

List of MSQE Courses

Compulsory Courses

Econ271A: Microeconomics I
Econ271B: Microeconomics II
Econ272A: Game Theory I
Econ273A: Econometric Methods I
Econ274A: Macroeconomics I
Econ274B: Macroeconomics II
Stat271: Statistics
Math271: Mathematical Methods

Optional Courses

Econ272B: Game Theory II
Econ273B: Econometric Methods II
Econ275: Agricultural Economics
Econ276: Industrial Organization
Econ277A: Economic Development I
Econ277B: Economic Development II
Econ278: Modern Growth Theory
Econ280: Social Choice and Political Economy
Econ281: Incentives and Organizations
Econ282: Privatization and Regulations
Econ283A: Econometric Applications I
Econ283B: Econometric Applications II
Econ284: Bayesian Econometrics
Econ285: Intertemporal 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
Econ295X: Theory of Finance I
Econ295Y: Theory of Finance II

Econ295C: Theory of Finance III
Econ296: Political Economy and Comparative Systems
Econ279A: Selected Topics I
Econ279B: Selected Topics II
Stat272: Sample Survey: Theory and Practice
Stat273: Time Series Analysis and Forecasting
Comp271: Computer Programming and Applications

SYLLABI OF THE COURSES

a. Compulsory courses

Econ271A: Microeconomic Theory I

1. Theory of consumer behaviour: preference ordering, utility function, budget set, demand, duality theory, theory of revealed preference, aggregate demand.
2. Theory of the firm: production set, cost minimization, profit maximization, supply, duality theory, aggregate supply.
3. Equilibrium in a single market, stability, comparative statics.
4. Imperfect competition and market structure.
5. Decision-making under uncertainty : lotteries, measures of risk.

Econ271B: Microeconomic Theory II

1. General equilibrium of an exchange economy.
2. General equilibrium with production.
3. Welfare economics : the fundamental theorems of welfare economics, core of an economy, introduction to Social Choice theory
4. Asymmetric information, market failure, theory of second best and strategic interactions.
5. Introduction to non-Walrasian equilibrium.

Econ272A: Game Theory I

a. Non-Cooperative Games

1. Games in normal form.
2. Rationalizability and iterated deletion of never-best responses.
3. Nash equilibrium : existence, properties and applications.
4. Two-person Zero Sum Games.
5. Games in extensive form : perfect recall and behaviour strategies.
6. Credibility and Subgame Perfect Nash Equilibrium.
7. Bargaining.
8. Repeated Games; Folk Theorems.

b. Introduction to Cooperative Games (TU games)

Econ273A: Econometric Methods I

Nature of Econometrics, Review of CLRM, Alternative measures of goodness of fit, use of dummy variables as regressors.

Specification problems in CLRM :

- a. Problems due to the nature of the error term : Nonspherical disturbances and their implications for the properties of the OLS estimators of CLRM parameters, Aitken theorem and Generalised Least Squares (GLS) methods of estimation, Heteroscedasticity - nature of the problem, tests and estimation techniques.

Autocorrelations -nature of the problems, tests and estimation techniques.

- b. Problems due to the nature of the regressors : Multicollinearity - nature of the problem, and its consequences, detection of multicollinearity, and possible solutions, stochastic regressors - problem of errors in variables and its consequences for OLS estimator of CLRM parameters, instrumental variable methods of estimation.
- c. Model evaluation and other diagnostic tests : Chow test, Ramsay's RESET, Bera-Jarque test of normality of errors, Hausman specification test.
- d. Autoregressive and Distributed Lag (ADL) relationships : Specification, estimation and tests, Exogeneity tests, Wu-Hausman test.
- e. Simultaneous Equations System : Structural and reduced forms, least squares bias problem, identification problem, estimation methods, introduction to VAR.

Econ274A: Macroeconomic Theory I

1. Review of Keynes, Classics and Structuralist macroeconomics.
2. Friedman and New Classical Economics
3. New Keynesian Economics
4. Introduction to macro models of optimal behaviour over time: Ramsay-Solow and Overlapping Generations model.
5. Real Business Cycle Theory.

