

**844. Plant Organelle Genetics**  
Winter of odd-numbered years. 3(3-0)  
Approval of department. Interdepartmental  
with Genetics and the departments of Botany  
and Plant Pathology, Forestry, and Horticulture.  
Administered by the Department of Horticulture.

Organization, structure, function, heredity,  
molecular biology and manipulation of chloroplasts  
and mitochondria. Biological interactions between  
the nucleus and organelles.

**850. Soil Chemistry**  
Winter. 5(3-6) CSS 430; CEM 162,  
CEM 383; or approval of department.

Chemistry of mineral weathering and soil formation,  
ion activities, ionic exchange and equilibrium reactions,  
soil pH, specific elements and their chemical analysis,  
and availability of nutrients to plants.

**865. Organic Chemistry of Soils**  
Spring of odd-numbered years. 3(3-0)  
CEM 242.

Relationship of natural and synthetic organic  
chemicals to chemical and biochemical processes  
in the soil environment.

**870. Origin and Classification of Soils**  
Winter. 4(3-2) CSS 470, CSS 840, or  
approval of department.

Genesis, morphology and classification of major  
soils of the world. Relationships among soils in  
natural and cultural landscapes. How soil properties  
affect their use, management and conservation.  
Land classifications for various purposes.

**899. Master's Thesis Research**  
Fall, Winter, Spring, Summer. Variable  
credit. Approval of department.

**920. Applied Regression Analysis**  
Spring. 3(3-0) STT 423 or approval of  
department.

Multiple regression, model selection, the general  
linear model and confounding in factorial sets of  
treatments.

**940. Theoretical Population Genetics**  
Winter of even-numbered years. 4(4-0)  
MTH 113, STT 422, CSS 821. Interdepartmental  
with the departments of Forestry and Horticulture.  
Administered by the Department of Forestry.

Discussion of mathematical theories in population  
genetics and experimental works on natural and  
laboratory populations.

**941. Quantitative Genetics in Plant Breeding**  
Spring of even-numbered years. 4(4-0)  
STT 423, CSS 823 or approval of department.  
Interdepartmental with the departments of Forestry  
and Horticulture.

Calculation and implication of genetic parameters.  
Linkage. Coancestry and inbreeding. Covariance  
between relatives. Heritability and selection.  
Genotype by environment interaction. Emphasis  
on relationship of quantitative genetics to plant  
breeding.

**944. Physiological Genetics**  
Winter. 3(3-0) BOT 413; CSS 821. Interdepartmental  
with the departments of Forestry and Horticulture.  
Administered by the Department of Forestry.

Control of variation in higher plants including  
adaptive physiology, quantitative genetics,  
growth correlation, biochemical genetics, hybrid  
physiology, and genecology.

**999. Doctoral Dissertation Research**  
Fall, Winter, Spring, Summer. Variable  
credit.

## DAIRY SCIENCE

See Animal Science.

## EARTH SCIENCE

See Geological Sciences.

## ECONOMICS

EC

### College of Business and Graduate School of Business Administration

Courses are classified as follows:  
Applied Welfare Economics—410.  
Labor Economics and Industrial Relations—  
305, 306, 455, 457.  
Money and Banking—318, 330, 470.  
International Economics—428.  
Public Finance—406, 407, 408.  
Price and Value Theory—324, 325, 426.  
Income and Employment Theory—326, 451,  
470.  
History of Economic Thought—421, 422.  
Industrial Organization and Control—444, 445.  
Economic Development, Regional Studies,  
and Comparative Economics  
Systems—430, 431, 434.

**200. Introduction to Macroeconomics**  
Fall, Winter, Spring, Summer. 4(4-0)  
Open to Freshmen. Students may begin  
sequence with either EC 200 or EC 201.

Determinants of Gross National Product, unemployment,  
inflation and economic growth. National  
income accounting, fiscal policy;  
aggregate demand and supply management.

**201. Introduction to Microeconomics**  
Fall, Winter, Spring, Summer. 4(4-0)  
Open to Freshmen. Students may begin  
sequence with either EC 200 or EC 201.

Economic institutions, reasoning and analysis.  
Consumption, production, determination of  
price and quantity in different markets, income  
distribution, market structure and normative  
analysis.

**210. Fundamentals of Economics**  
Fall, Winter. 4(4-0) MTH 215 or MTH  
228; or concurrently. Students may not earn  
credit in EC 210 if they have credit in either EC  
200 or EC 201.

