

# ECON - ECONOMICS

## ECON111 Thinking Like an Economist (3 Credits)

An introduction to the modes of thought of economics. Use of simple standard tools of economics to analyze important problems that arise frequently in public policy, the news media, and in daily life. An emphasis on how economists predict what choices societies make and how economists analyze whether those are good choices. Practical application of a variety of economic tools leading to a focus on the essential unity underlying these analytical tools, viewing economics as a discipline that applies a core methodology in different ways in different situations.

**Restriction:** Must be sophomore standing or lower.

## ECON175 Inequality: Determinants and Policy Remedies (3 Credits)

History shows that the gap between the rich and the poor has varied over time within and between countries, most recently seeming to increase within many countries while somewhat decreasing between countries. This course challenges students to investigate why people make different amounts of money, why income inequality has changed dramatically in recent years, what public policy tools exist to counter inequality increases, and what different institutional arrangements different countries use to lower inequality. This course will introduce students to theoretical tools used by economists to understand the sources of inequality and will also examine various empirical measures of inequality.

## ECON181 Putting a Price on the Environment: An Economist's Perspective on Sustainability (3 Credits)

How does society balance the benefits of environmental protection and preservation against the costs? Though some might say that the environment is priceless, economists recognize that every action involves trade-offs. This course investigates sustainability through comparing costs and benefits. From this perspective, other questions arise: How can we design policies that incentivize sustainable choices? Why might usual market functioning fail to achieve sustainability? Do we need to put a price on the environment in order to protect it? How do we measure an economy's "success"? This course explores the answers to these and other related questions from an economist's perspective.

## ECON185 Energy: Crisis or Breakthrough? (3 Credits)

Will we face an energy crisis in the near future, or will technological breakthroughs solve problems? Will we destroy the environment by careless use of polluting energy, or we will find new and clean sources of energy that resolves the environmental issue once and for all? Will politicians and governments succeed in agreeing on a coherent strategy to deal with global issues related to energy, or do we expect individual countries to move in different directions and exacerbate the problems? Students will explore the demand and supply sides of the energy market and their relationships with government policies and environmental concerns. Students will also analyze empirical evidence to better understand the factors affecting energy production and consumption in the past and possible directions in the future. By examining past situations when technological change mitigated problems in energy markets, we can make informed predictions about what could happen next.

## ECON200 Principles of Microeconomics (3 Credits)

Introduces economic models used to analyze economic behavior by individuals and firms and consequent market outcomes. Applies conceptual analysis to several policy issues and surveys a variety of specific topics within the broad scope of microeconomics.

**Prerequisite:** MATH107 or MATH110; or must have math eligibility of MATH113 or higher.

**Additional Information:** It is recommended that students complete ECON200 before taking ECON201.

## ECON201 Principles of Macroeconomics (3 Credits)

An introduction to how market economies behave at the aggregate level. The determination of national income/output and the problems of unemployment/inflation, will be examined, along with monetary and fiscal policy.

**Prerequisite:** MATH107 or MATH110; or must have math eligibility of MATH113 or higher.

**Recommended:** ECON200.

**Credit Only Granted for:** ECON201 or ECON205.

## ECON230 Applied Economic Statistics (3 Credits)

Introductory course to develop understanding of statistical concepts used in applied economics. Students will acquire skills needed to calculate and interpret statistical concepts, including descriptive statistics, probability, discrete and continuous distributions, sampling, point and interval estimations, hypothesis testing, basic analysis of variance, and simple linear regression models. Students will apply these concepts to data using both handheld calculators and spreadsheets(Excel), and students will be introduced to an econometric software package such as SPSS or SAS or R.

**Prerequisite:** Must have math eligibility of MATH113 or higher; or 1 course with a minimum grade of C- from (MATH107, MATH110); and minimum grade of C- in ECON200 and ECON201.

**Recommended:** Students should already have basic familiarity with Microsoft Excel or similar spreadsheet software.

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

## ECON258 Special Topics in Study Abroad II (1-6 Credits)

Special topics course taken as part of an approved study abroad program.

**Repeatable to:** 15 credits if content differs.

## ECON298 Special Topics in Economics (3 Credits)

Selected topics in economics. Designed to meet the changing interests of students and staff.

**Repeatable to:** 6 credits if content differs.

## ECON300 Methods and Tools for Economic Analysis (3 Credits)

Economic application of mathematical tools and concepts necessary for intermediate and advanced coursework in economics. Topics include: multivariable calculus, constrained optimization, foundational coverage of probability theory, and exponential/logarithmic functions.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON200, ECON201); and minimum grade of C- in MATH140.

**Restriction:** Must be in Economics Bachelor of Science program; and must not have completed MATH241.

**ECON305 Intermediate Macroeconomic Theory and Policy (4 Credits)**

Analysis of the determination of national income, employment, and price levels. Discussion of consumption, investment, inflation, and government fiscal and monetary policy.

