

University of Calcutta

Master of Arts (Economics)

Structure for Year 1 of the 2-year programme

Effective from Academic Year 2026-27

Structure of Syllabus
Two-year (Four Semester) M.A/M.Sc. Degree Course of Economics under
NEP 2020
University of Calcutta

Semester-I (20credits, 250marks)

Type of Course	Paper Code	Name of the Course	Credit	Marks	Remarks
Core Course	ECO411	Microeconomics-I	4	50	
Core Course	ECO412	Macroeconomics-I	4	50	
Core Course	ECO413	Mathematical Methods For Economics	4	50	
Core Course	ECO414	Econometrics-I	4	50	Partially Lab-based course
Core Course	ECO415	Advanced Indian Economics	4	50	

Semester-II (20credits, 250marks)

Type of Course	Paper Code	Name of the Course	Credit	Marks	Remarks
Core Course	ECO421	Microeconomics-II	4	50	
Core Course	ECO422	Macroeconomics-II	4	50	
Core Course	ECO423	Econometrics-II	4	50	
Core Course	ECO424	Development Economics	4	50	
Skill-enhancement Course (SEC1)	ECO425	Economic Methodology	2	25	
Skill-enhancement Course (SEC)	ECO426	Data Visualization and Management	2	25	Lab based course

Type of Course	Paper No.	Name of the Course	Credit	Marks	Remarks
Discipline Centric Elective Course (DCEC 1)	XI	One paper from Group-A	4	50	Please see the list of Papers as provided under Group-A
Discipline Centric Elective Course (DCEC 2)	XII	One paper from Group-B	4	50	Please see the list of papers as provided Under Group-B
Discipline Centric Elective Course (DCEC 3)	XIII	One paper from Group-C	4	50	Please see the list of Papers as provided under Group-C
Core Course (CC10)	XIV	Project-I	4	50	It will be based on Review of Literature
Skill-enhancement Course (SEC 3)	XV	Basics of Programming	2	25	Lab based course
Skill-enhancement Course (SEC 4)	XV	Field Survey Techniques	2	25	

Group A papers under semester III: Advanced Macroeconomics-I, Game Theory and Information-I, International Economics-I, Urban Economics-I, Public Economics-I, Economics of Industry-I. *All papers have 4 credits.*

Group B papers under semester III: Advanced Econometrics-I, Operations Research-I(2(Th)+2(P)), Economics of Money and Finance-I, Economics of Institutions-I, Development Management-I, Political Economy of Development-I, Experimental Economics-I. *All papers have 4 credits. For Operations Research there is a practical component so it is 2+2 credits.*

Group C papers under semester III: Labour Economics-I, Economics of Agriculture –I, Urban Planning-I, Health Economics-I, Resource and Environmental Economics-I, Marxian Economics-I.

Semester-IV (20 Credits, 250 marks)

Type of Course	Paper No.	Name of the Course	Credit	Marks	Remarks
Discipline Centric Elective Course (DCEC 4)	XI	One paper from Group-A	4	50	Please see the list of Papers as provided under Group-A
Discipline Centric Elective Course (DCEC 5)	XII	One paper from Group-B	4	50	Please see the list of papers as provided Under Group-B
Discipline Centric Elective Course (DCEC 6)	XIII	One paper from Group-C	4	50	Please see the list of Papers as provided under Group-C
Core Course (CC11)	XIV	Project-II	6	75	It will include usage of theoretical or empirical methodology
Employability and Entrepreneurship Skills Course (EEC 1)	XVI	Basics of Entrepreneurial Skill and Management	2	25	

Group A papers under semester IV: Advanced Macroeconomics-II, Game Theory and Information-II, International Economics-II, Urban Economics-II, Public Economics-II, Economics of Industry-II. *All papers have 4 credits*

Group B papers under semester IV: Advanced Econometrics-II (2(Th)+2 (P)), Operations Research-II (2(Th) +2(P)), Economics of Money and Finance-II, Economics of Institutions-II, Development Management-II, Political Economy of Development-II, Experimental Economics-II.

I. *All papers have 4 credits. For Advanced Econometrics and Operations Research there are practical components so that for both the papers there are 2+2 credits*

Group C papers under semester IV: Labour Economics-II, Economics of Agriculture-II, Urban Planning-II, Health Economics-II, Resource and Environmental Economics-II, Marxian Economics-II. *All papers have 4 credits.*

So, all total we have 20+20+20+20=80 credits and 1000 marks.

Detailed Syllabus of Courses for Semester 1 and 2

Semester 1

Core Course (CC1)-Microeconomics-I

Total Credit -4

Total Lecture Hours: 60

Full Marks: 50 [Theory: 40 marks +Internal Assessment: 10 marks]

Course Objectives (CO)

To develop students' understanding of advanced microeconomic theories and analytical skills for examining economic behaviour, market outcomes, uncertainty, and welfare issues in research and policy.

Course Learning Outcomes (CLO)

- *Students will be able to demonstrate a sound understanding of advanced microeconomic theories, concepts, and analytical frameworks.*
- *They will analyze consumer behaviour, production decisions, and market structures using formal economic models and analytical techniques.*
- *Students will evaluate decisions under risk and uncertainty and examine their implications for economic outcomes.*
- *They will interpret competitive and imperfect market structures and assess their relevance to contemporary economic issues.*
- *Students will develop critical thinking, quantitative reasoning, and research skills necessary for economic inquiry.*
- *They will apply microeconomic principles to real-world economic problems and will be prepared for higher studies, research, and professional careers in economics.*