Economic principles, institutions and reasoning  
using mathematics, when useful, as a tool of  
analysis. Consumption, production, the market  
system, income distribution and elements of  
employment and inflation theory.

**251H. Households, Firms and Markets**  
Fall. 5(5-0) Honors College students.

Microeconomic theory and its applications to  
analysis and policy. Substitutes for EC 201, EC  
324, and EC 325.

**252H. Macroeconomics and Public Policy**  
Winter. 5(5-0) Honors College students.

Theory of national income, unemployment,  
inflation and economic growth and its application  
to economic analysis and policy. Substitutes for  
EC 200, EC 326 and EC 327 combined.

**305. Industrial Relations and Trade Unionism**  
Fall, Winter, Spring, Summer. 4(4-0)

Development, aims, structure, and functions of  
labor and employer organizations. Their relation  
to economic, political, and legal institutions  
and their impact on society. Primary issues in  
collective bargaining.

**306. Government Programs for Workers**  
Winter, Spring. 4(4-0) EC 201. Interdepartmental  
with Public Affairs Management.

Economics of selected government institutions  
and programs for workers. Social security,  
worker's compensation, Unemployment Insurance,  
OSHA, employment and training programs,  
wages and hours legislation, anti-discrimination  
programs.

**318. Money, Credit and Banking**  
Fall, Winter, Spring, Summer. 4(4-0)  
EC 200 or EC 210.

Commercial banking and the money supply.  
The Federal Reserve System, the Treasury, and  
other financial institutions. Sources and uses of  
funds in the financial market.

**324. Microeconomics I**  
Fall, Winter, Spring, Summer. 3(3-0)  
EC 200 and EC 201, or EC 210.

Theory of production and cost. Theory of the  
firm under varying market structures.

**325. Microeconomics II**  
Fall, Winter, Spring, Summer. 3(3-0)  
EC 200 and EC 201, or EC 210, and EC 324.

Consumer choice and theory of demand. Theory  
of distribution and factor rewards. Welfare  
economics and general equilibrium theory.

**326. Macroeconomics I**  
Fall, Winter, Spring, Summer. 3(3-0)  
EC 200 and EC 201 or EC 210.

Review of national income accounting. Determination  
of aggregate output, employment, the price level,  
and the inflation rate. Policy applications.

**327. Macroeconomics II**  
Fall, Winter, Spring, Summer. 3(3-0)  
EC 326.

Consumption theories, investment theories, role  
of expectations, theories of economic growth  
and cycles, stabilization policies, and other  
advanced topics.

**330. Investments and Security Markets**  
Fall, Spring. 3(3-0) EC 200 or EC 210,  
Juniors.

The stock market; principles of investment;  
analysis of selected industries and corporations;  
regulation by the Securities and Exchange  
Commission.

**337. American Social and Economic History: Foundations**  
Winter. 4(4-0) Interdepartmental with  
and administered by the Department of History.

Multiple sources of economic growth in  
economic, social and political change, education,  
science and technology, political action, and  
other factors, mid-19th century.

**338. American Social and Economic History: Modern Trends**  
Spring. 4(4-0) Interdepartmental with  
and administered by the Department of History.

Urbanization, origins and implications of large-scale  
organizations in business and other sectors  
of society, and sources of economic growth since  
mid-19th century.

## Descriptions — Economics

### of Courses

- 361. Economic Development of Asia**  
Fall. 3(3-0) EC 200 and EC 201 or EC 210.

Population and resources; comparison of three economic systems: Communism in China, free enterprise in Japan and socialism in India; the role of Japan in regional trade and development.

- 362. Economic Development of Latin America**  
Winter. 3(3-0) EC 200 and EC 201 or EC 210.

Concentration of political and economic power as related to income distribution, tax structures, agrarian reform; inflation, trade, exchange rates, integration; population and employment policy.

- 363. Economic Development of Tropical Africa**  
Spring. 3(3-0) EC 200 and EC 201 or EC 210. *Interdepartmental with Public Affairs Management.*

African economic development in historical perspective. Analysis of contemporary economic development problems faced by tropical African countries. Alternative strategies for African economic development.

- 371A. European Economic History to 1800**

Fall. 4(4-0) *Interdepartmental with and administered by the Department of History.* Economic history of medieval and early modern Europe stressing the nature of agrarian societies, the growth of cities, the divergence of the European economies, and the Industrial Revolution in England.

