

Crop and Soil Sciences—CSS

- 840 Soil Physics**
Fall of odd years. 3(2-3) R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, or College of Natural Science.
Physical properties of soil including texture, structure, consistency, aeration, moisture content, and temperature. Quantitative measurement of plant growth. Agronomic and engineering practices.
- 841 Soil Microbiology**
Spring of even years. 3(3-0) Interdepartmental with Microbiology and Molecular Genetics. Administered by Department of Microbiology and Molecular Genetics. P:NM: (MIC 425) SA: MPH 841
Ecology, physiology, and biochemistry of microorganisms indigenous to soil.
- 842 Population Genetics, Genealogy and Genomics**
Fall. 3(3-0) Interdepartmental with Forestry; Animal Science; Genetics; Fisheries and Wildlife; Horticulture. Administered by Department of Forestry. RB: Pre-calculus, basic genetics
Population genetic processes underlying patterns of molecular genetic variation. Genealogical approaches to the study of genomic diversity, phylogenetic reconstruction, and molecular ecology.
- 850 Soil Chemistry**
Spring. 3(3-3) R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, or College of Natural Science.
Ion activities, ionic exchange and equilibrium reactions. Soil pH, macro- and micronutrients, saline soils and availability of nutrients to plants.
- 853 Plant Mineral Nutrition**
Fall of odd years. 3(3-0) Interdepartmental with Horticulture. P:NM: (BOT 301)
Inorganic ion transport in plant cells and tissues. Physiological responses and adaptation to problem soils. Genetic diversity in nutrient uptake and use by plants. Physiological roles of elemental nutrients in crop growth.
- 855 Interfacial Environmental Chemistry**
Fall of even years. 4(4-0) R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, or College of Natural Science.
Principles and mechanisms of reactions at solid-liquid interfaces emphasizing environmental chemistry. Sorption of ionic and organic compounds. Properties of colloids. Kinetics of surface reactions.
- 863 Mineral-Water Interactions**
Spring of odd years. 4(3-2) Interdepartmental with Geological Sciences. Administered by Department of Geological Sciences. R: Open only to graduate students in Crop and Soil Sciences or Geological Sciences or Geography.
Mineralogy, petrology and geochemistry of fluid-rock reactions in geologic, sedimentary and geochemical cycles. Rock and mineral weathering, soil formation, genesis and burial diagenesis of sediments and sedimentary rocks, and metamorphism.
- 865 Organic Chemistry of Soils**
Spring of odd years. 2(2-0)
Chemistry of natural and anthropogenic organic substances in soils.

- 870 Techniques of Analyzing Unbalanced Research Data**
Spring. 4(4-0) Interdepartmental with Animal Science; Forestry; Fisheries and Wildlife; Horticulture. Administered by Department of Animal Science. P:NM: (STT 464) R: Open only to graduate students in the College of Agriculture and Natural Resources. SA: ANS 943 Not open to students with credit in ANS 943.
Linear model techniques to analyze biological research data characterized by missing and unequal number of observations in classes. Simultaneous consideration of multiple factors. Prediction of breeding values and estimation of population parameters from variance and covariance components.
- 890 Independent Study**
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, or College of Natural Science.
Individual study on field, laboratory, or library research.
- 891 Current Topics in Ecology and Evolution**
Summer. 1 credit. Given only at W.K. Kellogg Biological Station. A student may earn a maximum of 8 credits in all enrollments for this course. Interdepartmental with Zoology; Botany and Plant Pathology. Administered by Department of Zoology.
Presentation and critical evaluation of theoretical and empirical developments by visiting scientists.
- 891B Selected Topics in Plant Breeding and Genetics**
Fall, Spring, Summer. 1 to 2 credits. A student may earn a maximum of 6 credits in all enrollments for this course. Interdepartmental with Horticulture; Forestry. Administered by Department of Horticulture. R: Open only to graduate students in Plant Breeding and Genetics or Genetics. Approval of department.
Selected topics in plant breeding.
- 892 Plant Breeding and Genetics Seminar**
Fall, Spring, Summer. 1(1-0) A student may earn a maximum of 8 credits in all enrollments for this course. Interdepartmental with Horticulture; Forestry. Administered by Department of Horticulture.
Experience in review, organization, oral presentation, and analysis of research.
- 893 Selected Topics**
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, or College of Natural Science.
Selected topics in crop and soil sciences of current interest and importance.
- 899 Master's Thesis Research**
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to master's students in Crop and Soil Sciences.
Master's thesis research.