Course Outline

1. Consumer Behaviour: Revision of basic ideas: duality approach to consumer behaviour, expenditure function, indirect utility function, consumer surplus, equivalent and compensating variation, revealed preference theory; Choice under uncertainty: the lottery space, axioms related to lottery space, certainty equivalent income, risk premium, absolute and relative measures of risk aversion, concept of fair bet, state contingent indifference curve, economics of insurance and choice under uncertainty, the insurance decision, demand for insurance, risk spreading, the Arrow-Lind Theorem. [Lecture Hours 20]
2. Production and Costs : Theory of Firm and the Competitive Market : Revision of basic ideas of production and costs : homothetic and homogeneous production functions, cost equation and cost function, profit function, envelope theorem and its applications, duality in production and costs, Hotelling's Lemma and Shephard's Lemma, constant returns to scale, unit isoquant and envelope theorem, unit isoquants and Shephard's lemma, elasticity of substitution under CRS, implications for competitive equilibrium; Production under uncertainty: competitive firm under uncertainty, price uncertainty and comparison with certainty case, the risk neutral firm and the risk averse firm, price and technological uncertainty, production with future markets. [Lecture Hours 16]
3. Imperfect Markets: Monopoly: price discrimination, pricing tactics : two-part tariff and peak-load pricing; Monopolistic competition: love for variety and equilibrium under monopolistic competition, extended model of monopolistic competition using Dixit-

Stiglitz (1977) utility function, location models: the linear approach and the circular approach. [Lecture Hours 10]

4. General Equilibrium and Welfare: The exchange economy: equilibrium (existence, uniqueness and stability), Brouwer's Fixed Point Theorem and Existence Theorem, Pareto optimality, the concept of core, competitive equilibrium and core allocation. The First and the Second Fundamental Theorems of Welfare Economics, social welfare optima, relation between fundamental theorems and the core; The production model: fixed and flexible coefficients, relation between endowments and product mix, relation between commodity prices and factor prices. Two sector mobile factor and specific factor models. [Lecture Hours 14]

References

- Varian H. (2009) - Microeconomic Analysis, 3rd Edition, Viva Books Pvt. Ltd.
- MasCollé A., Whinston M. D. and Green J. R. (2012) - Microeconomic Theory, Oxford University Press, India
- Gravelle, H. and Rees, R.(2004) –Microeconomics, 3rd Edition, Prentice Hall
- Jehle G. A. and Reny P. J. (2006) – Advanced Microeconomic Theory, 3rd Edition, Pearson Education, India
- Oz Shy (1995) : Industrial Organization : Theory and Applications, The MIT Press
- Dixit, A. and Stiglitz, J.E. (1977) : 'Monopolistic Competition and Optimum Product Diversity', *The American Economic Review*, vol 67, No.3, 291-308.
- R. Caves, J. Frankel and R. Jones, World Trade and Payments, 10th edition, Pearson, 2007(Supplements to the chapters on sector-specific model and Heckscher-Ohlin model).

Core Course (CC2)-Macroeconomics-I

Total Credit -4

Total Lecture Hours: 60

Full Marks: 50 [Theory: 40 marks +Internal Assessment: 10 marks]

Course Objective

This course analyses capitalism as a monetary production economy, contrasting classical supply-side orthodoxy and the New Classical counter-revolution with Post-Keynesian models of fundamental uncertainty and effective demand. It equips students to evaluate the institutional role of policy alongside long-run growth dynamics, specifically examining how automation and Artificial Intelligence shape the modern productivity paradox and at the same time may trigger systemic effective demand crises.

Course Learning Outcomes (CLOs)

After completion of the course, the students will be able to:

1. *Analyze capitalism as an institutional, monetary production economy using forward contracts.*
2. *Contrast supply-side orthodoxy with demand-driven models under fundamental uncertainty.*
3. *Model the New Classical counter-revolution, rational expectations, and the Lucas Critique.*
4. *Critique the macroeconomic efficacy of policy rules versus discretionary state intervention.*
5. *Evaluate long-run exogenous and endogenous growth theories and convergence debates.*
6. *Assess AI's productivity paradox and its threat to effective demand.*

Course Outline

1. Capitalist Economy: Cooperation, Market, and State; Systemic Crisis and the Birth of Macroeconomics [Lecture Hours 4]
2. Circular flow between aggregate demand and aggregate expenditure- A supply side approach and demand side approach. [Lecture Hours 2]
3. Introduction to supply based models: wage-price flexibility and voluntary unemployment. [Lecture Hours 2]
4. Demand based models: Critique of Classical Postulates and Says Law, Ergodicity and Neutrality of Money Axioms; The Monetary Production Economy and Forward Money Contracts; Fundamental Uncertainty, Liquidity Preference and Effective Demand; Aggregate Demand and Involuntary Unemployment. [Lecture Hours 16]
5. Uncertainty, expectation and policy in New Classical Counter-Revolution macroeconomics: (a) Adaptive expectation, Rational expectation; (b) Sargent-Wallace model of policy with rational expectations; Kydland-Prescott model of rules vs discretion; Lucas critique and micro-foundation. [Lecture Hours 16]
6. Economics of Growth: Solow model; Convergence debate; Introduction to Endogenous Growth. [Lecture Hours 14]
7. Digital Economy, Artificial Intelligence and the Modern Productivity Paradox. [Lecture Hours 6]

References:

- Barro, R. J., & Sala-i-Martin, X. (2004). *Economic Growth* (2nd ed.). MIT Press.
- Bhaduri, A. (1986). *Macroeconomics: The Dynamics of Commodity Production*. Palgrave Macmillan.
- Brynjolfsson, E., Rock, D., & Syverson, C. (2019). Artificial intelligence and the modern productivity paradox: A clash of expectations and statistics. In A. Agrawal, J. Gans, & A. Goldfarb (Eds.), *The Economics of Artificial Intelligence: An Agenda* (pp. 23-57). University of Chicago Press.
- Davidson, P. (1994). *Post Keynesian Macroeconomic Theory: A Foundation for Successful Economic Policy in the Twenty-first Century*. Edward Elgar Publishing. (Note: A revised 2nd edition was published in 2011).
- Hicks, J. (1942). *The Social Framework: An Introduction to Economics*. Oxford University Press.
- Keynes, J. M. (1936). *The General Theory of Employment, Interest and Money*. Palgrave Macmillan. (Chapters 1-4, 8-10, 19-21).
- Lucas, R. E., & Sargent, T. J. (Eds.). (1981). *Rational Expectations and Econometric Practice* (Vols. 1 & 2). University of Minnesota Press. (Selected articles).
- Romer, D. (2019). *Advanced Macroeconomics* (5th ed.). McGraw-Hill.
- Sheffrin, S. M. (1983). *Rational Expectations*. Cambridge University Press.
- Włodarczyk, M., & Wisła, R. (2025). *The Digital Economy and the Productivity Paradox* (1st ed.). Routledge.

