

Graduate Economics (ECG)

ECG 515/FOR 515 Environmental and Resource Policy (3 credit hours)

Application of price theory and benefit-cost analysis to public decisions related to resources and environment. Emphasis on evaluation of water supply and recreation investments, water quality management alternatives, public-sector pricing, common property resources and optimum management of forest and energy resources.

Prerequisite: EC(ARE) 301 or 401

Typically offered in Spring only

ECG 528/FIM 528/MA 528 Options and Derivatives Pricing (3 credit hours)

The course covers (i) structure and operation of derivative markets, (ii) valuation of derivatives, (iii) hedging of derivatives, and (iv) applications of derivatives in areas of risk management and financial engineering. Models and pricing techniques include Black-Scholes model, binomial trees, Monte-Carlo simulation. Specific topics include simple no-arbitrage pricing relations for futures/forward contracts; put-call parity relationship; delta, gamma, and vega hedging; implied volatility and statistical properties; dynamic hedging strategies; interest-rate risk, pricing of fixed-income product; credit risk, pricing of defaultable securities.

Prerequisites: MA 341 and MA 405 and MA 421

Typically offered in Fall only

ECG 530 Topics in Labor Economics (3 credit hours)

This course covers topics in labor economics including labor supply, labor demand, human capital, household production, discrimination, and immigration. The course textbook will be supplemented with readings from academic research papers. Students will learn how empirical research evaluates the predictions of economic theory and the impact of public policy. Students will gain an understanding of how to read and critique empirical research by applying the theory and measurement techniques developed by economists.

Prerequisites: ECG 505 and ECG 561

Typically offered in Spring only

ECG 537 Health Economics (3 credit hours)

Microeconomic analysis of public and private policy issues concerning health care financing and delivery in United States including: choice under conditions of asymmetric information; health insurance; performance of physician, hospital, long-term care and pharmaceutical markets.

Prerequisite: EC(ARE) 401 or ECG 700

Typically offered in Fall only

ECG 540 Economic Development (3 credit hours)

Examination of problems encountered in promoting regional and national economic development. Consideration given to structural changes required for raising standards of living. Some basic principles of economics applied to suggest ways of achieving development goals. Planning strategies, policies and external assistance.

Prerequisite: EC(ARE) 301 or 401

Typically offered in Spring only

ECG 548 International Economics (3 credit hours)

This course covers the determinants of international trade, migration, and investment and their connection with economic growth. It also covers macro/monetary issues, including exchange rates, financial markets and monetary-fiscal policy in open economies.

Prerequisite: EC 301

Typically offered in Spring only

ECG 561/ST 561 Applied Econometrics I (3 credit hours)

Introduction and application of econometrics methods for analyzing cross-sectional data in economics, and other social science disciplines, such as OLS, IV regressions, and simultaneous equations models. Students should have had a statistical methods course at the 300 level or above as well as Calculus I and II.

Typically offered in Fall only

ECG 562 Applied Econometrics II (3 credit hours)

This course is a continuation of Applied Econometrics I (ECG 561). After a review of probability and statistics, and simple and multiple regression models, we explore the following topics: regression using panel (longitudinal) data, instrumental variables regression, regression with a binary dependent variable, prediction with many regressors and "Big Data" methods, and time series regression. The emphasis is on recognizing the conditions in which it is appropriate to apply the various techniques, formulating a relevant model, estimating the model and interpreting the results. This course will also provide the students practical experience in applied econometrics using STATA.

P: ECG 561

Typically offered in Spring only

ECG 563 Applied Microeconometrics (3 credit hours)

This course will survey econometric methods for the analysis of panel and limited dependent variable data. Both the theoretical foundation and empirical application of methods will be covered. Topics include fixed and random effects, program evaluation, censored, truncated, discrete choice and count data models. Although not required, ECG 561, ST 511 or ST 512 is encouraged prior to taking this class.

Typically offered in Fall only

ECG 564 Big Data Econometrics (3 credit hours)

The goal of this course is to introduce students to a wide range of methods, which are designed to tackle commonly seen real-world problems, and are intensively used in the current literature. These methods include linear regression, logistic regression, bootstrapping, cross validation, bagging, boosting, splines, random forests, neural networks, and support vector machines. This course is application oriented. We will emphasize the intuition behind each method and touch on a little bit of theory.

