460. Special Problems
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 10 credits. Approval of department.

IDC. The Impact of Animal Resource Management Upon the World's Developing Nations
For course description, see Interdisciplinary Courses.

850. Topics in Dairy Science
Fall, Winter, Spring. Variable credit. May re-enroll for credit. Approval of department.

899. Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

925. Advanced Ruminant Nutrition
Fall of even-numbered years. 4(4-0)
BCH 452, PSL 801 or approval of department.

945. Physiology of Mammalian Reproduction
Winter. 4(5-0) DRY or PSL 445 or approval of department. Interdepartmental with the Department of Physiology.

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

EARTH SCIENCE
See Geology.

ECONOMICS
EC

College of Business
Courses are classified as follows:
Labor Economics and Industrial Relations—305, 455, 456, 457.
Money and Banking—318, 330, 470.
International Economics—427.
Public Finance—406, 407, 408.
Price and Value Theory—324, 335, 420.
History of Economic Thought—431, 442.

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

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

210. Fundamentals of Economics
Fall, Winter. 4(4-0) MTH 215 or 226; or concurrently. Students may not earn credit in 210 if they have credit in either 200 or 201.

211H. Households, Firms and Markets
Fall. 5(5-0) Honors College students.
Microeconomic theory and its applications to analysis and policy. Substitutes for 201, 324, and 325.

212H. Aggregate Economics and Public Policy
Winter. 5(5-0) Honors College students.

305. Industrial Relations and Trade Unionism
Fall, Winter, Spring, Summer. 5(5-0)
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.

316. Money, Credit and Banking
Fall, Winter, Spring. 4(4-0) 200 or 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.

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

321. Macroeconomics II
Fall, Winter, Spring, Summer. 3(3-0)
Expansion of role of monetary factors in macroeconomic theory. Theories of economic growth and cycles. Study of macroeconomic problems of inflation, unemployment, and other current policy problems.

324. Microeconomics I
Fall, Winter, Spring, Summer. 3(3-0) 200 and 201, or 210.
Theory of production and cost. Theory of the firm under varying market structures.

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

330. Investments and Security Markets
Fall, Spring. 3(3-0) 200 or 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 History Department.
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 History Department.
Urbanization, origins and implications of large-scale organizations in business and other sectors of society, and sources of economic growth since mid-19th century.

361. Economic Development of Asia
Fall. 3(3-0) 200 and 201 or 210.
Population and resources; comparison of three economic systems: Communist, socialistic, 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) 200 and 201 or 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) 200 and 201 or 210.
Interdepartmental with Public Affairs Management.

371A. European Economic History to 1500
Fall. 4(4-0) Interdepartmental with and administered by the History Department.
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 1500
Winter. 4(4-0) Interdepartmental with and administered by the History Department.
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.
406. Public Expenditure: Theory and Policy
Fall, Spring. 4(4-0) 201 or 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) 201 or 210. Principles and theory of the distribution of tax burdens and the incidence of taxation. Incomes, sales, property, and other major revenue sources.

408. State and Local Finance
Spring. 4(4-0) Juniors. 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) 200, 201, or approval of department. Interdepartmental with the Department of Urban and Metropolis Studies. 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 Health Care
Spring. 3(3-0) 200, 201, or 210. Interdepartmental with the Department of Urban and Metropolis Studies. 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. 3(3-0) 200, 201. Interdepartmental with the Department of Urban and Metropolis Studies. 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 the Resource Development Department, Public Affairs Management and Food Systems Economics and Management and administered by the Resource Development Department. Factors affecting man's economic use of land and space resources. 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) 200 and 201, or 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) 200 and 201, or 210. The decline of classical economics and the rise of marginalist value and distribution theory. Marxism and institutionalism.

429. Introductory Mathematical Economics
Spring. 3(3-0) 280, 284; MTH 214. Mathematical analysis of production, cost, and consumer choice. Mathematical models of aggregative and general-equilibrium economic systems.

437. International Trade and Finance
Fall, Winter, Spring. 3(3-0) 200 and 201, or 210. Theory of comparative advantage. Tariffs, quotas, and customs unions. Mechanism of balance of payments adjustments. Exchange rate determination and international financial relationships.

