NEW MS(QE) COURSE STRUCTURE: 2014-15

The main features of the course revision are as follows:
1. **Revision of all existing courses and the addition of new ones.**
2. **The introduction of 'project' option (elective) in the third semester and 'thesis' option (elective) in the fourth semester of the Programme.**
3. **Allowing MSQE students to take up to three courses (over the two-year programme) in other Master-level programmes of the Institute subject to the approval of the Teachers' Committee and the concerned teacher.**

Semester I
Econ271A: Microeconomics I
Econ272A: Game Theory I
Stat271: *Statistics
Math271: *Mathematical Methods
One optional course.

Semester II
Econ271B: Microeconomics II
Econ273A: Econometric Methods I
Econ274A: Macroeconomics I
Two optional courses

* Students having Mathematics and/or Statistics as major/honours subjects at their Bachelor's level may take suitable other courses including Econ298 (Basic Economics) (in consultation with the appropriate Teachers' Committee) in lieu of Math 271 and Stat 271 courses.

Semester III
Econ274B: Macroeconomics II
Four optional courses (including Project)

Semester IV
Five optional courses (including Thesis)

List of Compulsory Courses

Econ271A: Microeconomics I
Econ271B: Microeconomics II
Econ272A: Game Theory I
Econ273A: Econometric Methods I
Econ274A: Macroeconomics I

Econ274B: Macroeconomics II
Stat271: Statistics/suitable other course
Math271: Mathematical Methods/ suitable other course

List of Optional Courses

Econ272B: Game Theory II
Econ273B: Econometric Methods II
Econ275: Agricultural Economics
Econ276A: Industrial Organization
Econ276B: Advanced Topics in Industrial Organization
Econ277A: Economic Development I

Econ277B: Economic Development II
Econ277C: Economic Development III
Econ278: Modern Growth Theory
Econ279A: Selected Topics I
Econ279B: Selected Topics II
Econ279C: Selected Topics III

Econ280A: Individual and Collective Choice
Econ280B: Political Economy
Econ281: Incentives and Organizations
Econ282: Incentives and Regulation
Econ283A: Econometric Applications I
Econ283B: Econometric Applications II
Econ284: Bayesian Econometrics
Econ285: Inter temporal Economics
Econ286: Theory of Planning
Econ287: Social Accounting
Econ288: Public Economics
Econ289: Regional Economics
Econ290A: International Economics I
Econ290B: International Economics II
Econ290C: Advanced Topics in International Economics
Econ291: Mathematical Programming with Applications to Economics
Econ292: Monetary Economics
Econ293: History of Economic Thought
Econ294: Environmental Economics

Econ295A: Finance I
Econ295B: Finance II
Econ295C: Finance III
Econ296: Comparative Systems
Econ297: Law and Economics
Econ298: Basic Economics
Econ299: Indian Economy: Selected Topics
Econ300: Experimental and Behavioural Economics
Econ301A: Project
Econ301B: Thesis
Econ 302: The Theory of Mechanism Design
Econ 303: Corporate Finance
Econ 304: Global Macroeconomics
Econ 305: Labour Economics
Stat272: Sample Survey: Theory and Practice
Stat273: Time Series Analysis and Forecasting
Comp271: Computer Programming and Applications

About optional courses Econ301A (Project) and Econ301B (Thesis):

The objective behind these two courses is to develop a capacity for independent thinking and a taste for research among the students. Course Econ301A, if offered, will be in Semester III, and Econ301B, if offered, will be in Semester IV.

Econ301A (Project) is a pre-requisite for Econ301B (Thesis).

The following are the rules for allowing a student to opt for 'thesis' in the fourth semester.

If a student who has opted for 'project' in the third semester likes to continue with the optional course 'thesis' in the last (fourth) semester, he/she has to satisfy either of the following conditions:

(a) His/her average score (averaged over the aggregates obtained in the first three semesters) is 65 percent or above;
(b) His/her score in the 'project' is 80 percent or above.

Guidelines:

The project/thesis supervisor can only be a regular or visiting faculty member of the Institute. It is the responsibility of the student to find a suitable supervisor from amongst the faculty members of the respective Centre for both 'project' and 'thesis'.

The student shall also submit a Thesis Proposal, prepared in consultation with supervisor, and having the supervisor's written approval, to the Dean of Studies or the In-charge, Students' Academic Affairs within the due date.

A supervisor may supervise at most three students on three different projects.

If a supervisor is unable to continue as supervisor for whatever reason, the supervisor must find a substitute who shall supervise the concerned student on the same topic.

The distribution of weights for a project/thesis course shall be 20% for mid-semester assessment by the supervisor and 80% for semester-end assessment by the supervisor and two other examiners who are regular or visiting faculty of the Institute. Regular faculty members of other recognized universities/ institutes may also be considered as examiners. The supervisor will identify the two other examiners and submit their names directly to the Dean of Studies or the In-charge, Students' Academic Affairs by the due date.

The student shall submit one hard copy of the work done for the mid-semester evaluation to the supervisor by a date decided by him/her. The supervisor shall forward this hard copy, together with a mid-semester score out of 100, to the Dean of Studies or the In-charge, Students' Academic Affairs directly within the due date.

The student shall submit the project/thesis to the supervisor within the due date. The supervisor should forward copies to the relevant people.

The student shall make an oral presentation of the project/thesis within the due date to the supervisor and two other examiners; the semester-end assessment shall be based on the project/thesis and the oral presentation. The weights for the semester-end assessment shall be at least 60% on the thesis and at least 30% on the oral presentation, adding up to 100%. The final weights should be decided by the supervisor in consultation with the examiners. The supervisor will inform the Dean of Studies or the In-charge, Students' Academic Affairs of the final weights, while submitting the name of the examiners. The supervisor will also inform the student. The supervisor and the two other examiners may score separately, or give a combined score. When supervisor and the two other examiners score separately, the simple average or the median shall be the final score.