Core Course (CC3)-Mathematical Methods in Economics

Total Credit -4

Total Lecture Hours: 60

Full Marks: 50 [Theory: 40 marks +Internal Assessment: 10 marks]

Course Objectives

To develop students' analytical and quantitative skills and understanding of different mathematical economic concepts, definitions, and their applications in solving real world economic issues as a quantitative tool.

Course Learning Outcomes

After completing this course, students will be able to:

- *Apply different concepts like nonlinear programming techniques to solve constrained and unconstrained optimization problems in economics, linear algebra and matrix methods to analyze linear economic models and solve systems of equations*
- *Analyze the stability of dynamic economic systems using differential equations and relevant stability criteria*
- *Solve the real-world various economic and financial problems such as analysing portfolios, optimal resource use, intergenerational welfare maximization etc.*
- *Also integrate other economic theories with their mathematical economic concepts by using the concepts of countability, order relations, fundamental properties of functions in real analysis, and dynamic optimization techniques like optimal control and explain the foundations of microeconomic and macroeconomic phenomena.*
- *Develop an overall quantitative knowledge and mathematical aptitude*

Course Outline:

1. Real Analysis: Preliminaries-Functions and their Properties, Countability, Order Relations; Metric Spaces: Definition & Properties; Pseudometric Spaces, Open Sets, Closed Sets, Bounded Sets, Linear Space, Convex Sets, Convex Cones, Compact Sets, Fixed Point Theorem and its Economic Application. [Lecture Hours 10]
2. Nonlinear Programming: Review of Classical Constrained Programming, Concave Programming, Quasi-Concave Programming, Weirstrass' Theorem, Local-Global maximum, minimum, Local-Global Theorem, Generalised Envelope Theorem, Comparative Statics, Saddle Point Theorem, Constraint Qualifications. [Lecture Hours 10]
3. Linear Models, Vector Analysis, Matrix Algebra: Linear Models and Matrices, Matrix Operation, Scalar Valued Functions defined on Matrices, Quadratic Forms; Symmetric Square Matrices, Frobenius Theorem, Dominant Diagonal Matrices. [Lecture Hours 10]
4. Ordinary Differential Equations and Stability: Trajectories, Concept of Stability, Stable Manifold, Saddle Point Equilibria. Asymptotic Stability, Liapunov Stability. Stability of a large time-invariant system: Hurwitz test, Liénard–Chipart stability criterion. Linear Phase Diagrams. [Lecture Hours 10]
5. Optimal Control Theory: Hamiltonian function, Necessary and Sufficiency Condition; Transversality Condition, Finite and Infinite Horizon Problems, An application of optimal control theory. [Lecture Hours 10]

5. Other Mathematical Economic Concepts & Methods. [Lecture Hours 10]

References:

- Dixit(1976):OptimizationinEconomicTheory,OUP
- Beavis&Dobbs(1990):OptimizationandStabilityTheory forEconomicAnalysis,CUP
- Intrilligator(1971);MathematicalOptimizationandEconomicTheory,PrenticeHall
- Hadley(1960):LinearAlgebra,Addision-Wesley,Massachusetts
- Chiang(1992):DynamicOptimization,McGrawHillInc.
- Simmons, G.F. (1963). Introduction to Topology and Modern Analysis, New York McGraw Hill
- Ok, Efe A (2007). Real Analysis with Economic Applications, Princeton University Press.
- Kamien&Schwartz(1981):DynamicOptimization,NorthHolland
- Other relevant articles and textbooks

Core Course (CC4)-Econometrics-I
Total Credit -4 (2 for theory and 2 for practical)
Total Lecture Hours: 60

Full Marks: 50 [Theory: 25(20 Exam +5 IA) marks +Practical: 25 (15 Exam 10 IA+ marks)]

Econometrics I

Group A: Econometrics Theory – Cross section analysis (2 credits – 30 hours)

Course Objectives

This course covers regression analysis used for cross-sectional data. It explores various model specifications and emphasizes on the appropriate use of each. The course also takes students on a journey from regression to understanding the basics of causality.

Course Learning outcomes

Upon successful completion of this course, students will be able to

- *Formulate, estimate, and interpret multiple linear regression models using matrix algebra and dummy variables;*
- *Evaluate model fit and statistical significance using F-tests and R^2 measures; identify and address econometric issues such as omitted variable bias, multicollinearity, heteroskedasticity, measurement error, missing data, and outliers;*
- *Apply alternative model specifications and robust estimation techniques; analyze qualitative, censored, truncated, and sample-selection data using Logit, Probit, Tobit, and Heckman models;*
- *Distinguish among advanced regression methods and their applications; and assess causal relationships using randomized experiments, instrumental variables, and two-stage least squares (2SLS).*

Course outline

1. Multiple Linear Regression Model: Model with k variables, matrix form representation, the 2 & 3 variable case as a special form of the k variable model. Multiple regression with dummy variables, OLS asymptotic properties, Model restrictions, the F statistic as a measure of the overall significance of a regression, R square and adjusted R2. [Lecture Hours 6]
2. Omitted variable bias: cause and effect, conditions and extent of bias, how to decide whether to include or drop an explanatory variable on the basis of OVB. Multicollinearity and tradeoff with OVB. [Lecture Hours 2]
3. Components of OLS Variances, multicollinearity, micro-numerosity, sample variation in explanatory variables, heteroscedasticity, robust regression.[Lecture Hours 3]
4. Model specifications under MLRM: Data scaling, logarithmic and quadratic forms. Concepts of missing data, measurement errors non-random samples, outliers. Using a proxy variable.[Lecture Hours 3]
5. Regression with Qualitative Dependent Variables: LPM and its disadvantages, Logit and Probit as a transformation from LPM. MLE estimates. Interpretation of the estimates, Odds Ratio model, marginal effects. [Lecture Hours 4]
6. Censored and truncated data: Tobit model. Sample selection – Heckman model.[Lecture Hours 3]