Econ274B: Macroeconomic Theory II

Selected topics out of the following list :

1. Open Economy Issues
2. Overlapping Generations models: advanced topics
3. Public Debt
4. Asset Pricing
5. Optimal taxation

6. Theories of Inflation
7. Equilibrium search and matching
8. Growth and Distribution
9. Modern theories of Unemployment

Stat271: Statistics

Probability Theory:

Sample space, events, combinatorics, classical and axiomatic definitions of probability, equally likely probability models, marginal and conditional probabilities, independence, Bayes' formula, random variables, distribution function, expectation, variance and other moments, discrete random variables - binomial, Poisson, geometric, illustrations; continuous random variables - uniform, normal, exponential, logistic, illustrations through data: bivariate normal distributions and its properties; Chebyshev's inequality, weak law of large numbers, central limit theorem.

Statistical Inference:

- a. Estimation of parameters of a statistical model : basic concepts - parameter & statistic, estimator & estimate, sampling distribution, sampling variance & mean square error, properties of an estimator - unbiasedness, consistency, efficiency, Cramer-Rao inequality, point & interval estimation, methods of estimation - least squares, methods of moments, maximum likelihood method.
- b. Testing of hypotheses - type I & II errors, level, size and p-value of a test, power of a test, testing hypotheses about the mean and the variance of a normal population.
- c. Small sample distributions : X , t and F distributions and examples of their applications.

It is presumed that the students have adequate background in statistical methods. The teacher concerned will have the flexibility to adjust the contents of the syllabus wherever necessary.

Math271: Mathematical Methods

A. Linear Algebra

1. Vectors and Vector Spaces : Vector Operations; Scalar Product; Linear Dependence; Vector Spaces and Subspaces; Basis of a Vector Space.
2. 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.
3. 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 eigen vectors; Quadratic Forms.

A. Real Analysis

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

B. Static Optimization Theory

Optimization under inequality constraints, Kuhn-Tucker theory.

C. Dynamic Optimization Theory

Introduction to methods of control theory.

b. Optional Courses

Econ272B: Game Theory II

a. Games of Incomplete Information

1. Bayes-Nash equilibrium.
2. Applications to industrial organization.
3. Reputation models.

b. Auction theory

1. First and second price auctions.
2. The Revenue Equivalence Theorem.
3. Revenue optimal auctions in the independent values case.
4. Efficient auctions in the common-values case.

c. The theory of equilibrium selection

1. Sequential and trembling hand perfect equilibria.
2. Forward induction.

d. Mechanism Design

1. Strategy-proof mechanisms: the Gibbard-Satterthwaite Theorem.
2. Transferable utility and Groves-Clarke theory.
3. Bayesian Incentive compatibility.

e. Topics in evolutionary game theory

f. Advanced topics in cooperative games

Econ273B: Econometric Methods II

1. Discrete and Limited Dependent Variables Model: types of discrete choice models, linear probability model, the probit and the logit models and Tobit model.
2. Analysis of Panel Data: Fixed effects model, random effects model (error components model), fixed or random effects? – Wu-Hausman test, Swamy’s random coefficient model.
3. Specification testing and Diagnostic Checking: inferential problems in misspecified or inadequately specified models; tests based on ML principle – W, LR and Rao’s (RS) tests; White’s information matrix test; tests for non-nested hypothesis – Davidson and McKinnon’s J test and the encompassing test.
4. Cointegration: a general cointegrated system, two variable model: Engle-Granger method, system estimation method – Johansen procedure; error correction model and tests for cointegration; vector autoregression and Granger causality.
5. ARCH model: properties of ARCH/GARCH model, different interpretations, various generalisations, estimation and testing.
6. Other methods of testing (excluding LS and ML methods): generalized method of moments (GMM) and method of least absolute deviation : basics of non-parametric regression – idea of smoothing, smoothing techniques, the kernel method and choosing the smoothing parameter.
7. Introduction to Bayesian Econometrics: Bayes’ theorem, prior probability density functions, point estimates of parameters and prediction.

