

**301. Forage Crops**

Fall. 3(2-2) Sophomores.

Distribution, morphology, identification, physiology, management and utilization of forage crops for hay silage, and pasture for livestock and for soil improvement and conservation.

**380. Ecology and Physiology of Agricultural Plants**

Spring. 3(3-0) FOR 220 or BOT 301.

Interrelationships of physiological processes and environmental manipulation for higher yield of agricultural plants.

**402. Principles of Weed Control**

Fall. 3(2-2) Juniors. Interdepartmental and administered jointly with the Horticulture Department.

Comprehensive study of principles underlying weed control practices, and factors involved in both mechanical and chemical control.

**406. Crop Improvement and Seed Production**

Winter. 4(3-2)

Practical methods of crop improvement, seed production, storing, cleaning, packing, and distribution, seed certification of small grains, legumes, corn, beans, potatoes, visits to seed agencies and seed farms.

**407. Special Crop Problems**

Fall, Winter, Spring, Summer. 1 to 3 credits. May re-enroll for a maximum of 9 credits. Approval of department.

Independent study in any of the following specialties: special crop problems, production, physiology, ecology, weed control, turfgrass management, crop storage and preservation, and seed studies.

**408. Principles of Plant Breeding**

Winter. 4(3-2) 250. Interdepartmental with the Horticulture Department.

Application of genetics and other sciences to breeding and improvement of agronomic and horticultural crops.

**415. Turfgrass Management**

Spring. 3(2-2)

Adaptation characteristics and utilization of turf grasses, management principles and physiological bases for the establishment and maintenance of turf for lawns, athletic fields, golf courses, cemeteries, parks, highways and air-fields.

**420. Seminar**

Winter. 1(1-0) May re-enroll for a maximum of 4 credits. Interdepartmental and administered jointly with Soil Science.

**485. Seed Science**

Spring. 3(3-2) Approval of department.

Morphological and physiological changes during seed formation, development, maturation and germination. Practical and biological aspects of seed drying, storage, deterioration, dormancy and quality. Current problems and research in seed science.

**IDC. The Impact of Animal Resource Management Upon the World's Developing Nations**

For course description, see Interdisciplinary Courses.

**801. Crop Ecology**

Fall of even-numbered years. 3(3-0) Approval of department.

Environment within the crop community and the environmental stresses limiting crop survival. Temperature, light, water and atmospheric stresses and variations in the crop canopy will be discussed.

**803. Crop Physiology**

Spring of even-numbered years. 3(3-0) Approval of department.

Role of physiological factors determining maximum crop yields and quality.

**805. Herbicidal Action and Metabolism**

Spring of odd-numbered years. 3(3-0) 402; BOT 415 or concurrently.

A study of the properties and characteristics of herbicides, the fundamental processes involved in the physiological action, behavior, and metabolism of herbicides.

**814. Advanced Field Crop Studies**

Fall, Winter, Spring, Summer. 1 to 3 credits. May re-enroll for a maximum of 6 credits. Approval of department.

Advanced work in any of the following specialties: advanced field crop studies, management, physiology, ecology, breeding, turfgrass culture, weed control, nutritional quality, tropical crops, crop extension, and seed studies.

**820. Seminar**

Winter, Spring. 1(1-0) May re-enroll for a maximum of 3 credits. Interdepartmental and jointly administered with Soil Science.

Studies and presentation of research in crop and soil sciences.

**830. Physiological Genetics**

Winter. 3(3-0) Approval of department. Interdepartmental with and administered by the Forestry Department.

Physiological bases for genetic variation in higher plants including adaptive physiology, quantitative genetics, growth correlations, biochemical genetics, hybrid physiology, and geneology.

**831. World Food Crops**

Spring of odd-numbered years. 3(3-0)

World food crop production and related systems of agriculture which provide this resource. The impact of modern discoveries and opportunities for change.

**851. Quantitative Genetics in Plant Breeding**

Fall of odd-numbered years. 4(3-1) One course in genetics or breeding, and one course in biometry, or approval of department. Genetic systems and quantitative inheritance in relation to the establishment of superior populations.

**899. Research**

Fall, Winter, Spring, Summer. Variable credit.

**920. Design and Analysis of Agronomic Experiments**

Spring. 3(3-0) STT 423 or approval of department.

Constructing and analyzing designs for experimental investigations in the biological sciences.

**951. Cytogenetics in Plant Breeding**

Winter of odd-numbered years. 3(3-0) BOT 427, 828, or approval of department. Interdepartmental with the Horticulture Department.