7. *Other regression models & methods*: Multinomial, ordered, nested logit/ probit, Tobit, Heckman, Count Data models – Poisson, Hierarchical Linear Models, Simultaneous equation models, simultaneity bias and identification problem, Seemingly Unrelated Regression models, Structural Equation Modelling, Multivariate Regression, Principal Component Analysis (Concepts only). When to use each of them – type of data & research question.[Lecture Hours 3]
8. *Concept of causality*: Randomized trials. Instrumental Variables, 2SLS. [Lecture Hours 6]

References

- J. M. Wooldridge – Introductory Econometrics
- J.D. Angrist & J-S Pischke – Mastering Metrics
- J.D. Angrist & J-S Pischke – Mostly Harmless Econometrics
- Cameron & Trivedi – Microeconometrics: Methods and Applications

Group B : Econometrics Practical (2 credits 60 hours)

Course Objective:

To develop practical skills in Stata/R for data management, statistical analysis, econometric modelling, diagnostic testing, causal inference, and effective interpretation of empirical research findings.

Course Learning Outcomes

Upon completion of this practical course, students will be able to

- Use Stata/R for data management, statistical analysis, and econometric modelling.
- Demonstrate proficiency in importing, organizing, and exploring datasets;
- Generating descriptive statistics and cross-tabulations;
- Visualizing data through graphs and scatter plots; creating and transforming variables, including dummy variables;
- Estimating and interpreting OLS, Logit, Probit, Instrumental Variable (IV), and Two-Stage Least Squares (2SLS) models; conducting regression diagnostics for multicollinearity, heteroskedasticity, and model specification errors; exporting analytical results for reporting; and
- Apply Principal Component Analysis (PCA) for data reduction and exploratory analysis.

Course Outline

1. Basics of Stata/R – Interface, navigating the menu, import data, data log and command. [Lecture Hours 4]
2. Understanding a data set – Types of variables. [Lecture Hours 2]
3. Summary statistics of continuous variables. [Lecture Hours 4]
4. Proportions for binary and categorical variables.[Lecture Hours 4]
5. Tab and cross tab of variables, with row and column percentages, scatter diagram.[Lecture Hours 6]
6. Creating dummy variables from continuous and categorical variables. [Lecture Hours 8]
7. OLS regression – prediction of dependent variable, plotting fitted line, Checking model specifications by plots – Interpretation of regression output – Exporting regression to word. [Lecture Hours 14]

8. Regression diagnostics – Detection of multi-collinearity (VIF), heteroscedasticity (Lagrange-Multiplier Test/ Breusch-Pagan Test), Tests for omitted variables, robustness of regression. [Lecture Hours 4]
9. Logit and Probit models, OR model -Interpretation of regression output. [Lecture Hours 6]
10. IV and 2SLS. [Lecture Hours 6]
11. PCA. [Lecture Hours 2]

Reference:

- Hamilton L. *Statistics with Stata*
- STATA USER'S GUIDE RELEASE 13, <https://www.stata.com/manuals13/u.pdf>
- *Introduction to Econometrics with R*, Christoph Hanck, Martin Arnold, Alexander Gerber, and Martin Schmelzer, 2024, (companion to Stock, J., & Watson, M. (2015) *Introduction to Econometrics*) [<https://www.econometrics-with-r.org/ITER.pdf>]
- Christian Kleiber, Achim Zeileis, *Applied Econometrics with R*, Springer Nature (codes available from <https://www.zeileis.org/teaching/AER>)
- Cameron & Tivedi. *Microeconometrics using Stata*

Core Course (CC5)-Advanced Indian Economics

Total Credit -4

Total Lecture Hours: 60

Full Marks: 50 [Theory: 40 marks +Internal Assessment: 10 marks]

The Course Objectives (CO)

The Advanced Indian Economics course specifically emphasize the areas of Indian economy what students are expected to know, understand, assimilate and be able to apply research and economic policy making. These outcomes are highly interlinked with the given syllabus and focus on building advanced knowledge on Indian economic problems and associated remedies and policy measures.

Course Learning Outcomes (CLO)

This course will help the students to

- *Understand Post Reform performance of Indian Economy and to critically evaluate the policy of economic reforms, redefine the development strategy and understand the changing role of market and state.*
- *Grasp a broader idea about India's growth and sectoral performance related to growth and productivity in primary, secondary and tertiary sectors and the changes that occurred there.*
- *Better understand the current employment scenario of India and predict the future implications with proper criticism of the scenario, the methods of measurement and also get fair idea about the different government schemes relating to employment.*
- *Differentiate the nature of food insecurity in rural and urban India and learn the features of public distribution system.*
- *Develop critical thinking about the sustainable development and will identify the role of environment in securing development in India.*
- *Diagnose the recent trends federal finance in India*

Course Outline

1. Post-Reform (1991 onwards) performance of Indian Economy: Appraisal of Indian Economic Reforms: Redefining India's Development Strategy: Changing Role of State and Market. [Lecture Hours 5]
2. India's Growth and Sectoral Performance: India's Growth experience, Structural change and Productivity: i) Agricultural growth and distribution. ii) Manufacturing growth and issues relating to productivity, market structure and economies of scale; software industry growth iii) Issues relating to Service-led growth. [Lecture Hours 25]
3. Indian Economy: Some Current and Future Issues: i) Employment-Definition and Measurement Issues: employment Generating Schemes by GOI. Livelihood security, National Urban Livelihood Mission, and VB G RAM G (Viksit Bharat. Guarantee for Rozgar and Aajeevika Mission Gramin); ii. Food Insecurity in India: Rural and Urban Food Insecurity. The Public Distribution System. iii) Issues relating to federal finance, GST iv) Environment: Environment and Development. Basic issues relating to Environment: Sustainable development and environmental accounting. Policies and Environmental Regulation in India. [Lecture Hours 30]