- 371B. European Economic History after 1800**

Winter. 4(4-0) *Interdepartmental with and administered by the Department of History.* The industrialization of Europe stressing urbanization, national rivalry, problems of the maturation of capitalist institutions, and the social and ecological impact of economic growth in the twentieth century.

- 400. Independent Study**  
Fall, Winter, Spring, Summer. 1 to 4 credits. *Seniors or approval of department.*

Research and reading course for students interested in doing independent work in economics.

- 401. Interpreting Economic News and Research**

Winter. 3(3-0) EC 200 and EC 201 or EC 210 or EC 251H and 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.

- 406. Public Expenditure: Theory and Policy**

Fall, Spring. 4(4-0) EC 201 or EC 210. *Interdepartmental with Public Affairs Management.*

Expenditure theory; objectives and rationale of government activity in the market system; efficiency criteria in government decision-making; planning-programming-budgeting systems and cost-benefit analysis.

- 407. Public Revenues**  
Winter. 4(4-0) EC 201 or EC 210.

Principles and theory of the distribution of tax burdens and the incidence of taxation. Income, sales, property, and other major revenue sources.

- 408. State and Local Finance**  
Spring. 4(4-0) EC 201 or EC 210 or EC 251H.

Fiscal problems at the state and local levels of government, including revenues, expenditures, borrowing, and intergovernmental fiscal relations.

- 410. Medical Economics**  
Spring. 3(3-0) EC 200, EC 201, or approval of department.

Demand, supply and economic efficiency in the markets for health services. Demand for medical care, organization forms, methods of payment, utilization and cost, and public policy for health care.

- 412. The Economics of Poverty**  
Winter. 3(3-0) EC 200, EC 201.

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.

- 413. Urban Economics**  
Fall. 4(4-0) EC 200, EC 201.

Location theory and urban development. Economics of city size and urban-suburban conflict. Economic aspects of certain community problems like housing, transportation, welfare and poverty. Strategies for urban development.

- 417. Land Economics**  
Fall, Spring. 4(4-0) *Interdepartmental with Public Affairs Management, and Food Systems Economics and Management and the Department of Resource Development. Administered by the Department of Resource Development.*

Factors affecting the economic use of land and space resources by people. Input-output relationships; development, investment, and enterprise location decisions. Land markets; property rights, area planning; zoning and land use controls.

- 421. Economic Thought I**  
Fall, Summer. 4(4-0) EC 200 and EC 201, or EC 210.

Forerunners of classical economics. Development of classical economic thought from Adam Smith to J. S. Mill. The socialist reaction.

- 422. Economic Thought II**  
Winter, Spring. 4(4-0) EC 200 and EC 201, or EC 210.

The decline of classical economics and the rise of marginalist value and distribution theory. Marxism and institutionalism.

- 426. Introductory Mathematical Economics**  
Spring. 3(3-0) EC 324, EC 326, MTH 214.

Mathematical analysis of production, cost, and consumer choice. Mathematical models of aggregate and general-equilibrium economic systems.

- 428. International Trade**  
Fall, Winter, Spring, Summer. 3(3-0) EC 200 and EC 201, or EC 210. EC 428 and EC 429 are a two-term sequence. *Student should take the courses in succeeding terms, though they may begin with either course.*

Pure theory of trade and comparative advantage. Free trade versus protection. Customs unions. U.S. commercial policy. Trade problems of less-developed nations.

- 429. International Finance**  
Fall, Winter, Spring, Summer. 3(3-0) EC 200 and EC 201, or EC 210. EC 428 and EC 429 are a two-term sequence. *Students should take the courses in succeeding terms, though they may begin with either course.*

Balance-of-payments accounting. Foreign exchange markets. Balance-of-payments mechanisms. The international monetary system.

- 430. Stagnation and Development in Emerging Societies**  
Winter, Summer. 4(4-0) EC 200 and EC 201, or EC 210.

Obstacles to economic growth, theories of economic development, reorganizing agriculture and industry; problems in mobilizing the economy to accommodate new productive techniques; population problems.

- 431. Principal Issues in Promoting Economic Development**  
Spring. 4(4-0) EC 430.

Structural change and growth, capital formation and investment criteria; financing development; foreign trade and finance in development; government and planning.

- 434. Comparative Economic Systems**  
Fall, Winter, Summer. 4(4-0) EC 200 and EC 201, or EC 210.

Characteristics and functions of an economic system. Analysis of alternative patterns of economic control, planning and market structure. Experiences under capitalism, socialism and mixed economies. Consideration of their theories and philosophies.

