BENGALURU
DR. B. R. AMBEDKAR
SCHOOL OF
ECONOMICS

A Unitary University, Govt. of Karnataka

MSc Economics

Course Structure and Syllabus

November 2020

MSc Economics program outline

Bengaluru Dr. B. R. Ambedkar School of Economics (BASE) University aims to be globally recognized as an institute of excellence in the field of Economics and allied academic disciplines. BASE University offers a 2-year MSc Economics program for candidates who are well motivated and seek an in depth understanding in various subjects in the domain of Economics. The quantitative focus in the core courses will add value in any area of employment. In addition, the elective courses will permit a specialisation designed for the corporate sector, public policy or research or any combination of these that each student is interested in.

Five core courses each are a part of the first two semesters and two core papers are offered in the third semester. Students can choose six or more electives in the third and fourth semesters. An internship of two months' duration in the corporate/academic research/public policy sectors is a requirement. The fourth semester also requires students to complete a dissertation on a topic of their choice under the guidance of the faculty members. The skills acquired through these taught and practical courses will impart a well-rounded advanced education to BASE University graduates who will be industry-ready by the end of the programme. The syllabus presented here provide a broad framework of the program. The final discretion on the topics to be covered within each course rests with the concerned faculty.

Bengaluru Dr B. R. Ambedkar School of Economics University
MSc Economics Course

Subject Code	Subject	Credits	
Semester I			
All core courses	Advanced Microeconomics [PE1401]	4	
	Quantitative Techniques in Economics [PQ1401]	4	
	Advanced Econometrics-I [PQ1402]	4	
	History of Economic Thought [PE1402]	4	
	Programming with R [PQ1403]	2	18
Semester II			
All core courses	Advanced Macroeconomics [PE2401]	4	
	Public Economics [PE2402]	4	
	Advanced Econometrics-II [PQ2401]	4	
	Game theory [PQ2402]	4	
	Advanced Research Methods [PE2403]	4	
	Programming with Python [PQ2403]	2	22
	Internship [PS2401]	2	2
Semester III			
Core	International Trade and Finance [PE3401]	4	
Core	Indian Economy [PE3402]	4	8
Electives	Monetary Economics [PD3401]		
	Behavioural Economics [PD3402]		
	Development Economics [PD3403]		
	Financial Econometrics [PD3404]		
	Global Financial Markets [PD3405]		
	Economics of Banking and Finance [PD3406]		
	World Economic History [PD3407]		
	Labour Economics [PD3408]		
	Introduction to Big Data Analytics [PG3401]		
	Law and Economics [PG3402]		
Semester IV			
Electives	Dissertation [PS4401]		
	Political Economy [PD4401]		
	Economics of climate change [PG4401]		
	Corporate Finance [PD4402]		

Indian Economic Thought [PD4403]
New Institutional Economics [PD4404]
Gender and Economics [PD4405]
Advanced Operations Research [PG4402]
Health Economics [PD4406]
Agricultural Economics [PD4407]
Analysis of the Informal Economy [PD4408]
Introduction to Artificial Intelligence and Machine Learning [PG4403]

Total core credits	18+22+2+8	50
Minimum elective credits (7 courses)		28
Minimum total credits		78

Semester I

Advanced Microeconomics

Course Objective: This course examines the economic decisions made by households and firms and their interaction. It also studies the equilibrium in presence of externalities/public goods and information asymmetry. Additionally, there will be a discussion of social choice theory and welfare economics.

Learning outcomes: Students should be able to appreciate the nuances of consumer behaviour, the motivations and decision-making at the level of firms, the functioning of various market structures; and the associated welfare outcomes.

1. Theory of consumer behaviour:

Preference and choice; Demand; Duality; Revealed preference; Aggregate demand; utilitarianism and its critique, irrationality and economic theory

2. Theory of the firm:

Production sets; Profit maximization and cost minimization; Supply; Aggregation; Duality in production, Simon's views on rational decision-making in business; the entrepreneurial state

3. Choice under uncertainty:

Expected utility theory; Money lotteries; Risk aversion; Stochastic dominance

4. Competitive markets

Imperfect competition; Externalities; Tirole on market power and regulation; Roth and Shapley on market design

5. Adverse selection:

Market for lemons; Information and efficiency of market outcomes; Signalling; Screening; Moral hazard and Principal-agent problem under asymmetric information; Information and market performance; free riding

6. General equilibrium:

General equilibrium in competitive markets; General equilibrium theory in consumption and production, General equilibrium under uncertainty

7. Welfare economics:

Fundamental theorem of welfare economics, Social choice theory; Social Choice and Arrow's Theorem and possibility of social choice; Measurability, Comparability, and Invariance using Rawlsian form and Utilitarian form; Social Justice; Social choice and Gibbard-Satterthwaite Theorem; Deaton on welfare; cooperative conflict

References

Mas-Colell, A., Whinston, M. D., & Green, J. R. (1995). Microeconomic theory (Vol. 1). New York: Oxford university press.