**Prerequisite:** Minimum grade of C- in ECON200 and ECON201; and 1 course with a minimum grade of C- from (MATH120, MATH130, MATH136, MATH140).

**Credit Only Granted for:** ECON305 or ECON325.

**ECON306 Intermediate Microeconomic Theory & Policy (4 Credits)**

Analysis of the theories of consumer behavior, producer behavior, different market structures, and various sources of inefficient outcomes. Analysis of microeconomic policies designed to improve market outcomes.

**Prerequisite:** Minimum grade of C- in ECON200 and ECON201; and 1 course with a minimum grade of C- from (MATH120, MATH130, MATH136, MATH140).

**Credit Only Granted for:** ECON306, ECON326, AREC489M, or AREC326.

**ECON310 European Economic History (3 Credits)**

The evolution of the capitalist system from its medieval origins to the present. Emphasis on dynamic forces of cumulative change in capitalism, including capital accumulation, technology, expansion of markets, the corporate form of private property in the means of production, and the relation of capitalism to war and revolution.

**Prerequisite:** Minimum grade of C- in ECON200 and ECON201.

**ECON311 American Economic History Before the Civil War (3 Credits)**

Economic concepts are used to analyze various aspects of the founding and early history of the U.S., including the British settlement of the North American colonies, the economics of the American Revolutionary war, the writing of the Constitution, the development of financial markets, policies on public lands and the spread of western agriculture, slavery, banking, and early industrialization.

**Prerequisite:** Minimum grade of C- in ECON200 and ECON201.

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**ECON312 American Economic History After the Civil War (3 Credits)**

Topics include: the economics of the Civil War, the performance of southern agriculture in the late 19th century, the rise of large corporations, industrialization, the development of financial markets, the creation of the Federal Reserve Board, the economics of the Great Depression and the New Deal, the economic impact of World War II, and the rise of the modern service economy in the late 20th century. Utilizes basic economic theories to understand these episodes as well as the progress of the U.S. economy over this period.

**Prerequisite:** Minimum grade of C- in ECON200 and ECON201.

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**ECON314 Economic History, Development and Policy (3 Credits)**

Study abroad in the economic history, institutional development, and recent economic policy problems of selected areas.

**Prerequisite:** ECON200 and ECON201.

**ECON315 Economic Development of Underdeveloped Areas (3 Credits)**

Analysis of the economic and social characteristics of underdeveloped areas. Recent theories of economic development, obstacles to development, policies and planning for development.

**Prerequisite:** Minimum grade of C- in ECON200 and ECON201.

**Credit Only Granted for:** ECON315 or ECON416.

**ECON317 Global Economic Policies (3 Credits)**

Analysis of policy options and debates on fostering economic growth and development in a global economy where national boundaries are no longer relevant. Topics covered will include real loanable funds markets in both local and international contexts during normal conditions and during financial crises, the design of trade and industrial policies, and the role of the World Bank, IMF, WTO, and other international agencies as well as regional and bilateral trade agreements. Emerging economies will be emphasized.

**Prerequisite:** Minimum grade of C- in ECON200 and ECON201.

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**ECON321 Economic Statistics (3 Credits)**

Introduction to the use of statistics in economics. Topics include: Probability, random variables and their distributions, sampling theory, estimation, hypothesis testing, analysis of variance, regression analysis and correlation.

**Prerequisite:** Minimum grade of C- in ECON200 and ECON201; and minimum grade of C- in ECON300 or (MATH241 and any statistics course).

**Restriction:** Must be in Economics Bachelor of Science program.

**ECON325 Intermediate Macroeconomic Analysis (4 Credits)**

Analysis of macroeconomic behavior and policy with emphasis on theoretical rigor. Topics include the determinants of economic growth, unemployment, inflation, and international economic flows.

**Prerequisite:** Minimum grade of C- in ECON200 and ECON201; and minimum grade of C- in ECON300 or (MATH241 and any statistics course).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Science; Economics minor).

**Credit Only Granted for:** ECON305 or ECON325.

**ECON326 Intermediate Microeconomic Analysis (4 Credits)**

Analysis of economic decision-making by individuals and firms, the resulting market outcomes, and applications to real-world problems. Emphasis on analytical logic and theoretical rigor. Topics covered include consumer preferences and utility maximization, perfect competition and market power, uncertainty and risk, externalities, and asymmetric information.

**Prerequisite:** Minimum grade of C- in ECON200 and ECON201; and minimum grade of C- in ECON300 or (MATH241 and any statistics course).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Science; Economics minor).

**Credit Only Granted for:** ECON306, ECON326, or AREC326.

**ECON327 Behavioral Economics (3 Credits)**

Integrating the insights of psychology into economics. Analysis of the ways in which individuals make decisions that systematically depart from the so-called "standard model" of homo economicus, which assumes perfect rationality, perfect selfishness, and perfect willpower. Investigating the implications of the major findings of behavioral economics for policymakers.