The date and time for the project/thesis presentation shall be decided by the supervisor in consultations with two other examiners. The Dean of Studies, or the In-charge, Students'

Academic Affairs should be informed of the thesis presentation preferably a week in advance, with a minimum of three working days' notice.

The Dean's Office or the In-Charge Student Academic Affairs will announce the thesis presentation dates and time; the presentation will be open to all. However, the evaluation will be open only to the supervisor and the examiners.

The minimum composite score to pass any of these two optional courses is 35%. In case a student obtains less than 45% in the composite score in any of these two optional courses, the student will be offered an opportunity to appear for a back-paper examination. The student should submit a revised project/thesis by the last working day before the back-paper examinations for that semester. There will be a project/thesis presentation during the week of the back-paper examination --- the date will be finalized by the supervisor in consultation with the examiners and be conveyed to the Dean of Studies, or the In-charge, Students' Academic Affairs for announcement as done in the usual Project Presentation. The scoring will be based only on the new project/thesis presentation. The maximum possible score in the back paper examination shall be 45%. The other rules and regulations regarding back-paper examinations for a regular subject will also apply.

The supervisor shall forward the semester-end score (out of 100) to the Dean of Studies or the In-charge, Students' Academic Affairs directly within due date.

BRIEF SYLLABI

3.1 Compulsory Courses

Econ271A: Microeconomic Theory I
Theory of consumer behaviour: preference orderings, demand, duality theory, revealed preference, aggregate demand.
Theory of the firm: production sets, cost minimization, profit maximization, supply, duality theory, aggregate supply.
Equilibrium in a single market: stability and comparative statics.
Imperfect competition and market structure.
Decision-making under uncertainty: lotteries, measures of risk, stochastic dominance.

References
- Microeconomic Theory by Mas-Colell A, Whinston M and J. Green, Oxford University Press.
- Advanced Microeconomic Theory by Jehle G and P. Reny, Prentice Hall.
- Microeconomic Analysis by H. Varian

Econ271B: Microeconomic Theory II

General equilibrium in exchange and production economies.

Welfare economics: the fundamental theorems of welfare economics, core of an economy, introduction to social choice theory.

Public goods and externalities.

Asymmetric information: moral hazard and adverse selection; the principal agent model.

<u>References</u>

- Microeconomic Theory by Mas-Colell A, Whinston M and J. Green, Oxford University Press.
- Advanced Microeconomic Theory by Jehle G and P. Reny, Prentice Hall.
- Microeconomic Analysis by H. Varian

Econ272A: Game Theory I

Games in normal form: notions of domination; rationalisable strategies.

Nash equilibrium: existence, properties and applications.

Two-person Zero Sum Games.

Games in extensive form: credibility and Sub-game Perfect Nash Equilibrium.

Introduction to Bargaining and Repeated Games.

Equilibrium refinements.

Games of incomplete information: Bayes-Nash equilibrium; applications to the theory of auctions and bilateral trade.

Dynamic Games of incomplete information; signalling games.

<u>References</u>

- A Course in Game Theory, MIT Press, by M. Osborne and A. Rubinstein
- Game Theory for Applied Economists, Princeton University Press by R. Gibbons
- Game Theory, Harvard University Press by R. Myerson
- Game Theory, MIT Press, by D. Fudenberg and J. Tirole

Econ273A: Econometric Methods I

Method of least squares: graphical demonstration, model along with assumptions, Gauss-Markov theorem, least-squares estimates (matrix notation), interpretation, Frisch-Waugh theorem, statistical properties (finite samples as well as large samples including consistency) and inference. Omitted variable bias and other special topics such as restricted least square, dummy variables, model selection and multicollinearity. Generalised least squares method of estimation and its properties. Heteroscedasticity: nature of the problem, tests for heteroscedasticity and estimation. Autocorrelation: models for autocorrelation, tests for autocorrelated disturbances and estimation.

Model evaluation and other diagnostic tests: Chow test, RESET, Jarque-Bera test of normality of errors and Hausman specification test.

Measurement errors: inconsistency of OLS estimator, proxy variables and IV estimator.

Simultaneous equation systems: Structural and reduced forms, least squares bias, identification problem and estimation methods; Zellner's SURE procedure.

Introduction to nonlinear models: limitations of linear probability model, probit and logit models, truncated and censored (Tobit) models.

Applications of these models and the methodologies thereof should be adequately demonstrated using software.

References

- Introduction to Econometrics, by James H. Stock and Mark W. Watson, Addison-Wesley.
- Introductory Econometrics: A Modern Approach, by Jeffrey M. Wooldridge. Thomson.
- Mostly Harmless Econometrics, by Joshua B. Angrist and Jorn-Steffen Pischke.
- Macroeconometric, by A.C. Cameron and P.K. Trivedi
- Econometric Analysis, by W.H. Green

Econ274A: Macroeconomic Theory I

Empirics of Growth: The Neo-classical Growth Model (exogenous growth): Harrod-Domar, Solow-Swan, Solow-Swan Augmented with Human Capital and the Mahalanobis Model. Optimal Control and Dynamic Programming. The Ramsey-Cass-Koopmans Model. The Overlapping Generations Model, finite lifetime OLG models. Endogenous Growth Theory: endogenous growth models with human capital, public capital and externalities. Endogenous Technological Change: expanding variety models, the Schumpeterian model and directed technological change. Unbalanced Growth.

References

- Introduction to Modern Economic Growth, by Daron Acemoglu. Princeton University Press, 2010.
- Economic Growth, by Robert Barro and Xavier Sala-i-Martin. 2nd Edition, McGraw Hill, 2004.
- Advanced Macroeconomics, Fourth Edition, by David Romer. McGraw Hill, 2011.