- 440. Radical Political Economy**  
Spring. 3(3-0) EC 200 and EC 201, or EC 210, or EC 251H and EC 252H.

Development and contemporary characteristics of capitalism from Marxian-radical perspective. Historical materialism and class analysis. Radical critique of modern economics. Relationship of inequality, racism, alienation and other problems to the structure of capitalism.

- 444. Private Enterprise and Public Policy**  
Fall, Winter, Spring, Summer. 3(3-0) EC 201 or EC 210.

Competition and monopoly in the American economy. Problems of antitrust.

- 445. Economics of Regulated Industries**  
Winter. 4(4-0) EC 444.

Government policy and role of competition in the public utility and transportation industries.

- 451. Introduction to Econometric Methods**  
Fall, Spring. 4(4-0) EC 324, EC 326; STT 422 or STT 442 or STT 316.

Specification, estimation and interpretation of econometric models. Understanding and evaluation of current quantitative work in economics.

- 453. Women and Work: Issues and Policy Analysis**  
Winter. 3(3-0) PAM 201 or EC 200 or EC 201 or approval of department. *Interdepartmental with and administered by Public Affairs Management.*

Quantity and quality of labor force participation by women, current status and past trends. Issues analyzed include differential earnings and occupations of men and women, employment discrimination and labor legislation.

**455. Labor and the Law**

Spring. 4(4-0) EC 305.

Development and current status of labor law as it applies to unions, employers, employees and collective bargaining. Economic and social issues regulated by, and posed by, labor law.

**457. Analysis of Labor Markets**

Spring. 4(4-0) EC 200 and EC 201, or EC 210.

Theories of labor market behavior, empirical evidence and policy implications. Topics include labor supply, labor demand, wage differentials (due to education, discrimination, and union membership), competition and mobility.

**460. Regional Economics**

Winter. 4(4-0) R D 417 or EC 324. *Interdepartmental with Food Systems Economics and Management, Public Affairs Management, and the Department of Resource Development. Administered by the Department of Resource Development.*

Forces affecting location decisions of firms, households and governments. Applications to agricultural, industrial, and regional developments.

**461. Regional Economics Laboratory**

Spring. 1(0-2) R D 460 and approval of department. *Interdepartmental with Public Affairs Management, and Food Systems Economics and Management and the Department of Resource Development. Administered by the Department of Resource Development.*

Evaluation and use of analytical models designed to solve regional economic problems.

**463. Economics of Urban Education**

(UMS 463.) Spring. 3(3-0) EC 201 or EC 210.

Political economy of urban schools. Education as a commodity: efficient production and distribution, supply and demand for education, financing education, planning education to meet job needs and social mobility.

**470. Monetary Theory**

Fall. 3(3-0) EC 327.

Relationship between money and interest rates, prices and output.

**480. Mathematics for Economists**

Fall. 5(5-0) MTH 113, graduate status in either economics, agricultural economics or College of Business, or approval of department. *Interdepartmental with and administered by the Department of Mathematics.*

Matrix algebra, determinants, quadratic forms, characteristic values. Partial derivatives, chain rule, Jacobian matrix, Taylor series, constrained optimization, linear differential equations. Mathematics introduced and developed using student's background in economics.

**803. Managerial Economics**

(860.) Fall, Winter, Summer. 4(4-0) Graduate students in Business Administration or approval of department. *Not open to undergraduates or to those with credit in EC 805A, EC 812A, or EC 860.*

Analysis of the firm. Problems facing management; economizing in use of resources, optimal combinations of products, pricing, competitive forces in markets affecting the firm.

**804. Macroeconomic Models**

(861.) Fall, Winter, Spring, Summer. 4(4-0) Graduate students in Business Administration or approval of department. *Not open to undergraduates or to those with credit in EC 805B, EC 813A or EC 861.*

Determinants of the national income, employment, and capital formation. National income accounts. Business fluctuations. Fiscal and monetary policy.

**805A. Microeconomics Theory**

Fall, Winter. 3(3-0) MTH 113, EC 324; *not open to students with credit in EC 812A.*

A review of microeconomic theory with calculus: production, costs, demand, markets, general equilibrium and welfare theory.

**805B. Macroeconomic Theory**

Fall, Spring. 3(3-0) MTH 113, EC 326; *closed to students with credit in EC 813A.*

A review of macroeconomic theory with calculus; comparative statics of macroeconomic models; theories of inflation and unemployment.