Jehle, G. A. & Reny P. J. (2010). Advanced microeconomic theory, 3rd ed

Krugman, P., & Wells, R. (2010). Microeconomics (for AP). New York: Worth Publishers.

Rubinstein, A. (2012). Lecture notes in microeconomic theory: the economic agent. Princeton University Press.

Kreps, David M. Microeconomic Foundations I: Choice and Competitive Markets. Vol. 1. Princeton University Press, 2012.

Akerlof, G. A. (1978). The market for "lemons": Quality uncertainty and the market mechanism. In Uncertainty in economics (pp. 235-251). Academic Press.

Bowles, S. (2009). Microeconomics: behavior, institutions, and evolution. Princeton University Press.

Jeffrey, M. P. (2017). MICROECONOMICS: Theory and Applications with Calculus Plus Myeconlab with Pearson Etext. Pearson

Varian, H. R. (1992). Microeconomic analysis (No. 338.5 V299m 1992). WW Norton.

Quantitative Techniques in Economics

Course objective:

This course is designed to teach students advanced quantitative techniques in statistics and mathematics. The course gives quick refresher to some of the fundamental concepts in mathematics and statistics before delving deeper into the application side. The program includes probability theory, differential calculus, multivariate calculus, optimization, and dynamics.

Learning outcomes: Help students to successfully use mathematics in economics and business applications and enhance their ability to communicate economic ideas and make economic arguments with the help of mathematical equations.

1. Probability Theorem

Random variables; Concept of probability; conditional probability; Probability density & distributions -types; Central Limit Theorem; Stochastic process; Markov Chains; Poisson process; Brownian Motions; Estimation- OLS, Maximum likelihood and method of moment estimation; Interval estimation.

2. Hypothesis testing

Inferential statistics; Decision rules, alpha beta risk. p-values; Uni-, bi-, multi-variate tests for mean, variance and proportion; ANOVA; MANOVA, ANCOVA, MANCOVA; Tests of goodness of fit

3. Differential Calculus

Single variable calculus and its applications; Functions and Real Analysis; Derivative, limit, inequalities, absolute values, limit theorems and continuity and differentiability of a function. Differentiation of function of several variables; higher order derivatives; Taylor's approximation; Euler's theorem; Exact differential equations. Non-linear differential equations of first orders the quantitative; Discrete time: First order differential equations. The dynamic stability of equilibrium.

4. Optimization and applications

Unconstrained optimization – first order and second order conditions; global maxima and global minima; constrained optimization- equality and inequality constraints; mixed constraints; Kuhn Tucker formulation; Multiplier; Lagrange multiplier method; Envelope theorems; Homogeneous and Homothetic Functions; Concave and Quasiconcave Function; Economic applications; Linear and Non-linear Optimization; Duality theory; Linear programming

5. Dynamics

Static input – output models – The genesis of dynamic systems. Solving simultaneous dynamic equations. Dynamic input-output models. Application to inflation – unemployment model.

Linear programming – Graphical approach, the general LP problem, introduction to duality theory, the duality theorem-A general economic interpretation.

Reference

Ross, S. M. (2014). Introduction to probability models. Academic press.

Ross, S. (2009). A First Course in Probability 8th Edition. Pearson.

Chung, K. L. (2012). Elementary probability theory with stochastic processes. Springer Science & Business Media.

Freedman, D., Pisani, R., Purves, R., & Statistics, W. W. (1998). Norton & Company. New York.

Simon, C. and L. Blume, Mathematics for Economists, Norton, London, 1994

Sydsaeter, K., Hammond, P., Seierstad, A., & Strom, A. (2008). Further mathematics for economic analysis. Pearson education.

Wainwright, K. (2005). Fundamental methods of mathematical economics/Alpha C. Chiang, Kevin Wainwright. Boston, Mass.: McGraw-Hill/Irwin,.

Bartle, R. G., & Sherbert, D. R. (2000). Introduction to real analysis (Vol. 2). New York: Wiley.

Advanced Econometrics-I

Course objective: This course is meant to familiarize students with time series econometric techniques, commonly used in financial analysis, policy formulation and academic research. Each module includes lab sessions where students apply these concepts using relevant data. Understanding of Basic econometrics concepts and Statistics is a prerequisite for this course.

Learning outcomes: The students will be able to choose the appropriate time series techniques to analyse various economic problems and draw suitable inferences.

1. Basic concepts of Time series

The concept of data generating process - Stochastic process and Deterministic process, white noise process, stationary and non-stationary stochastic process – with and without intercept and trend, difference stationary and trend stationary process, concept of unit root, tests for detecting unit root.