P: EC 451 or ECG 561 or ST 430

Typically offered in Fall only

ECG 590 Special Economics Topics (1-6 credit hours)

Examination of current problems on a lecture-discussion basis. Course content varies as changing conditions require new approaches to deal with emerging problems.

Typically offered in Fall, Spring, and Summer

ECG 630 Independent Study (1-3 credit hours)

Typically offered in Fall, Spring, and Summer

ECG 695 Master's Thesis Research (1-9 credit hours)

Thesis research.

Prerequisite: Master's student

Typically offered in Fall, Spring, and Summer

ECG 700 Fundamentals of Microeconomics (3 credit hours)

Preparatory course for ECG701-702, intended for those lacking sufficient background to go directly into those courses Economic theory with extensive use of calculus. Consumer and producer optimization. Price and output determination in competitive markets, monopoly, and imperfectly competitive markets. Factor Markets. General equilibrium, externalities and public goods.

Prerequisite: MA 131 and EC(ARE)301

Typically offered in Fall only

ECG 701 Microeconomics I (3 credit hours)

Theory of consumer behavior. Primal-dual relationships in consumer theory including indirect utility functions and consumer expenditure functions. Properties of consumer demand functions. Consumer welfare measurement. Production technology and the theory of the firm including cost minimization and profit maximization. Dual relationships in producer theory including cost functions and profit functions. Properties of firm output supply and input demand equations. Long-run market equilibrium in a competitive market environment. Market equilibrium with upward sloping input supply equations. The theory of monopoly.

Prerequisite: ECG 700, MA 231

Typically offered in Fall only

ECG 702 Microeconomics II (3 credit hours)

General equilibrium. Economics of information and uncertainty. Game theory. Mechanism design and social choice. Contract theory.

Prerequisite: ECG 701

Typically offered in Spring only

ECG 703 Fundamentals of Macroeconomics (3 credit hours)

Fundamental topics in macroeconomics, including consumption, investment, government purchases, taxation, government debt, output supply, money and inflation, unemployment, elementary economic growth. Emphasis is on the microeconomic foundations of macroeconomics. Economic intuition is stressed.

Prerequisite: EC(ARE) 301, EC 302, BUS(ST)350, MA 131

Typically offered in Spring only

ECG 704 Macroeconomics I (3 credit hours)

Rigorous examination of basic macroeconomic theory, including household choice of consumption demand and labor supply, capital accumulation and economic growth, government purchases, taxation, government debt, investment, consumption and investment under uncertainty, real business cycle models. Throughout the course, the connection between economic intuition and formal mathematical analysis is emphasized. The level of mathematical rigor is high.

Prerequisite: ECG 561, ECG 703, MA 242

Typically offered in Fall only

ECG 705 Macroeconomics II (3 credit hours)

Continuation of ECG 704. Topics include, but are not limited to, money demand and supply; money and growth; inflation; term structure of interest rates; money and fluctuations, including real and New Keynesian models; theories of unemployment; conduct of policy and problems of time consistency; asset pricing; introduction to open economy models.

Prerequisite: ECG 704

Typically offered in Spring only

ECG 706 Industrial Organization (3 credit hours)

Survey of microeconomic literature on industrial organization: internal structure of the firm, number and sizes of firms in an industry, pricing and output behavior of firms. Public policy, including antitrust laws, patent and copyright laws, and government regulation of industry.

Prerequisite: ECG 700

Typically offered in Fall only

ECG 707 Topics In Industrial Organization (3 credit hours)

Advanced study of selected topics such as oligopoly theory, empirical models of industry, principal-agent contracts, economic theories of firm organization, antitrust issues, economic theories of regulation and economics of property rights.

Prerequisite: ECG 700

Typically offered in Spring only

ECG 708 Advanced Microeconomic Theory (3 credit hours)

Survey of literature on game theory focusing on applications to numerous areas of economics. Course will cover the classic literature on auctions, matching theory and non-cooperative game theory. Special focus on applying these theoretical results to practical problems of market design.