Econ274B: Macroeconomic Theory II

IS-LM to Rational expectations and staggered wage contracts

Micro-founded New Keynesian models: Menu cost argument, Efficiency wage, Implicit contracts, Explicit wage bargaining, Insider outsider models, coordination failures

Foundations of Money including money demand, neutrality, super-neutrality and if possible money in the OLG framework

Fiscal policy including pension issues – both Pay-as-you go and fully funded-its relationship with other instruments in endogenous growth setup.

Money in Public Finance.

Time consistency.

New Keynesian Phillips curve analysis.

Macroeconomics and Financial Markets (including lending channel of monetary policies - traditional lending issues - bank run at the end)

Stochastic Dynamic Programming with applications to growth

Asset pricing, Contingent claim prices, the equity premium.

Search and Matching.

References

- Monetary Policy, Inflation, and the Business Cycle by Jordi Gali, Princeton University Press, 2008.
- Recursive Macroeconomic Theory, by Thomas Sargent and Lars Ljungqvist, 2nd Edition, September 2004.
- Theory: A Dynamic General Equilibrium Approach, by Michael Wickens, Princeton University Press, 2008.
- Monetary Theory and Policy, by Carl Walsh, 3rd Edition (MIT Press), 2010.
- The ABCs of RBCs, by Georg McCandless, Harvard University Press, 2008.

Stat271: Statistics

Theory of Probability: Elements of probability theory: classical and axiomatic definitions of probability, standard theorems, conditional probability, independence, Bayes' theorem; discrete random variables- negative binomial distribution; continuous random variables– normal, uniform and gamma distributions; moment generating function and characteristic function; bivariate distribution, marginal probabilities, correlation; bivariate normal distribution and its properties; convergence on probability space, Chebysev's inequality, law of large numbers and central limit theorem.

Estimation: Standard sampling distributions: χ^2, t and F distributions and their properties. Estimation of parameters: basic concepts – parameter and statistics, estimator and estimate, sampling distribution, sampling variance and mean squared error, properties of an estimator – unbiasedness, consistency, efficiency, sufficiency; Cramer-Rao inequality, point and interval estimations.

Testing of hypotheses: Type I and II errors, level, size and power of a test, testing hypotheses about the mean and the variance of a normal population.

Classical linear regression model: Assumptions, ordinary least squares (OLS) and maximum likelihood methods of estimation, properties of OLS and ML estimators, tests of significance of the parameters, and ANOVA.

References

- An Introductory to Probability Theory and Mathematical Statistics: V.K. Rohatgi.
- A First Course in Probability: S. Ross.

- Probability: J. Pitman.
- Introduction to Statistical Theory: P.G. Hoel, S.C. Port and C.J. Stone.
- Introduction to Theory of Statistics: A.M. Mood, F.A. Graybill and D.C. Boes.
- Statistical Inference: G. Casella and R.L. Berger.

Math271: Mathematical Methods

Linear Algebra: Vectors and Vector Spaces, Vector Operations; Scalar Product; Linear Dependence; Vector Spaces and Subspaces; Basis of a Vector Space.

Matrix Algebra: Basic Operations; Trace of a Matrix; Rank and Inverse of a Matrix; Vector and Matrix Differentiation; Orthogonal, Symmetric, Idempotent and Definite Matrices – Definition and Properties; Rank Factorization.

Characteristic Value Problem and Quadratic Forms: Characteristic roots and vectors of a square matrix; Similarity; Characteristic value problem of a symmetric matrix and properties of eigenvectors; Quadratic Forms.

Real Analysis: Introduction to real number system, elements of set theory, selected results in point set topology, compactness, convergence, continuity.

Static Optimization Theory: Optimization under inequality constraints, Kuhn-Tucker theory.

Dynamic Optimization Theory: Introduction to methods of control theory.

References
- Mathematics for Economists, by Carl P. Simon and Lawrence Blume, 1994, W. W. Norton & Company.
- A First Course in Optimization Theory, by Rangarajan K. Sundaram, 1996, Cambridge University Press.
- Linear Algebra, by A. R. Rao and P. Bhimasankaram

3.2 Optional Courses

Econ272B: Game Theory II (Prerequisite: Game Theory I)

Further topics in Bargaining, Repeated Games and Equilibrium Refinements.

Topics in Dynamic Games; models of reputation.

Further topics in the theory of auctions.

Topics in the theory of common knowledge.

Topics in cooperative games: Core, Shapley Value, Nucleolus in TU Games.

Voting: models with interdependent values; analysis of voting power.

Topics in evolutionary game theory.

References
- A Course in Game Theory, MIT Press, by M. Osborne and A. Rubinstein
- Game Theory, Harvard University Press by R. Myerson
- Game Theory, MIT Press, by D. Fudenberg and J. Tirole

Econ273B: Econometric Methods II

Analysis of Panel Data: Fixed effects model, random effects model /error components models; fixed or random effects? Wu-Hausman test; dynamic panel.

Specification testing and diagnostic checking: Inferential problem in misspecified models; White's information matrix test; tests for non-nested hypotheses – Davidson and Mckinnon's J test, encompassing test.

Estimation by generalized method of moments (GMM): Orthogonality conditions, properties, and test for over identification.

Models of volatility: ARCH/GARCH models and their properties, method of estimation, testing and the problem of nuisance parameters, other generalizations–EGARCH, GJR, TGARCH models; GARCH – M model.

Regressions with time series data: Concept of cointegration, two-variable model – Engle – Granger method and ECM; system of equations – vector autoregression (VAR), Johansen procedure, VECM, extensions with deterministic components; tests for cointegration; Granger causality.

[Applications of these models and the methodologies thereof should be adequately demonstrated using softwares. Students should be given assignments as well.]

References

- Micro Econometrics: A.C. Cameron and P.K. Trivedi.
- Time Series Analysis: J.D. Hamilton.
- Econometric Analysis of Panel Data: B.H. Baltagi.
- Misspecification Tests in Econometrics: L.G. Godfrey.
- Econometric Analysis of Cross Section and Panel Data: J. Wooldridge.