2. Univariate Time Series Models

Autoregressive (AR) model, Moving Average (MA) model, ARMA, ARIMA and SARIMA models, Box Jenkins Methodology – model identification, diagnostics, forecasting – dynamic vs static forecasts, Smooth transition models

3. Multivariate time series models

Cointegration – Engle Granger and Johansen Juselius methodology, error correction model - VAR models –lag length selection, factorization – Cholesky decomposition and structural factorization, Causality tests in VAR framework, impulse response functions, variance decomposition - ARDL approach – cointegration with mix of I(0) and I(1) variables, bounds testing, error correction model; NARDL model.

4. Volatility modelling

Modelling high frequency data; testing for ARCH effect, estimating ARCH models – ARCH, GARCH, ARCH – M, TGARCH, EGARCH, diagnostic checks.

5. Introduction to Spectral Analysis and Bayesian Approach

Time domain and Frequency domain, The spectrum and its properties, Spectral representation for weekly stationary process, spectrum estimation, Wavelet coherence analysis. Bayesian analysis – Overview of classical and Bayesian views on probability, the role of priors, posterior estimation, Gibbs sampling, Markov Chain Monte Carlo (MCMC) methods.

References:

Kerry Patterson (2000), An Introduction to Applied Econometrics, Palgrave Macmillan.

Chris Brooks (2002), Introductory Econometrics for Finance, Cambridge UP

James D. Hamilton (1994), Time Series Analysis, Princeton University Press.

Pesaran, M. H. (2015). Time series and panel data econometrics. Oxford University Press.

Walter Enders (2015), Applied Econometric Time Series, 4th Edition, Wiley.

Bernardo, Jose M. and Adrian F. M. Smith (1994): Bayesian Theory, Wiley Series in Probability and Statistics, John Wiley & Sons

Chan, Joshua, Gary M. Koop, Dale J. Poirier and Justin L. Tobias (2019): Bayesian Econometric Methods, 2nd Edition, Cambridge University Press

Davidson, R., & MacKinnon, J. G. (2004). Econometric theory and methods (Vol. 5). New York: Oxford University Press.

Koopmans, L. H. (1995). The spectral analysis of time series. Elsevier.

Peter Kennedy (2008) A Guide to Econometrics, 6th Edition, Blackwell Publishing

Priestley, M. B. (1981). Spectral analysis and time series: probability and mathematical statistics

Verbeek, M. (2008). A guide to modern econometrics. John Wiley & Sons.

History of Economic Thought

Course objective: This course is meant to give a bird's eye view of the entire subject of economics and highlight the origins of the most foundational concepts in economics that illuminate the modern world.

Learning outcomes: The value of this lies in the students being in a position to carry out a more nuanced critique of scholarly and policy claims with regard to economic phenomena.

1. Introduction, and the early thinkers:

Ways of doing economics; some preliminary discussions in methodology; Greek philosophy; ancient Indian economic thought, mercantilism, physiocracy

2. The Classicals:

Mandeville and the bees; the Scottish enlightenment and Smith; Ricardo's and Malthus' dismal world; Marx's dire predictions; Say's law; Mill's individualism; Senior's abstinence theory; some idealists and socialists

3. The Marginalists:

Jevons' logical calculus; Menger and the Austrian school; Bentham's utilitarianism; Walras' articulation of the economic sciences; Marshall and the Neo-Classical school; Pareto's welfare economics

4. Twentieth and twenty-first century thinkers:

Keynes' heresies; Hayek's critique; Schumpeter's gale of creative destruction; Friedman's counter-revolution; approaches to the major economic issues of the twenty-first century - New Keynesians; Neo-Marxists; experimental economists

References

Blaug, M. (1997). Economic theory in retrospect. Cambridge university press.

Gide, C., & Rist, C. (2000). Early Histories of Economic Thought, 1824-1914: History of economic doctrines (Vol. 8). Taylor & Francis US.

Heilbroner, R. L. (2011). The worldly philosophers: The Lives, Times and Ideas of the Great Economic Thinkers. Simon and Schuster.

Hunt, E. K., & Lautzenheiser, M. (2015). History of Economic Thought: A Critical Perspective. Routledge.

Kishtainy, N. (2018). A little history of economics. Yale University Press.

Morgan, M. S. (2012). The world in the model: How economists work and think. Cambridge University Press.

Rodrik, D. (2015). Economics rules: Why economics works, when it fails, and how to tell the difference. OUP Oxford.

Schumpeter, J. A. (2006). History of Economic Analysis. Routledge.

Screpanti, E., & Zamagni, S. (2005). An Outline of the History of Economic Thought. Oxford University Press on Demand.

Programming with R

Course Objective: This course aims to introduce students to programming using R. This program is a blend of probability theory and programming. Given the increasing importance of programming in corporate, policy and academic career, this program starts right from basic coding and proceeds to data visualizations, various regression techniques.