**806A. Public Expenditures**

Fall. 3(3-0) Approval of department.

Public sector allocation and redistribution. Public goods, externalities, market imperfections, property rights. Cost-benefit analysis and PPBS. Alternative theories of the state. Political theories of public expenditures.

**806B. Public Revenues**

Winter. 3(3-0) Approval of department.

Theory of taxation. Incidence and economic effects, especially on income and wealth redistribution. Institutional and policy analysis of the U.S. federal tax system.

**806C. State and Local Public Finance**

Spring. 3(3-0) Approval of department.

State and local expenditure systems in theory and practice; tax and nontax revenues; intergovernmental fiscal relationships; the fiscal problems of metropolitan governments.

**807. Survey of Microeconomic Analysis**

Winter, Spring. 3(3-0) EC 805A or EC 812A.

Analytical methods taught through journal readings and practical examples from public finance, labor economics, industrial organization, and international trade. Such topics as measurement of tax incidence and effects of unemployment insurance.

**808. Techniques of Microeconomic Analysis**

Spring. 3(3-0) EC 803 or EC 805A or EC 812A.

Techniques of microeconomic analysis taught through examples drawn from current economic events; an emphasis on getting answers to problems encountered by practicing economists.

**809. Macroeconomic Analysis**

Winter, Summer. 3(3-0) EC 804 or EC 805B or EC 813A.

Analysis techniques taught through readings and examples from monetary economics, economic development, and international finance. Such topics as macroeconomic forecasting, sources of economic growth, and exchange constraints on monetary policy.

**810. Economics of Public Choice**

Winter. 3(3-0) Approval of department. *Interdepartmental with the departments of Agricultural Economics, and Resource Development. Administered by the Department of Agricultural Economics.*

Economics of alternative institutions for collective action. Emphasis on property rights and natural resources. Public goods, externalities non-marginal change, commonwealth, income and power distribution, grants, welfare criteria and market failure.

**811. Public Program Analysis**

Spring. Summer of odd-numbered years. 3(3-0) EC 324 or approval of department. *Interdepartmental with the departments of Resource Development, and Agricultural Economics. Administered by the Department of Agricultural Economics.*

Application of benefit-cost analysis to public programs of resources development. Issues and case studies in budgeting, investment criteria, pricing, externalities, and coordination.

**812A. Microeconomics I**

Winter. 3(3-0) EC 324, EC 325; EC 480 or MTH 215 or concurrently.

Theories of consumption and production; duality, cost and expenditure functions; input demand; revealed preference.

**812B. Microeconomics II**

Spring. 3(3-0) EC 812A.

Functional forms in production and consumption; competitive equilibrium; theories of non-competitive markets; imperfect information and behavior under uncertainty; multiproduct firms.

**812C. Microeconomics III**

Fall. 3(3-0) EC 812B.

General equilibrium and welfare; optimality of competition; market failures; economics of linear and nonlinear programming and input-output analysis.

**813A. Macroeconomics I**

Fall. 3(3-0) EC 326, EC 327; EC 480 or MTH 215 or concurrently.

Income accounting and price indices; comparative statics of macroeconomics models; consumption and investment functions; the money supply.

**813B. Macroeconomics II**

Winter. 3(3-0) EC 813A.

Demand for money; portfolio theory; theories of inflation and unemployment.

**813C. Macroeconomics III**

Spring. 3(3-0) EC 813B.

Models of macroeconomic disequilibrium; macro dynamics and the effects of search; theories of neoclassical and optimal economics growth.

**818A. Monetary Theory**

Fall. 3(3-0) EC 812C, EC 813C, and EC 835 and approval of department.

Monetary and interest theories.

**818B. The Theory of Monetary Policy**

Winter. 3(3-0) EC 818A or approval of department.

Theories of the transmission of monetary policy to output, employment and prices.

**818C. Problems in Monetary Policy**

Spring. 3(3-0) EC 818B.

Goals and techniques of monetary policy.