443. Comparative Economic Systems
Fall, Winter, Summer. 4(4-0) 200 and 201, or 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.

444. Private Enterprise and Public Policy
Fall, Winter, Spring. 3(3-0) 201 or 210. Competition and monopoly in the American economy. Problems of antitrust.

445. Economics of Regulated Industries
Winter. 4(4-0) 444. Government policy and role of competition in the public utility and transportation industries.

451. Methods of Economic Research and Forecasting
Spring. 4(4-0) 330 and 394, STT 429 or 317. Research design, testing of economic hypotheses, elementary methods of projection, forecasting, estimation, and introduction to econometrics.

453. Women and Work: Issues and Policy Analysis
Winter. 3(3-0) FAM 201 or EC 200 or 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. Public Policy and Labor Relations
Fall, Winter, Spring. 3(3-0) 305. Evolution of public policy concerning trade unions and collective bargaining. Causes and effects of labor-management disputes, public and private methods and agencies for dispute settlement.

457. Manpower Economics
Fall, Winter, Summer. 5(5-0) 200 and 201, or 210. Leading theories explaining wage determination, wage differentials and trends in wage structure. Labor force composition, distribution of unemployment, labor mobility, and manpower utilization. Data sources and forecasting methods.

458. Economics of Social Security
Spring. 3(3-0) 305 or Seniors. Problems of unemployment, old age, and medical care from standpoint of economic theory, political philosophy, and our changing economic and social structure. Workmen's Compensation Laws, Railroad Retirement Act, Civil Service Retirement Act, and Social Security Act.

459. Manpower Economics
Fall, Winter, Summer. 5(5-0) 200 and 201, or 210. Leading theories explaining wage determination, wage differentials and trends in wage structure. Labor force composition, distribution of unemployment, labor mobility, and manpower utilization. Data sources and forecasting methods.

463. Economics of Urban Education
Spring. 3(3-0) EC 201 or 210. Interdepartmental with and administered by the Department of Urban and Metropolis Studies. 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) 321. Relationship between money and interest rates, prices and output.

480. Mathematics for Economists
Fall. 119. Graduate status in either economics, agricultural economics or College of Business, or approval of department. Interdepartmental with and administered by the Mathematics Department. 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.

485. Public Policy and Labor Relations
Fall, Winter, Spring. 3(3-0) 305. Evolution of public policy concerning trade unions and collective bargaining. Causes and effects of labor-management disputes, public and private methods and agencies for dispute settlement.
Economics

506A. Public Expenditures
Fall. 3(3-0) Approval of department.

506B. 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.

506C. 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.

810. Economics of Public Choice
Winter. 3(3-0) Approval of department. Interdepartmental with the Agricultural Economics and Resource Development Departments and administered by the Agricultural Economics Department.
Economics of alternative institutions for collective action. Emphasis on property rights and natural resources. Public goods, externalities, non-market 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) FSM 401 or EC 324 or approval of department. Interdepartmental with the Resource Development and Agricultural Economics Departments and administered by the Agricultural Economics Department.
Application of benefit-cost analysis to public programs of resource development. Issues and case studies in budgeting, investment criteria, pricing, externalities, and coordination.

812A. Microeconomics I: Choice and Exchange
Fall, Summer. 3(3-0) 324; 325; 450 or MTH 215 or concurrently.
Consumption exchange, the axioms of choices, involving time, introduction to welfare.

812B. Microeconomics II: Production and Distribution
Winter. 3(3-0) 812A.
Production–variable proportions, the multiproduct firm, programming analysis. Distribution—the micro theory.

812C. Microeconomics III: The Firm and Market
Spring. 3(3-0) 812B.
Theories of the firm, Market behavior–perfect and imperfect markets. Game theory.

813A. Macroeconomics I: Comparative Statics
Fall. 3(3-0) 220, 221, 450 or MTH 215 or concurrently.
Macro models and macro function; the interaction of macro markets.

813B. Macroeconomics II: Dynamics
Winter. 3(3-0) 813A.
Stochastic and dynamic models. Growth and technical change. The macro theory of distribution.