References

- Acharya, Sankar and Rakesh Mohan (eds.) (2010), *India's Economy: Performance and Challenges*, OUP, New Delhi.
- Ahluwalia, M S, S S Tarapore and Y V Reddy (eds.) (2004), *Macroeconomics and Monetary Policy*, OUP, New Delhi.
- Balakrishnan, P (2010), *Economic Growth in India*, OUP, New Delhi.
- Basu, K (ed.) (2005), *India's Emerging Economy*, OUP, New Delhi.
- Bhaumik, S K (ed.) (2008), *Reforming Indian Agriculture: Towards Employment Generation and Poverty Reduction*, Sage Publications, New Delhi.
- Chakravarty, R (2006), *The Financial Sector in India*, OUP, New Delhi.
- Mahendra Dev, S (2008), *Inclusive Growth in India*, Oxford University Press, New Delhi.
- *India Development Report*, Various years, OUP, New Delhi.
- Panagariya, A (2008), *India: The Emerging Giant*, OUP, New Delhi.
- Rakshit, M (2008a), *Macroeconomics of Post-Reforms India*, OUP, New Delhi.
- Rakshit, M (2008b), *Money and Finance in the Indian Economy*, OUP, New Delhi.
- Reddy, Y V (2004), *Lectures on Economic and Financial Sector Reforms in India*, OUP, New Delhi.
- Singh, N. (2015). Information technology and its role in India's economic development: A review. *Development in India: Micro and macro perspectives*, 283-312.
- Kumar, K. G. (2012). Historical evolution of federal finances in India. *Federal Governance*, 9(1).
- Chakraborty, L. S. (2019). Indian fiscal federalism at the crossroads: some reflections.

Selected articles will be given as references in the course of teaching.

Courses in Semester2

Core Course (CC6)-Microeconomics II

Total Credit -4

Total Lecture Hours: 60

Full Marks: 50 [Theory: 40 marks +Internal Assessment: 10 marks]

Course Objective

This course introduces the theory of strategic decision-making. It equips students to model situations of conflict and cooperation among rational agents, to solve them using the central solution concepts of non-cooperative game theory under both complete and incomplete information, and to apply these tools to oligopoly, bargaining, auctions, signalling, and contracting under asymmetric information.

Learning Outcomes

On completing the course, a student should be able to:

- *Represent strategic situations in normal and extensive form and identify dominance relations.*
- *Solve static and dynamic games of complete information using Nash and subgame-perfect equilibrium, with applications to oligopoly and bargaining.*
- *Analyse games of incomplete information using Bayesian Nash and perfect Bayesian equilibrium, including auctions and signalling.*
- *Characterise optimal contracts under adverse selection and moral hazard.*

Course Outline

1. Foundations of Non-cooperative Game Theory: Strategic interaction and rational choice; cooperative versus non-cooperative games; rationality and common knowledge. Representation of games: the normal (strategic) form and the extensive form; information sets; perfect and imperfect information. Dominance; iterated elimination of strictly dominated strategies; rationalizability (outline). [Lecture Hours 6]
2. Static Games of Complete Information- Nash Equilibrium: Best responses and Nash equilibrium; pure and mixed strategies; existence of equilibrium (Nash's theorem, statement). Applications: Cournot quantity competition; Bertrand price competition and the Bertrand paradox; the Hotelling location model. [Lecture Hours 12]
3. Dynamic Games of Complete Information-Subgame Perfection: Backward induction and credibility of threats; subgames and subgame-perfect Nash equilibrium. Applications: Stackelberg quantity leadership; sequential bargaining (ultimatum, finite-horizon, and Rubinstein's model). Repeated games: finitely and infinitely repeated games; trigger strategies; collusion; the Folk Theorem (statement and intuition). [Lecture Hours 14]
4. Static Games of Incomplete Information — Bayesian Nash Equilibrium: Types and beliefs; the Harsanyi transformation; Bayesian games and Bayesian Nash equilibrium. Application: auctions — first-price and second-price (Vickrey) auctions; revenue equivalence (outline). [Lecture Hours 8]
5. Dynamic Games of Incomplete Information — Perfect Bayesian Equilibrium and Signalling: Perfect Bayesian equilibrium: sequential rationality and consistent beliefs. Signalling games: separating and pooling equilibria; equilibrium refinements (outline). Applications: job-market signalling; limit pricing as entry deterrence.[Lecture Hours 10]

6. *Asymmetric Information — Adverse Selection and Moral Hazard*: Adverse selection: the market for lemons; screening and self-selection; optimal contracts (menu of contracts). Moral hazard: the principal-agent problem; optimal contracts and the trade-off between risk-sharing and incentives. [Lecture Hours 8]

References

Core text

- Gibbons, R. (1992). *Game Theory for Applied Economists*. Princeton University Press (also published as *A Primer in Game Theory*).

Supplementary readings

- Jehle, G. A. & Reny, P. J. *Advanced Microeconomic Theory* — relevant chapters on game theory and information.
- Osborne, M. J. *An Introduction to Game Theory*.
- Mas-Colell, A., Whinston, M. D. & Green, J. R. *Microeconomic Theory* — Part IV (game theory, adverse selection, moral hazard).
- Tadelis, S. *Game Theory: An Introduction*.

Core Course (CC7) - Macroeconomics II

Total Credit - 4

Total Lecture Hours: 60

Full Marks: 50 [Theory: 40 marks +Internal Assessment: 10 marks]

Course Objectives

This is a master's level course designed to equip students with the rigorous analytical tools and theoretical foundations required to understand modern macroeconomic phenomena. Being a sequel to Macroeconomics I in the previous semester, the course introduces and elaborates the fundamentals of microeconomic foundation of macroeconomics. The topics that will be covered provide an in-depth understanding about the problems of resource allocation in modern economies.