- 921 Contemporary Statistical Models in Biology**
Fall of odd years. 3(3-0) P:NM: (STT 465) or approval of department. Working knowledge of SAS.
Estimating functions. Growth models, generalized linear models, linear and non-linear mixed models. Field experiments with spatial trends. Longitudinal data. Modeling in the presence of spatial and temporal correlations.
- 941 Quantitative Genetics in Plant Breeding**
Spring of even years. 3(3-0) Interdepartmental with Forestry; Horticulture. P:NM: (CSS 450 and STT 422)
Theoretical genetic basis of plant breeding with emphasis on traits exhibiting continuous variation. Classical and contemporary approaches to the study and manipulation of quantitative trait loci.
- 999 Doctoral Dissertation Research**
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to doctoral students in Crop and Soil Sciences.
Doctoral dissertation research.

EARTH SCIENCE ES

Department of Geological Sciences College of Natural Science

- 445 Field Studies in Earth Science**
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Approval of department.
Field experience and techniques in geological sciences or oceanology.
- 446 Laboratory Investigations in Earth Science**
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Approval of department.
Laboratory techniques and investigations in geological sciences or oceanology.
- 800 Special Problems in Earth Science**
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Approval of department.
Individual faculty directed study on topics in earth science.

ECONOMICS EC

Department of Economics The Eli Broad College of Business and The Eli Broad Graduate School of Management

- 201 Introduction to Microeconomics**
Fall, Spring, Summer. 3(3-0) Not open to students with credit in EC 251H.
Economic institutions, reasoning and analysis. Consumption, production, determination of price and quantity in different markets. Income distribution, market structure and normative analysis.

