# Department of Economics

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As one of the social sciences, economics studies how the choices we make as individuals—as consumers and producers, as savers and investors, as managers and employees, as citizens and voters—combine to determine how society uses its scarce resources to produce and distribute goods and services. This practical discipline provides insights into important issues such as, the determinants of wealth and poverty—unemployment, inflation, international trade, and economic growth; as well as success and failure in the marketplace. The rigorous, systematic analysis that the study of economics brings to bear on these and other real-world issues provides excellent preparation for careers in both the private and the public sectors, as well as for graduate study in economics, business, public policy, and law. Economics graduates pursue varied careers in business, law, banking and finance, government service, education, and private consulting. Students considering graduate study in economics leading to a master’s or doctoral degree are strongly encouraged to meet with their advisor as early as possible to plan an appropriate course of study.

## Requirements for the Major

In addition to fulfilling undergraduate Core Curriculum and College of Arts and Sciences requirements for the bachelor of science degree, students majoring in economics must complete the following departmental requirements:

* ECON 1 or 1E, 2, and 3
* MATH 11 and 12, or MATH 30 and 31, or MATH 35 and 36
* OMIS 40 or MATH 122 or MATH 8, or AMTH 108
* ECON 41 and 42
* ECON 113, 114, 115, and 181 or 182
* Five upper-division economics electives, at least two of which must be completed after ECON 113 and 115

## Requirements for the Minor

Students with a minor in economics through the College of Arts and Sciences must complete the following requirements:

* ECON 1, 2, 3, 113, and 115
* Two additional upper-division economics courses
* MATH 11 or 30 or 35

### Concentration in Data Analysis for Economics

The concentration in Data Analysis for Economics provides a structured course of study for economics majors to develop their skills in econometrics and data analysis and apply them to issues in economics and related areas. In addition to completing all requirements for the major in economics, students must pass the following courses with a grade of “C” or higher\*:

* A. ECON 43
* B. One of the following: ECON 173 or 174
* C. Three of the following: ECON 134, 135, 142, 150, 151, 154, 166, 186, 187, 188; 173 or 174 (if not used to satisfy B above)

\*All upper-division courses in the concentration can count as upper-division electives toward the economics major. One

(and only one) of the courses in list C may be substituted with: (a) an approved course in another social science or business discipline with a significant data analysis component; or (b) an independent study course with a substantial data analysis component (4 or 5 units). Substitutions must be approved by the Concentration advisor. Currently pre-approved substitutions: CSCI 183, ENVS 117, OMIS 114, or OMIS 150. Non-economics courses will not count as one of the upper-division electives toward the economics major.

### Mathematical Economics Concentration

Economics majors desiring a concentration in mathematical economics must complete the following requirements in addition to the regular requirements for the major:

* All of the following courses: MATH 11, 12, 13, 14, 23, 53, AMTH 106 (MATH 122 and 123 are strongly recommended)
* Three out of the following courses: ECON 170, 171, 172, 173, 174, 187, or 188 (these courses also count as electives required for the major)

Note: Students completing the mathematical economics concentration take MATH 11 and 12 instead of MATH 30 and 31.

## Lower-Division Courses

### 1. Principles of Microeconomics

Introduction to microeconomics and its applications to business decisions and public policy. Topics include supply, demand, and the coordinating role of prices in a market economy; the behavior of business firms, including output and pricing decisions; competition and monopoly; and government policies and regulations affecting markets. (4 units)

### 1E. Principles of Microeconomics

Special section of ECON 1 emphasizing environmental applications of economics. Introduction to microeconomics and its applications to business decisions and public policy. Topics include supply, demand, and the coordinating role of prices in a market economy; the behavior of business firms, including output and pricing decisions; competition and monopoly; government policies and regulations affecting markets. (4 units)

### 2. Principles of Macroeconomics

Determinants of national income and product in the long run and short run; inflation, unemployment, and business cycles; monetary and fiscal policies; and economic growth. Prerequisite: ECON 1. (4 units)

