Courses

3.1 Dissemination of Economic Research

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Dissemination of Economic Research	2	1	0	1		

Objectives

The course is designed to help students organize, write and present arguments in economics. This is required to communicate with policy makers and communicate with non-economists through popular writing. It is also essential to be able to write a research paper and give seminars on economic reseearch.

Learning Outcomes

1. Students will learn how to express their economic arguments through opinion pieces written in clear, non-technical language.

2. Students will learn how to write an economics research paper and present their work in a seminar.

Content

1. **Communicating with non-economists**
   Ways of communicating economic arguments to non-economists. Elements of an effective Op-ed. **(5 hours)**

2. **Presenting economics research**
   Elements of a successful preparation and presentations of a research talk. Organizing a research paper. Presenting graphs, tables, maps and other exhibits. Citing the literature using standard bibliographic styles. Recognizing intellectual property**(10 hours)**

Readings

Cochrane, J. H. (2005). Writing tips for Ph. D. students. (along with his writing groups webpage https://www.johnhcochrane.com/writing-group)

List, John A. Experimental economics: Theory and practice. University of Chicago Press, 2025. (Ch: 20)

McCloskey, Deirdre N. Economical Writing, Third Edition. University of Chicago Press, 2019.

Zinsser, W. (2013). On writing well. Harper Paperbacks.

Practical Activities

Writing op-eds, short-class presentations, editing existing articles. Communicating as a group.

3.2 Qualitative Methods in Economics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Qualitative Methods in Economics	2	1	0	1		

Objectives

This course introduces students to qualitative methods in economics, with a focus on understanding economic behaviour, institutions, and processes that are not easily captured through quantitative data. It aims to complement formal economic analysis by equipping students with tools to investigate the "why" and "how" underlying observed economic outcomes.

Learning Outcomes

1. Students will appreciate the role of qualitative methods within economic research.
2. Students will be able to design and conduct qualitative data collection using interviews and focus group discussions.

Content

1. The role of qualitative methods and research ethics (7 hours)
   Mixed-methods research in economics. Research ethics: informed consent, anonymity, power dynamics, and data protection.

2. Qualitative Data Collection and Analysis (8 hours)
   The design and conduct of interviews- structured and semi-structured approaches. Focus group discussions and group dynamics. Observational and archival methods. Transcription and organisation of qualitative data. Coding frameworks and identification of themes in economic narratives.

Practical Activities

Focus group discussions, practice of interview and moderation skills, coding workshops.

Readings

Starr, M. A. (2014). Qualitative and mixed-methods research in economics: surprising growth, promising future. *Journal of Economic Surveys*.

Krueger, R. A., & Casey, M. A. (2014). *Focus Groups: A Practical Guide for Applied Research*. Sage Publications.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*.

King, G., Keohane, R. O., & Verba, S. (1994). *Designing Social Inquiry*. Princeton University Press.

3.3 Algorithmic Thinking for Economists

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Algorithmic Thinking for Economists	2	1	0	1		

Objectives

Algorithms in discrete mathematics and computer science are becoming increasingly relevant for economics and data professionals in the age of Artificial Intelligence and Machine Learning. While postgraduate students are well-versed with solving economic

models, most are unfamiliar with algorithmic thinking that helps them scale up their modeling knowledge. This course aim to bridge the gap between theoretical solvability and practical execution by enabling students with the logical rigor of discrete mathematics and the procedural efficiency of algorithmic design. Students will master formal proofs and graph theory to model complex economic systems, while applying computational complexity and dynamic programming to optimize large-scale systems.

Learning Outcomes

1. Students will be able to apply discrete mathematics and graph theory to model complex multi-agent economic problems, such as those relating to social networks, supply chains, e-marketplaces;
2. They will be able to apply algorithms to various problems of economic interest and evaluate their efficiency.

Content

1. Logical structure: Proofs, recursion, graphs and matching, elementary number theory, elementary probability (7 hours)
2. Computational techniques: Linear programming, searching and sorting, shortest path, dynamic programming, efficiency, NP-completeness (8 hours).

Readings

Lehman, Eric, F. Thomson Leighton, and Albert R. Meyer. Mathematics for computer science. Cambridge, Massachusetts: Massachusetts Institute of Technology (2010)

Cormen, Thomas H. Algorithms unlocked. MIT Press (2013)

Cormen, T. H., Leiserson, C. E., Rivest, R. L., and Stein, C. Introduction to algorithms. MIT press (2022).

Practical Activities

Group project activities and presentations.

3.4 Spatial Data Analysis for Economics

Course title	Credits	Credit Distribution			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Spatial Data Analysis for Economics (SBC)	2	1	0	1		

Objectives

The course will show students how to conduct research using different types of spatial datasets that have become integral to empirical research in economics. Students will familiarise themselves with different types of spatial datasets (both vector and raster). It will also introduce them to different applications of spatial data analysis for empirical economic research.

Learning Outcomes

1. Students will familiarise themselves with different spatial datasets and coordinate reference systems.
2. Students will be able to do spatial data analysis in a wide range of applications.

Content

1. **Spatial Datasets and Projections**
   The types of spatial datasets (vector datasets: points like schools, polylines like roads, polygons like districts; raster datasets: satellite data of night lights activity, pollution level, landuse, elevation/terrain) and their associated coordinate references systems and projections. **(7 hours)**
2. **Applications with Spatial Datasets**
   Applications such as economic impacts of railway infrastructure (e.g. Donaldson 2018), extractive institutions (e.g. Dell 2010) and city shape (e.g. Harari 2020). Creating new datasets using webscraping from Google Map and OpenStreetMap. **(8 hours)**

Readings

Abramitzky, R., Boustan, L. P., & Storeygard, A. (2025). New data and insights in the Handbook of regional and urban economics.

Bolstad, P., Manson, S. (2022). GIS Fundamentals: A First Text on Geographic Information Systems. United States: Eider Press.

Dell, M. (2010). The persistent effects of Peru's mining mita. Econometrica, 78(6), 1863-1903.

Donaldson, D. (2018). Railroads of the Raj: Estimating the impact of transportation infrastructure. American economic review, 108(4-5), 899-934.

ESRI resources https://www.esri.com/en-us/arcgis/products/arcgis-online/resources

Giuliano, P., & Matranga, A. (2021). Historical data: where to find them, how to use them. In The handbook of historical economics (pp. 95-123). Academic Press.

Harari, M. (2020). Cities in bad shape: Urban geometry in India. American Economic Review, 110(8), 2377-2421.

Lapaine, M., & Usery, E. L. (Eds.). (2017). Choosing a map projection. Springer International Publishing.

Pebesma, E., and Bivand, R. (2023). Spatial data science: With applications in R. Chapman and Hall/CRC. URL:https://r-spatial.org/book/

Robinson, A.H., and Morrison, J.L., and Muehrcke, P.C., and Kimerling, A.J., and Guptill, S.C. (2009). Elements of cartography, 6TH ED. India: Wiley India Pvt. Limited.

Practical Activities

Conduct analysis using vector data (e.g. National Highways) and data from satellites (e.g. satellite night lights).