## Descriptions — Economics

### of Courses

- 821A. Competition and Monopoly in American Industry**  
Fall. 3(3-0) Approval of department.  
Examination of structure, behavior, and performance in industries.
- 821B. Government Policy Toward Private Enterprise**  
Winter. 3(3-0) Approval of department.  
Evolution of government policy with respect to such problems as conspiracy, monopoly, mergers, unfair practices, and discrimination. Economic and legal appraisal of policy alternatives.
- 821C. Problems Related to Regulated Industries**  
Spring. 3(3-0) Approval of department.  
Departures from market competition as a policy norm, as in public utilities and transportation.
- 826A. Theory of International Trade**  
Fall. 3(3-0) EC 428 or approval of department.  
Classical and modern theories of international trade. Application of modern techniques of economic analysis to international trade theory.
- 826B. Theory of International Trade Policy**  
Winter. 3(3-0) EC 826A.  
Various means by which a government may influence the volume, character, and direction of its foreign commerce. In this connection an analysis is made of the theory of the tariff, the subsidy, exchange control, and quotas. Emphasis on the economic impact of trade controls upon a nation and the world.
- 826C. International Exchanges and Capital Flows**  
Spring. 3(3-0) EC 826B.  
Theory of exchange rates and international money markets especially with reference to other than current account items in balances of payments. Analysis of sources, causes, effects of capital flows with developing economies considered as a special case.
- 831. Mathematical Economics I**  
Fall of even-numbered years. 3(3-0) EC 812; MTH 214, MTH 334.  
Economic behavior of firms, households, commodity markets. Relation of traditional theories to programming models, theory of games and other decision theories. Dynamic models of behavior. Equilibrium of multiple markets.
- 832. Mathematical Economics II**  
Winter of odd-numbered years. 3(3-0) EC 813; MTH 215, MTH 334.  
Mathematical models of growth and fluctuations dealing with macroeconomics, monetary theory, fiscal policy. The cobweb, static and dynamic multipliers, multiplier-accelerator models, trade cycle models. Relations among stocks, flows and time lags.
- 833. Mathematical Programming**  
Spring. 3(3-0) EC 800; or EC 812A; MTH 334. Interdepartmental with the departments of Agricultural Economics, and Statistics and Probability. Administered by the Department of Agricultural Economics.  
Linear programming. Theory of linear economic models. Topics in nonlinear programming.
- 835. Introduction to Econometrics**  
Spring, Summer. 3(3-0) EC 325, STT 422; not open to students with credit in EC 836. Interdepartmental with the Department of Agricultural Economics.  
Specification, estimation and interpretation of economic models. Applications to empirical problems.
- 836. Econometric Methods**  
Winter. 3(3-0) STT 442; EC 325 or EC 803 or EC 805A or EC 812A; not open to students with credit in EC 835.  
Properties of least squares and maximum likelihood estimators of single and simultaneous equations economic models.
- 841A. History of Economic Thought: Classical**  
Fall. 3(3-0)  
Early thought, mercantilism, physiocracy, and classical economics.
- 841B. History of Economic Thought: Heterodox**  
Winter. 3(3-0)  
Historicism, socialism, and institutionalism.
- 841C. History of Economic Thought: Modern**  
Spring. 3(3-0)  
Development of marginalism, general equilibrium theory, employment theory, and mathematical economics.
- 850. The Development of Economic Institutions**  
Fall. 3(3-0) EC 430 or approval of department.  
Cross-cultural analysis of factors influencing the organization of economies. Motivation, values, and technological change. Growth of markets, entrepreneurship, industrial labor force and the diffusion of knowledge.
- 851. The Economics of Secular Change**  
Winter. 3(3-0) EC 324, EC 326 or approval of department.  
Empirical studies of long-run economic trends and a consideration of alternative hypotheses explaining these trends including classical Marxian, Harrod-Domar, and other general theories of economic development. Population growth, technological change, capital formation, occupational distribution, urbanization, and international trade.
- 852. Economic Problems of Underdeveloped Areas**  
Spring. 3(3-0) EC 324, EC 326 or approval of department.  
Overcoming problems relating to early stages of economic development; investment priorities, mobilizing savings, balance of payment considerations; and policies and programs of various types.
- 855. The Industrial Revolution in Europe**  
Winter of even-numbered years. 3(3-0) EC 318, EC 324. Interdepartmental with the Department of History.  
The preconditions that led to the momentous changes in agriculture and industry in Europe from 1700-1914.
- 857A. Wage Theory I**  
(857.) Fall. 3(3-0) EC 324, EC 326 or approval of department. Interdepartmental with the School of Labor and Industrial Relations.  
Advanced analysis of: theories of wage determination; labor market research, economic effects of collective bargaining upon the national wage structure, output, employment, distribution of national income, the price level; nature and effects of government wage policies.
- 857B. Wage Theory II**  
Winter. 3(3-0) EC 324, EC 326 or approval of department.  
Advanced analysis of education, on-the-job training, family background, and discrimination as determinants of earnings. Causes and measurement of inequality and social mobility. Macroeconomic view of labor market.
- 858. Collective Bargaining**  
Fall, Winter, Spring. 3(3-0) EC 305 or approval of department. Open to graduate students in economics and related fields such as labor and industrial relations, psychology, sociology, anthropology, political science, business, and history. Interdepartmental with and administered by the School of Labor and Industrial Relations.  
Problems and issues in the administration and negotiation of collective bargaining agreements; includes both economic and noneconomic aspects of industrial relations policies and practices.
- 862. Business and Public Policy**  
Winter. 4(4-0) EC 803 or approval of department. Not open to majors.  
Problem of government regulation of business. Economic models which relate to regulation. Regulatory legislation, regulatory bodies, and alternatives available.
- 876. Statistical Inference in Economics I**  
Fall. 3(3-0) EC 812A or EC 805A; STT 443 or STT 863; or approval of department. Interdepartmental with the departments of Agricultural Economics, and Statistics and Probability.  
Review and extension of single-equation regression models. Properties of least-squares estimators under alternative specifications. Problems of analyzing nonexperimental data. Errors in variables, autoregressive and heteroscedastic models.
- 877. Statistical Inference in Economics II**  
Winter. 3(3-0) EC 876 or approval of department. Interdepartmental with the departments of Agricultural Economics, and Statistics and Probability.  
Specification interpretation and estimation of simultaneous equation models. Nonlinear models. Bayesian approach to estimation problems. Recent developments in econometrics.
- 878. Statistical Inference in Economics III**  
Spring. 3(3-0) EC 877 or approval of department. Interdepartmental with the departments of Agricultural Economics, and Statistics and Probability.  
Validation and application of dynamic econometric models. Bayesian approach to estimation problems. Recent developments in econometric methods and in applied econometric research.