Course Learning Outcomes (CLOs)

Upon successful completion of this course, students will be able to:

1. *Characterize the of general equilibrium structure for representative agents.*
2. *Understand the modern consumption and investment theories and their implications in macroeconomic research.*
3. *Appreciate the importance of intertemporal government budget constraint and the fiscal initiatives of the government under such constraint.*
4. *Understand the optimal growth models and their implications in modern macroeconomic analysis.*
5. *Understand the two important pillars of modern macroeconomics – Real Business Cycles Theories and New Keynesian Macroeconomic Theories.*
6. *Cultivate the ability to critically read, evaluate, and engage with seminal and contemporary macroeconomic literature, preparing students for independent research and policy analysis.*

Course outline:

1. General Equilibrium Approach to Macroeconomics: Exchange economy, Production Economy, Capital Accumulation Economy, One-Period Framework, Two-Period Framework, Multi-period Framework, Welfare Theorems. [Lecture Hours 10]
2. Consumption and investment: Optimal Consumption Model, Permanent Income Hypothesis, Stochastic Consumption, Hall's Random Walk Hypothesis, Credit Constraint in Consumption, Precautionary Savings, Tobin's q Model, Financial Market Imperfections. [Lecture Hours 10]
3. Role of Government Budget Constraint: Introduction to Overlapping Generation Models - Ricardian Equivalence, Tax Smoothing. [Lecture Hours 6]
4. Growth Economics: Ramsey-Cass-Koopman's Optimal Growth Model, Diamond's Overlapping Generation Model, Endogenous Growth Models - AK Model, Romer Model and Lucas Model. [Lecture Hours 20]
5. Real Business Cycle Model and New Keynesian Macroeconomics: Facts of Business Cycle Fluctuations, Technology Shock, Fiscal Shock. New Keynesian IS Curve, Non-neutrality of Money, Menu Cost. [Lecture Hours 14]

References:

- Azzimonti, M. *et. al. Macroeconomics*, OUP.
- Campanti, F. *et. al. Advanced Macroeconomics – An Easy Guide*, LSE Press.
- Carlin W. and D. Soskice. *Macroeconomics- Imperfections, Institutions and Policies*, OUP.
- Chugh, S.K. *Intermediate Macroeconomics*, MIT Press.
- DSouza, E. *Macroeconomics*, Pearson, India.
- Haijdra, B.J. *Foundations of Modern Macroeconomics*, OUP.
- Mumford P. and D. Peel. *Advanced Macroeconomics: A Primer*, Edward Elgar.
- Niepelt, D. *Macroeconomics*, MIT Press.
- Romer, D. *Advanced Macroeconomics*, McGraw Hill.

Core Course (CC8)- EconometricsII

Total Credit -4

Total Lecture Hours: 60

Full Marks: 50 [Theory: 40 marks +Internal Assessment: 10 marks]

Course Outcome (CO)

The course aims to equip students with advanced econometric techniques for analyzing time series, panel, and observational data. It develops a thorough understanding of dynamic econometric models, panel data estimation methods, and modern approaches to causal inference. The course emphasizes the application of these techniques to empirical economic research, enabling students to select appropriate econometric methods, interpret estimation results, and draw credible inferences for policy analysis and evidence-based decision-making.

Course Learning Outcomes (CLO)

By the end of the course, students will be able to:

- *Explain the theoretical foundations of time series, panel data, and causal inference methods.*
- *Apply appropriate univariate and multivariate time series models, including AR, MA, ARMA, ARIMA, while distinguishing between stationary and non-stationary processes and their implications for econometric analysis.*
- *Understand unit root tests, and cointegration techniques, to analyse economic time series data.*
- *Estimate and interpret panel data models using fixed effects and random effects approaches, and select the appropriate model by employing statistical tests such as the Chow, Breusch–Pagan, and Hausman tests.*
- *Evaluate alternative causal inference methods, including randomized controlled trials, propensity score matching, difference-in-differences, and regression discontinuity designs, to identify and estimate causal effects in empirical research.*
- *Design and conduct empirical econometric analyses by selecting suitable econometric techniques, interpreting estimation results, and drawing evidence-based conclusions for economic research and policy analysis.*

Course Outline:

1. Introduction to Time Series: Stationary and Nonstationary process. Univariate Time Series Model: Autoregressive(AR) process; Moving average (MA) process; Autoregressive moving average(ARMA)process; Autoregressive integrated moving average (ARIMA); Non-stationarity with and without unit root; Unit root tests – Augmented Dickey–Fuller test. Multivariate Time Series Model: Basic concept of cointegration: Granger's representation theorem (single equation framework); Engle-Granger's two step methodology interesting co-integration.[Lecture Hours 18]
2. Panel Data: Concepts of longitudinal data; Unrestricted and Restricted model with Chow Test; Fixed effects and Random effects; Breusch & Pagan(1980)test; Hausman Test. [Lecture Hours 20]

3. Causality analysis: Identification problem. Randomized control trial; Propensity score Matching; Difference in Difference; Regression Discontinuity [Lecture Hours 22]

References:

- Baltagi, Badi H. (2021), *Econometric Analysis of Panel Data*, Springer, 6th Edition.
- Enders, W. (2004): *Applied Econometric Time Series*, John-Wiley & Sons (2/e)
- Maddala, G. S. and K. J. Lahiri (2009), *Introduction to Econometrics*, John Wiley & Sons, England, 4th Edition.
- Wooldridge, Jeffrey M. (2009), *Introductory Econometrics: A Modern Approach*, South-Western Cengage Learning, USA, 4th Edition.
- Wooldridge, J. M., 2002. Econometric analysis of cross section and panel data MIT press. *Cambridge, ma*, 108(2), pp.245-254.
- Das, P. (2026), *Econometrics in Theory and Practice - Analysis of Cross Section, Time Series and Panel Data with Stata 18 and R*, Singapore, Springer
- Angrist, J. D. and Pischke, J. S., (2009). *Mostly harmless econometrics: An empiricist's companion*. Princeton university press.
- Cunningham, S., (2021). *Causal inference: The mixtape*. Yale university press.