**Prerequisite:** Minimum grade of C- in ECON200 and ECON201.

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**ECON330 Money and Banking (3 Credits)**

The structure of financial institutions and their role in the provision of money and near money. Analysis of the Federal Reserve System, the techniques of central banks, and the control of supply of financial assets in stabilization policy. Relationship of money and credit to economic activity and the price level.

**Prerequisite:** Minimum grade of C- in ECON200 and ECON201.

**ECON340 International Economics (3 Credits)**

Introduces economic models of international trade and finance. Analyzes policies designed to promote and restrict international trade and to manage exchange rates and impact international capital flows.

**Prerequisite:** Minimum grade of C- in ECON200 and ECON201.

**Credit Only Granted for:** ECON340 or ECON441.

**ECON354 Using Big Data to Solve Economic and Social Problems (4 Credits)**

Shows how "big data" can be used to understand and address some of the most important social and economic problems of our time. The course will give students an introduction to frontier research and policy applications in economics and social science in a less-technical manner. Topics include equality of opportunity, education, racial disparities, innovation and entrepreneurship, health care, climate change, criminal justice, and tax policy. In the context of these topics, the course will also provide an introduction to basic methods in data science, including regression, causal inference, and machine learning.

**Prerequisite:** Minimum grade of C- in ECON200 and ECON201; and 1 course with a minimum grade of C- from (ECON230, BMGT230, ECON321, STAT401).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics Bachelor of Science; Economics minor; Social Data Science-Economics).

**ECON358 Special Topics in Study Abroad III (1-6 Credits)**

Special topics course taken as part of an approved study abroad program.

**Prerequisite:** At least one principles level course.

**Repeatable to:** 15 credits if content differs.

**ECON371 Economic Analysis of Good, Evil, and Fairness (3 Credits)**

Examines how economic tools can be used to analyze and better understand issues of "Good", "Evil" and "Fairness". Considers questions such as: What is the relation between fairness and equal treatment? Between fairness and equality? What makes an economic or political system "fair" or "unfair"? What makes a system "good"?

**Prerequisite:** Minimum grade of C- in ECON200 and ECON201.

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**ECON375 Economics of Poverty and Discrimination (3 Credits)**

Examination of various issues, including: the causes of persistent poverty over time for some groups within society; the relationship of poverty to technological change, to economic growth, and to education and training; economic results of discrimination; proposed remedies for poverty and discrimination.

**Prerequisite:** Minimum grade of C- in ECON200 and ECON201.

**ECON386 Experiential Learning (3 Credits)**

See Department Advising Office for course eligibility, course requirements, and application information.

**Prerequisite:** ECON201 and ECON200.

**Restriction:** Permission of BSOS-Economics department; and must be in a major within the BSOS-Economics department; and minimum cumulative GPA of 2.5; and junior standing or higher.

**ECON387 Career Preparation for Economics Majors (2 Credits)**

Increase student knowledge of career paths, job search tools, and strategies for successfully obtaining a job with a BA or BS in economics. Students will engage in a range of different activities which build their understanding of job opportunities in economics and hone their abilities to find positions they want. Students will reflect on specific skills employers seek from economics graduates and incorporate that knowledge in their own individual job search and career plan.

**Prerequisite:** Minimum grade of C- in ECON200 and ECON201.

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics Bachelor of Science); and must have earned a minimum of 30 credits.

**ECON396 Independent Honors Study (3 Credits)**

First semester of the departmental honors sequence. Students will develop and apply research skills required to carry out original research. By the end of the semester students will have produced a complete draft of an honors thesis resembling a scholarly journal article.

**Restriction:** Permission of BSOS-Economics department.

**ECON397 Honors Thesis (3 Credits)**

General supervision will be provided through assembled meetings with the professor in charge of the course.

**Prerequisite:** ECON396.

**Restriction:** Must be a candidate for honors in economics.

**ECON398 Topics in Economics (3 Credits)**

This course is designed to meet the changing interests of students and staff. Topics vary in response to those interests. Students are advised to seek information about the coverage and prerequisites during the registration period.

**Prerequisite:** ECON201 and ECON200.

**Restriction:** Permission of BSOS-Economics department.

**Repeatable to:** 6 credits if content differs.

**ECON399 Independent Study in Economics (1-3 Credits)**

Integrated readings and independent study under direction and supervision of a faculty member. Contact department for additional information.

**Prerequisite:** Minimum grade of C- in ECON200 and ECON201.

**Restriction:** Permission of BSOS-Economics department.

**Repeatable to:** 6 credits if content differs.

**ECON401 Current Issues in American Economic Policy (3 Credits)**

Analysis of current economic problems and public policies. Topics could include poverty, income inequality, social insurance, education, environmental sustainability, immigration, and innovation. Other issues may be substituted depending on current events.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON305, ECON325); and 1 course with a minimum grade of C- from (ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON424, ECON422, ECON426).