Prerequisite: ECG 702

Typically offered in Fall only

ECG 709 Behavioral and Experimental Economics (3 credit hours)

Survey of literature on behavioral and experimental economics from a broad perspective, with coverage of numerous fields of economics, including both laboratory and field experiments. Methodology of experimental economics and design of laboratory and field experiments will be covered.

Prerequisite: ECG 702

Typically offered in Spring only

ECG 715 Environmental and Resource Economics (3 credit hours)

Theoretical tools and empirical techniques necessary for understanding of resource and environmental economics, developed in both static and dynamic framework. Discussions of causes of environmental problems, possible policies and approaches to nonmarket valuation. Analysis of resource use over time using control theory for both renewable and exhaustible resources.

Prerequisite: ECG 700

Typically offered in Fall only

ECG 716 Topics In Environmental and Resource Economics (3 credit hours)

Advanced study of selected topics in environmental and resource economics. Topics vary with interests of instructor and students.

Prerequisite: ECG 715

Typically offered in Spring only

ECG 730 Labor Economics (3 credit hours)

Application of microeconomic theory and econometric methods to labor market behavior in both static and dynamic contexts. Labor demand analysis, labor force participation, hours of work, household production, human capital, distribution of earnings, information and search, and mobility.

Prerequisite: ECG 700 and one of the following: ECG(ST) 561, ST 422, ST 512, ST 708

Typically offered in Fall only

ECG 739 Empirical Methods for Development Economics and Applied Microeconomics (3 credit hours)

This course will provide an in-depth study of the application of the core tools of causal inference and microeconometrics to answer questions in development microeconomics. The class will largely consist of two activities: (1) close reading and guided discussion of seminal and recent papers and (2) the analysis of real data to estimate causal relationships. While the particular applications we study will come largely from development economics, the course is intended to be useful to students in diverse areas of applied micro.

Prerequisite: ECG 751 and ECG 753

Typically offered in Spring only

ECG 740 Economic Growth and Development (3 credit hours)

Microeconomic issues of growth. Technology adoption and the distributional effects of technical change; the role of agriculture in economic development; land tenure and tenancy arrangements; the role of agrarian institutions in the development process; and poverty, inequality and economic growth in developing countries. Approximately equal time devoted to theory and evidence.

Typically offered in Fall only

ECG 741 Agricultural Production and Supply (3 credit hours)

Advanced study in logic of, and empirical inquiry into, producer behavior and choice among combinations of factors and kinds and qualities of output; aggregative consequences of individuals' and firms' decisions in terms of product supply and factor demand; factor markets and income distribution; and general interdependency among economic variables.

Prerequisite: ECG 700

Typically offered in Fall only

ECG 742 Consumption, Demand and Market Interdependency (3 credit hours)

Analysis of behavior of individual households and of consumers in aggregate with respect to consumption of agricultural products; impact of these decisions on demand for agricultural resources, competition among agricultural regions and for markets; and interdependence between agriculture and other sectors of the economy.

Prerequisite: ECG 700

Typically offered in Spring only

ECG 748 Theory Of International Trade (3 credit hours)

Consideration of specialized body of economic theory dealing with international movement of goods, services, capital and payments. A theoretically oriented consideration of policy.

Prerequisite: ECG 700, 703

Typically offered in Spring only

ECG 749 Monetary Aspects Of International Trade (3 credit hours)

Macroeconomic problems of an open economy including balance of payments adjustment mechanism, alternative exchange rate systems, external effects of monetary and fiscal policy, optimum currency areas and international monetary reform.

Prerequisite: ECG 703

Typically offered in Fall only

ECG 750/ST 750 Introduction to Econometric Methods (3 credit hours)

Introduction to principles of estimation of linear regression models, such as ordinary least squares and generalized least squares. Extensions to time series and panel data. Consideration of endogeneity and instrumental variables estimation. Limited dependent variable and sample selection models. Attention to implementation of econometric methods using a statistical package and microeconomic and macroeconomic data sets.