Econ275: Agricultural Economics

1. Growth and Fluctuations of Agricultural Output
2. Surplus Labour
3. Farm Efficiency
4. Tenurial Efficiency
5. Interlinked Factor Markets
6. Marketable Surplus
7. New Technology
8. Effect of Liberalization on Agriculture

Econ276: Industrial Organization

1. Structure conduct performance paradigm.
2. Static oligopoly models, homogeneous goods, Cournot and Bertrand models, differentiated products, horizontal and vertical differentiation, models with free entry, contestable markets, Cournot and price setting, models with free entry.
3. Measures of concentration and performance.
4. Dynamic oligopoly models : entry deterrence, limit pricing, attrition and reputation models, collusion and cartels.
5. Price discrimination, price dispersion and search theory.

6. R & D and adaptation/adoption of technology: private vs. social incentives for R & D models of adoption, diffusion and transfer of technology.
7. Mergers and takeovers, firm size and vertical integration, corporate finance.
8. Regulation of monopolies, rate of return regulation, regulation of firms with unknown costs/demands.
9. Multinational firms.
10. Quality, durability and warranty.
11. Advertising.
12. Joint venture, licensing and patents.

Econ277A: Economic Development I

- a. The Dual Economy: Surplus Labour, Wage Rigidity and Unemployment
- b. Underdevelopment as a Path Dependant Process: Vicious Circles, Balanced vs. Unbalanced Growth and Big Push Theory.
- c. Growth, Development and Income Distribution
- d. Rural Markets and Institutions

Econ277B: Economic Development II

1. Economic Development and Planning of Dual Economics : Choice of Techniques, Marketable Surplus, Rural-Urban Migration, Unemployment.
2. Role of trade and factor mobility in economic development; international technology transfer and relative technological backwardness of less developed countries.
3. Endogenous growth : increasing returns and technological progress; multiple equilibria and underdevelopment trap.

Econ278: Modern Growth Theory

1. Review of traditional growth models, efficiency results, barriers to growth, technical progress.
2. AK models of growth - alternative foundation.
3. Education and growth.
4. Market structure and innovation.
5. Obsolescence, Schumpeterian growth.
6. Distribution and Political Economy of growth.
7. Open growing economies, trade policies.

Econ279A: Selected Topics I

To be determined by the instructor

Econ279B: Selected Topics II

To be determined by the instructor

Econ280: Social Choice and Political Economy

Selected topics from the following :

1. Classical aggregation theory : Arrow's theorem, Harsanyi's theorem, aggregation with rich informational structures.
2. Stochastic Dominance, Lorenz and Generalized Lorenz orderings, Ethical approaches to measurement of inequality and poverty.
3. Classical voting theory : the Gibbard-Satterthwaite theorem, results on restricted domains, the median voter result, stochastic outcome functions.
4. The theory of implementation in complete and incomplete information settings.
5. The theory of elections, legislatures and agenda control.
6. The theory of interest groups : lobbying, bureaucracies, endogenous coalition formation.
7. Models of corruption, political economy of the state.

Econ281: Incentives and Organizations

1. Theory of incentives : adverse selection, moral hazard, multiple agents, contract dynamics.
2. Organization theory : team theory, message space size, costly information processing models.
3. Incentive-based approaches : supervision, managerial slack, limited commitment.
4. Applications to the theory of the firm : decentralization, hierarchies, transfer pricing, managerial compensation, cost allocation.

Econ282: Privatization and Regulations

1. Regulation of competition, externalities and natural monopolies, vertical integration, mergers and takeovers, bureaucracies and corruption.
2. Public sector performance in India and other developing countries.
3. Privatization, theory and experiences.

Econ283A: Econometric Applications I

1. Analysis of economic inequality and allied size distributions : Measures of inequality, poverty concept and measurement, empirical implications of the theories of industry evolution on firm-size distribution, relationship of size, growth and age of firms.
2. Demand analysis : Demand function and elasticities of demand, Engel curve analysis, aggregation issue, methodologies for estimation of unconstrained demand functions using aggregated data and using micro data.
3. Production analysis : Production function – theoretical properties, various forms, elasticities of substitution, problems of estimation.

Econ283B: Econometric Applications II

Some subset of the following topics will be covered depending upon the interest of the instructor and the students.