**Restriction:** Permission of BSOS-Economics department; and must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**ECON402 Macroeconomic Models and Forecasting (3 Credits)**

Analysis of the fluctuations in economic activity and the formulation and use of forecasting models of the economy. Illustrations of computer macro models and forecasting problems.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON305, ECON325); and 1 course with a minimum grade of C- from (ECON230, BMGT230, ECON321).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**ECON406 Advanced Microeconomics (3 Credits)**

Expands on the assumptions of rational decision-making used in intermediate microeconomics and develops more complicated, more realistic models which address uncertainty, intertemporal choices, strategic interactions, social preferences and considerations of what is fair.

**Prerequisite:** Minimum grade of C- in ECON326; and 1 course with a minimum grade of C- from (ECON321, STAT401).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Science; Economics minor).

**ECON407 Advanced Macroeconomics (3 Credits)**

An in-depth analysis of current issues in macroeconomic theory and policy. Topics covered include: 1. alternative perspectives on macroeconomics including monetarism, new classical equilibrium models, rational expectations, and real business cycle models; 2. long term growth, the slowdown in productivity growth, and concerns about U.S. competitiveness; 3. the effectiveness of macroeconomic policy in an open economy; 4. the effects of finance on the real sector.

**Prerequisite:** Minimum grade of C- in ECON325; and 1 course with a minimum grade of C- from (ECON321, STAT401).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Science; Economics minor).

**ECON410 Comparative Economic Institutions (3 Credits)**

Institutions are the sets of rules that constrain the decisions and interactions of economic agents. The course uses economic analysis to understand both formal institutions (e.g. laws) and informal institutions (e.g. cultural norms). Practical examples are drawn from economics, law, and politics, and reflect the experience of many different countries.

**Prerequisite:** Minimum grade of C- in ECON325 and ECON326; and 1 course with a minimum grade of C- from (ECON321, STAT401).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Science; Economics minor).

**ECON412 Economic History and Modern Development (3 Credits)**

Analysis of major economic, political, and social change in the developed world since 1800. This includes factors contributing to increases in economic performance, changes in the form of government, technological change (including industrialization), and integration and disintegration of the global economy. Emphasis is on institutional changes in how societies organize economic and political activities.

**Prerequisite:** Minimum grade of C- in ECON325 and ECON326.

**Restriction:** Must be in one of the following programs (Economics Bachelor of Science; Economics minor).

**ECON414 Game Theory (3 Credits)**

Studies the competitive and cooperative behavior that results when several parties find that their individual outcomes are jointly determined. Students will learn how to use game theory to analyze situations of potential conflict. Applications are drawn from economics, business, and political science.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON230, BMGT230, ECON321, STAT401).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics Bachelor of Science; Economics minor).

**Credit Only Granted for:** CMSC474, ECON414, GVPT399A or GVPT390.

**ECON415 Market Design (3 Credits)**

Focuses on recent developments in the design of markets to improve economic performance and to open new economic opportunities. It is divided into three main segments – auction design, the design of matching mechanisms, and antitrust theory and policy.

**Prerequisite:** Minimum grade of C- in ECON414.

**Restriction:** Must be in one of the following programs (Economics Bachelor of Science; Economics minor).

**ECON416 Analysis of Economic Development (3 Credits)**

Analysis of the determinants and influences on economic development. Emphasis on both theoretical models and econometric methods of explaining why some countries are poor, along with examination of policies to promote development.

**Prerequisite:** Minimum grade of C- in ECON325, ECON326, and ECON422.

**Restriction:** Must be in one of the following programs (Economics Bachelor of Science; Economics minor).

**Credit Only Granted for:** ECON315 or ECON416.

**ECON417 Estimating Policy and Program Impact (3 Credits)**

Governments, businesses, non-profits, funders, and other organizations must allocate scarce resources between competing uses. Understanding the causal effect of policies, programs or investments on key outcomes can guide the choices of these decision-makers. Correlations between policies and outcomes or changes in outcomes after new policies are adopted are rarely sufficient for estimating the causal effect, however. This course focuses on econometric strategies for obtaining unbiased causal estimates, including experimental methods, instrumental variables, regression discontinuity, and differences-in-differences. There will be an emphasis on using Stata and on interpreting the results of econometric analysis.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON306, ECON326) and 1 course with a minimum grade of C- from (ECON424, ECON422).

**Restriction:** Permission of BSOS-Economics department; and must be in one of the following programs (Economics Bachelor of Arts; Economics Bachelor of Science; Economics minor; Social Data Science-Economics).

**ECON418 Economic Development of Selected Areas (3 Credits)**

Economic and institutional characteristics of a specific geographic area are identified and discussed, and alternate strategies and policies for development are analyzed.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON305, ECON306, ECON325, ECON326); and 1 course with a minimum grade of C- from (ECON230, BMGT230, ECON321).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**Repeatable to:** 6 credits if content differs.

