

**951. Cytogenetics in Plant Breeding**  
Winter of odd-numbered years. 3(3-0)  
BOT 827, 919, 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.

**953. Cytogenetics in Plant Breeding Laboratory**

Winter of odd-numbered years. 3(0-6)  
951 or concurrently. Interdepartmental with and administered by the Horticulture Department.

Laboratory course to accompany 951.

**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.

**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.

**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(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 a maximum of 10 credits. Approval of department.

**471. Dairy Seminar**

Spring. 1(1-0) Seniors.

Review and integration of information leading to successful operation of the dairy enterprise. Present day trends and problems. Introduction to evaluation and interpretation of scientific reports.

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

Winter. 3(4-0)

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.

**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, 322, 330.

International Economics—427.

Public Finance—406, 407, 408.

Price and Value Theory—324, 325, 426.

Income and Employment Theory—320, 322, 451, 452.

History of Economic Thought—421, 422.

Industrial Organization and Control—444, 445, 446, 448.

Economic Development, Regional Studies, and Comparative Economics Systems—360, 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. Aggregate Economics and Public Policy**

(250H.) 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.