- 201T Introduction to Microeconomics**
Fall, Spring. 3(2-2) Not open to students with credit in EC 201 or EC 251H.
Microeconomic reasoning and analysis. Determination of price and quantity in different markets. Income distribution, market structure, and normative analysis. Extensive use of computer exercises and internet technology.
- 202 Introduction to Macroeconomics**
Fall, Spring, Summer. 3(3-0) Not open to students with credit in EC 252H.
Determinants of Gross National Product, unemployment, inflation and economic growth. National income accounting and fiscal policy. Aggregate demand, supply management and monetary policy.
- 210 Economics Principles Using Calculus**
Fall. 3(3-0) P:M: (MTH 133 or MTH 153H or MTH 126) Not open to students with credit in EC 201 or EC 202.
A combined microeconomics and macroeconomics course. Emphasis on topics of interest in engineering and management, such as discounting, cost-benefit analysis, innovation, externalities, and the role of government regulation.
- 251H Microeconomics and Public Policy**
Fall, Spring. 4(4-0) Not open to students with credit in EC 301.
Theories of consumer behavior, production and cost. Output and price determination in competition and monopolies. Welfare economics, general equilibrium, externalities, and public goods.
- 252H Macroeconomics and Public Policy**
Fall, Spring. 3(3-0) P:M: (EC 201 and EC 301) or (EC 251H) Not open to students with credit in EC 302.
Theory of national income, unemployment, inflation and economic growth and its application to economic analysis and policy.
- 293 Cooperative Education for Business Students**
Fall, Spring. 1(1-0) A student may earn a maximum of 3 credits in all enrollments for this course. Interdepartmental with Marketing and Supply Chain Management; Accounting; Finance; Management; Hospitality Business. Administered by Department of Marketing and Supply Chain Management.
R: By permission of the Department only.
Integration of pre-professional educational employment experiences in industry and government with knowledge and processes taught in the student's academic program. Educational employment assignment approved by the Department of Marketing and Supply Chain Management.
- 301 Intermediate Microeconomics**
Fall, Spring, Summer. 3(3-0) P:M: (EC 201) P:NM: (EC 202) Not open to students with credit in EC 251H.
Theories of consumer choice, production, cost, perfect competition, and monopoly. Welfare economics, general equilibrium, externalities and public goods.
- 302 Intermediate Macroeconomics**
Fall, Spring, Summer. 3(3-0) P:M: (EC 201 and EC 202) Not open to students with credit in EC 252H.
National income accounting. Determination of aggregate output, employment, price level, and inflation rate. Policy implications.
- 303 Economic Thought I**
Fall. 3(3-0) P:M: (EC 201 or EC 251H) and (EC 202 or EC 252H) SA: EC 403
Forerunners of classical economics. Classical economic thought from Adam Smith to J.S. Mill. The socialist reaction.
- 304 Economic Thought II**
Spring. 3(3-0) P:M: (EC 201 or EC 251H) and (EC 202 or EC 252H) SA: EC 404
Decline of classical economics and rise of marginalist value and distribution theory. Marxism and institutionalism.
- 306 Comparative Economic Systems**
Fall. 3(3-0) P:M: (EC 201 or EC 251H) and (EC 202 or EC 252H)
Characteristics and functions of economic systems. Alternative patterns of economic control, planning, and market structure. Theories, philosophies, and experiences associated with capitalism, socialism, and mixed economies.
- 310 Economics of Developing Countries**
Spring. 3(3-0) P:M: (EC 201 or EC 251H)
Overview of economic patterns and policy issues of developing countries such as modern economic growth and structural transformation, state controls versus markets, poverty and human welfare, investments in human resources, and trade and industrialization.
- 320 Analysis of Economic Data**
Fall, Spring. 3(3-0) P:M: (EC 201 or EC 251H) and (EC 202 or EC 252H) R: Not open to students in the Department of Accounting and Information Systems or Department of Finance or School of Hospitality Business or Department of Management or Department of Marketing and Supply Chain Management.