**ECON422 Econometrics (3 Credits)**

Emphasizes the interaction between economic problems and the assumptions employed in statistical theory. Formulation, estimation, and testing of economic models, including single variable and multiple variable regression techniques, theory of identification, and issues relating to inference.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON325, ECON326); and 1 course with a minimum grade of C- from (ECON321, STAT401).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Science; Economics minor).

**Credit Only Granted for:** ECON422, ECON424, or AREC422.



**ECON423 Advanced Topics in Econometrics (3 Credits)**

Interaction between economic problems and specification and estimation of econometric models. Topics may include: autocorrelation, heteroscedasticity, functional form, simultaneous equation models, logit and probit models, instrumental variables, qualitative choice models, and other computational methods.

**Prerequisite:** Minimum grade of C- in ECON422.

**Restriction:** Must be in one of the following programs (Economics Bachelor of Science; Economics minor).

**ECON424 Applied Econometrics (3 Credits)**

Provide the knowledge and skills necessary to accomplish and utilize basic applied econometric analysis utilized by many business service providers, government agencies, and nonprofits engaged in policy analysis. Topics include simple and multiple regressions using cross section, time series, and panel data, issues of heteroskedasticity, serial correlation, and multicollinearity, models with binary dependent variable, and program evaluation. Course emphasizes application of knowledge using software packages but still covers essential theoretical background.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON305, ECON306, ECON325, ECON326); and 1 course with a minimum grade of C- from (ECON230, BMGT230, ECON321).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**Credit Only Granted for:** ECON422, ECON424 or AREC422.

**ECON425 Mathematical Economics (3 Credits)**

Covers mathematical tools and skills utilized in upper undergraduate and master's level coursework in Economics and Public Policy. Reviews calculus and math of finance and growth. Introduces techniques of optimization, linear algebra, and differential equations and connects them to micro and macro theory and applications. Topics will also include coverage of probability theory to explore how economists model uncertainty, as well as economic applications of integration.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON305, ECON325); and 1 course with a minimum grade of C- from (ECON306, ECON326).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**ECON426 Economics of Cost-Benefit Analysis (3 Credits)**

Study of how to use cost benefit analysis and other similar tools of applied microeconomics to conduct policy analyses. Cost-benefit analysis is an empirical method of identifying an optimal choice from a set of policy alternatives, where optimal is defined in terms of economic efficiency. Real world examples are addressed, so that students understand limitations of the methods and also interactions of economic analysis with political and administrative processes.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON305, ECON306, ECON325, ECON326); and 1 course with a minimum grade of C- from (ECON230, BMGT230, ECON321).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**ECON427 Experimental Economics (3 Credits)**

An introduction to the methodology of experimental economics and its application to issues such as decision-making under uncertainty, auctions, and public goods. Also an introduction to behavioral economics as a relatively new area of economic research.

**Prerequisite:** Minimum grade of C- in ECON326; and 1 course with a minimum grade of C- from (ECON321, STAT401).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Science; Economics minor).

**ECON432 Applied Machine Learning (4 Credits)**

Offers a comprehensive examination of the concepts and techniques used in machine learning, with a specific emphasis on their applications in economics. Focuses on the practical aspects of machine learning, including the use of different methods, model selection, and performance evaluation. Students will explore both supervised and unsupervised learning techniques, such as linear and non-linear regression, k-nearest neighbors, tree-based approaches, support vector machines, neural networks, and dimensionality reduction methods. Additional advanced methods may be covered, depending on the time available. Hands-on implementation of these techniques will be conducted using the R programming language.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON422, ECON424).

**Restriction:** Permission of BSOS-Economics department; and must be in one of the following programs (Economics Bachelor of Arts; Economics Bachelor of Science; Economics minor; Social Data Science-Economics).

**ECON433 Economics of Big Data (4 Credits)**

The importance of big data in the global economy is rising. Students will explore the definition and characteristics of big data, the impact of big data on individuals, use of big data by firms, entrepreneurs and non-profits, as well as how big data reshapes various public policies.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON230, BMGT230, ECON321, STAT401).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics Bachelor of Science; Economics minor; Social Data Science-Economics).

**ECON434 The Economics of Information and Uncertainty (3 Credits)**

How do rational agents make decisions when faced with uncertainty? How do markets and other institutions deal with risks? How do markets behave when some actors are better informed than others? What incentives influence whether economic decision-makers hide or reveal information? Topics include the value of information, the purchase of warranties, agency problems in management, adverse selection and moral hazard in insurance, and signaling in education.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON230, BMGT230, ECON321, STAT401).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics Bachelor of Science; Economics minor; Social Data Science-Economics).

