872. Criminal Procedure
Winter. 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.

873. Law of Corrections
Winter. 4(4-0) Majors or approval of school.

880. Analysis and Evaluation of Justice Systems
Spring. 4(4-0) Majors or approval of school.

881. Project and Program Planning in Criminal Justice Systems
Spring. 4(4-0) Majors or approval of school.

885. The organization and management of security supervision. Discretion, planning, role of planning in organizational planning, assessment of current system capabilities.

892. Quantitative Methods in Criminal Justice Research
Winter. 4(4-0) C J 492, C J 811.

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

897. Policy Change Paper
Fall. Winter. Spring. Summer. 1 to 4 credits. May enroll for a maximum of 4 credits. Majors or approval of school.

Development of plan for significant policy change and its implementation in a criminal justice agency.

899. Master's Thesis Research
Fall. Winter. Spring. Summer. 1 to 12 credits. May enroll for a maximum of 12 credits. Majors or approval of school.

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

CROP AND SOIL SCIENCES

College of Agriculture and Natural Resources

101. Crop Science
Fall. 304.

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 Agriculture 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. 3(5-0) B S 211.

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

301. Forage Crops
Fall. 3(2-2) C J 492.

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) C S 210.

Management of soils, drainage, and irrigation, organic matter, tillage, rotation, conservation practices, soil reaction, line, 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.

402. Principles of Weed Control in Field Crops
Fall. 3(3-2) C E M 132, BOT 301.

Principles underlying weed control practices for agronomic crops. Factors involved in mechanical, chemical, and biological control and basic physiological aspects of herbicide applications.

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) C S S 250. Interdepartmental with the Department of Horticulture.

Application of genetistics 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 enroll for a maximum of 6 credits if different problems are 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(3-0) or 3(3-0). May reenroll for a maximum of 6 credits if 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.

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 airfields.

420. Seminar  
Fall, Winter, Spring, Summer. 1(1-0). May reenroll for a maximum of 4 credits.

424. Forest Soils  
Spring. 4(3-3) CSS 210; FOR 220 or FOR 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) CSS 210.

Major, secondary, and micronutrient elements of soils. Role of colloids in ion fixation and exchange, acidity, liming, fertilizer application, technology and soil-plant diagnosis.

440. Soil Biophysics  
Winter. 3(3-0) CSS 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 MPH 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, Winter, Summer. 4(0-6) CSS 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) CSS 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.

805. Herbicidal Action and Metabolism  
Spring of odd-numbered years. 3(3-0) CSS 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 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. Soil 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 physical and chemical 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 genecology.

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 930, SLS 930). Winter. 3(3-0) Approval of department. Interdepartmental with and administered by the Department of Microbiology and Public Health.

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

840. Soil Physics  
Fall. 3(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 relationship to plant growth, and agronomic and engineering practices.

842. Advanced Soil Microbiology  
Spring. 3(3-0) MPH 425 or approval of department. Interdepartmental with and administered by the Department of Microbiology and Public Health.

Biochemistry, biology, and community ecology of microorganisms indigenous to soil. Emphasis on current research problems.

843. Soil Microbiology Laboratory  
Spring. 3(0-6) MPH 842 concurrently or approval of department. Interdepartmental with and administered by the Department of Microbiology and Public Health.

Fundamental techniques of dealing with microorganisms indigenous to soil. Metabolic activity of microorganisms. Interaction between microorganisms and plants.

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 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.


899. Master's Thesis 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 528, or approval of department. Interdepartmental with the Department of Horticulture.

Application of cytogenetic principles to plant breeding. Significance of recombination, role of induced mutations, polyploidy, 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. Doctoral Dissertation Research
Fall, Winter, Spring, Summer. Variable credit.

DAIRY SCIENCE

Colleges of Agriculture and Natural Resources

214. Dairy Production
Fall, Spring. 4(3-2)


314. Dairy Herdsmen Techniques
Winter. 2(0-4) DRY 214, majors only. Illness 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. 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 of ideas.

413. Dairy Farm Management
Spring. 3(2-2)

Analysis of dairy farm organization and operations. Dairy herd management practices. Dairy 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.


445. Endocrinology and Reproductive Physiology
Fall. 4(3-0) 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.

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.

550. 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. Master's Thesis 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 501 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. Partition.