### 3. International Economics, Development, and Growth

Analysis of international trade theory and policy, balance-of-payments adjustments and exchange-rate regimes, and economic development. Prerequisites: ECON 1 and 2. (4 units)

### 3H. International Economics, Development, and Growth

Honors section. Analysis of international trade theory and policy, balance-of-payments adjustments and exchange-rate regimes, and economic development. Must be in the University Honors Program or Leavey Scholars Program, or have permission of instructor. Prerequisites: ECON 1 and 2. (4 units)

### 41. Data Analysis and Econometrics

Introduction to statistical methods for analyzing economic data. Emphasis on applications of multiple regression and establishing causality in observational data. Prerequisites: a grade of C- or better in ECON 1 and 2; and MATH 11 or 30 or 35; and MATH 8, or MATH 122, or OMIS 40, or AMTH 108, or equivalent. Economics majors only, or by permission of instructor. Must enroll simultaneously in ECON 42. (4 units)

### 42. Data Analysis Applications

Hands-on course in obtaining and analyzing data using statistical software. Prerequisites: a grade of C- or better in ECON 1 and 2; and MATH 11 or 30 or 35;and MATH 8, or MATH 122, or OMIS 40, or AMTH 108, or equivalent. Economics majors only, or by permission of instructor. Must enroll simultaneously in ECON 41. (2 units)

### 43. Data Wrangling and Visualization

Data acquisition, manipulation, and visualization using statistical software, with hands-on applications to economics. Prerequisites: a grade of C- or better in ECON 41 and 42; or OMIS 30, 40, and 41. (2 units)

## Upper-Division Courses

Prerequisites: Unless otherwise noted, a grade of C- or better in ECON 1, 2, and 3 is required for all upper-division economics courses.

### 101. Resources, Food, and the Environment

Exploration of the relationship among food production, resource use, and the environment. Topics include food innovation, biotechnology, the green revolution, resource depletion, environmental degradation, and food safety. Also listed as MGMT 173. Prerequisite: None. (5 units)

### 111. Economics of the Environment

Economic analysis of environmental issues and government policies for environmental protection. Applications to important environmental issues, such as global climate change, water and air pollution, hazardous wastes, biodiversity, and endangered species. Prerequisite: a grade of C- or better in ECON 1. (5 units)

### 113. Intermediate Microeconomics I

Theory of rational individual choice and its applications to decision making, consumer demand, and social welfare; and economics of uncertainty and information. Additional prerequisite: a grade of C- or better in MATH 11 or 30 or 35. (5 units)

### 114. Intermediate Microeconomics II

Theory of the firm; determination of price and quantity by profit-maximizing firms under different market structures; strategic behavior; general equilibrium; market failure and government policies. Additional prerequisites: a grade of C- or better in the following courses: ECON 113 and MATH 11 or 30 or 35. (5 units)

### 115. Intermediate Macroeconomics

Macroeconomic analysis, emphasizing modern economic models for explaining output, employment, and inflation in the short and long run. Macroeconomic policymaking, including fiscal and monetary policy. Additional prerequisite: a grade of C- or better in MATH 11 or 30 or 35. (5 units)

### 120. Economics of the Public Sector

Microeconomic analysis of the role of government in the market economy. Supply of public goods and services, government’s role in controlling externalities and regulating private industry, and the economics of the political process. (5 units)

### 122. Money and Banking

Theoretical, institutional, and historical approach to the study of money and banking, with particular emphasis on the relationship between the monetary and banking system and the rest of the economy. Additional prerequisite: a grade of C- or better in Econ 115, (can be taken concurrently). (5 units)

### 126. Economics and Law

Economic analysis of law and legal institutions focusing on the common law areas of property, contracts, and torts. (5 units)

### 129. Economic Development

Causes and consequences of economic growth and poverty in less developed countries; analysis of the role of government policies in economic development. (5 units)