Econ275: Agricultural Economics

Agriculture in Development: Two sector models and agricultural productivity.

Production and Supply, Uncertainty, risk aversion and grower decision-making, Risk-Management, Crop Insurance, Risk Sharing and Community Institutions.

Patterns and sources of technological change, innovation , adoption and diffusion , Public sector Research, Intellectual Property Rights, Biotechnology, Agricultural Extension.

Land markets: Farm size distribution and efficiency, Labour Markets, Migration models and evidence, Rural Credit Markets.

Storage and price stabilization, Commodity Markets, Futures exchanges.

Marketing margins, Industrial organization of agricultural trade and markets, Standards and Grading, Economics of International Agricultural Trade.

Agriculture and the Environment; common property resources, land and water resources, Climate Change.

Welfare analysis of agricultural policies, Political Economy Issues,

Food policy, Food Security and Subsidies, Food-Safety Nets and Nutrition, Food Safety, Labelling Policies and Quality Standards.

Econ276A: Industrial Organization

The theory of the firm: Why do firms exist? Firm boundaries and profit-maximization.

Monopoly: Linear and non-linear pricing; menu pricing, inter-temporal price discrimination; bundling; regulation; non-price strategies (e.g., quality, advertisement).

Classical oligopoly models: Homogeneous and differentiated product models; price vs. quantity competition (strategic substitutes and strategic complements); location models; monopolistic competition.

Entry Deterrence: leader-follower structures; entry-exit models; strategic entry deterrence models; managerial delegations.

Vertically related markets and vertical control.

Cartel, collusion and horizontal merger.

R&D, patent protection and technology transfer: Market structure and R&D incentives; Innovation race; Cooperative vs. non-cooperative R&D.

Network Industries: The standardization-variety trade-off; competition under network externalities; technology advance in network industries; standards and switching costs; demand for telecommunication; copyright enforcement.

<u>References</u>

- Paul Belleflamme and Martin Peitz, Industrial Organization: Markets and Strategies; Cambridge Univ. Press, 2010.
- Luis M. B. Cabral, Introduction to Industrial Organization, the MIT Press, 2000.
- Jean Tirole, The Theory of Industrial Organization; the MIT Press, 1988.
- Oz Shy, Industrial Organization: Theory and Applications, the MIT Press, 1995.
- Stephen Martin, Advanced Industrial Economics; Blackwell, 2003.
- Handbook of Industrial Organization, Vol. I, II, and III.

Econ277A: Economic Development I

Introduction: Economic Lives of the Poor.

Nutrition: The Capacity Curve; Nutrition and Productivity: Interrelationship.

Health: Health Seeking Behaviour; Productivity Effects of Health.

Education: Private and Social Returns to Education; Education Quality; Education Policy.

Gender Discrimination.

Decision Making within Families. Fertility Decisions and Population.

Econ277B: Economic Development II

Labour Markets: Labour Supply and Labour Demand; Migration.

Land Markets: Land Rental Contracts; Land Ownership; Land Reform.

Markets for Credit and Savings: Credit Constraints; Informal Credit Markets; Microfinance.

Risk and Insurance.

Property Rights.

Social Networks and Informal Institutions. Provision of Public Goods.

Econ277C: Economic Development III

Development from the viewpoint of convergence.

Development from the viewpoint of non-convergence:

− Expectations and Development.

− Aspirations and Development.

− History-dependence: Inequality and Markets.

− History-dependence: Political and Legal Institutions.

Financial Institutions and Economic Development.

Population Growth and Economic Development.

Econ278: Modern Growth Theory

Objective: This course will discuss recent developments in growth and development, and in particular dynamic macroeconomic theory focusing, among other issues, on labour market distortions, pollution and the heterogeneity of agents (e.g. in wealth, ability, preferences, information structures, etc.).

Topics

Labour market distortions (labour unions, unemployment etc.) and endogenous growth.

Environmental pollution and endogenous growth.

Public capital and endogenous growth.

Neoclassical Growth Models with Heterogeneous agents (Complete and Incomplete Markets) Heterogeneous OLG models Review of traditional growth models, efficiency results, barriers to growth, technical progress. AK models of growth/growth models with linear production functions - alternative foundation.

Education and growth. Market structure and innovation. Obsolescence, Schumpeterian growth. Distribution and Political Economy of growth. Open growing economies, trade policies.

References

- Income Distribution in Macroeconomic Models, by G. Bertola, R. Foellmi, J. Zweimuller, Princeton University Press, 2005.

Econ279A: Selected Topics I

To be determined by the instructor.

Econ279B: Selected Topics II

To be determined by the instructor

Econ279C: Selected Topics III

To be determined by the instructor

Econ280A: Individual and Collective Choice

Decision Theory: Decision-making under uncertainty, von-Neumann-Morgenstern's expected utility, risk-aversion, Savage's subjective expected utility, Anscombe-Aumann subjective expected utility, ambiguity.

Collective Choice Theory: Classical aggregation theory: Arrow's theorem, aggregation with rich informational structures, probabilistic aggregation, judgement aggregation, the liberal paradox.

Axiomatic Approaches to Welfare Economics: Stochastic Dominance, Lorenz and Generalized Lorenz orderings, ethical approaches to measurement of inequality and poverty, fair allocations.

Econ281: Incentives and Organizations

Theory of incentives: adverse selection, moral hazard, multiple agents, contract dynamics.

Organization theory: team theory, message space size, costly information processing models.

Incentive-based approaches: supervision, managerial slack, limited commitment.

Applications to the theory of the firm: decentralization, hierarchies, transfer pricing, managerial compensation, cost allocation.