Learning outcome: This program enables students to write their own codes for various applications with special focus on techniques used in Economics. The students would become familiar with Data visualization and various regression techniques using R programming

1. Introduction to Programming language

Program Design, Program Quality, Algorithms, Pseudo code, Flowcharts.

R programming: Evolution of R, Features of R, R – Environment setup, basic syntax

2. Data Types and Operators

Data Types: Vectors, list, Matrices, Array, factors, data frames

Operators: Arithmetic, Logical, relational, Assignment

3. Decision Making, Loops and other Packages

Decision Making: If, If – Else, Nested If – Else, Switch statements,

Loops: Repeat, While, For loop, loop control statements: Break, Next

Functions, Strings, Data Frames, R Packages

4. Data Visualization and Regression Analysis

Various packages of R for Data Visualization, Data Import Techniques

Regression: Simple linear regression, Multiple regression, Qualitative predictors, Interaction terms, Non-linear transformations of the predictors

5. Classification

Linear discriminant analysis; Quadratic discriminant analysis; K-nearest neighbours

Reference

Grolemund, G., & Wickham, H. (2018). R for data science.

Lander, J. P. (2018), R for Everyone: Advanced Analytics and Graphics (second edition)

James, G., Witten, D., Hastie, T., &Tibshirani, R. (2013). An introduction to statistical learning (Vol. 112, p. 18). New York: springer.

Chang, W. (2018). R graphics cookbook: practical recipes for visualizing data. O'Reilly Media.

Mark Gardener (2013), Beginning R – The Statistical Programming Language

Mailund, T. (2017). Beginning Data Science in R: Data Analysis, Visualization, and Modelling for the Data Scientist. Apress.

Semester II

Advanced Macroeconomics

Course Objective: The course discusses various macroeconomic concepts according to the extant schools of thought. Further, the concepts of consumption, savings, and investment are discussed in the dynamic framework. It also examines the various financial crises and banking systems.

Learning outcomes: Students will be in a position to distinguish between the ideas of the different schools of thought, as they are apparent in policy discussions. They will be equipped with methodological and analytical skills and will be able to fruitfully apply these skills to macroeconomic policy formulation.

1. Keynesian ideas and other schools of macroeconomics

Recapitulation of various schools of thought: Classical school, Keynesian, Monetarist, New classical, New Keynesian

2. Role of expectation in macroeconomics

Adaptive expectation hypothesis; Expectation augmented Philips curve; Rational expectation hypothesis and equilibrium approach; Lucas supply function; Policy ineffectiveness theorem; The Lucas critique; Real Business Cycle Theory; Role of News

3. New Keynesian Economics

Imperfect competition; Core propositions of New Keynesian Economics; Small menu cost model; Implicit wage contract model; Efficiency wage theory; Insider-outsider model; co-ordination failures and non-Walrasian theories; Introduction to DSGE model

4. Consumption, Investment and Markets

Consumption under Certainty: The Life-Cycle Hypothesis (LCH) and Permanent Income Hypothesis (PIH); Consumption under uncertainty: The Random Walk Hypothesis (RWH) – Two tests of Random Walk Hypothesis; Interest Rate and Saving; Consumption and risky assets; Alternative views of consumption; Investment and stock of capital; Investment with adjustment costs; Tobin's q; Uncertainty and investments; Financial market imperfections; Basic Infinite Horizon Models of Consumption and Investment: The Ramsey problem; The Decentralized economy; The Government in the decentralized economy; The Overlapping Generations Model.

5. Credit market and macro economy

The consumption-saving decision and credit markets: Two period model of the Economy; Ricardian equivalence theorem; Credit market imperfections and consumption; Asymmetric information and the financial crisis; Limited commitment and the financial crisis; Social security programs.

References:

Romer, David. Advanced macroeconomics. McGraw Hill, 2012.

Wickens, Michael. Macroeconomic Theory: A Dynamic General Equilibrium Approach. Second Edition, Princeton University Press, 2012.

Williamson, Stephen D. Macroeconomics, Sixth Edition, Pearson Publication, 2018.

Schiller, Bradley, and Gebhardt, Karen. The Macro Economy Today, 15th Edition, McGraw-Hill Education, 2019.

Snowdon, Brian, and Howard R. Vane. Modern macroeconomics: its origins, development and current state. Edward Elgar Publishing, 2005.

Blanchard, Olivier, and David R. Johnson. Macroeconomics, Global Edition. Essex: Pearson Education Limited, 2013.

Canova, F. (2011). Methods for applied macroeconomic research. Princeton university press.

Cencini, A. (2005). Macroeconomic foundations of macroeconomics (Vol. 72). Psychology Press.