**Credit Only Granted for:** ECON498U or ECON434.

**Formerly:** ECON498U.

**ECON435 Financial Markets and the Macroeconomy (3 Credits)**

Provides students with the necessary tools to understand financial decisions investors and firms make. The course will cover two of the main areas of financial economics: Asset pricing and corporate finance. Asset pricing topics include the valuation of bonds, stocks, derivatives, portfolio decisions, and arbitrage. Corporate finance topics include the valuation of investment projects, the cost of capital, capital structure, and financial distress.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON305, ECON325); and 1 course with a minimum grade of C- from (ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON230, BMGT230, ECON321, STAT401).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics Bachelor of Science; Economics minor; Social Data Science-Economics).

**Credit Only Granted for:** BMGT343 or ECON435.

**Additional Information:** Finance majors will not receive credit for ECON435.

**ECON436 Financial Econometrics (3 Credits)**

An introduction to financial econometrics, which is data science applied to understanding the financial system. Students will learn modern techniques in financial econometrics with an emphasis on the interaction between modeling (theory) and empirical analysis. Topics include relevant economic theory, optimization techniques, probability models, statistical analysis, and use of statistical software.

**Prerequisite:** Minimum grade of C- in ECON325 and ECON422.

**Restriction:** Must be in one of the following programs (Economics Bachelor of Science; Economics minor).

**ECON441 Theory of International Economics (3 Credits)**

Theoretical treatment of international trade and international finance. Includes Ricardian and Heckscher-Ohlin theories of comparative advantage, analysis of tariffs and other trade barriers, international factor mobility, balance of payments adjustments, exchange rate determination, and fiscal and monetary policy in an open economy.

**Prerequisite:** Minimum grade of C- in ECON326 and ECON325.

**Restriction:** Must be in a major within the BSOS-Economics department; and must not have completed ECON340, ECON442, or ECON443.

**Credit Only Granted for:** ECON340, ECON441, ECON442, or ECON443.

**ECON442 Globalization and Capital Markets (3 Credits)**

Uses models of open-economy macroeconomics to explain the causes and consequences of international capital flows. Analysis is made of private consumption, investment, the government sector, current accounts, the labor market, and the money and foreign exchange markets in small open economies. This framework is then used to study examples of how speculative attacks on currencies, sudden reversals of capital inflows, and the effects of the lack of credibility of economic policy affect economic development.

**Prerequisite:** Minimum grade of C- in ECON326 and ECON325; and 1 course with a minimum grade of C- from (ECON321, STAT401).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Science; Economics minor); and must not have completed ECON441.

**Credit Only Granted for:** ECON441 or ECON442.

**ECON443 International Trade and Trade Policy in the New Global Economy (3 Credits)**

Examines the economics of international economic integration, including the theory of customs unions and free trade areas, the role of GATT and the WTO, changes in individual countries' foreign trade policies during the new era of globalization, the special role of multinational firms in world trade, and recent controversies about the benefits and costs of globalized trade.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON305, ECON325); and 1 course with a minimum grade of C- from (ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON230, BMGT230, ECON321).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics); and must not have completed ECON441.

**Credit Only Granted for:** ECON441 or ECON443.

**ECON444 Research in Globalization (3 Credits)**

As globalization continues, individual countries must confront a variety of related issues including rising inequality, decline of domestic industries, climate change, and disputes over intellectual property rights. Various economic models and research methods will be covered to develop the analytic and empirical skills needed to perform independent research in globalization. Students will prepare literature reviews, conduct preliminary empirical investigations using STATA, and produce well-designed research proposals.

**Prerequisite:** Minimum grade of C- in ECON326 and ECON422.

**Restriction:** Must be in Economics Bachelor of Science program.

**Credit Only Granted for:** ECON498G or ECON444.

**Formerly:** ECON498G.

**ECON451 Public Choice (3 Credits)**

Analysis of collective decision making, economic models of government, program budgeting, and policy implementation; emphasis on models of public choice and institutions which affect decision making.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON230, BMGT230, ECON321).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**ECON453 Natural Resources and Public Policy (3 Credits)**

Rational use and reuse of natural resources. Theory, methodology, and policies concerned with the allocation of natural resources among alternative uses. Optimum state of conservation, market failure, safe minimum standard, and cost-benefit analysis.

**Prerequisite:** AREC326, ECON306, or ECON326; and (BMGT230 or ECON230).

**Cross-listed with:** AREC453.

**Restriction:** Must be in one of the following programs (Agricultural and Resource Economics; Agricultural and Resource Economics: Agribusiness; Agricultural and Resource Economics: Environmental and Resource Economics; Economics Bachelor of Arts; Environmental Science & Policy-Env Economics; Social Data Science-Economics; Economics minor).

**Credit Only Granted for:** AREC453 or ECON453.

**ECON454 Public Finance and Public Policy (3 Credits)**

The role of the the public sector in a market economy constitutes the over-arching topic of this course. Emphasis lies on analyzing government expenditure programs and the microeconomics of tax policy.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON230, BMGT230, ECON321 or STAT401).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics Bachelor of Science; Economics minor; Social Data Science-Economics).