**880. Organization and Control in the Political Economy: Institutions and Theory**  
Winter of even-numbered years. 4(4-0)  
Interdepartmental with the Department of Management.

Organization and technique in choice and implementation of economic (especially planning, programming) functions of political authority.

**881. Organization and Control in the Political Economy: Selected Problems**  
Winter of odd-numbered years. 4(4-0)  
Approval of instructor. Interdepartmental with the Department of Management.

Analysis of role and tasks, appropriate techniques and organizational structures of political agencies in planning and management of complex programs.

**891. Topics in Applied Econometrics**  
Spring. 3(3-0) EC 835 or EC 877.

Topics in applied econometrics with particular attention to problems of testing hypotheses in the context of economic models.

**895. Graduate Reading in Economics**  
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 8 credits.

**900. Special Topics in Economic Theory**  
Fall, Winter, Spring, Summer. 3(3-0)  
May reenroll for a maximum of 12 credits. EC 812C; EC 813C.

Special topics in economic theory of current interest and importance.

**972. Methodological Approaches to Research**  
Fall of even-numbered years, Summer of odd-numbered years. 3(3-0) Two terms of graduate study in social science or approval of department. Interdepartmental with and administered by the Department of Agricultural Economics.

Selection, planning and conduct of research. Alternative research approaches. Role of theory, beliefs and valuations. Critical appraisal of research studies.

**990B. Industrial Organization and Public Policy Workshop**  
Fall, Winter, Spring. 3 to 16 credits.  
Approval of department.

Critical evaluation of research reports by staff and other students. Students writing doctoral dissertations in the appropriate areas are encouraged to participate in workshop and may do so while registered for EC 999.

**990C. Mathematical Economics and Econometrics Workshop**  
Fall, Winter, Spring. 3 to 16 credits.  
EC 812A, EC 832; or approval of department. Interdepartmental with the Department of Agricultural Economics.

Critical evaluation of research reports by staff and other students. Students writing doctoral dissertations in the appropriate areas are encouraged to participate in workshop and may do so while registered for EC 999.

**990D. Economic Development Workshop**  
Fall, Winter, Spring, Summer. 3 to 16 credits. EC 850, EC 851, EC 852 or approval of department.

Critical evaluation of research reports by staff and students. Students writing doctoral dissertations in Development are encouraged to participate in the workshop and may do so while registered for EC 999.

**999. Doctoral Dissertation Research**  
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

## EDUCATION

See Counseling, Educational Psychology and Special Education; Educational Administration; Health and Physical Education; and Teacher Education.