Prerequisite: ST 421; Corequisite: ST 422

Typically offered in Spring only

ECG 751/ST 751 Econometric Methods (3 credit hours)

Introduction to important econometric methods of estimation such as Least Squares, instrumental Variables, Maximum Likelihood, and Generalized Method of Moments and their application to the estimation of linear models for cross-sectional economic data. Discussion of important concepts in the asymptotic statistical analysis of vector process with application to the inference procedures based on the aforementioned estimation methods.

Prerequisite: ST 421, ST 422

Typically offered in Fall only

ECG 752/ST 752 Time Series Econometrics (3 credit hours)

The characteristics of macroeconomic and financial time series data. Discussion of stationarity and non-stationarity as they relate to economic time series. Linear models for stationary economic time series: autoregressive moving average (ARMA) models; vector autoregressive (VAR) models. Linear models for nonstationary data: deterministic and stochastic trends; cointegration. Methods for capturing volatility of financial time series such as autoregressive conditional heteroscedasticity (ARCH) models. Generalized Method of Moments estimation of nonlinear dynamic models.

Prerequisite: ECG(ST) 751

Typically offered in Spring only

ECG 753/ST 753 Microeconometrics (3 credit hours)

The characteristics of microeconomic data. Limited dependent variable models for cross-sectional microeconomic data: logit/probit models; tobit models; methods for accounting for sample selection; count data models; duration analysis; non-parametric methods. Panel data models: balanced and unbalanced panels; fixed and random effects; dynamic panel data models; limited dependent variables and panel data analysis.

Prerequisite: ECG 751

Typically offered in Spring only

ECG 754 Advanced Econometrics: Theory of Machine Learning Methods (3 credit hours)

The course provide modern tools and papers relevant to big data in econometrics. The aim of the course will be a) provide the necessary toolbox b) go over the main proofs in the big data literature c) analyze some papers. The main topics will be high dimensional inference, moderate self deviation, Neyman orthogonality, approximate means, multiplier bootstrap, and deep learning.

P: ECG 751

Typically offered in Fall only

ECG 755 Advanced Econometrics: Practical Aspects of Machine Learning (3 credit hours)

This course will teach several new techniques, nodewise regression, factor models, and its applications in high dimensional finance. Practical papers on deep learning will also be read. The focus will be both theoretical, and practical will involve learning tools and going over few proofs in a detailed way.

P: ECG 751

Typically offered in Spring only

ECG 765 Mathematical Methods For Economics (3 credit hours)

Linear algebra and matrices, optimization with equality and inequality constraints, comparative statistics, differential and difference equations, intertemporal optimization. Economic applications to utility and profit maximization, national income determination, economic growth, business cycles.

Prerequisite: MA 231 , introductory course in linear algebra

Typically offered in Fall only

ECG 766 Computational Methods in Economics and Finance (3 credit hours)

Fundamental methods for formulating and solving economic models numerically will be developed. Emphasis on defining the mathematical structure of problems and practical computer methods for obtaining model solutions. Major topics include solution of systems of equations, complementarity relationships and optimization. Finite and infinite dimensional problems will be addressed, the latter through the use of finite dimensional approximation techniques. Particular emphasis placed on solving dynamic asset pricing, optimization and equilibrium problems. MS in Financial Mathematics Program required.

Prerequisite: (MA 305 or MA 405) and MA 341 and EC 301 and EC 302 and (CSC 112 or 114) or equivalents.

Typically offered in Fall only

ECG 784 Advanced Macroeconomics (3 credit hours)

Advanced study of macro-economics. Emphasis on business cycles and behavior of real variables. Real, incomplete information and disequilibrium theories of the business cycle; rational expectations; contract theory and indexation; investment; and effects of government expenditure, taxes and debt.

Prerequisite: ECG 704

Typically offered in Spring only

ECG 785 Monetary Economics (3 credit hours)

Field course for students desiring a specialization in monetary economics or macroeconomics. Survey of current topics in monetary theory and policy.

Prerequisite: ECG 705

Typically offered in Spring only

ECG 790 Avanced Special Topics (1-6 credit hours)

Typically offered in Fall and Spring

ECG 830 Independent Study (1-3 credit hours)

Typically offered in Fall and Summer

ECG 895 Doctoral Dissertation Research (1-9 credit hours)

Dissertation research.

Prerequisite: Doctoral student

Typically offered in Fall, Spring, and Summer