Econ282: Incentives and Regulation

Cost-reimbursement rules: Pricing by a single-product firm; pricing and incentives in a multi-product firm; Regulation of quality; Ramsey-pricing; Bypass and cream-skimming; Auctioning incentive contracts – static and dynamic (with and without commitment); Cost-padding, auditing and collusion; Regulatory capture and political economy; Privatization and incentives.

References
- A theory of incentives in procurement and regulation, JJ Laffont and J. Tirole.

Econ283A: Econometric Applications I

Income and allied size distribution: Measurement of income inequality and poverty, problem of measurements, Indian studies on inequality and poverty.

Demand analysis: Demand function and elasticities of demand, Engle curve analysis aggregation issue, methodologies for estimation of constrained demand function using macro and micro data, demand system, zero expenditure and corner solution, nonlinear budget frontiers, sources of dynamics in consumer behaviour, properties and estimation of multi-output production and cost functions, and non-parametric demand analysis.

Empirical approaches to measurement of household welfare: Parametric and non-parametric approaches to revealed preference and cost of living indices.

Production analysis: Frontier production function, data envelopment analysis (DEA), stochastic frontier, measurement of productivity, technical change, cost function, Olley Pakes algorithm and Levinsohn-Petrin algorithm.

Empirical industrial organization: Estimating market power in static competition models, collusion and strategic interaction, price discrimination, firm turnover and sunk cost.

[Applications of these models and the methodologies thereof should be adequately demonstrated using softwares. Students should be given assignments as well.]

References
- Handbook of Income Distribution (2000): Anthony Atkinson and F. Bourguignon.
- Economics and Consumer Behaviour (1980): A. Deaton and J. Muellbauer.
- Econometric Models, Techniques, and Applications (1978): Michael D. Intriligator.
- Handbook of Applied Econometrics: Microeconomics (1999): M. Hashem Pesaran and Peter Schmidt.
- An Introduction to Efficiency and Productivity Analysis (1998): T. Coelli, D.S.P. Rao and G. Battese.
- Data Envelopment Analysis: A Comprehensive Text with Models, Applications, References and DEA Solver Software (2000): W.W. Cooper, L.M. Seiford and K. Tone.
- Data Envelopment Analysis (2004): S.C. Ray.
- Stochastic Frontier Analysis: An Econometric Approach (2000): S.C. Kumbhakar and C.A.K. Lovell.
- Applied Non-parametric Regression: W Hardle.
- Non-parametric Econometrics: Theory and Practice, Q. Li and J. Racine.
- Micro Econometrics: A.C. Cameron & P.K. Trivedi.

Econ283B: Econometric Applications II

*[At least **four** of the following topics will be covered depending on the interests of the instructor as well as of the students.]*

Non-parametric and semi-parametric methods: Kernel density estimator, Kernel regression, alternative non-parametric regression estimators; semiparametric regression, single index model and illustrations.

Simulation-based methods: Jackknife and Bootstrap methods: concept and theory, paired bootstrap, residual bootstrap, bootstrap for dependent data.

Monte Carlo studies: purpose, random number generation, basics of computing integrals, indirect inference.

Bayesian approach: Bayesian linear regression, Monte Carlo integration, Gibbs sampling, MCMC, model selection.

Project Methodology: Primary data: preparation of questionnaire, implementation and related issues. Basic concepts in design and analysis of surveys.

Secondary data: Treatment evaluations: Set up and assumption, treatment effects and selection bias, matching and propensity score estimators, and difference-in – difference estimators.

Financial econometrics: The predictability of asset returns – random walk hypothesis, and tests of this hypothesis; market microstructure – bid-ask spread, rounding and barrier models, ordered probit model; capital asset pricing model – statistical framework for estimation and testing, size and power of tests; derivative pricing models – the Black-Scholes and Merton approach, and the martingale approach.

Empirical developmental issues: Household behaviour- theory and applications: unitary models, bargaining models, empirical tests of models of intra-household resource distribution, gender discrimination, health and education.

Macro econometric models: Measurement of cycles, Dynamic Stochastic General Equilibrium (DSGE) models, application of Monte Carlo, Bootsrap and VAR methods.

Empirical models of labour market: Duration analysis, labour supply and labour demand functions, and studies on Indian labour market.

[Applications of these models and the methodologies thereof should be adequately demonstrated using softwares. Students should be given assignments as well.]

References
- Applied Non-parametric Regression: W Hardle.
- Non-parametric Econometrics: Theory and Practice: Q. Li and J. Racine.
- Econometrics of Financial Markets: J. Campbell, A. W. Lo and A. C. MacKinlay.
- Micro Econometrics: A.C. Cameron and P.K. Trivedi.
- The Jackknife and Bootstrap: J. Shao.
- Structural Macroeconometrics: David N. DeJong with Chetan Dave
- Applied Macroeconometrics: Carlo A. Favero.

Econ284: Bayesian Econometrics

Principles of Bayesian analysis.
Simple univariate normal linear regression models.
Analysis of single equation nonlinear models.
Multivariate regression models.
Comparison and testing of hypothesis.
Simultaneous equations econometric models.

Econ285: Intertemporal Economics

Models of intertemporal accumulation.
Efficient programmes, characterizations of efficiency, efficiency and present value maximization.
Optimal programmes, optimality criteria in discounted and undiscounted models, existence of optimal programmes.

Econ286: Theory of Planning

Political economy of the state, alternative viewpoints.

Modelling government behaviour, rational choice models, median voter model, legislatures and special interest groups, bureaucracy models.

Planning models, centralized planning, informationally decentralized planning processes, Lange-Lerner, MDP procedures, team theory.

Incentives within the public sector.

Performance incentives for managers, decentralized organisation of production, multidivisional firms, cost centres and profit centres, cost allocation transfer pricing, labour policies: Soviet and East European firms.

Cost-benefit analysis.

Pricing public sector outputs, marginal cost and average cost pricing, peak load pricing, priority pricing.