## EDUCATIONAL ADMINISTRATION EAD

(Name changed effective July 1, 1984. Formerly department of Administration and Curriculum.)

### College of Education

**415. Student Leadership Training**  
(ED 415., EAC 415.) Fall, Winter, Spring. 2(0-4) May reenroll for a maximum of 4 credits if different topic is taken. Approval of instructor.

Prepares students for leadership roles and responsibilities by encouraging the development of skills and techniques consistent with the principles of our democratic society.

**433. Alcohol: A Social Dilemma**  
(ED 433., EAC 433.) Winter. 3(3-0)  
Juniors or approval of department. Interdepartmental with and administered by the School of Criminal Justice.

Substance abuse with emphasis on beverage alcohol. Sociological, psychological and medical aspects. Prevention, treatment, rehabilitation.

**805A. Educational Development Planning: Basic Concepts**  
(ED 879., EAC 805A.) Winter. 3(3-0)  
Approval of department.

Basic concepts of economic, social and political development are studied as they place demands upon educational planners to cope with them. The distribution of development benefits is stressed.

**805B. Educational Planning and National Development**  
(ED 880., EAC 805B.) Spring. 3(3-0)  
EAD 805A.

Formulation of educational development strategies and plans to deal with crucial national and community development problem areas paying particular attention to meeting the special needs of audiences with special problems.

**805C. Higher Education in Developing Countries**  
Fall. 3(3-0) Approval of department.

National and international development roles of higher educational institutions and personnel. Major focus on science and the appropriate technology for applying scientific knowledge to developmental problems in specific socio-cultural settings.

**816E. Instructional Simulation**  
(ED 823., EAC 816E.) Fall, Summer. 3(2-2) Teaching experience. Interdepartmental with and administered by the Department of Teacher Education.

Design and use of simulations and instructional games in the curriculum for development of social skills, values and affects.

**816J. Studies in Nonformal Education**  
(EAC 816J.) Summer. 4(3-2) Approval of department.

International invitational workshop for specialists, project planners, staff trainers and practitioners. Worldwide selection of contemporary case studies of nonformal education. Focus is on out-of-school education for development.

**816K. Curriculum for Nonformal Education**  
(E D 821E., EAC 816K.) Winter. 3(3-0) T E 810A, T E 810C or EAD 860.

Principles of curriculum related to non-formal education programs. Consideration of various fields of out-of-school education and training associated with community level rural and urban human resource development.

**839. African Research**  
(IDC 838., EAC 839.) Fall, Winter, Spring. 2 to 4 credits. May reenroll for a maximum of 8 credits. Graduate standing or approval of instructor. Interdepartmental with African Languages and the departments of Anthropology, Geography, History, Political Science, and Sociology. Administered by the Department of Anthropology.

African-related archival and field research topics and methodologies viewed from perspective of relevant social science and humanistic disciplines associated with the African Studies Center.

**850. The Teacher and Administrative Leadership**  
(ED 850., EAC 850.) Winter, Summer. 3(3-0) Twelve credits in Education and approval of department.

Not intended for school administration majors. Theory and practice underlying administration of schools in a democratic society. Intended for educational personnel seeking basic information in such areas as educational organization, roles of administrative leadership in schools and communities, and teacher's roles in administration.

**851A. Foundations of Administration: Theory and Organization**  
(ED 851A., EAC 851A.) Fall, Winter, Summer. 3(3-0) Approval of department.

Emphasizes basic administrative theory and research, focuses on current practice and emerging trends in such problems and issues as personnel, plant, finance, community school programs, and instructional improvement. Intended primarily for persons actively preparing for administrative positions in schools and other educational agencies.

**851B. Foundations of Administration: Practice and Problems**  
(ED 851B., EAC 851B.) Winter, Spring, Summer. 3(3-0) EAD 851A or approval of department.

Emphasizes basic administrative theory and research, focuses on current practice and emerging trends in such problems and issues as personnel, plant, finance, community school programs, and instructional improvement. Intended primarily for persons actively preparing for administrative positions in schools and other educational agencies.

**852A. Administration of Educational Institutions: Elementary School Administration**  
(ED 852A., EAC 852A.) Winter, Summer. 3(3-0) Twelve graduate credits in Education including EAD 851A, EAD 851B or approval of department.

Exploration of the nature and scope of responsibilities of areas in educational administration. Designed to serve as an initial application of administrative theory for those aspiring to one of the several areas.