Clarida, Richard, Jordi Galí, and Mark Gertler. 1999. "The Science of Monetary Policy: A New Keynesian Perspective." Journal of Economic Literature 37(2): 1661–1707

Galí, J. (2015). Monetary policy, inflation, and the business cycle: an introduction to the new Keynesian framework and its applications. Princeton University Press.

Mankiw, N. Gregory, and Mark P. Taylor. Macroeconomics. Cengage, 2017.

Paul Levine, 2019. "The State of DSGE Modelling," School of Economics Discussion Papers 0319, School of Economics, University of Surrey.

Romer, P. (2016). The trouble with macroeconomics. The American Economist, 20, 1-20.

Sargent, Thomas J. Dynamic macroeconomic theory. Harvard University Press, 2009.

Snowdon, B., Vane, H. R., &Wynarczyk, P. (1994). A modern guide to macroeconomics.

Public Economics

Course Objective: This course discusses some facets of public economics from public goods to social security and taxes. The paper focuses on various instances of market failures and considers alternative government responses. The course emphasises on the various social security measures and their implications.

Learning outcomes: The course would help students appreciate government policies from the point of view of economic efficiency and equity. They will be able to carry out a critical analysis of government policies, given the constraints, and propose appropriate interventions.

1. Public goods

Public finance and government; Public goods and efficient provision of public goods; Public versus private provisions; public goods and public choice; Externalities and public goods; externality theory, private-sector solutions to negative externalities, public-sector remedies for externalities; Allocation of resources, Arrow's Impossibility theorem- political equilibrium- voluntary exchange model and Samuelson's impossibility of decentralised provision of public goods; Tiebout mode, Cost-benefit analysis- measuring the costs of public projects, measuring the benefits of public projects; Market failures; Market failure vs. Government failure

2. Public revenue

Tax and non-tax sources of revenue; Types of taxes; Tax systems, vertical and horizontal equity; Haig-Simons comprehensive income definition; ability-to-pay considerations; Tax incidence; partial equilibrium models; general equilibrium models; Tax efficiency; Excess burden; Taxation and economic efficiency; efficient and equitable taxation, optimal taxation; Taxes and labour supply; Taxes on savings; taxes on risk taking and wealth; taxation on business income; Tax benefit models

3. Public expenditure

Theories of public expenditure, Cost Benefit Analysis, Social Rate of Discount, Shadow Prices; Social Security; consumption-smoothing benefits of social security, social security and retirement, optimal social insurance; unemployment benefits; health and insurance; income distribution and welfare programs; welfare policies in the India; moral hazard costs of welfare policy; cash transfers; universal basic income

4. Public Debt

Budget deficit and public debt; Debt dynamics; Public debt management- centre and state; FRBM; Recent trends in public debt

5. Budget processing

Concepts; types; instruments; objectives; budget process; budget execution

References

Gruber, J. (2016) Public Finance and Public Policy, 5th edition, Worth Publishers.

Rosen, H. and Gayer, T. (2014) Public Finance, 10th edition, McGraw-Hill.

Stiglitz, J. and Rosengard, J. (2015) Economics of the Public Sector, 4th edition, W. W. Nor-ton & Company.

Atkinson, A. and Stiglitz, J. (1980) Lectures on Public Economics, McGraw-Hill; reprinted by Princeton University Press (2015).

Feldman, Allan M. and Serrano, Roberto (2005). Welfare Economics and Social Choice Theory (2nd Edition), Springer, New York, USA.

Myles, G. (2008). Public Economics, Cambridge University Press.

Musgrave R. A and Musgrave PA, Public finance in theory and practice I.- 5th ed

Auerbach, A. and Feldstein M. (1985). Handbook of Public Economics, vol. 1,2,3,4,

Auerbach, A., Chetty, R., Feldstein M. and Saez, E. (2013). Handbook of public economics, vol. 5,

Basu K and Maertens, (2013), TheNew Oxford Companion to Economics in India, Oxford University Press.

Advanced Econometrics-II

Course Objective: This course focuses on cross- section and panel data regression models. It also covers various models associated with qualitative dependent variables and quantile regression models.

Learning outcomes: students will be able to apply the advanced econometric tools to cross-section and panel data, and arrive at suitable inferences.

1. Generalized Method of Moments

Endogeneity in linear regression models, Instrumental Variables Approach- Instrumental variables, Instrumental variables estimator. Finite-sample and asymptotic properties of the IV estimator. Choice of instruments, Generalized Method of Moments (GMM) Estimator. Asymptotic properties of GMM estimator. Efficient GMM estimator. Test of overidentifying restrictions.