**ECON455 Economics of Education Policy (3 Credits)**

Examines the role that government plays in providing and financing education. Analyzes why people invest in education. Considers the effects of education on long-term social and economic outcomes, the behavior of institutions that produce education, and how to design and implement public policies affecting the level and distribution of educational resources. Uses microeconomic models and empirical findings to analyze current issues in education policy.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON230, BMGT230, ECON321).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**Credit Only Granted for:** ECON468E or ECON455.

**Formerly:** ECON468E.

**ECON456 Law and Economics (3 Credits)**

Relationship of the exchange process to the system of institutions and rules that society develops to carry out economic transactions. Topics covered include: Property rights; torts, negligence, and liability; contracts and exchanges; criminal control and enforcement; equity and efficiency issues .

**Prerequisite:** 1 course with a minimum grade of C- from (ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON230, BMGT230, ECON321).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**ECON458 Special Topics in Study Abroad IV (1-6 Credits)**

Special topics course taken as part of an approved study abroad program.

**Prerequisite:** At least one intermediate theory course and/or statistics.

**Repeatable to:** 15 credits if content differs.

**ECON460 Industrial Organization (3 Credits)**

Examines different theoretical models of firm behavior in markets with varying amounts of market power. Relates theory to specific industries and examines how market structure evolves over time.

**Prerequisite:** Minimum grade of C- in ECON326; and 1 course with a minimum grade of C- from (ECON321, STAT401).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Science; Economics minor).

**ECON461 Economics of Regulation and Antitrust (3 Credits)**

Considers government intervention in economic activity of three types: antitrust policy, regulation of natural monopolies, and health safety regulation. Covers theoretical models, real-world policy applications, and empirical studies relevant to the impact of regulation.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON230, BMGT230, ECON321).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**ECON463 Economics of Sports (3 Credits)**

The application of theoretical and empirical economic tools to the sports industry, including competition at professional,collegiate, and international levels. Microeconomic models from labor, industrial organization and public finance will be applied to the sports industry and combined with data from sports markets, providing students with opportunities to produce and interpret economic analysis. The topic of discrimination will also be explored in the context of this particular economic activity.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON230, BMGT230, ECON321, STAT400).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**ECON465 Health Economics (3 Credits)**

An examination of the structure, conduct and performance of the health care market, including a study of physician services, the pharmaceutical industry, the hospital market and health insurance. Students will analyze markets for health care and related products by examining the incentives and constraints for various participants, including individuals, family units, doctors, pharmaceutical companies, hospitals, and insurance providers. Analysis will combine both theoretical models and empirical tools.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON230, BMGT230, ECON321, STAT401).

**Jointly offered with:** ECON671.

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics Bachelor of Science; Economics minor; Social Data Science-Economics).

**Credit Only Granted for:** ECON465 or ECON671.

**ECON468 Special Topics in Applied Economics (3 Credits)**

Selected topics in applied economics. Designed to meet the changing interests of students and staff.

**Prerequisite:** 1 course with a minimum grade of C- from (BMGT230, ECON230); and 1 course with a minimum grade of C- from (ECON305, ECON306).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**Repeatable to:** 15 credits if content differs.

**ECON470 Labor Economics: Theory and Evidence (3 Credits)**

Analysis of labor markets in theory and the real world. Topics include labor supply, labor demand, human capital, performance incentives, unemployment, discrimination, and immigration. Students will develop an understanding of how formal economic research is used to analyze U.S. labor markets and how research influences policy debates.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON230, BMGT230, ECON321, STAT401).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics Bachelor of Science; Economics minor; Social Data Science-Economics).

**Credit Only Granted for:** ECON470 or ECON471.

**ECON471 Labor Market Policies and Research (3 Credits)**

Economic analysis of labor based on modern theory and empirical analysis. Focus on public policy, studying the interactions between labor demand and labor supply in the labor market and how policies impact those interactions. Possible policies include welfare policy, minimum wage policy, immigration policy, and anti-discrimination policies. Uses statistical software to summarize and create visualizations of economic data.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON424, ECON422).

**Restriction:** Permission of BSOS-Economics department; Must be in one of the following programs (Economics Bachelor of Arts; Economics Bachelor of Science).

**Credit Only Granted for:** ECON470 or ECON471.

**ECON472 Economics of Social Safety Nets (3 Credits)**

Analysis of the economic issues associated with social safety nets. Topics to be covered include the cash transfer programs for breaking the cycle of poverty, labor market policies aimed at combating unemployment, childhood interventions to improve human capital development, and the challenges faced by pension systems over the world. The approach is based on a life-cycle perspective. Evidence and experiences from developed and developing countries will be covered.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON306, ECON326); and minimum grade of C- in ECON424.

**Restriction:** Permission of BSOS-Economics department; and must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**ECON481 Environmental Economics (3 Credits)**

An exploration of the use of economic incentives for protection of the environment and the determination of appropriate (or efficient) level of environmental quality. Also covers the choice of policy instruments for the attainment of environmental standards.