Sources of economic data. Techniques for presenting and summarizing economic data. Testing theories of economic behavior. Methods for forecasting in uncertain economic environments. Evaluation of current quantitative work in economics.
- 330 Money, Banking, and Financial Markets**
Fall, Spring, Summer. 3(3-0) P:M: (EC 201 or EC 251H) and (EC 202 or EC 252H)
Money markets and financial intermediation. Money, the Federal Reserve System, and monetary policy. Regulation of money markets.
- 335 Taxes, Government Spending and Public Policy**
Fall, Spring, Summer. 3(3-0) Interdepartmental with Public Resource Management. P:M: (EC 201 or EC 251H) Not open to students with credit in EC 435 or EC 436.
Economics of the public sector. Public goods, externalities, design and incidence of the tax system. Equity and efficiency effects of government programs.
- 340 Survey of International Economics**
Fall, Spring, Summer. 3(3-0) P:M: (EC 201 or EC 251H) and (EC 202 or EC 252H) Not open to students with credit in EC 440 or EC 441.
Comparative advantage. Costs and benefits of trade. International economic policies. Balance of payments. Foreign exchange markets. The international monetary system. Contemporary trade and international currency issues.
- 360 Private Enterprise and Public Policy**
Fall, Spring, Summer. 3(3-0) P:M: (EC 201 or EC 251H)
Effects of antitrust, economic regulation, and other public policies on competition, monopoly, and other market problems in the United States economy.
- 380 Labor Relations and Labor Market Policy**
Fall, Spring, Summer. 3(3-0) P:M: (EC 201 or EC 251H)
Development, functions, legal framework, and economic effects of unions and collective bargaining. Institutions and economic impacts of government programs. Minimum wages, workers' compensation, unemployment insurance, and antidiscrimination policies.
- 385 International Labor Market Policy and Labor Relations**
Fall. 3(3-0) P:M: (EC 201 or EC 251H) Not open to students with credit in EC 380.
Comparative treatment of labor policy and labor relations in the United States, Western Europe, Japan, Canada, and Australia. Analysis of how different policies affect wages, living standards, and economic efficiency. Labor markets and integration of national economies.
- 401 Advanced Microeconomics**
Fall, Spring. 3(3-0) P:M: (EC 301 or EC 251H)
Economics of uncertainty and incomplete information. Game theory and theories of oligopoly. Transaction costs. Advanced topics in welfare economics, general equilibrium, externalities, and public goods.
- 402 Advanced Macroeconomics**
Fall, Spring. 3(3-0) P:M: (EC 251H or EC 301) and (EC 252H or EC 302)
Consumption, investment, and monetary theories. The role of expectations. Theories of economic growth and cycles. Stabilization policies.
- 405 The Development of the American Economy**
Spring. 3(3-0) P:M: (EC 201 or EC 251H) and (EC 202 or EC 252H)
Causes and consequences of American economic development. Economic analysis of topics such as British trade policies, slavery, industrialization, immigration, the Great Depression, wars and income distribution.
- 406 Economic Analysis of the Soviet Union and Transition Economy**
Spring of even years. 3(3-0) P:M: (EC 201 or EC 251H) and (EC 202 or EC 252H)
History and analysis of Soviet planning, banking, and pricing systems. Analysis of labor markets and capital allocation under planning and transition.
- 410 Issues in the Economics of Developing Countries**
Fall. 3(3-0) P:M: (EC 201 or EC 251H) and (EC 202 or EC 252H)
Growth and transformation of low-income countries. Discontinuities, dualism. Capital, total factor productivity. Agriculture, natural resources. Population, health, nutrition. Labor, education. Entrepreneurship, technological change. Urbanization.
- 411 Issues in Economic Development**
Spring. 3(3-0) P:M: (EC 201 or EC 251H) and (EC 202 or EC 252H)
Mobilizing and allocating capital for raising productivity. Monetary policy, financial intermediaries. Investment criteria and project analysis. Taxes and public expenditures. Trade policy, foreign capital, international disequilibrium, and structural adjustment.