2. Panel Data Models

Pooled regression, fixed effects; random effects, first difference models; Hausman test; Time series correlation in panel data; Panel unit root tests; Co- integration tests; Dynamic panel data model: panel IV, Arellano-Bond estimates, panel VAR; Panel ARDL Models; Heteroskedasticity and serial correlation in panel data; Spatial Panel Data

3. Qualitative Dependent Variable Models

Limited dependent Variable – Logit Model – Probit Model - Tobit Model - Two-limit tobit, truncated regression model - Heckman Two-step method - Hurdle model- Count data Model: Poisson, Negative Binomial and Zero-inflated model; Multinomial Logit model; Ordered logit model; Nested logit model

4. Quantile Regression.

Review of Quantiles. Population Quantiles, Sample Quantiles. Conditional Quantile Function. Quantile Regression Estimator.

5. Other models

Difference-in-difference; Propensity score matching; non-parametric techniques; randomised control trials

Reference

Baltagi, B. (2008). Econometric analysis of panel data. John Wiley & Sons.

Long, J. Scott. 1997. Regression Models for Categorical and Limited Dependent Variables. Thousand Oaks, CA: Sage.

Agresti, A. (2018). An introduction to categorical data analysis. John Wiley & Sons.

Wooldrige, J.M, Econometric Analysis of Cross Section and Panel Data, MIT Press, Cambridge

Cameron, A. C. & Trivedi, P. K. (2005), Microeconometrics: Methods and Applications. Cambridge University Press

Greene, W.H. (2011). Econometric analysis. 7th edition. Prentice Hall. New York.

Hsiao, C., Analysis of Panel Data, Cambridge University Press, 2nd ed, 2004; 3rd ed., 2014.

Pesaran, M.H., Time Series and Panel Data Econometrics. Oxford: Oxford Univ Press, 2015.

Koenker, R. (2005). Quantile Regression (Econometric Society Monographs). Cambridge: Cambridge University Press.

Koenker, Roger , Victor Chernozhukov , Xuming He and Limin Peng , "Handbook of Quantile Regression" (Boca Raton: CRC Press, 25 Oct 2017), accessed 13 Nov 2020 , Routledge Handbooks Online.

Game Theory and Applications

Course Objective: Game theory studies strategic interactions amongst rational decision-makers. Traditionally, game-theoretic tools have been applied to solve problems in Economics, Business, Political Science, Biology, Sociology, Computer Science, Logic, and Ethics. In recent years, applications of game theory have been successfully extended to several areas of engineered / networked systems such as wireline and wireless communications, static and dynamic spectrum auction, social and economic networks. This course is intended to provide students with a comprehensive treatment of game theory with specific emphasis on applications in Economics.

Learning outcomes: Students will have a thorough understanding of the various cooperative and non-cooperative games that can be used to understand strategic interactions, which can be applied to various fields of economics.

1. Introduction to Game Theory

Introduction to game theory; Theory of rational choice; Interacting decision makers; Strategies, costs, and payoffs

2. Strategic Games and Nash Equilibrium

Strategic games; Examples (Prisoner's dilemma); Nash Equilibrium, concepts and examples; Best response functions; Dominant strategies; Pure strategy v/s Mixed strategy; Symmetric games and symmetric equilibria; Cournot's model of duopoly market; Bertrand's model of duopoly market; Electoral Competition; War of Attrition; Voting; Accident Laws

3. Mixed Strategy Nash Equilibrium

Introduction; Strategic games with randomisation; Mixed strategy Nash equilibrium: concept and examples; Dominated Actions; Formation of Players' beliefs

4. Extensive Games and Nash Equilibrium

Introduction to extensive games; Strategies and outcomes; Nash equilibrium; Subgame perfect Nash equilibrium; Backward induction; Stackelberg model of duopoly markets; Ultimatum game

5. Designing games

Repeated games; Bayesian games; Auctions

Routing games; Selfish routing; Quantifying inefficiency of equilibria; Price of Anarchy; Social optimum; Price of stability; Scheduling games

Population games; Evolutionary game theory; Evolutionary stable strategy; Replicator dynamics

6. Cooperative and Non-Cooperative Games

Cooperative game theory, Non-cooperative games; Nash bargaining; Adaptive decision making; Mechanism design; Algorithmic mechanism design; Distributed algorithmic mechanism design

References:

Maschler, M., and E. Solan. S. Zamir (2013). Game theory. Cambridge University Press

Başar, T., & Olsder, G. J. (1998). Dynamic noncooperative game theory. Society for Industrial and Applied Mathematics.

Fudenberg, D., & Tirole, J. (1991). Game theory mit press. Cambridge, MA, 86.

Gibbons, R. (1992). A primer in game theory–Prentice-Hall.

Karlin, A. R., & Peres, Y. (2017). Game theory, alive (Vol. 101). American Mathematical Soc.

Leyton-Brown, K., & Shoham, Y. (2008). Essentials of game theory: A concise multidisciplinary introduction. Synthesis lectures on artificial intelligence and machine learning, 2(1), 1-88.