**Prerequisite:** 1 course with a minimum grade of C- from (AREC326, ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON230, ECON321, BMGT230).

**Cross-listed with:** AREC481.

**Restriction:** Must be in one of the following programs (Agricultural and Resource Economics; Agricultural and Resource Economics: Agribusiness; Agricultural and Resource Economics: Environmental and Resource Economics; Economics Bachelor of Arts; Environmental Science & Policy-Env Economics; Social Data Science-Economics; Economics minor).

**Credit Only Granted for:** ECON481 or AREC481.

**ECON484 The Economics of Climate Change (3 Credits)**

The role of economics in the formation of climate policy; basic concepts of environmental economics including efficiency, externalities, and policy instruments; economic models of intertemporal decisions and decision making in the face of uncertainty. Applied economic analysis of specific issues and current policy initiatives.

**Prerequisite:** 1 course with a minimum grade of C- from (AREC326, ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON230, ECON321, BMGT230).

**Cross-listed with:** AREC454.

**Credit Only Granted for:** AREC454 or ECON484.

**ECON485 Economics of Land Use (3 Credits)**

Fundamentals of location theory. Microeconomics of land use decisions, including determination of rent and hedonic pricing models. Impacts of government decisions on land use, including regulation (e.g., zoning), incentives (transferable development rights), provision of public services, and infrastructure investments. Impacts of land use on environmental quality, including issues relating to sprawl, agricultural land preservation, and other topics of special interest.

**Prerequisite:** 1 course with a minimum grade of C- from (AREC326, ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON230, ECON321, BMGT230).

**Cross-listed with:** AREC455.

**Credit Only Granted for:** AREC455 or ECON485.

**ECON486 Energy and Environmental Economics (3 Credits)**

Economic theory and empirical methods are used to study problems of energy, the environment, and the economy. It examines the extraction, production, and use of energy and market institutions and regulatory approaches used to correct market failures. Topics covered include: oil and natural gas markets, management and design of electricity markets, renewable energy, non-market valuation, climate change, and transportation policies.

**Prerequisite:** 1 course with a minimum grade of C- from (AREC326, ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON230, ECON321, BMGT230).

**Cross-listed with:** AREC456.

**Credit Only Granted for:** AREC456 or ECON486.

**ECON488 Applied Research Practicum (1-3 Credits)**

Students gain experience applying economic knowledge and producing research valued by businesses, non-profits, and/or government agencies. Students engage in activities similar to what an intern or entry-level employee would perform. Students work in small groups to find different kinds of data and facts, analyze and interpret this information, and use research findings to develop and present recommendations for simulated clients.

**Prerequisite:** 1 course with a minimum grade of B- from (BMGT230, ECON321, ECON230); and 1 course with a minimum grade of C- from (ECON305, ECON325); and 1 course with a minimum grade of C- from (ECON306, ECON326).

**Recommended:** ECON422, ECON402, or ECON424.

**Restriction:** Permission of BSOS-Economics department.

**Repeatable to:** 6 credits if content differs.

**ECON489 Applied Economics Practicum (1-3 Credits)**

Students gain experience explaining economic knowledge to people who have not studied economics. Students engage in activities preparing them for careers in banking, business consulting, financial education, wealth management, and related services.

**Restriction:** Permission of BSOS-Economics department.

**Repeatable to:** 6 credits if content differs.

**ECON490 Urban & Regional Economics: Issues and Policies (3 Credits)**

Exploration of urban and regional economics and policies, including economic forces leading to formation of city and regional networks. Conceptual and empirical analysis of policies affecting land use, housing, transportation and other aspects of sub-national economic development.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON306, ECON326); and 1 course with a minimum grade of C- from (ECON321, BMGT230, ECON230).

**Restriction:** Must be in one of the following programs (Economics Bachelor of Arts; Economics minor; Social Data Science-Economics).

**Credit Only Granted for:** ECON398I or ECON490.

**Formerly:** ECON398I.



**ECON498 Special Topics in Economic Analysis (3 Credits)**

Selected topics in economic analysis. Designed to meet the changing interests of students and staff.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON321, STAT401); and 1 course with a minimum grade of C- from (ECON325, ECON326).

**Restriction:** Must be in Economics Bachelor of Science program.

**Repeatable to:** 15 credits if content differs.

**ECON499 Independent Research in Economics (1-3 Credits)**

Directed research under the supervision of a faculty member. Contact department for additional information.

**Prerequisite:** 1 course with a minimum grade of C- from (ECON230, ECON321, BMGT230, STAT400); and 1 course with a minimum grade of C- from (ECON305, ECON325); and 1 course with a minimum grade of C- from (ECON306, ECON326); and minimum of 3 credits from ECON400-499 course range.

**Restriction:** Permission of BSOS-Economics department.

**Repeatable to:** 6 credits if content differs.