

866. Correctional Management
Spring. 4(4-0) Majors or approval of school.

Planning, organizing, controlling and evaluating in relation to measurable correctional objectives. Establishing objectives from well defined alternatives. Change capable administration styles and decision making as functions of objectives.

871. Law of Corrections
Spring. 4(4-0) Majors or approval of school.

Constitutional limitations and impact of law on correctional practice. Due process, judicial sentencing, probation, prisoners' rights, parole grant, revocation of probation and parole.

872. Law of Criminal Procedure
Fall, Winter, Spring. 4(4-0) A law course.

Constitutional limitations on police activity. Due process, bill of rights, right to counsel, arrest, search and seizure, electronic eavesdropping, entrapment, confessions, lineups, scope of exclusionary rules.

874. Law of Administrative Procedure
Fall. 4(4-0) Majors or approval of school.

General principles of administrative law, labor law. Application of principles. Law enforcement policy making. Implementation of constitutional safeguards. Police unions and political activity.

885. Security Management
Fall. 4(4-0) 485 or concurrently, or approval of instructor.

The organization and management of security units, in industry, businesses, governments, institutions, etc. The protection of manpower, facilities, and other assets. Administrative, legal and technical problems. Loss prevention and control.

886. Advanced Security Management
Winter. 4(4-0) 885.

Salient problems and issues of concern to professional security administrators. "Growing edge" technologies. Specialized programs—e.g., government internal security controls; employee dishonesty; shoplifting.

890. Practicum
Fall, Winter, Spring, Summer. 1(0-4) to 6(0-24) Majors or approval of school.

Planned program of research observation, study and work in selected criminal justice agencies. Designed to supplement classroom study with participation in domestic and foreign criminal justice systems.

892. Quantitative Methods in Criminal Justice
Spring. 4(4-0) 492.

Views the relationship and application of statistical techniques to theory building and concept construction. Gives an overview of statistical methods with an emphasis on those most useful for research in criminal justice.

898. Comprehensive Readings
Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 4 credits. Majors or approval of school.

Individualized reading program for students who elect not to complete a thesis. Means of extending breadth and depth of course work to achieve mastery of criminal justice areas of interest.

899. Thesis Research
Fall, Winter, Spring, Summer. 1 to 6 credits. May re-enroll for a maximum of 6 credits. Majors or approval of school.

Planned research and writing directed by student's thesis committee.

930. Seminar on Criminal Justice Systems
Winter. 3(3-0) Graduate students.

Topical issues on the development, functioning, and interrelationships of components of criminal justice systems and how systemic coherence can be achieved within a democratic society.

990. Readings in Criminal Justice and Criminology
Fall. 3 to 5 credits. Graduate students.

Topical reading of major research contributions to criminology and criminal justice. Consideration of applicability of criminological research to functioning of the criminal justice system.

992. Research Utilization and Application in Criminal Justice
Spring. 3(3-0) Majors or approval of school.

Substantive and administrative problems of conducting research and existing attempts to solve these. Utilization of research in bringing about change in the criminal justice system. Methods of maximizing research utility.

CROP AND SOIL SCIENCES CSS

**College of Agriculture and
Natural Resources**

101. Crop Science
Fall. 3(3-0)

Principles of identification, adaptation, management, and utilization of field crops for food and fiber. Fundamentals of crop management, breeding, weed control, crop quality, and tropical crops in world agriculture.

202. Soils and Man's Environment
Winter. 3(3-0) Interdepartmental with the departments of Fisheries and Wildlife and Resource Development, and Natural Resources.

Use of soil-water resources in a technological society as it relates to environmental quality. Nature of pollution problems and their possible solutions. Food production and world population.

210. Fundamentals of Soil Science
Fall, Winter. 5 credits.

Principles of the origin and development of soils. Relationship of properties to utilization and soil fertility to plant composition and animal health. Emphasis is placed on changing soils to serve man.

250. Plant and Animal Genetics
Winter. 5(5-0) B S 211.

Fundamentals of modern genetics with particular focus on problems and application in agriculture and natural resources.

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.

331. Soil Management
Winter. 4(4-0) 210.

Management of soils, drainage and irrigation, organic matter, tillage, rotation, conservation practices, soil reaction, lime, fertilizers, and micronutrients. Soil management vs. soil conservation. Special study in general crops, horticultural crops, greenhouse crops, turf and organic soils.

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.

390. Soil Conservation and Land Use
Winter. 3(3-0) 210.

Concepts of soil erosion by water and wind and methods for soil conservation including control of erosion and sedimentation. Interpretation of soil properties for land use decisions.

402. Principles of Weed Control
Fall. 3(2-2) Juniors. Interdepartmental and administered jointly with the Department of Horticulture.

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.

408. Principles of Plant Breeding
Winter. 4(3-2) 250. Interdepartmental with the Department of Horticulture.

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

411. Special Problems in Agronomy
(407.) Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 6 credits if different problem is taken.

Special crop problems in production, physiology, ecology, weed control, turfgrass management, storage, preservation and seed studies. Special soils problems in fertility, geography, classification, conservation, management, organic soils and turfgrass soils.

412. Topics in Agronomy
Fall, Winter, Spring, Summer. 2(2-0) or 3(3-0) May re-enroll for a maximum of 9 credits of different topics are taken. Approval of department.

Topics will be selected from crop production, crop physiology, turfgrass management, organic soils, turfgrass soils, soil fertility and genetic analysis.

**Descriptions — Crop and Soil Sciences
of
Courses**

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.

424. Forest Soils

Spring. 4(3-3) CSS 210; FOR 220 or 304. Interdepartmental with and administered by the Department of Forestry.

Interrelationships of forest site and the growth of forests. Classification and productivity of forest soils. Effects of silvicultural and forest management practices on the soil. Two-day field trip required.

430. Soil Fertility and Fertilizers

Spring. 5(4-1) 210.

Assessment of the fertility of soils and alteration of fertility by the use of fertilizers, lime, manure, and cropping systems. The role of colloids in ion fixation and exchange. Soil and tissue tests. The history, technology, and use of fertilizers.

440. Soil Biophysics

Winter. 3(3-0) 210 and BOT 301; CSS 380 recommended.

Salient features of soil physical and biological properties related to plant growth, principles and applications. Emphasis on root responses to the environment. Bioenergetics of the root-soil interface.

442. Soil Microbiology

Spring. 3(3-0) MPH 200 or 301. Interdepartmental with and administered by the Department of Microbiology and Public Health.

Major groups of microorganisms of importance in soils are studied with emphasis on ecological, biochemical, and physical aspects.

470. Soil Classification

Fall, Spring, Summer of odd-numbered years. 4(0-8) 210 or approval of department.

Determination of soil properties by field examination of soils. Classification of soils. Preparation of land use report based upon soil maps of assigned areas. Field trips required.

480. Soil Geography and Land Use of North America

Spring. 3(2-1) 210 or approval of department.

Properties, geography and dominant land use of the major soils of North America.

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.

811. Advanced Problems

(810.) Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll 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 re-enroll 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 re-enroll for a maximum of 3 credits.

Studies and presentation of research in crop and soil sciences.

825. Clay Mineralogy

Winter. 4(3-4) 840, 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 gene-cology.

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, 930.) Winter. 3(3-0)

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) 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) 430; CEM 162, 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. 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) 470, 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, 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) 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**
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. 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 Reproduction of Farm Animals**
Fall. 4(5-0) PSL 240. Interdepartmental and administered jointly with the Department of Physiology.
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.
- 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—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 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.
- 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 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.