Osborne, M. J. (2004). An introduction to game theory (Vol. 3, No. 3). New York: Oxford university press.

Osborne, M. J., & Rubinstein, A. (1994). A course in game theory. MIT press.

Weibull, J. W. (1997). Evolutionary game theory. MIT press.

Advanced Research Methods

Course Objective: The core objective of this course is to familiarize the students with the philosophy of research and prepare for academic research. This course begins by introducing the scientific research and the evolution of research methodology in Economics over the years.

Learning outcomes: Students will have an understanding of the process of knowledge creation in the social sciences. Further, they will be in a better position to write research reports up to good academic standards.

1. Philosophy of Science & Research-

Epistemology, Positivism, Empiricism and Interpretivism; Nature of Science- Karl Popper, Thomas Kuhn, Lakatos; Logic- Rules, Logical Fallacy; Models of Scientific Explanation: Hypothetico-Deductive Model, Deductive-Nomological Model, and Inductive Approach

2. Methodology of Economics

Seven decades of Research Methodology in Economics; Types of research, types of knowledge and methods for the three types of research; Research process; Research Design; Research Literature; Identification of Research gap; Research Proposal

3. Data and Sampling

Methods of sampling and Sampling Design; Data- types; Data collection tools; Questionnaire design; Sampling errors; Different data Sources

4. Experimental Studies and design

Case studies; basic experimental design; randomised design; factorial designs

5. Research Results Reporting, Referencing Techniques and Plagiarism

Types of research reports, Structure of a research report, Presentation of tabular data and figures; Preparing bibliography, foot notes and annexure; Style of reference writing; Ethics in research; Plagiarism in research; Avoiding plagiarism; Introduction to software packages of detecting plagiarism

Reference

Davis, J. B., Hands, D. W., & Mäki, U. (1998). The handbook of economic methodology.

Hausman, D. M. (Ed.). (1994). The philosophy of economics: An anthology. Cambridge University Press.

McCloskey, Dierdre. (1998). Rhetoric of Economics. University of Wisconsin Press

Daniel Hausman, "Appendix: An Introduction to Philosophy of Science," The Inexact and Separate Science of Economics. Cambridge: Cambridge University Press, 1992, pp. 281-329

Hausman, D. M. (1989). Economic methodology in a nutshell. Journal of Economic Perspectives, 3(2), 115-127.

Boumans, M., & Davis, J. B. (2015). Economic methodology: Understanding economics as a science. Macmillan International Higher Education.

Godfrey-Smith, P. (2009). Theory and reality: An introduction to the philosophy of science. University of Chicago Press.

Lakatos, I. (1968, January). Criticism and the methodology of scientific research programmes. In Proceedings of the Aristotelian society (Vol. 69, pp. 149-186). Aristotelian Society, Wiley.

Popper, K. (2014). Conjectures and refutations: The growth of scientific knowledge. routledge.

Popper, K. R. (1982). Science: conjectures and refutations. Philosophy of science and the occult, 104-111.

Karl Popper, "Science: Conjectures and Refuations," in Conjectures and Refutations. London: Routledge and Kegan Paul, 1963,

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Programming with Python

Course Objective: This course aims to introduce students to Python programming. The Python programming language is one of the most popular programming languages worldwide and this course will be of great interest to all learners who would like to understand the basics of programming using the Python language and its applications in several domains.

Learning Outcome:

Students will be able to write their own Python codes for various applications including organizing data, data visualization, summary, various regression techniques and decision trees.

1. Fundamentals of Python Programming Language

Introduction to Python Language, Key features of Python Language, Applications of Python, Installing Python, basic syntax, editing, saving, and running a script, Keywords and Identifiers, comments, Input-Output Operations.

2. Working with Data and Operators

Implicit Declaration of Data Types, Python Numbers (Integers, floating point numbers, and complex numbers), Python Strings, Python boolean data type, List, Tuples, Sets, Dictionaries.

Operators: Arithmetic operators, Comparison/Relational Operators, Increment Operators, Logical operators, Python Identity Operators, and Python Operators Precedence

3. Control Flow Statements and Functions

Decision Making: Simple If Structure, if else structure, if elif structure, and nested If Structure; Loops: Do - While loop, For loop, Nested Loop Structures, and Inserting conditions in Loops and vice versa; Break, Continue, Pass; Functions and Modules: Writing and Calling Functions, Local and Global Scope, Call by Value, Call by reference.