Economics—EC

- 412 Economic Analysis of Latin America**
Fall of even years. 3(3-0) P:NM: (EC 201 or EC 251H) and (EC 202 and EC 252H)
Population growth, agriculture, and urbanization. Dependence on primary exports and import protection. Inequality and populist-orthodox policy cycles. Hyper-inflation, international debt crises, and adjustments. United States policy interests and interventions.
- 413 Economic Analysis of Asia**
Spring of odd years. 3(3-0) P:M: (EC 201 or EC 251H) and (EC 202 or EC 252H)
Development of agriculture, industry, labor markets, and trade in some of the following: India and South Asia, China, the Pacific Rim countries, and Japan. Productivity, income distribution, finance, and planning.
- 414 Economic Analysis of Sub-Saharan Africa**
Fall of odd years. 3(3-0) P:M: (EC 201 or EC 251H) and (EC 202 or EC 252H)
African economic development in historical perspective. Contemporary development issues including population growth, agricultural and industrial development, and foreign trade. Alternative strategies for African economic development.
- 420 Introduction to Econometric Methods**
Fall, Spring. 3(3-0) P:M: (EC 201 or EC 210 or EC 251H) and (EC 202 or EC 252H) and (STT 315 or STT 421 or STT 430 or STT 441)
Specification, estimation, and interpretation of econometric models. Evaluation of current quantitative work in economics.
- 425 Law and Economics**
Fall. 3(3-0) Interdepartmental with Finance. P:M: (EC 201 or EC 251H)
Application of economic analysis to the law. Property rights, takings, the Coase Theorem. The economics of regulation, crime and punishments, liability law, and public choice.
- 435 Public Expenditures**
Fall. 3(3-0) P:M: (EC 251H or EC 301)
Expenditure theory. Objectives and rationale of government activity in the market system. Efficiency criteria in government decision-making. Public choice. Cost benefit analysis.
- 436 Public Revenues**
Spring. 3(3-0) P:M: (EC 251H or EC 301)
Principles and theory of efficiency and the incidence of taxation. Income and sales taxes and other major revenue sources.
- 437 State and Local Public Finance**
Fall of even years. 3(3-0) P:M: (EC 201 or EC 251H)
Theoretical and policy analysis of state and local government fiscal behavior. Revenues, expenditures, borrowing, intergovernmental fiscal relations. Applications to such areas as education, transportation, and economic development. Intergovernmental comparisons.
- 440 International Trade**
Fall. 3(3-0) P:M: (EC 251H or EC 301)
Neoclassical and modern theories regarding trade patterns and commercial policies. Applications of theory to United States policy. Contemporary issues involving international trade of goods, services, and productive factors.
- 441 International Finance**
Spring. 3(3-0) P:M: (EC 252H or EC 302)
Neoclassical and modern theories pertaining to balance of payments and exchange rate determination. Macroeconomic performance under alternative exchange rate regimes. Contemporary issues involving international monetary arrangements.
- 453 Women and Work: Issues and Policy Analysis**
Spring. 3(3-0) Interdepartmental with Public Resource Management; Women's Studies. Administered by Department of Agricultural Economics. P:NM: (EC 201 or EC 202 or PRM 201 or concurrently) R: Not open to freshmen or sophomores.
Current and past quantity and quality of women's participation in the labor force. Gender differentials in earnings and occupations. Employment discrimination. Laws, especially affirmative action laws. Social policy effects. International issues.
- 460 American Industry: Structure and Behavior**
Fall, Spring. 3(3-0) P:M: (EC 251H or EC 301)
Market structure and performance. Empirical analysis of market definition, concentration, product differentiation, vertical integration, innovativeness, collusion, and entry deterrence.
- 461 Regional Economics**
Fall. 3(3-0) Interdepartmental with Resource Development; Public Resource Management. Administered by Department of Resource Development. P:M: (EC 201) P:NM: (RD 200) R: Open only to juniors or seniors.
Location decisions of firms and households. Relevant government policies. Applications of regional analysis to industrial, regional, and community development.
- 480 Analysis of Labor Markets**
Fall, Spring. 3(3-0) P:M: (EC 251H or EC 301) and (EC 201 or EC 251H)
Labor supply and demand. Human capital, search, migration, and labor turnover. Analysis of unemployment and wage growth. Structure of wages, including economics of discrimination.
- 489 Senior Seminar for Policy and Applied Economics Majors (W)**
Fall. 3(3-0) P:M: (EC 251H or EC 301) and (EC 320) and completion of Tier I writing requirement. R: Open only to seniors in the Policy and Applied Economics major.
Capstone course for policy and applied economics majors. Reading and discussion concerning selected economics topics. Preparation and presentation of student research project.
- 490 Independent Study**
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 3 credits in all enrollments for this course. R: Approval of department.
Research and reading course for students interested in doing independent work in economics under faculty supervision.
- 495 Economics of Poverty and Income Distribution**
Fall. 3(3-0) P:M: (EC 201 or EC 251H)
Theory of the distribution of income and wealth. Concepts and measurement of welfare. Definitions of poverty. Effects of public and private programs on the poor.
- 496 Interpreting Economic News and Research**
Spring of even years. 3(3-0) P:M: (EC 201 or EC 251H) and (EC 202 or EC 252H)
Reporting and interpreting economic news and research. Sources of data and research information. Critical examination of written and broadcast reports through application of economic principles. Case studies.
- 497 Economics of Education**
Spring of odd years. 3(3-0) P:NM: (EC 201 or EC 251H)
Relationship between education and the economy. Production of education. Analysis of education as an investment. Supply and demand for teacher services. Financing education.
- 498 Economics of Health Care**
Fall of odd years. 3(3-0) P:NM: (EC 201 or EC 251H)
Economic factors in determining health care costs, utilization, quality, and efficiency. Demand and insurance. Comparative health care systems. Public policy issues.
- 499 Senior Seminar for Economics Majors (W)**
Fall, Spring. 3(3-0) P:M: (EC 251H or EC 301) and (EC 252H or EC 302) and (EC 420 or concurrently) and completion of Tier I writing requirement. R: Open only to seniors in Economics.
Capstone course for economics majors. Reading and discussion concerning selected economics topics. Preparation and presentation of student research project.
- 801 Mathematical Applications in Economics**
Fall. 3(3-0) P:NM: (MTH 120 or MTH 124 or MTH 132) R: Open only to graduate students in Economics, Agricultural Economics, and Business Administration.
Applications of mathematical tools in economic analysis. Matrix algebra, derivatives, partial derivatives, optimization, integration and linear differential equations.
- 803 Managerial Economics**
Fall, Spring. 3(3-0) R: Open only to MBA students. Not open to students with credit in EC 805 or EC 812A.
Analysis of the firm. Economizing in the use of resources, optimal combinations of products, pricing, competitive forces in regional and international markets affecting the firm.
- 804 Macroeconomics**
Fall, Spring. 3(3-0) P:NM: (EC 803) R: Open only to MBA students. Not open to students with credit in EC 809 or EC 813A.
Determinants of national income, employment, and inflation. National income accounting. Business fluctuations, fiscal and monetary policy, international trade, and capital flows.
- 805 Microeconomic Analysis**
Fall. 3(3-0) P:NM: (EC 301 and EC 801) or (MTH 126 or concurrently) R: Open only to graduate students in Economics, Agricultural Economics, and Business Administration. Not open to students with credit in EC 812A.
Microeconomic theory with calculus. Production, costs, demand, markets, general equilibrium and welfare theory.