Econ287: Social Accounting

The economic process and various concepts.

A system of social/national accounts.

National accounts and various estimates.

'Real' gross domestic product and 'real' national income.

Estimation of national income in India.

Preparation of an input-output (IO) table.

Econ288: Public Economics

Public goods: optimal provision and decentralization, local public goods and the optimal size of clubs, heterogeneity of tastes and endowments.

Social welfare functions, Median voter theorems, inter-personal utility trade-offs.

Optimal taxation, effects and incidence, taxation of goods and incomes, dynamic models.

Tax policy: Alternatives within direct and indirect taxation corporate and individual income taxation, VAT.

Federal systems.

Taxation and the environment.

Taxation and political economy: Issues relating to avoidance, evasion, corruption and fraud; behavioural models.

Econ289: Regional Economics

Introduction to regional planning.

Review of the Indian situation.

Concepts and techniques used in regional planning.

Regional decision making and regional balance.

Functional spatial configuration and regional synthesis.

Econ290A: International Economics I

Various comparative-advantage based competitive theories of international trade including the Ricardian model, the Heckscher-Ohlin model and the sector specific model and their generalizations.

Theory of commercial policy: tariffs, taxes and quantitative restrictions in traditional trade models.

Imperfectly competitive and intra-industry trade models of international trade.

Implications of WTO, and its features.

Econ290B: International Economics II

Political Economy of Trade Protection.

Preferential Trading Arrangements.

Firm Heterogeneity and Implications of international trade and investment.

Trade, growth and innovation (Grossman Helpman type models, product cycle models).

International Trade and Income/Wealth Distribution.

International Factor Movements.

Econ290C: Advanced Topics in International Economics

Political economy of trade policy.

International trade and endogenous growth.

Trade and environment.

Trade and distribution.

Exchange rate dynamics in a small country setting.

Agency problems and international lending.

The New-Keynesian Models of the Open Economy.

International Capital Mobility and Development.

Econ291: Mathematical Programming with Applications to Economics

Convex Sets, Separating hyperplane theorems, polyhedra and polytopes, Farkas Lemma with applications in cooperat. Linear Programming: the simplex method, duality, weak and strong duality theorems, applications to zero-sum games. Integer Programming: linear relaxation of integer programs, totally unimodular matrices, applications to assignment problem and prices.

Discrete Optimization. Basic graph theory - path, cycle, degree, cut, tree, connectedness, minimum cost spanning tree problem, application: a game on graph, Hall's marriage theorem, max-flow min-cut theorem, Gale's demand theorem, graph decomposition, shortest paths and potentials, application: fair prices.

Non-linear Programming: KKT Conditions, convex optimization - unconstrained and constrained.

Econ292: Monetary Economics

Classical monetary models.

Deterministic and Stochastic Dynamic Programming.

Solving Social Planning Problems on the Computer.

Recursive Competitive Equilibrium.

RBC model with money.

Calibration techniques (use of Matlab and DYNARE).

Closed economy nre Keynesian models.

Open economy new Keynesian DSGE models.

References:

- Monetary policy, Inflation and the Business Cycles by J. Gali, Princeton University Press, 2008.
- The ABCs of RBCs, by G. McCandles, Harvard University Press, 2008.
- Macro-economic Theory: A dynamical general equilibrium approach. By M. Wickens, Princeton University Press, 2008.
- Monetary Theory and Policy, by C. Walsh, MIT Press (3rd edition), 2010.

Econ293: History of Economic Thought

The classical economists.

The marginalist revolution. Neo-classical microeconomics. General equilibrium and welfare theorems.

The origins of macroeconomics - the Keynesian breakthrough and the neoclassical synthesis.

The information revolution – missing markets, adverse selection, moral hazard.

Unemployment and credit rationing as market failure in the markets for capital and labour.

The impact of game theory.

Making economics a science: econometrics and the testing of predictions. The Lucas critique, new classical and new Keynesian macro-economics and their critics.

A new methodological individualism: behavioural economics and evolutionary models.

Econ294: Environmental Economics

Theories of externalities and public goods.

Valuing environmental services.

The design of environmental policy. Marketable pollution permits, pollution taxes and other policy instruments.

Models of resource depletion, exhaustible and renewable resources.

The commons problem. International issues in environmental economics.

The economics of global warming.

Econ295A: Finance I

[Pre-requisites and co-requisites: Micro-economics I, Econometrics I.]

Choice under uncertainty and stochastic dominance, mean-variance portfolio theory.

Asset pricing theories: CAPM, APT, multi-factor, IPO, Fundamental Theorem of Asset Pricing. Pricing of forwards and futures.

Option pricing: general properties, binomial-tree and Black-Scholes models, Greeks, Implied Volatility.

Financial Markets in the Arrow-Debreu General Equilibrium Framework.

Brief overview of relevant properties of random walk, martingale, stopping times, Brownian motion, stochastic differential equation.

Numerical pricing of options, Trinomial tree model, exotic options, trading strategies

Econ295B: Finance II *[Pre-requisite: Finance I]*

Incomplete market, definition and testing of different levels of efficient market hypothesis, regulations, role of different agents.

Term structure of interest rates, swaps, stochastic volatility, estimation of volatility, ARCH/GARCH models, management of market risk (VaR etc.).

Valuation of Bonds and Interest Rates: 'Yield to maturity, Duration and convexity, immunization of interest rate risk, forward interest rate and forward rate agreement.'

Modigliani- Miller theorem. Agency costs and management. Debt vs. equity.

Valuation of stocks, valuation of cash cows and capital budget allocation.

