

250. Plant and Animal Genetics
Spring. 4(4-0) N S 192 or B S 211.
Fundamental genetic principles with particular reference to problems in plant and animal biology.

251. Plant and Animal Genetics Laboratory
Spring. 1(0-2) 250 concurrently.

301. Forage Crops
(201.) 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.

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) N S 193.
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 6 credits. Approval of department.
Independent comprehensive study of some area of crop science.

408. Principles of Plant Breeding
Spring. 4(3-2) 250. Interdepartmental and administered jointly 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 the Soil Science Department.

485. Seed Science
(912.) 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.

813. Field Plot Techniques
(913.) Fall of even-numbered years. 3(2-2) Approval of department.
Design of field plot and greenhouse experiments including some phases of the analysis of data. A proportion of laboratory time is devoted to techniques of preparing for and planting greenhouse and field plots.

814. Advanced Field Crop Studies
(914.) Fall, Winter, Spring, Summer. 1 to 3 credits. Approval of department.
Opportunity for students to prepare graduate level reports on specific fields.

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 Crop Adaptation
Spring. 3(3-0)
Distribution, adaptation, and importance of crops in world agriculture and their production as influenced by climate, soil, people and markets.

851. Quantitative Genetics in Plant Breeding
Fall. 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.

902. The Nature and Management of Reserve and Storage Materials in Crops
Winter. 3(2-2)
Effect of agricultural practices on the consequent development of plants with particular reference to storage organs and materials.

903. Advanced Grassland Management
Spring of odd-numbered years. 3(2-2) Basic undergraduate courses in Crop Science.
Advanced studies concerned with the establishment, maintenance and utilization of grassland crops.

904. Seminar
Fall, Winter, Spring. 1(1-0) Required of majors; others: approval of department.
Studies and presentation of research in crop science.

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.

923. Preservation and Storage of Field Crops
Spring of even-numbered years. 3(2-2)
Effects of equilibrium moisture contents, rapidity of establishment of equilibrium, relative humidity, chemical composition, rapidity of fermentation, molding or heating, pressure, temperature, etc. upon the quality of stored crops.

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 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.

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.

ECONOMICS

EC

College of Business

Courses are classified as follows:

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. Aggregative 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, 318, and 320.

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. Income and Employment Theory

Fall, Winter, Spring, Summer. 3(3-0) 200 or 210.

The forces that determine the general level of prices, output and employment.

322. Monetary Theory

Fall. 3(3-0) 320.

Relationship between money and interest rates, prices and output.

324. Price System I

Fall, Winter, Spring, Summer. 3(3-0) 201 or 210 or approval of department.

Behavior of business firms under fully and imperfectly competitive conditions. Pricing of products and productive resources.

325. Price System II

Winter, Spring, Summer. 3(3-0) 324.

Effects of changes in conditions of supply and demand under alternative market structures. Introduction to general equilibrium and welfare economics.

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.

360. Economies of Selected Areas

Fall, Winter, Spring. 3(3-0) May re-enroll for a maximum of 9 credits. 200 and 201, or 210.

Economic characteristics and problems of one of the following areas, with emphasis on economic development: (a) Asia; (b) Soviet Union; (c) Latin America; (d) Africa; (e) other.

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 Finance

Fall, Summer. 4(4-0) 200 or 210.

Public spending, revenue collection and public borrowing, with analysis of their nature, origin and economic effects.

407. Public Revenues

Winter. 4(4-0) 201 or 210.

Principles and theory of the distribution of tax burdens and the incidence of taxation. Income, 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.

417. Land Economics

Fall, Spring. 4(4-0) 201 or AEC 240, or approval of department. Interdepartmental with the Agricultural Economics and Resource Development Departments 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.

426. Introductory Mathematical Economics

Spring. 3(3-0) 320, 324; MTH 214.

Mathematical analysis of production, cost, and consumer choice. Mathematical models of aggregative and general-equilibrium economic systems.

427. International Trade and Finance

Fall, Winter, Spring, Summer. 5(5-0) 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.

430. Stagnation and Development in Emerging Societies

(350.) Winter, Summer. 4(4-0) 200 and 201, or 210.

Obstacles to economic growth, theories of economic development, reorganizing agriculture and industry; problems in mobilizing the economy to accommodate new productive techniques; population problems.

431. Principal Issues in Promoting Economic Development

(351.) Spring. 4(4-0) 430.

Structural change and growth, capital formation and investment criteria; financing development; foreign trade and finance in development; government and planning.

434. 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.