

921. Contemporary Statistical Models in Biology

Fall of odd years. 3(3-0) P: 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.

930. Advanced Forest Genetics

Fall of odd years. 2(1-2) Interdepartmental with Forestry; and Horticulture. Administered by Forestry. P: HRT 819 or HRT 836. Applications of genetics, plant breeding, and biotechnology to the improvement, and preservation of diversity, of tree species.

941. Quantitative Genetics in Plant Breeding

Spring of even years. 3(3-0) Interdepartmental with Forestry; and Horticulture. P: CSS 450, 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.

943. Techniques of Analyzing Unbalanced Research Data

Spring. 4(4-0) Interdepartmental with Animal Science; Forestry; Fisheries and Wildlife; and Horticulture. Administered by Animal Science. P: STT 464. R: Open only to graduate students in the College of Agriculture and Natural Resources. Linear model techniques to analyze research data characterized by missing and unequal number of observations in classes. Simultaneous consideration of multiple factors. Estimable comparisons. Hypothesis testing. Computational strategies. Variance and covariance components. Breeding values.

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.

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: (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: (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.

301. Intermediate Microeconomics

Fall, Spring, Summer. 3(3-0) P: (EC 201) (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: (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: (EC 201 or EC 251H) and (EC 202 or EC 252H) Forerunners of classical economics. Classical economic thought from Adam Smith to J.S. Mill. The socialist reaction. SA: EC 403

304. Economic Thought II

Spring. 3(3-0) P: (EC 201 or EC 251H) and (EC 202 or EC 252H) Decline of classical economics and rise of marginalist value and distribution theory. Marxism and institutionalism. SA: EC 404

306. Comparative Economic Systems

Fall. 3(3-0) P: (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: (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: (EC 201 or EC 251H) and (EC 202 or EC 252H) R: Not open to students in the Department of Accounting 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: (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: (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.