Econ295C: Finance III

Advanced Topics in Banking and Finance

Market Microstructure

Regulation and Incentives

Econ296: Comparative Systems

Classical political economy: Crystallization of the concept of "social structure" in the concept of "class", class division and boundary of production ("productive" vs "unproductive" class/labour) in Quesnay and Smith, the systems of social accounting policy aspects, reaction against "mercantilism: theoretical structure of classical political economy, value, distribution and accumulations, the Ricardian system, the post Ricardian scene, emergence of "socialist" doctrines.

Marxian political economy: the broader perspectives and view of history, "modes of production" (feudalism, capitalism and socialism), the political economy of capitalism, surplus value, theories of crises.

Further developments in the political economy of capitalism: developments within a "class" framework, Kalecki's theory of effective demand and business cycles, abandoning the "class" framework or the turning point in the history of economic thought, birth of "welfare

economics", "competition" and "monopoly", Keynes ' theory of effective demand and its link up with the theory of growth.

Political economy of socialism: doctrines and experiences.

Political economy of LDCs: the intrinsic heterogeneity and amorphousness of LDCs, the "goal" of development in a historical perspective, the concept of "dual economy", global perspectives.

Econ297: Law and Economics

Role of Property Rights in Economic Transactions
Allocating and Establishing Ownership Rights
Conflicting Property Rights and Externalities
Common Property
The Coase Theorem

Legal Aspects of Complete and Incomplete Contracts
Notion of Contracts and Contracting Costs
Complete and Incomplete Contracts
Breach of Contract and Remedies

Economics of Tort-Liability Rules-Accident Laws
Theories of Tort-Liability and Incentives for Precaution
A Game Theoretic Analysis of Tort-Liability Rules
Products Liability
The Role of Uncertainty and Insurance

Crime and Punishment
Criminal Intents and Public Harm
Rational Crime and Optimal Deterrence
Economic Goal of Criminal Law
Fines versus Imprisonment

Selected Topics
Aspects of Intellectual Property Rights and the WTO
Law and Corporate Governance
Environmental laws

Stat272: Sample Survey: Theory and Practice

Introduction. Sampling techniques. Planning and conduct of sample surveys. Non-sampling errors. Experience of Indian surveys on selected topics.

Stat273: Time Series Analysis

Exploratory analysis of time series: graphical display, classical decomposition model, estimation and elimination of trend and seasonal components.

Stationary stochastic time series models: weak and strong stationarity , AR, MA and ARMA processes – their properties, conditions for stationarity and invertibility, autocorrelation function (ACF), partial autocorrelation function (PACF), identification based on ACF and PACF, estimation, order selection and diagnostic checks.

Modelling non-stationary processes: ARIMA models, determination of the order of integration, trend stationarity and difference stationary processes tests of nonstationarity (unit root tests) – Dickey-Fuller (DF) test, augmented DF test, Phillips-Perron test.

Forecasting: Simple exponential smoothing, Holt-Winters method, minimum MSE forecast, forecast error, in sample and out-of-sample forecasts.

Modelling seasonal time series: seasonal ARIMA models, estimation; seasonal unit root test (HEGY test).

Intervention analysis and detection of outliers: different types of interventions, implications of interventions, additive and innovational outliers and procedures for detecting outliers.

Structural breaks in time series: Quandt-Andrews test for single structural break, estimation of break date, structural break and unit root tests, and Perron's extension of the ADF test.

Simple state space models: state space representation of ARIMA models, basic structural model and Kalman recursion.

Elements of spectral analysis: spectral density function (s.d.f.) and its properties, s.d.f. of AR, MA and ARMA processes, and periodogram analysis.

[Applications of these models and the methodologies thereof should be adequately demonstrated using software. Students should be given assignments as well.]

References
- Time Series Analysis: J.D. Hamilton.
- Introduction to Time Series Analysis: P.J. Brockwell and R.A. Davis.
- Introduction to Time Series: C. Chatfield.
- Introduction to Statistical Time Series: W.A. Fuller.
- The Statistical Analysis of Time Series: T.W. Anderson.
- Analysis of Financial Time Series: R.S. Tsay.
- Time Series Techniques for Economists: T.C. Mills.
- Applied Time Series Econometrics: H. Lutkepohl and M. Kratzig.

Comp271: Computer Programming and Applications

Elements and characteristics of a computer system, basic computer operations, storage information, compiler and high level languages, algorithm, analysis of algorithm, flow chart, data-structure, sorting and searching techniques.

Program development in a suitable language or languages, for example, C, C++, and FORTRAN.

FORTRAN: Constants; simple and subscripted variables; records; arithmetic, string, logical and related operators; arithmetic, string and logical expressions; specification statements; arithmetic, string and logical assignment statements; control statements; I/O statements; statement function statement; block data statement; function and subroutine subprograms.

C: Constant, variables and data types, operators and expression, decision making and branching, looping, arrays, user defined functions, standard library, structure and unions, pointers, file management, C pre-processor.

Solutions of elementary problems on numerical analysis, using C/FORTRAN language.

Excel, R and Matlab.

References:
- Programming in C: Schaum Outline Series: B. C. Gottfried.
- The C Programming Language: B. W. Kernighan and D. M. Ritchie.
- The Art of R Programming: A Tour of Statistical Software Design: Norman Matloff.
- R in Action: Data Analysis and Graphics with R: Robert I. Kabacoff.
- Matlab: A Practical Introduction to Programming and Problem Solving: Stormy Attaway.
- Matlab Programming: Y K Singh and B B Chaudhuri.
- Excel 2010 Bible: John Walkenbach.

Econ276B: Advanced Topics in Industrial Organization

(Pre-requisite: Industrial Organization)

Theory of competition policy. MNC business strategies. Strategic alliances, coalition formation. Theory of the firm. Theory of regulation. Employment contracts. Information and strategic behaviour. Dynamic models of oligopoly. Price discrimination, vertical control and the theory of the firm. Networks, standardization and compatibility. Market intermediation. Empirical studies on topics of industrial organization.