Core Course (CC9)-Development Economics

Total Credit -4

Total Lecture Hours: 60

Full Marks: 50 [Theory: 40 marks +Internal Assessment: 10 marks]

Course Outcome (CO)

Students will develop analytical frameworks to understand why countries differ in economic development, integrating macro-level institutional and geographical explanations with micro-level evidence on human capital, networks, and labour markets.

Course Learning Outcomes (CLO)

- *Evaluate competing theories of convergence and divergence, and the role of history and institutions in shaping long-run development trajectories*
- *Analyse how technology adoption, learning-by-doing, and micro-innovation determine productivity and structural transformation*
- *Critically assess the empirical literature on property rights and contract enforcement institutions as determinants of poverty and prosperity*
- *Apply models of credit market imperfection and occupational choice to understand poverty traps and inequality*
- *Explain the role of economic geography, agglomeration, and demand linkages in spatial patterns of development*
- *Interpret causal evidence from randomised and quasi-experimental studies on health, education, and labour market policy*
- *Assess how informal networks shape human capital investment and labour market outcomes, with particular reference to caste and community networks in developing economies*

Course Outline

Development Economics A: Macro Issues

1. Introduction: Why development economics? Big questions. Convergence vs non-convergence views – roles of history and institutions. [Lecture Hours 6]
2. Technology adoption and economic development: Learning by doing – role of micro-innovation—technology adoption. [Lecture Hours 6]
3. Property right institutions and economic development: International evidence. [Lecture Hours 6]
4. Contract enforcement institutions and poverty trap -- credit market imperfection and human capital formation – occupational choice. [Lecture Hours 6]
5. Economic geography and economic development – economics of location – role of demand in open economy. [Lecture Hours 6]

Development Economics B: Micro Issues

6. From growth centric approach to human development centric approach -- health, human capital and labor market outcomes – impact of health and education policies on health, education and labor market outcomes. [Lecture hours 15]
7. Networks, human capital and labor market outcomes – Role of networks in human capital investment and labour market outcomes. [Lecture hours 15]

Suggested Readings:

- Ray, Debraj (2008), "Development Economics", in *The New Palgrave Dictionary of Economics*, edited by L. Blume and S. Durlauf.
- Mookherjee, Dilip and Debraj Ray (2000), *Introduction to Readings in the Theory of Economic Development*, London: Blackwell.
- Economic development as self-discovery, Ricardo Hausmann Dani Rodrik, *Journal of Development Economics*, 72 (2003) 603– 633
- *The Gifts of Athena: Historical Origins of the Knowledge Economy*, Joel Mokyr, Princeton University Press.
- Acemoglu, Daron, Simon Johnson, and James A. Robinson. "The colonial origins of comparative development: An empirical investigation." *American economic review* 91.5 (2001): 1369-1401.
- Acemoglu, D., & Robinson, J. A. (2012). *Why nations fail: The origins of power, prosperity, and poverty*. Crown Publishers.
- Ray, Debraj. *Development economics*. Ch 7. Palgrave Macmillan UK, 2014.
- Galor, O. and J. Zeira. "Income Distribution and Macroeconomics", *Review of Economic Studies* (1993) 60, 35-52
- Ghatak, Maitreesh, and Neville Nien-Huei Jiang. "A simple model of inequality, occupational choice, and development." *Journal of development Economics* 69.1 (2002): 205-226.
- Krugman, Paul. "Increasing returns and economic geography." *Journal of political economy* 99.3 (1991): 483-499.
- Krugman, Paul. *Geography and Trade*. Cambridge, MA: MIT Press, 1991.
- Miguel, Edward, and Michael Kremer. "Worms: identifying impacts on education and health in the presence of treatment externalities." *Econometrica* 72.1 (2004): 159-217.
- Lavy, Victor, Analia Schlosser, and Adi Shany. *Out of Africa: Human capital consequences of in utero conditions*. No. w21894. National Bureau of Economic Research, 2016.
- Duflo, Esther. "Schooling and labor market consequences of school construction in Indonesia: Evidence from an unusual policy experiment." *American economic review* 91.4 (2001): 795-813.
- Spears, Dean. "Exposure to open defecation can account for the Indian enigma of child height." *Journal of Development Economics* 146 (2020): 102277.
- Munshi, Kaivan, and Mark Rosenzweig. "Traditional institutions meet the modern world: Caste, gender, and schooling choice in a globalizing economy." *American Economic Review* 96.4 (2006): 1225-1252.
- Luke, Nancy, Kaivan Munshi, and Mark Rosenzweig. "Marriage, networks, and jobs in third world cities." *Journal of the European Economic Association* 2.2-3 (2004): 437-446.
- Munshi, Kaivan. "Strength in numbers: Networks as a solution to occupational traps." *The Review of Economic Studies* 78.3 (2011): 1069-1101.

(Newly published papers will be periodically incorporated into the reading list under the broad themes mentioned above.)

Skill-Enhancement Course (SEC1)-Economic Methodology: History of Economic Ideas

Total Credit -2

Total Lecture Hours: 30

Full Marks: 25 [Theory: 20 marks +Internal Assessment: 5 marks]

Course Objective

The course aims to develop a critical understanding of the philosophical, methodological, and historical foundations of economic thought. It familiarizes students with the evolution of major economic paradigms, the methodological debates that have shaped the discipline, and the underlying assumptions of competing schools of economics.

