

811. Advanced Problems

(810.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 6 credits if different problem is taken. Approval of department.

Field crop problems in management, physiology, ecology, breeding, turfgrass culture, weed control, nutritional quality, tropical crops, crop extension and seed studies. Soils problems in biophysics, chemistry, classification, conservation, fertility, geography, management microbiology, biochemistry, micronutrients, micropedology, mineralogy, organic soils and physics.

812. Selected Topics

Fall, Winter, Spring, Summer. 2(2-0) or 3(3-0) May reenroll for a maximum of 9 credits if different topics are taken. Approval of department.

Topics will be selected from physiology of herbicides, micronutrients, advanced soil physics, advanced soil chemistry.

820. Seminar

Winter, Spring. 1(1-0) May reenroll for a maximum of 3 credits.

Studies and presentation of research in crop and soil sciences.

825. Clay Mineralogy

Winter. 4(3-4) CSS 840, CSS 850 or approval of department. Interdepartmental with and administered by the Department of Geology.

Structures and properties of clays; their origins, occurrence, and utilization. Methods of studying clays including x-ray diffraction, differential thermal analysis, infrared absorption and other chemical and physical techniques.

830. Physiological Genetics

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

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

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.

833. Soil Fertility and Plant Nutrition

(SLS 830, SLS 930.) Winter. 3(3-0) CSS 430 or approval of department.

Fundamental concepts in soil fertility and mineral nutrition of plants; fate of nutrients applied to soils, nutrient uptake, translocation and utilization by plants; principles of laboratory, greenhouse and field research methods.

840. Soil Physics

Fall. 5(3-6) CSS 430, CEM 162 or approval of department.

Physical properties of soil (texture, structure, consistency, aeration, water, temperature, etc.), their quantitative measurement, and relation to plant growth, and agronomic and engineering practices.

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.

851. Developmental Genetics and Plant Breeding

Fall of odd-numbered years. 4(3-1) One course each in genetics, statistics and plant breeding.

Plant breeding in relation to genetics of growth and development. Problem sets in statistical treatment of plant breeding data.

860. Soil Biochemistry

Spring of even-numbered years. 4 credits. CSS 850; MPH 442.

Biochemical transformations of mineral nutrients and of natural and exotic organic materials in soils, considered in relation to chemical, physical and ecological systems in the complex 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. Research

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

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, BOT 828, or approval of department. Interdepartmental with the Department of Horticulture.

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) DRY 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 showing procedures. Competitive judging. Teams selected to represent Michigan State University in national competition.

371. Dairy Seminar

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 361.

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. Ruminant Nutrition

Winter. 4(3-2) ANS 325. Interdepartmental with Animal Science.

Principles of ruminant nutrition and application to actual feeding practices in commercial dairy and beef operations. Rumen fermentation as related to feed utilization, growth, milk production and milk composition.

444. Mammary Physiology

Winter. 4(3-2) PSL 240, BCH 200. Interdepartmental and administered jointly with the Department of Physiology.

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 Reproductive Physiology

Fall. 4(5-0) PSL 240. Interdepartmental and administered jointly with the Department of Physiology.

Processes of reproduction and endocrinology with special emphasis on anatomy of reproductive systems, folliculogenesis, gametogenesis, reproductive cycle, fertilization, sex determination, gestation and artificial regulation of these reproductive events for economic benefit.

**Descriptions – Dairy Science
of
Courses**

460. Special Problems
Fall, Winter, Spring, Summer. Variable credit. May reenroll 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 reenroll 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 445 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--410.
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, 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 EC 200 or EC 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 EC 200 or EC 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 MTH 228; or concurrently. Students may not earn credit in EC 210 if they have credit in either EC 200 or EC 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.

IDC. Introduction to Latin America III
For course description, see Interdisciplinary Courses.

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. 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 EC 200, EC 320, and EC 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) 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.

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

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 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.

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) 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.