1. Income and allied size distributions : Stochastic models of income distribution, Measurement of income inequality, problems of measurement, Indian studies on inequality and poverty.
2. Advanced demand analysis : Demand systems, zero expenditure and corner solutions, nonlinear budget frontiers, rationing, sources of dynamics in consumer behaviour, durable goods, non-parametric demand analysis.
3. Production analysis : Frontier production function, measurement of productivity and technical change, flexible forms, aggregation, properties and estimation of multi-output production and cost functions.
4. Application of Econometrics to Macro-Economic Problems : Macro-econometric models-economic issues in the specification and estimation, illustrative applications, uses in forecasting and policy evaluation.
5. Estimation of structural models of firm behaviour : Dynamic programming models, policy effects on productivity, capital formation and product-mix of firms, models of firm heterogeneity – measurement of product quality and efficiency differences among firms.
6. Empirical models of the labour market : Duration analysis, labour supply and labour demand functions including the impact of unionisation, studies on the Indian labour market.

Econ284: Bayesian Econometrics

1. Principles of Bayesian analysis.
2. Simple univariate normal linear regression models.
3. Analysis of single equation nonlinear models.
4. Multivariate regression models.
5. Comparison and testing of hypothesis.
6. Simultaneous equations econometric models.

Econ285: Intertemporal Economics

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

Econ286: Theory of Planning

1. Political economy of the state, alternative viewpoints.
2. Modeling government behaviour, rational choice models, median voter model, legislatures and special interest groups, bureaucracy models.
3. Planning models, centralized planning, informationally decentralized planning processes, Lange-Lerner, MDP procedures, team theory.
4. Incentives within the public sector.
5. 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.
6. Cost-benefit analysis.
7. Pricing public sector outputs, marginal cost and average cost pricing, peak load pricing, priority pricing.

Econ287: Social Accounting

1. The economic process and various concepts.
2. A system of social/national accounts.
3. National accounts and various estimates.
4. 'Real' gross domestic product and 'real' national income.
5. Estimation of national income in India.
6. Preparation of an input-output (IO) table.

Econ288: Public Economics

1. Welfare objectives of the State : interpersonal utility comparisons.
2. Principles of taxation.
3. Theory of Second Best, problems of externalities & public goods.
4. Incentives and mechanism design, Gibbard-Satterthwaite theorem.
5. Tax incidence in static (partial and general equilibrium) models.
6. Tax incidence in Dynamic Models.
7. Optimal taxation and public production.
8. Dynamics, incidence and efficiency analysis of taxes.
9. Economics of corruption.
10. Economics of Public Sector Enterprises.
11. Procurement policies : incentive contracts and auction theory.
12. Regulation of private firms.

Econ289: Regional Economics

1. Introduction to regional planning.
2. Review of the Indian situation.
3. Concepts and techniques used in regional planning.

4. Regional decision making and regional balance.
5. Functional spatial configuration and regional synthesis.

Econ290A: International Economics I

1. 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.
2. Theory of commercial policy, tariffs, taxes and quantitative restrictions in traditional trade models.
3. Imperfectly competitive models and intra-industry trade models of international trade.
4. Trade, growth and development.
5. International factor movements.

Econ290B: International Economics II

1. Dynamics of Small Open Economies in Infinite Horizon and Overlapping Generations Models.
2. Non traded goods, Real Exchange Rate and the Terms of Trade.
3. Uncertainty and International Financial Markets.
4. Money and Exchange rates under flexible and fixed prices.
5. Sovereign Debt.

Econ290C: Advanced Topics in International Economics

1. Political economy of trade policy.
2. International trade and endogenous growth.
3. Trade and environment.
4. Trade and distribution.
5. Exchange rate dynamics in a small country setting.
6. Agency problems and international lending.
7. The New-Keynesian Models of the Open Economy.
8. International Capital Mobility and Development.

Econ291: Mathematical Programming with Applications to Economics

1. Static Linear and Non-linear Programming Problems
2. Dynamic Problems: Calculus of Variations, Optimal Control Theory and Dynamic Programming

Econ292: Monetary Economics

1. Transaction, precautionary and speculative demands for money.
2. Money in an overlapping generation model, general equilibrium Baumol-Tobin model, cash-in-advance model.
3. Currency and credit with long lived agents in overlapping generations set-up.