- 807 Applied Microeconomic Analysis**
Spring. 3(3-0) P:NM: (EC 805)
Applications of microeconomic theory taken from public finance, labor economics, international trade, and industrial organization.
- 809 Macroeconomic Analysis**
Spring. 3(3-0) P:NM: (EC 302) and (EC 801 or MTH 126 or concurrently) Not open to students with credit in EC 813A.
Closed- and open-economy macroeconomic theory with calculus. Inflation, unemployment, growth, business cycles, consumption, investment, and money demand. Policy debates and macroeconomic forecasting.
- 810 Institutional and Behavioral Economics**
Fall. 3(3-0) Interdepartmental with Agricultural Economics; Resource Development. Administered by Department of Agricultural Economics.
Relationships among institutions, individual and collective actions, and economic performance. Public choice, property rights, and behavioral theories of firms and bureaucracies.
- 811 The Structure of Economic Analysis**
Fall. 3(3-0) P:NM: (MTH 133 or EC 801) R:
Open only to graduate students in Economics, Agricultural Economics, and Business Administration.
Static and dynamic decision models in economics. Concepts of equilibrium, stability, comparative statics and duality.
- 812A Microeconomics I**
Fall. 3(3-0) P:NM: (EC 811 or concurrently)
Consumption theory, including choice under uncertainty. Theory of production in perfectly competitive markets. General equilibrium in the presence of perfect competition. Efficiency properties of competitive equilibria.
- 812B Microeconomics II**
Spring. 3(3-0) P:NM: (EC 812A)
Introduction to social choice. Market failure, including externalities, public goods, imperfect information and market power.
- 813A Macroeconomics I**
Fall. 3(3-0) P:NM: (EC 811 or concurrently)
Static and dynamic macroeconomic models. Theories of consumption, investment, money demand and supply. Rational expectations and the government budget constraint.
- 813B Macroeconomics II**
Spring. 3(3-0) P:NM: (EC 813A)
New classical theories of business cycles and growth. Theories of price and wage rigidities, search, imperfect competition, and credit rationing in macroeconomic models. Asset pricing.
- 815 Economic Thought I**
Fall. 3(3-0)
Ancient, scholastic, and mercantilist economic thought. Origins and development of classical political economy. Socialist, Romantic, and Marxist reactions to classicism.
- 816 Economic Thought II**
Spring. 3(3-0)
German and English economic historicism. Austrian and general equilibrium economics. Neoclassical economics. Institutionalism. Origins and development of Keynesian economics. History of economic thought in retrospect.
- 819 Economic Role of Government**
Spring. 3(3-0)
The legal system and legal foundations of economic structure and performance. Property rights, the taking issue, and compensation.
- 820 Econometrics I**
Spring. 3(3-0) Interdepartmental with Agricultural Economics; Statistics and Probability. P:NM: (EC 801 and STT 430)
The single equation regression model. Properties of least-squares estimators under various specifications. Multicollinearity, generalized least-squares, errors in variables, seemingly unrelated regressions. Identification and estimation in simultaneous equations models.
- 821 Econometrics II**
Fall. 3(3-0) Interdepartmental with Agricultural Economics; Statistics and Probability. P:NM: (EC 820 and STT 442)
Estimation and hypothesis testing. Asymptotic properties of optimization estimators. Analysis of cross-sectional economic data. Qualitative and limited dependent variables. Probit, logit, tobit, and sample selectivity. Duration models. Count data.
- 822 Econometrics III**
Spring. 3(3-0) Interdepartmental with Agricultural Economics; Statistics and Probability. P:NM: (EC 820 and STT 442)
Dynamic models and time series data. ARMA models. ARCH models. Unit roots, cointegration and error correction. Rational expectations models.
- 823 Applied Econometrics**
Fall. 3(3-0) P:NM: (EC 820)
Problems of estimating models and testing hypotheses from economic theory. Applications of various econometric models to economic problems.
- 827 Economic Forecasting**
Spring. 2(2-0) P:NM: (MBA 814) R: Open only to MBA students.
Concepts, sources, measurement, and forecasts of economic data. Forecasting techniques. Time series analysis and economic models. Uses of economic models and forecasts in business decision making.
- 829 The Economics of Environmental Resources**
Fall. 3(3-0) Interdepartmental with Agricultural Economics; Forestry; Park, Recreation and Tourism Resources; Resource Development. Administered by Department of Agricultural Economics.
Economic principles related to environmental conflicts and public policy alternatives. Applications to water quality, land use, conservation, development, and global environmental issues.
- 830 Advanced Macroeconomics and Monetary Theory**
Fall. 3(3-0) P:NM: (EC 812B and EC 813B)
General equilibrium models of monetary economies. Money and growth. Monetary and financial models of the business cycle. Hyperinflation. Bubbles, sunspots, cycles, and multiple equilibria.
- 831 Problems in Monetary Theory and Policy**
Spring. 3(3-0) P:NM: (EC 809 or EC 813A) and (EC 820)
Empirical models of money, output, prices and interest rates. Goals and techniques of monetary policy.
- 835 Public Expenditures**
Fall. 3(3-0) P:NM: (EC 805 or EC 812A)
Allocative and distributional effects of public expenditure. Public goods and externalities. Selected topics in public expenditure analysis such as cost-benefit analysis, fiscal federalism, mechanism design, public choice, general equilibrium models.
- 836 Public Revenues**
Spring. 3(3-0) P:NM: (EC 805 or EC 812A)
Theory of taxation. Allocative and distributional effects of taxation, user charges, and deficit finance. Positive and normative aspects. General equilibrium models. Dynamic models. Issues of fiscal federalism.
- 840 International Trade: Theory and Commercial Policy**
Fall. 3(3-0) P:NM: (EC 805 or EC 812A)
Commodity composition of trade. Welfare and distributional effects. Measures such as tariffs, quotas, and export subsidies. International economic policy. Theory and practice of regional economic integration.
- 841 Exchange Rates and Capital Flows**
Spring. 3(3-0) P:NM: (EC 805 and EC 809) or (EC 812A and EC 813A)
The balance of payments statement. Mechanisms of balance of payments adjustment. Exchange rate determination. Domestic policies under alternative exchange rate regimes. Regional monetary integration. The international currency system.
- 850 Growth, Development, and Human Resources**
Fall. 3(3-0) P:NM: (EC 805 or EC 812A)
Theory and measurement of long-run growth. Population growth, technological change, capital formation, urbanization, entrepreneurship, and structural change.
- 851 Domestic and Foreign Development Policies**
Spring. 3(3-0) P:NM: (EC 805 and EC 809) or (EC 812A and EC 813A)
Problems of economic development. Market formation, financial markets and monetary policy, fiscal policy, investment criteria and externalities, trade policy, foreign capital, international disequilibrium.
- 860 Market Structure and Behavior**
Fall. 3(3-0) P:NM: (EC 805 or EC 812A)
The consequences of concentration and entry conditions. Theory of the firm as it relates to size, scope, integration, motivation. Static market behavior. Antitrust treatment of cartels and mergers.
- 861 Dynamic Market Behavior and Performance**
Spring. 3(3-0) P:NM: (EC 805 or EC 812A)
Theoretical and empirical treatments of dynamic aspects of industry behavior. Strategic behavior, predation, and antitrust treatment. Research, development, innovation. Government controls. Public utilities and regulation.
- 880 Labor Economics I**
Fall. 3(3-0) P:NM: (EC 805 or EC 812A)
Labor supply and measurement of the labor force. Labor demand. Mobility, turnover, and migration. Equalizing wage differentials. Trade union growth, goals, bargaining and effects.