Econ280B: Political Economy

Electoral competition and voter behaviour: Downsian and citizen-candidate models, dynamic voting models, voter response to economic performance, electoral accountability, career concerns. Partisan politics and political agency: basic partisan models, partisan influence on politics, Special interest politics: collective action, lobbying and special interest groups, strategic delegation. Models of legislative bargaining. Role of political institutions and economic policy.

References:
- Political economics: Persson, T and Tabellini, G.E.

Econ298: Basic Economics[1]

A. Macro Economics

National income accounting: different concepts and three methods of measurement, circular flow of income.

Determination of equilibrium income (employment): Classical model, simple Keynesian model and its extension to government sector and open economy.

Money market: Supply of money and monetary policy, Demand for money.

Determination of equilibrium income and interest: IS-LM model in a closed economy. Role of fiscal policy.

Determination of equilibrium price: Aggregate supply-demand model.

Inflation: Causes and methods to control it.

Concepts of cyclical fluctuation and economic growth.

B. Development Economics

Developed vs. underdeveloped economy; features of backward agriculture; dual economy and problems of industrialization; problem of unemployment; poverty and inequality.

C. International Trade

Explanations of trade; balance of payment equilibrium; effects of devaluation.

References:
- Dornbusch, R. and Fischer, S.: Macroeconomics.
- Branson, W.H.: Macroeconomic Theory.
- Mankiw, N. Gregory: Macroeconomics.
- Todaro, M.P: 'Economic Development.
- Krugman, P and Obstfeld, M.: International Economics.
- Samuelson P. A. and Nordhaus, H.D.: Economics.

Econ299: Indian Economy: Selected Topics

The topics to be covered would be decided by the instructor. An indicative list is the following:

Poverty, Standards of Living and Welfare, Income Distribution, Agriculture and Food Policies, Migration and Urbanization, Land markets and Land Acquisition, Labour Markets and Regulation, Industrial Policies and Manufacturing Growth, Infrastructure policies and Investment, Regional and Spatial Inequalities, Education and Health, Gender Inequalities, Environment and Economic Growth, International Trade and Foreign Direct Investment, Sectoral Composition of Growth, Taxation and Public Finance, Political Economy Issues, Macro issues of Fiscal and Monetary Policies, Inflation.

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[1] May be offered in MS(QE) 1st semester to those students who have degrees other than BA/B Sc (Hons) degree in Economics.

Econ300: Behavioural and Experimental Economics

Design of laboratory (also field/survey) experiments: social and clinical psychology, sociology and anthropology and evolutionary biology.

Deviations from homo-economicus: altruism, reciprocity, boredom, spite, uncertainty and loss aversion.

Theories pertaining to learning, dynamic choice behaviour and norm formation.

Econ301A (Project)

Econ301B (Thesis) *[Pre-requisite: Project]*

Econ302: The Theory of Mechanism Design

Complete Information implementation theory: Maskin monotonicity and Nash implementation, sub-game perfect implementation, virtual implementation, 2-agent implementation, honest implementation, Bayesian implementation, the King Solomon problem.

Auctions: revelation principle, quasi-linearity, dominant strategy-mechanisms, efficiency with Groves transfers, affine maximizers and generalized Groves transfers, combinatorial auctions and the pivotal (VCG) mechanism, public good provision with Groves transfers, cycle monotonicity, single object auction, Myerson monotonicity, revenue equivalence, optimal auction design, budget balance, bilateral trade.

Voting: Unrestricted domain and Gibbard-Satterthwaite Theorem, single-peaked and single-crossing domains, the median voter rule, randomization and random dictatorship theorem, separable domain and decomposition, matching - top trading cycle and serial dictatorship, two-sided matching - deferred acceptance algorithm, stable matching.

Econ303: Corporate Finance

Corporate governance and corporate financing; some stylized facts. Corporate financing and agency costs: Outside financing capacity, some determinants of borrowing capacity, liquidity and risk management, long term finance, corporate financing under asymmetric information, product markets and earning manipulations. Investors of Passage: Entry, Exit, and Speculation, Lending Relationships and Investor Activism

Security Design: The Control Right View: corporate governance, takeovers

Security Design: The Demand Side View

Macro-economic implications and political economy of corporate finance.

Econ304: Global Macroeconomics

[Pre-Requisites: Macro II, and Monetary Economics.]

This course will focus on macroeconomic policy at an international level. The theoretical foundations of the course will lie in open economy macroeconomics. It will address both

positive and normative dimensions of policy while considering political economy constraints to policy making.

Course Content:

- International Economic Interdependence: Theoretical Foundations.
- Traditional Approaches and the Inter-temporal Approach to the Current Account.
- Inter-temporal approaches to Fiscal Policy in the World Economy.
- Monetary Policy.
- International Financial Integration and Foreign Exchange Rate Policy.
- Growth Policies.
- Tax Policy.
- Financial Crises.

References:

- Economic Policy: Theory and Practice, Oxford University Press by Benassy-Quere, Agnes, Coeure, Benoit, Jacquet, Pierre, and Jean Pisani-Ferry.
- Fiscal Policies and Growth in the World Economy, MIT Press, by Frankel, Jacob, and Assaf Razin.
- The Oxford Handbook of the Indian Economy, Eds (Ghate, C). Oxford University Press, New York.

Econ305: Labour Economics

Recent empirical approaches to labour economics; Static Labour Supply models; Female labour supply; Intertemporal Labour Supply: Theory and empirics; Empirical estimates of labour supply relationships; Labour demand and wage determination; Compensating Differentials; Incentive pay and efficiency wages; Human capital Investment and returns to education (private and social); Signalling approach to education; Education Production Functions; Labour market discrimination; Wage Inequality: Decomposition, Empirical evidence and Theoretical explanation

References

- Cahuc, Pierre and Andre Zylberberg (2004), Labour Economics, MIT Press.
- Handbook of Labour Economics (relevant volumes)