813C. General Equilibrium and Welfare
Spring. 3(3-0) 813B, 812C or concurrently.
The disaggregated general equilibrium system. Input-output economics. Welfare.

815. Labor Force Behavior
Spring. 4(4-0) 457. Interdepartmental with and administered by the School of Labor and Industrial Relations.
Theoretical and empirical analysis of factors affecting labor force participation rates, unemployment levels, employment distribution, hours of work, and labor mobility. Concepts and measurement methods.

818A. Monetary Theory
Fall. 3(3-0) 812C, 813C, and 835 and approval of department.
Monetary and interest theories.

818B. The Theory of Monetary Policy
Winter. 3(3-0) 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) 818B.
Goals and techniques of monetary policy.

821A. Competition and Monopoly
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.

826B. Theory of International Trade Policy
Winter. 3(3-0) 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) 826B.
Theory of exchange rates and international money markets especially with reference to other than current account items in balance of payments. Analysis of sources, causes, effects of capital flows with developing economies considered as a special case.
852. Economic Problems of Underdeveloped Areas
Spring. 3(3-0) 320, 324, 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.

854. The Emergence of Commercial Capitalism
Winter of odd-numbered years. 3(3-0) 315, 324. Interdepartmental with the Department of History. The rise of the mercantilist economies of Europe with stress on the growth of internal and international trade and finance during the 16th and 17th centuries.

855. The Industrial Revolution in Europe
Winter of even-numbered years. 3(3-0) 315, 324. Interdepartmental with the Department of History. The preconditions that led to the momentous changes in agriculture and industry in Europe from 1700-1814.

857. Wage Theory
Fall. 3(3-0) 320, 324, 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.

858. Industrial Relations
Winter. 3(3-0) 305 and 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.

860. Economics of the Firm
Fall, Winter, Summer. 4(4-0) Graduate students in Business Administration. Not open to Economics majors. Analysis of the firm. Problems facing management, economizing in use of resources, optimal combinations of products, pricing, competitive forces in markets affecting the firm.

861. American Economy

862. Business and Public Policy
Winter, Spring. 4(4-0) 860 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) 812A or 801; STT 443 or 863; or approval of department. Interdepartmental with the Agricultural Economics, and Statistics and Probability Departments. Review and estimation of single-equation regression models. Properties of least-squares estimators under alternative specifications. Problems of analyzing unexperimental data. Errors in variables, autoregressive and heteroscedastic models.

877. Statistical Inference in Economics II
Spring. 3(3-0) 876 or approval of department. Interdepartmental with the Agricultural Economics, and Statistics and Probability Departments. 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) 877 or approval of department. Interdepartmental with the Agricultural Economics, and Statistics and Probability Departments. 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. 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
Spring. 4(4-0) Approval of instructor. Interdepartmental with and administered by the Department of Management. Analysis of role and tasks, appropriate techniques and organizational structures of political agencies in planning and management of complex programs.

895. Graduate Reading in Economics
Fall, Winter, Spring, Summer. Variable credit.

899. Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

900. Selected Problems in Advanced Microeconomic Theory
Fall, Winter, Spring, Summer. 3(3-0) May re-enroll for a maximum of 12 credits. 812A, 812B, 812C; 813C. Advanced applications of economic methodology to the analysis of household and firm behavior; risk; uncertainty; and transactions costs.

901. Selected Problems in Advanced Macroeconomic Theory
Fall, Winter, Spring. 3(3-0) May re-enroll for a maximum of 12 credits. 813A, 813B. Analysis of the behavior and interaction of multimarket systems.

923. 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 Agricultural Economics Department. Selection, planning and conduct of research. Alternative research strategies. Role of theory, beliefs and valuations. Critical appraisal of research studies.

990A. Monetary Theory and Policy Workshop
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 999.

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 999.

990C. Mathematical Economics and Econometrics Workshop
Fall, Winter, Spring. 3 to 16 credits. 812A, 812, 832, or approval of department. Interdepartmental with the Agricultural Economics 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 999.

990D. Economic Development Workshop
Fall, Winter, Spring, Summer. 3 to 16 credits. 850, 851, 852 or 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 999.

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

EDUcation — Descriptions of Courses