4. Monetary policy, (non-) neutrality.
5. Money, inflation and stability, money vs. interest rate targeting.

Econ293: History of Economic Thought

1. Introduction – relevance of the subject, the idea of a mainstream.
2. Mercantilism – economic and political background, issues and doctrines.
3. The physiocratic breakthrough – focus upon production, the framework of reproduction and concept of produit net, tableau economique and the concept of circular flow, the physiocratic system.
4. Classical political economy (CPE) – Adam Smith’s break and continuity with mercantilism; the physiocratic input: transformation of the framework of reproduction through the motion of stock; the framework of value, distribution and accumulation; the idea of free competition: price formation through equalization of rates of profit – natural rule and market price; Ricardo’s "elimination" of rent; the Ricardian system and its evolution through time.
5. Marx and the Marxist tradition – the labour standpoint : view of history, concept of surplus and class analysis.
6. The marginalist revolution – unresolved problems of CPE; fresh search for first principles; unification of different branches economic theory under marginal calculations and demand – supply analysis.
7. The Walrasian tradition – the idea of a general equilibrium, mathematical development : connection with optimisation, the ‘welfare ’ branch.
8. The Marshallian tradition – the idea of a ‘short period ’, theory of the firm and market structure, the Keynesian breakthrough – re-emergence of macro analysis, macro-micro relations.
9. The Mengerian tradition – subjectivism and methodological individualism, ‘new institutional economics ’.
10. The ‘present ’ as history – any mainstream ?

Econ294: Environmental Economics

1. Theories of externalities and public goods.
2. Trade and environmental policy.
3. Design of environmental policy.
4. Marketable pollution permits.
5. Choice between permits and taxes.
6. Methods of measuring the benefits of environmental improvements.
7. Models of resource depletion, exhaustible and renewable resources.

Econ295X: Theory of Finance I

1. Preference representation under uncertainty : stochastic dominance and measures of risk. Portfolio frontier, value maximization and the separation theorem.
2. CAPM, valuation of security.
3. Asymmetric information and efficiency.

Econ295Y: Theory of Finance II

1. Modigliani- Miller theorem.
2. Agency costs and management.
3. Debt vs. equity.
4. Corporate law and governance.
5. Takeovers, mergers, acquisitions and their disciplinary impact on opportunistic behaviour. Value of large vs. small shareholders.
6. Financial institutions and the market for corporate control.

Econ295C: Theory of Finance III

Advanced Topics in

1. Banking Finance
2. Market Microstructure
3. Regulation and Incentives

Econ296: Political Economy and Comparative Systems

1. 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.
2. 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.
3. 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.
4. Political economy of socialism : doctrines and experiences.
5. 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.

Stat272: Sample Survey : Theory and Practice

1. Introduction.
2. Sampling techniques.
3. Planning and conduct of sample surveys.
4. Non-sampling errors.

5. Experience of Indian surveys on selected topics.

Stat273: Time Series Analysis and Forecasting

1. Exploratory Analysis of Time Series: graphical display, classical decomposition method, estimation and elimination of trend and seasonal components
2. 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.
3. Modelling Non-Stationary Processes: ARIMA models, determination of the order of integration, tests of nonstationarity (unit root tests) - Dickey-Fuller (DF), augmented DF, Phillips-Perron tests, trend stationarity and difference stationary processes.
4. Forecasting based on ARIMA models: minimum MSE forecast, forecast error and optimality of exponential smoothing.
5. Modelling Seasonal Time Series: seasonal ARIMA models, estimation and forecasting.
6. Intervention Analysis and Detection of Outliers: different types of intervention, implications of interventions, additive and innovational outliers, procedure for detecting outliers.
7. Single output Transfer Function Noise Model: cross correlation function and its properties, identification, estimation and diagnostic checking.
8. State Space Models: state space representation of ARIMA models, basic structural model and Kalman recursion.
9. Elements of Spectral Analysis: spectral density function (sdf) and its properties, sdf of AR, MA and ARIMA processes and periodogram analysis.

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 C/FORTRAN :

FORTRAN: constants; simple & subscripted variables; records; arithmetic, string, logical & 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 & subroutine subprograms.

C: Constant, Variables and data types, operators and expression, Decision making and branching, looping, arrays, user defined functions, Standard library, Structures and Unions, pointers, File management, C Preprocessor.