4. Data Visualization and Regression Analysis

Various packages of R for Data Visualization, Data Import Techniques

Regression: Simple linear regression, Multiple regression, Qualitative predictors, Interaction terms, Non-linear transformations of the predictors

5. Classification

Linear discriminant analysis; Quadratic discriminant analysis; K-nearest neighbours

6. Beyond Linearity

Polynomial regression; Regression Splines; Smoothing splines; Generalized additive models; Non-linear modelling

7. Decision Trees

Basics of decision trees- Regression trees, Classification trees; Trees vs. linear models; Bagging, Random forests, Boosting

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Semester III

International Trade and Finance

Course Objective: The course aims to familiarize students with the two major aspects in a global economy - trade and finance. The course gives an elaboration of the recent trade theories along with the issues in international finance, especially the determination of exchange rates and currency trade.

Learning outcomes: Students will be able to understand the current account in a dynamic framework. They will be able to carry out a nuanced analysis of the inner workings of international finance.

1. Balance of Payments, Exchange Rates and International Monetary System

Balance of Payments Accounts; Exchange Rate systems; Disequilibrium in BOP; Elasticity approach to BOP, absorption approach, monetary approach to BOP; International monetary system – gold standard, the Bretton Woods system, post-Bretton Woods monetary arrangements

2. Trade Theories

Comparative advantage; HO theory; Factor price equalisation; Intra industry trade; New trade theory- Economies of Scale; Imperfect competition - Rybczynski theorem; Linder's preference similarity; Product life cycle theory; Gravity model of trade.

3. Inter-temporal Approach to Current Account

Two-period endowment theory; Role of investment; Two region world economy; Taxation of foreign borrowing and lending; International labour movements; Small economy with many periods; Dynamics of current account; Stochastic current account model; Consumer durables and current account; Firms, labour markets and investments.

4. Overlapping Generations model of Current Account

Government budget policy in the absence of Overlapping Generations model; Government budget deficit in an Overlapping Generations model; Output fluctuations; Demographics and life cycle- investment and growth; Application of Feldstein and Horioka's saving-investment puzzle.

5. Exchange Rate Determination

Purchasing Power Parity Theory; Balassa – Samuelson model; Flexible price monetary model; Dornbusch sticky price monetary model; Real interest rate differential model of Franke; Portfolio balance model; Empirical evidence on exchange rates; Exchange market efficiency; News approach to modelling exchange rates; Modelling exchange rate expectations.

6. Foreign Exchange Risks and Currency Derivatives

Types of foreign exchange exposures and their management- translation, transaction, operating, contingent, tax, exposures; Exposure Netting; Growth of currency derivative markets; Hedging; Foreign currency forwards, futures, options, swaps– The pricing of currency derivatives; Over the counter markets.

7. International Investments and Financing

Short-term and long-term capital movements; Gains from international capital markets; Foreign Direct investment and Foreign Institutional Investments – FDI and economic growth; Evaluating foreign projects; Discount rates, adjusted present value technique; Portfolio investments; Multi-National Banking; Capital flow episodes; Capital flows and Financial Crisis; Banking crisis; Balance of Payment crisis; Currency crisis.

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Indian Economy

Course objective: This main objective of this program is to provide a detailed analysis of the modern history of various sectors of the Indian economy.

Learning outcomes: Apart from facilitating a thorough understanding of the Indian economy, this paper also aims at preparing students for competitive exams. Students will be in a position to evaluate the efficacy of various government programmes and propose alternative policy directions.

1. Introduction to Indian Economy

Features of Indian Economy – Demographic, Development indices, Inequality, Poverty, Unemployment, Inflation, Healthcare system, Education; trends

2. Sectoral comparison of Indian Economy

Agriculture- Growth and issues; Land reforms; Green revolution; Subsidies; Recent developments; Growth and efficiency; employment generation; Public distribution system; food security; storage management; issue of farmer suicides; policy interventions, regulations and reforms

Industry: Performance, problems and prospects; Capital formation; industrial infrastructure; Regional imbalances; MSME's; Output and employment; labour reforms; Development strategies and policy; Industrial growth; technology and innovation; industrial policy; Power sector reforms; Atmanirbhar Bharat

Service: Overview; Market size; Service sector led growth story; Employment; labour productivity; Policy intervention; ICT and economic growth; FDI inflows; Sub sector wise performance; informal sector; Digital India

3. Policy Reforms

Economic Planning in India; Five Year Plans; Planning commission v/s NITI Ayog; New Economic Policy; Centre state Finance Relations, Finance commission; Monetary policy in India; Indian banking sector; priority sector lending; Insolvency and Bankruptcy code; J-A-M trinity; New Companies act; GST

4. Social security

Social security measures in organized and unorganized sector; Pension; Health and medical insurance; disability benefits; Maternity benefits; Poverty alleviation schemes; MGNREGA; LPG distribution; Housing; Food Security Act

5. External Sector

India’s foreign trade value composition and direction; Balance of payment since 1991; Foreign capital flow; Impact of Globalization on Indian Economy; WTO and India; Trade agreements; Free trade agreements; Trade in service sector; Impact of Global financial crisis

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