Course Learning Outcomes

By the end of the course, students will be able to:

1. *Explain the philosophical foundations of economic inquiry, including epistemology, ontology, methodology, causality, and the evolution of scientific reasoning in economics.*
2. *Compare and critically evaluate the major schools of economic thought—from the Physiocrats and Classical economists to Neoclassical, Keynesian, Marxian, Austrian, and Structuralist traditions—with reference to their theories of value, distribution, and economic organization.*
3. *Analyze contemporary methodological debates in economics by examining competing paradigms, including post-structuralist, postmodernist, positivist, and non-positivist approaches.*
4. *Assess the relevance of alternative scientific metaphors and philosophical perspectives, such as the Cartesian, dialectical, and quantum paradigms, in shaping economic theory and research methodology.*
5. *Critically evaluate the ethical and normative dimensions of economic analysis by contrasting competing perspectives on morality, human behaviour, and economic policy, particularly those of Adam Smith, Milton Friedman, Paul Samuelson, and Mahatma Gandhi.*

Course Outline

1. Foundations of Economic Methodology and Meta-Theory: Epistemology, Ontology, Methodology, Method, Entry Point, Causality Questions [2 hours]
2. Pre-classical and Classical Schools: Theories of value, surplus and distribution: Physiocrats, Mercantilism, Adam Smith, Ricardo, Marx. [8 hours]
3. Contending Economic Theories and Modern Paradigms: Theoretical Humanism and Methodological Individualism – Neoclassical, Late Neoclassical and Austrian Theory; Structuralism – Keynesian Theory and Historical Materialist Theory; Introducing Post-Structuralist Marxian Theory and Postmodernist Approach of McCloskey. [10]
4. Scientific Metaphors in Economic Methodology: Cartesian/Mechanistic Paradigm, Dialectical Biology and Quantum Space [4 hours]
5. Positivist Debate: Friedman's Instrumentalism versus Samuelson's Operationalism/Realism. [2 hours]
6. Beyond Positivism: The Economics of Morality — Mahatma Gandhi versus Adam Smith. [4 hours]

References:

- Acharyya, R., & Bhattacharya, N. (Eds.). (2020). *Research methodology for social sciences*. Routledge India.
- Blaug, M. (1983). *Economic theory in retrospect* (3rd ed.). Vikas Publishing House.

- Dasgupta, A. K. (2002). *Gandhi's economic thought*. Routledge.
- Friedman, M. (1953). The methodology of positive economics. In M. Friedman (Ed.), *Essays in positive economics* (pp. 3–43). University of Chicago Press.
- Gandhi, M. K. (1934, September 21). "Economics and Ethics." *Harijan*.
- Holcombe, R. G. (2014). *Advanced introduction to the Austrian school of economics*. Edward Elgar Publishing.
- Hunt, E. K., & Lautzenheiser, M. (2011). *History of Economic Thought: A Critical Perspective* (3rd ed.). M.E. Sharpe.
- Levins, R., & Lewontin, R. (1985). *The dialectical biologist*. Harvard University Press.
- Madra, Y. M. (2016). *Late neoclassical economics: The restoration of theoretical humanism in contemporary economic theory*. Routledge.
- Magnusson, L. (2015). *The Political Economy of Mercantilism*. Routledge.
- Mirowski, P. (1989). *More heat than light: Economics as social physics, physics as nature's economics*. Cambridge University Press.
- McCloskey, D. N. (1985). *The rhetoric of economics* (any edition). University of Wisconsin Press.
- Meek, R. L. (1962). *The economics of physiocracy: Harvard monographs in the history of science*. George Allen & Unwin.
- Orrell, D. (2022). *Quantum Economics and Finance: An Applied Mathematics Introduction* (3rd ed.). Panda Ohana Publishing.
- Samuelson, P. A. (1963). Problems of methodology: Discussion. *The American Economic Review*, 53(2), 231–236.

Skill-Enhancement Course (SEC2):Data Visualization and Management
Total Credit -2
Total Lecture Hours: 30

Full Marks: 25 [Theory: 15 marks +Internal Assessment: 10 marks]

Course Objectives

The course aims to equip students with the knowledge and analytical skills required to manage, visualize, and analyze datasets using modern statistical and spatial tools. It introduces the fundamentals of Geographic Information Systems (GIS), panel data analysis, and causal inference techniques, enabling students to apply data-driven methods for research, policy analysis, and evidence-based decision-making.

Course Learning Outcomes:

Upon successful completion of this course, students will be able to:

- *Understand the principles and techniques for managing large datasets, including data storage, organization, and efficient handling of structured and unstructured data.*
- *Develop skills in data wrangling and visualization by cleaning, transforming, and presenting data through appropriate graphs, plots, and other visual analytical tools to facilitate informed decision-making.*
- *Acquire fundamental knowledge of Geographic Information Systems (GIS), including spatial data concepts, coordinate systems, and basic GIS applications for data analysis and mapping.*
- *Apply panel data analysis techniques to evaluate longitudinal datasets, select appropriate econometric models, and interpret empirical results.*
- *Understand and implement causal inference methods by applying modern causal estimation techniques to identify and evaluate causal relationships in observational and experimental data.*

Content

1. Management of big datasets. [Lecture Hours 6]
2. Visual representation of Data: Data wrangling, Graphs and plots. [Lecture hours 6]
3. Introduction to GIS fundamentals. [Lecture Hours 4]
4. Analysis of panel data. [Lecture Hours 5]
5. Causal estimate. [Lecture Hours 9]

References

- Healy, K. (2018). Data visualization: a practical introduction. Princeton University Press
- Bolstad, P., Manson, S. (2022). GIS Fundamentals: A First Text on Geographic Information Systems. United States: Eider Press.
- Foster, I., and Ghani, R., and Jarmin, R.S., and Kreuter, F., and Lane, J. (2020). Big Data and Social Science: Data Science Methods and Tools for Research and Practice. United States: CRC Press
- Das, P. (2026), Econometrics in Theory and Practice - Analysis of Cross Section, Time Series and Panel Data with Stata 18 and R, Singapore, Springer
- Cameron, A. C., Trivedi, P. K., Cameron, A. C., & Trivedi, P. K. (2010). *Microeconometrics using stata* (Vol. 2). College Station, TX: Stata press.