### 134. African Economic Development

Examination of the economic development of sub-Saharan African countries, with particular emphasis on the relationships between economic growth and their social, political, and economic structures. Additional prerequisites: a grade of C- or better in ECON 41 and 42, or by permission of instructor. (5 units)

### 135. Gender Issues in the Developing World

Explores the gendered nature of poverty in the developing world, with special focus on sub-Saharan Africa, using applied statistical analysis, and economic theory. Also listed as WGST 121. Additional prerequisites: a grade of C- or better in ECON 41 and 42 or permission of instructor. (5 units)

### 136. 20th-Century Economic History

The development of the U.S. economy during the 20th century. Topics include the causes and consequences of economic growth, the Great Depression, the rise of government regulation, the changing role of women in the workforce, and the increasing internationalization of markets during the postwar period. Additional prerequisite: a grade of C- or better in ECON 115. (5 units)

### 137. World Economic History

Development of Western and non-Western economies since the late 19th century. Topics include globalization and economic integration, convergence and divergence in economic growth across countries, international monetary systems, and the impact of alternative policies and institutional regimes on economic performance. Additional prerequisite: a grade of C- or better in ECON 115 or permission of instructor. (5 units)

### 138. History of Economic Thought

Origins and evolution of economic ideas in their historical and philosophical context. Emphasis on the theories of Adam Smith, David Ricardo, and Karl Marx, as well as the emergence of modern microeconomics and macroeconomics in the 19th and 20th centuries. (5 units)

### 139. American Economic History

Macroeconomic history of the United States since 1869. Productivity, economic growth, inflation, and recession in the United States from the end of the Civil War to the present. Particular emphasis on the Great Depression and the Great Recession. Additional prerequisite: a grade of C- or better in ECON 115. (5 units)

### 140. Behavioral Economics

This course is an introduction to behavioral economics: the attempt to incorporate insights from psychology into economics. Though behavioral economics is a relatively new field, it has already led to multiple Nobel Prizes and is beginning to have a substantial impact in the field of economics, finance, marketing, management, and political science. In this course, we will study how behavioral economists explain a range of economic phenomena, and how those explanations differ from standard economic ones. The use of experiments to identify behavioral economic phenomena will be emphasized. We will study various ways in which (so-called) irrationality influences people’s judgment and decision-making. Behavioral economics is invaluable to anyone with an interest in human behavior. No previous acquaintance with behavioral economics is necessary. Additional prerequisite: a grade of C- or better in Econ 113 and Econ 41 or OMIS 41 (5 units)

### 142. Economics of Sports

Tools of economic analysis applied to sports in pursuit of broader lessons and insights. Topics will include labor market discrimination, cartel theory, cognitive biases, strategy, labor unions, public policy, and profit maximization. The overriding objective is to use the observability of sports to help us understand economic decision-making in non-sports environments. Additional prerequisites: a grade of C- or better in ECON 41, 42, 113, and 114. (5 units)

### 150. Labor Economics

This course covers topics related to the labor market including theory of labor supply and demand, determination of wages and employment in the labor market, human capital theory, income inequality, unemployment, and labor market discrimination. The course will cover basic institutional background and statistics on each issue, and develop economic models important to the evaluation of each topic. Applications to policy issues including minimum wage, negative income tax, unionization, and unemployment insurance. Emphasis on data analysis and empirical methods applied to the labor market. Additional prerequisites: a grade of C- or better in ECON 41, 42, and 113. (5 units)

### 151. Economics of Education

This course deals with the important economic issues linked to education and will present an overview of the main theoretical and empirical knowledge available. Topics covered include: the impact of class size, the role of teachers, the return to education, the role of school choice and of tuition fees in higher education, and the role of early investment in long term labor outcomes. The course will discuss empirical methodologies used to analyze education systems worldwide. Examples will be taken from both developing and developed countries.

