433. Dairy Cattle Nutrition
Winter. 4(3-2) ANS 325.
Principles of nutritious nutrition and its application to actual feeding practices in commercial dairy herds. Rumen fermentation as related to feed utilization, milk production and milk composition.

444. Milk Secretion
Winter. 4(3-2) Interdepartmental and administered jointly with the Physiology Department.

445. Endocrinology and Reproduction of Farm Animals
Fall, 4(3-2) PSL 240. Interdepartmental and administered jointly with the Physiology Department.
Endocrine and reproductive systems are presented with emphasis upon characteristics which can be altered for economic benefit and upon causes, prevention, and treatment of endocrine abnormalities.

460. Special Problems
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for credit. Approval of department.
Topics from breeding, management, nutrition, or physiology, changing from term to term to include recent technical advances.

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:


The Impact of Animal Resource Utilization, Milk Composi­
tion and Milk Secretion. Physiology of milking; physio­
logical, pathological and management factors affecting lactation.

ECONOMICS — Descriptions of Courses

200. Introduction to Economics
Fall, Winter, Spring. Summer. 3(3-0) 200 or 201.
Open to freshmen. Students may begin sequence with either 200 or 201.
Problem of unemployment; meaning and determina­
tion of national income; the multiplier; the accelerator; fiscal policy; deficit spending; mone­
tary policy; banks creation of money; interna­
tional aspects of the employment problems.

201. Introduction to Economics
Fall, Winter, Spring, Summer. 4(4-0) 200 or 201.
Open to freshmen. Students may begin sequence with either 200 or 201.
Problem of resource allocation; price determination (demand, supply), applications to agricul­
tural policy, pricing of natural resource returns; behavior of the firm (determination of quantity of output, hiring of factors); aspects of international trade.

251H. Household, Firms and Markets
Fall. 5(5-0) Honors College students. Microeconomics and its application to analysis and policy. Substitutes for 201, 292, and 325.

252H. Aggregative Economics and Public Policy

305. Industrial Relations and Trade Unionism
Fall, Winter, Spring, Summer. 3(3-0) 200 or 211.
Development, size, 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.

318. Money, Credit and Banking
Fall, Winter, Spring. Summer. 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.

321. Macroeconomics II
Fall, Winter, Spring, Summer. 3(3-0) 230.

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 companies; 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 eco­

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
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Economics — Descriptions of Courses

806C. State and Local Public Finance
Spring. 3 credits. 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 Department 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-marginal change, commonwealth, income and power distributions, 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. 3(3-0) 324, 325; 480 or MTH 215 or concurrently.
Consumption, exchange, the axioms of choice, involving time, introduction to welfare.

812B. Microeconomics II: Production and Distribution
Spring. 3(3-0) 812A.
Production—variable proportions, the multi-product firm, programing analysis. Distribution—the micro theory.

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

813A. Macroeconomics I: Comparative Statics
Fall. 3(3-0) 320, 331; 480 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; 813C or concurrently.
The disaggregated general equilibrium system, input-output economics, Welfare.

815. Labor Force Behavior
Spring. 4(4-0) 437, 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 credits. 818C, 813C, and 835 and approval of department.
Monetary and interest theories.

818B. The Theory of Monetary Policy
Winter. 3 credits. 818A or approval of department.
Theories of the transmission of monetary policy to output, employment and prices.

818C. Problems in Monetary Policy
Spring. 3 credits. 818B.
Goals and techniques of monetary policy.

81A. Competition and Monopoly in American Industry
Fall. 3 credits. Approval of department.
Examination of structure, behavior, and performance in industries.

81B. Government Policy Toward Private Enterprise
Winter. 3 credits. 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.

81C. Problems Related to Regulated Industries
Spring. 3 credits. Approval of department.
Departures from market competition as a policy norm, as in public utilities and transportation.

826A. Theory of International Trade
Fall. 3 credits. 427 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 credits. 528A.
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 credits. 528B.
Theory of exchange rates and international money markets, especially with reference to such as current account items in balances of payments. Analysis of sources, causes, effects of capital flows among the various economies considered as a special case.