Economics—EC

881 Labor Economics II
Spring, 3(3-0) P:NM: (EC 805 and EC 809)
or (EC 812A and EC 813A)

Theories of human capital. Internal labor markets and the economics of personnel. Economics of discrimination. Wage distributions. Job search and matching. Macroeconomic issues.

895 Graduate Reading in Economics
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.

Faculty guided research projects.

911 Strategic Behavior in Economic Environments
Fall, 3(3-0) P:NM: (EC 812B)

Topics in cooperative and non-cooperative game theory. Applications include: oligopoly and bargaining theories, strategic voting and principal agent models, endogenous coalition formation, signalling, strategic trade, and auctions theories.

912 Risk, Uncertainty and Information
Spring, 3(3-0) P:NM: (EC 812A)

Effects of risk in economic environments. Topics include: expected utility theory, risk aversion, stochastic dominance, mean-variance models, state preference models, general equilibrium models with risk, information theory.

923 Advanced Environmental and Resource Economics

Spring of even years. 3(3-0) Interdepartmental with Agricultural Economics; Forestry; Park, Recreation and Tourism Resources; Resource Development. Administered by Department of Agricultural Economics. P:NM: (AEC 829 and EC 805)

Advanced economic theory of environmental management and policy. Treatment of externalities and market and non-market approaches to environmental improvement. Topics in conservation and sustainable economic growth. Applications to research and policy.

925 Environmental and Resource Economics Research

Spring of odd years. 3(3-0) Interdepartmental with Agricultural Economics; Forestry; Resource Development; Park, Recreation and Tourism Resources. Administered by Department of Agricultural Economics. P:NM: (AEC 829 and EC 805) SA: AEC 991H

Topics such as contingent or non-market valuation, institutional analysis, pollution prevention, environmental quality and location, recreational demand modeling, and environmental risk management. Research process in environmental and resource economics.