Goals of the course: Introducing students to the available literature on education and the methodology used to analyze education systems worldwide. At the end of the course, students will be acquainted with rigorous quantitative methods used to analyze education, and will have been in contact with the most prominent results available in the economics of education. Additional Prerequisite a grade of C- or better in Econ 41 and 42 (5 units)

### 154. ​Economics of Health Care

​Health care spending currently accounts for 18% of GDP in the U.S., and is one of the fastest growing areas of public expenditure. The purpose of this course is to familiarize you with the US healthcare system, and introduce you to economic models related to the study of health care provision and payment. The topics covered in this course include demand for health care, health insurance markets, pharmaceutical companies and innovation, and U.S. institutions such as Medicare, Medicaid, and the Affordable Care Act. Additional prerequisites: a grade of C- or better in ECON 41, 42, and 113. (5 units)

### 156. Real Estate Economics

Economic analysis of real estate markets, including supply of and demand for land and improvements, legal aspects of real estate ownership and transactions, government regulation and taxation of real estate, and real estate markets in urban and regional economies. Additional Prerequisite: a grade of C- or better in Econ 41 and 42, or OMIS 41. (5 Units)

### 160. The Economics of Poverty and Inequality

Examines theories and evidence regarding poverty and economic inequality in the United States. Evaluates alternative public policies aimed at combating poverty. (5 units)

### 165. Economics and Justice

Study of theories of economic justice with applications to economic issues and policy. Alternative theories to be considered include utilitarian, libertarian, welfare-economic, egalitarian, feminist, and religious moral perspectives. Topics include poverty and income distribution; economic inequality and mobility by class, gender, and race; the role of the government in promoting justice; effects of globalization; and justice under different economic systems. Additional prerequisite: a grade of C- or better in ECON 113. (5 units)

### 166. Race, Ethnicity, and Gender in the U.S. Economy

Analysis of current and historical differences in economic status by race, ethnicity, and gender; theory and evidence of discrimination; role of government policies. Additional prerequisite: a grade of C- or better in ECON 41 and 42. (5 units)

### 170. Mathematical Economics: Static Optimization

The standard classical models of microeconomic and macroeconomic theory are generalized and reformulated as mathematical systems. The primary goal of the course is to extract empirically testable propositions that would permit testing model veracity. Linear algebra and the tools of calculus including power series, the implicit function theorem, envelope theorems, and duality are used as the basis of analysis. Additional prerequisites: a grade of C- or better in MATH 11 or 30 or 35, and MATH 12 or 31 or 36, and ECON 113, or permission of instructor. (5 units)

### 171. Mathematical Economics: Dynamic Optimization

The course will discuss the mathematical tools needed to analyze dynamic situations in economics. Applications to optimal decision-making over time with respect to natural resource allocations, manufacturing and storage paths, consumption/investment decisions, and stability of economic systems are discussed. Topics include optimal control, dynamic programming and calculus of variations. Additional prerequisites: a grade of C- or better in MATH 11 or 30 or 35, and MATH 12 or 31 or 36, and ECON 113, or permission of instructor. (5 units)

### 172. Game Theory

This course introduces game theoretical concepts and tools. Theoretical topics include Nash equilibrium, Subgame perfection, Bayesian-Nash equilibrium, Harsanyi transformation, commitment, and Perfect Bayesian Equilibrium. Applications to topics such as oligopoly, strategic investment, and agency theory are discussed. Additional prerequisites: a grade of C- or better in MATH 11 or 30 or 35, and MATH 12 or 31 or 36, and ECON 113, or permission of instructor. (5 units)

### 173. Applied Econometrics

Statistical analysis of cross-section and panel data, with economic applications. Topics include identification of causal effects using panel methods, instrumental variables, and quasi-experimental techniques; models with binary outcomes; sample selection. Handson analysis of data using statistical software. Additional prerequisites: a grade of C- or better in MATH 11 or 30 or 35, and MATH 12 or 31 or 36, and ECON 41 and 42, and ECON 113. (5 units)