831. Mathematical Economics I
Fall. 3(3-0) 812; MTH 314, 334.

832. Mathematical Economics II
Winter. 3(3-0) 813; MTH 315, 334.
Mathematical models of growth and fluctuations dealing with macroeconomics, monetary theory, fiscal policy. The cobweb, static and dynamic multiplier-accelerator models, trade cycle models. Relations among stocks, flows and time lags.

833. Mathematical Programming
Spring. 3(3-0) 800; or 812A; MTH 334, Interdepartmental with the Agricultural Economics and Probability Departments and administered by the Agricultural Economics Department.
Linear programming. Theory of linear economic models. Topics in nonlinear programming.

835. Introduction to Econometrics
(ACE 531.) Fall, Spring, Summer.
3(3-0) 385, STT 422. Interdepartmental with the Agricultural Economics Department.

1DC. Interdisciplinary Seminar on Africa
For course description, see Interdisciplinary Courses.

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.

550. The Development of Economic Institutions
Fall. 3(3-0) 430 or approval of department.

551. The Economics of Secular Change
Winter. 3(3-0) 320, 324, or approval of department.
Empirical studies of long-run economic trends and a consideration of alternative hypotheses explaining these trends including classical, Marxist, Harrod-Domar, and other general theories of economic development. Population growth, technological change, capital formation, occupational distribution, urbanization, and international trade.

552. 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.

554. The Emergence of Commercial Capitalism
Winter of odd-numbered years. 3 credits. 318, 324, Interdepartmental with the History Department.
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.

555. The Industrial Revolution in Europe
Winter of even-numbered years. 3 credits. 318, 324, Interdepartmental with the History Department.
The preconditions that led to the momentous changes in agriculture and industry in Europe from 1790-1914.
557. Wage Theory  
Fall. 3 credits. 390, 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.

558. Industrial Relations  
Winter. 3 credits. 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 and administered jointly with 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.

560. Economics of the Firm  
Fall, Winter, Summer. 4 credits. Graduate students in Business Administration. Not open to Economics majors. Analysis of the firm. Problems facing management; economics of use of resources, optimal combinations of products, pricing, competitive forces in markets affecting the firm.

561. American Economy  

562. Business and Public Policy  
Winter, Spring. 4 credits. 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.

576. Statistical Inference in Economics I  
Fall: 3(3-0) 812A or 801; S7T 443 or 883; or approval of department. Interdepartmental with the Agricultural Economics, and Statistics and Probability Departments. 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.

577. Statistical Inference in Economics II  

578. 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, Summer. 3(3-0) May re-enroll for a maximum of 12 credits. 813A, 813B. Analysis of the behavior and interaction of multisystem markets.

902. 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 approaches. Role of theory, beliefs and valuations. Critical appraisal of research studies.

909C. Mathematical Economics and Econometrics Workshop  
Fall, Winter, Spring. 3 to 16 credits. 812A, 812B; 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.

909D. 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 students. Students writing doctoral dissertations in Development are encouraged to participate in the workshop and may do so while registered for 999.

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

EDUCATION

College of Education

101A. Exploring Elementary Teaching  
Fall, Winter, Spring. 3(1-4) Preparation major. Emphasis on the nature of teaching in the elementary school achieved through field experience while serving as a teacher aide in an elementary classroom. Concurrent lecture sessions focus on techniques of classroom management and operation.

102A. Introduction to Secondary Education  
Fall. 1 credit. Not receive credit for 102A and 450. Series of monthly seminars on secondary school problems and issues.

102B. Personal Dimensions of Secondary Teaching  
Winter. 2 credits. May not receive credit for 102B and 206, 102A. Laboratory setting emphasizing personal values, beliefs and behaviors related to teaching in secondary schools. Includes micro-teaching, small group processes and individual assessment activities.

102C. Secondary School Youth Culture  
Spring. 2 credits. May not receive credit for 102C and 450. Laboratory setting emphasizing characteristics of adolescent social system in and out of school. Participants will include students from local schools, EBSTEP members, and upperclassmen in secondary teacher education.

124. Introduction to Careers in Vocational and Practical Arts Education  
Opportunities in teaching agriculture, business, home economics or industrial education and in closely related fields; analysis of student's potentialities for these fields.

A. Agriculture  
Fall. 2(1-1) Interdepartmental with Agriculture.