999 Doctoral Dissertation Research

Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to Ph.D. students in Economics.

Doctoral dissertation research.

EDUCATIONAL ADMINISTRATION EAD

Department of Educational Administration College of Education

315 Student Leadership Training
Fall, Spring. 3(2-2)

Student leadership role, skills, and technique, consistent with the principles and demands of a democratic multicultural society.

451 Models of Special Education Administration and Services
Spring. 3(2-2) Interdepartmental with Counseling, Educational Psychology and Special Education. Administered by Department of Counseling, Educational Psychology, and Special Education. R: Open only to students admitted to the teacher certification program in emotional impairment or learning disabilities or to master's students in the Special Education major.

Application of theory and research to special education program design and implementation.

800 Organization Theory in Education
Fall, Spring, Summer. 3(3-0)

Organizational theory and research applied to educational administration. Topics include comparative organization settings, external environments, organizational effectiveness, and ethics.

801 Leadership and Organizational Development
Spring, Summer. 3(3-0)

Interaction of leadership with organizational culture and development within a variety of educational organizations.

802 Building a Learning Organization
Spring. 3(3-0)

Disciplines and practices for crafting a learning organization. Examination of Eastern, Western, and Quantum models of organization dynamics. Emphasis on strategies and skills for increasing human capacity.

803 Planning, Budgeting, and Evaluation
Spring. 3(3-0)

Planning, budgeting, and evaluation in educational organizations. Topics include needs assessment, funding sources, and processes for estimating costs and revenues.

804 Administration of Human Resources in Education
Fall, Summer. 3(3-0)

Tasks of personnel management in schools, colleges, and other educational organizations, including recruitment, selection, orientation, development, compensation, and evaluations. Focus on attracting and retaining a quality workforce in education.

805 Administration in Higher Education
Fall. 3(3-0)

Theories, systems, structures and processes of college and universities. Comparison of the organization, leadership, and governance of higher education institutions to other non-profit organizations.

806 Learning Leadership and Organizational Analysis I
Fall. 2(2-0) R: Open only to graduate students in K-12 Educational Administration.

Leadership of K-12 schools and associated community organizations. Theory and skills to discern organizational dynamics of schools and community. Professional ethics of K-12 school leadership.

807 Learning Leadership and Organizational Analysis II
Spring. 2(2-0) P: M: (EAD 806) R: Open only to graduate students in K12 Educational Administration.

Data-based organizational analysis of K-12 schools and school-community relations. Leadership skills to define vision strategies. Case analysis and double-loop learning.

808 Professional Inquiry and Reflection Seminar

Fall, Spring. 1(1-0) P:M: (EAD 806) P:NM: (EAD 807) R: Open only to graduate students in K-12 Educational Administration.

Skills and methods of disciplined reflection applied to issues of leadership practice. Methods of reflection and applications of multiple theories to cases of practice.

809 Interpersonal Dimensions of Leadership
Spring, Summer. 1(1-0) P:M: (EAD 806 and EAD 807 and EAD 808) P:NM: (EAD 820 and EAD 821) R: Open only to graduate students in K-12 Educational Administration.

Assessment of different approaches to school leadership. School leader as reflective practitioner and effective communicator in school and community contexts.

820 Internship in Educational Administration I

Fall, Spring. 1 to 3 credits. R: Open only to graduate students in K12 Educational Administration.

Supervised internship in an educational institution focused on school leadership issues.

821 Internship in Educational Administration II

Spring, Summer. 1 to 3 credits. R: Open only to graduate students in K12 Educational Administration.

Supervised internship in an educational and/or community organization focused on school-community leadership issues.

845 Teaching, Learning, and School Restructuring
Spring. 3(3-0)

Relationship between school-wide interventions and improvement in classroom teaching: school restructuring and reculturing, strategies for school improvement, approaches to teaching and learning.

852A Elementary and Middle School Administration

Fall, Summer. 3(3-0)

Administration and supervision of elementary and middle schools. Alternative organizational arrangements, curricula, and practices. Problems and strategies for improving K-8 education.

852B Secondary School Administration
Fall, Summer. 3(3-0)

Administration and supervision of secondary schools. Alternative organizational arrangements, curricula, and practices. Problems and strategies for improving secondary schools.