Application of cytogenetic principles to plant breeding. Significance of recombination, role of induced mutations, polyploid, chromosome substitution, and aneuploid analyses as they apply to the field of plant breeding.

**952. Plant Breeding Biometrics**

Winter of even-numbered years. 4(3-2) Approval of department.

Biometrical genetics as it applies to plant breeding. Includes studies of path coefficients, partitioning of variance, and the principles of selection in a changing environment.

**999. Research**

Fall, Winter, Spring, Summer. Variable credit.

**DAIRY SCIENCE DRY**

**College of Agriculture and Natural Resources**

**214. Dairy Production**

Fall, Spring. 4(3-2)

Dairy cattle in modern agriculture. Normal cow behavior. Feeding, breeding and management of herd. Commercial milk production and marketing milk.

**314. Dairy Herdsman Techniques**

Winter. 2(0-4) 214, majors only.

Herd health and management procedures, disease prevention and detection, equipment maintenance and record systems for dairy herds.

**323. Dairy Cattle Judging**

Spring. 3(0-6)

Desired type in dairy cattle. Judging and show ring procedures. Competitive judging. Teams selected to represent Michigan State University in national competition.

**371. Dairy Seminar**

(471.) Spring. 1(1-0) Juniors.

Major issues pertinent to the dairy industry are described by authorities from MSU and the dairy industry of Michigan. Students are provided an opportunity for an exchange in ideas.

**413. Dairy Farm Management**

Spring. 3(2-2)

Analysis of dairy farm organization and operations. Dairy herd management practices. Dairy cattle housing with emphasis on economical and efficient usage. Use of dairy records in the farm operation.

**424. Dairy Cattle Breeding**

Spring. 4(2-4) ANS 461.

Applications of population genetics to improving dairy cattle. Use of selection, aids to selection, and systems of mating to formulate breeding plans. Inheritance of economic traits. Breed improvement programs.

**433. Dairy Cattle Nutrition**

Winter. 4(3-2) ANS 325.

Principles of ruminant nutrition and 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.

Anatomy of mammary gland. Hormonal and nervous control of mammary growth, initiation and maintenance of lactation. Biochemistry of milk secretion. Physiology of milking; physiological, pathological and management factors affecting lactation.

**445. Endocrinology and Reproduction of Farm Animals**

Fall. 4(5-0) 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.

**Descriptions — Dairy Science  
of  
Courses**

**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.

Topics from breeding, management, nutrition, or physiology, changing from term to term to include recent technical advances.

**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.

Microbiology, physiology and biochemistry of ruminant digestion and the absorption and metabolism of rumen fermentation products.

**945. Physiology of Mammalian Reproduction**

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

Chemistry and biosynthesis of reproductive hormones. Gonadal, hypothalamic and pituitary development of reproductive potential. Ovulation, fertilization, implantation and placentation will be studied. Relationships of conceptus, uterus and corpus luteum. Parturition.

**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:

Applied Welfare Economics—380, 390, 410.  
Labor Economics and Industrial Relations—305, 455, 456, 457.

Money and Banking—318, 330, 470.  
International Economics—427.

Public Finance—408, 407, 408.

Price and Value Theory—324, 325, 426.

Income and Employment Theory—320, 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 Economics**

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

Problem of unemployment; meaning and determination of national income; the multiplier; the accelerator; fiscal policy; deficit spending; monetary policy; banks creation of money; international aspects of the employment problems.

**201. Introduction to Economics**

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

Problem of resource allocation; price determination (demand, supply), applications to agricultural policy; diminishing returns; behavior of the firm (determination of quantity of output, hiring of factors); aspects of international trade.

**210. Fundamentals of Economics**

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

Introductory course in economic theory, employing mathematics, when useful, as a tool analysis. Covers consumer and business behavior, markets and the price system, income distribution, and elements of employment theory.

**251H. 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.

**252H. Aggregative Economics and Public Policy**

Winter. 5(5-0) Honors College students.

Theory of national income and its application to analysis and policy. Substitutes for 200, 320, and 321.

**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.

**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 or 210.

Measurement of economic activity. Determination of equilibrium aggregate output and the theory of underemployment equilibrium. Role of consumption, investment, government and foreign sectors in determining national income.

**321. Macroeconomics II**

Fall, Winter, Spring, Summer. 3(3-0) 320.

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.

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

**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: 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) 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.

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 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 1800**

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.