### 174. Applied Time Series Analysis

Methods to forecast and interpret hypotheses about time-varying economic variables. Topics include stationary and non-stationary series; characterizing time series in tractable ways; separating regular (trend and seasonal) and irregular parts of a time series; and examining identification and estimation strategies. Synthesize, present, and evaluate time series analysis to assess credibility. Additional prerequisites: a grade of C- or better in ECON 41 and 42, and ECON 115. (5 units)

### 181. International Trade

Analysis of the theories of international trade and strategic interactions; assessment of the empirical patterns of trade; analysis of the political economy of protection; and applications to policies guiding international competition. Additional prerequisite: a grade of C- or better in ECON 113. (5 units)

### 182. International Finance and Open Economy Macroeconomics

Analysis of the monetary aspects of international economics, including the balance of payments, exchange rates and foreign exchange markets, speculative attacks and currency crises, and the implications of international trade and capital flows for macroeconomic activity and policy. Additional prerequisite: a grade of C- or better in ECON 115. (5 units)

### 184. The Economics of Intellectual Property

This course provides a helicopter tour of the economics of intellectual property. The objective of the course is to offer students an overview of some of the most relevant and interesting topics surrounding intellectual property. The course covers in particular recent events related to intellectual property, such as the debate on vaccine patents, software patents, “patent wars”, patent litigation involving patent trolls, and standard essential patents. It also introduces students to the economics of other intellectual property rights, including trademarks, copyright, and design rights. The course material varies substantially across topics; it is both theoretical and empirical and cuts across a number of disciplines, most importantly law and economics. Additional prerequisite: a grade of C- or better in ECON 113 and 114. (5 units)

### 185. The Economics of Innovation

This course introduces students to the use of economic analysis for the understanding of technical change and the innovative process, its determinants and consequences. The course focuses on innovations which have a direct impact on the economy, either via increasing the productivity of its members or by improving and expanding the goods and services available to them. The course adopts both a macro- and microeconomic perspective. It discusses how innovation contributes to economic growth. It also covers how the innovation process works, what motivates innovators, and how innovations translate into successful new products and services in the marketplace. The course also discusses how innovation can help companies choose strategies that increase their profits or defend against competitors. Finally, students will also learn about innovation policy in this area.Additional prerequisite: a grade of C- or better in ECON 113 and 114. (5 units)

### 186. Economics of Digitization

Digitization has dramatically reduced the costs of data storage and transmission. The transformative force of the internet has, in many areas, fundamentally changed the ways consumers and companies interact. This course explores the impact of different digital technologies on the behavior of markets and market outcomes. It combines tools and insights from a number of fields, including industrial organization, labor economics, the economics of innovation, and applied econometrics. Topics covered include big data, copyright and online piracy, apps markets, online retailers, social media, online gaming, and virtual currencies. Additional prerequisite: a grade of C- or better in ECON 41, 42, 113 and 114. (5 units)

### 187. Dynamic Macroeconomics

Dynamic macroeconomic models are artificial economies that are designed for doing applied time-series analysis and policy simulation. This course provides an introduction to such models. Topics include a review of analytical and numerical tools for dynamic optimization; quantitative analysis of business cycle using the neoclassical growth theory; monetary policy analysis and projection using new Keynesian models; and other selected topics of economic dynamics. Problem sets include both theoretical and computer exercises. Additional prerequisites: a grade of C- or better in ECON 41, 42, 113, and 115. (5 units)

### 188. Advanced Macroeconomics: Theory and Empirics

Designed to provide students with a deeper understanding of macroeconomics and useful rigorous analytical and statistical skills. Topics covered include economic growth, and monetary and fiscal policies in business cycles. Analyze these topics in theoretical models, and validate the theories using actual data with R. Additional prerequisite: a grade of C- or better in ECON 41, 42, and 115. (5 units)

### 190. Economics Seminar

Seminar on contemporary economic theories and problems. Admission by invitation only. (5 units)

### 199. Directed Reading/Directed Research

Independent projects undertaken by upper-division students with a faculty sponsor. Independent studies are normally permitted only under special circumstances. Prerequisite: Written proposal must be approved by instructor and chair at least one week prior to registration. (1–5 units)