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

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.

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, confession, Miranda, scope of exclusionary rules.

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

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.

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.

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.

Quantitative Methods in Criminal Justice
Spring. 4(4-0) 493.
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.

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.

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.

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.

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 research to functioning of the criminal justice system.

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

College of Agriculture and Natural Resources

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.

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.

Fundamentals of Soil Science
Fall, Winter. 5 credits.
Principles of the origin and development of soils. Relationship of properties to soil fertility and genetic composition of plants. Emphasis is placed on changing soils to serve man.

Plant and Animal Genetics
Winter. 3(3-0) B S 211.
Fundamentals of modern genetics with particular focus on problems and application in agriculture and natural resources.
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
Winter. 1(1-0) May re-enroll for a maximum of 4 credits.

424. Forest Soils
Spring. 4(3-3) CSS 210; FOR 250 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 389 recommended.
Salient features of soil physical and biological properties related to plant growth, principles and applications. Emphasis on root responses to the environment. Biosenergetics 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(2-2) 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)
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, 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 basis for genetic variation in higher plants including adaptive physiology, quantitative genetics, growth correlations, bio-chemical genetics, hybrid physiology, and genetics.

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 430, 430). Winter. 3(3-0) 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. 3(3-0) 436; 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. 3(3-0) 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 449.
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.

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 even-numbered years. 3(3-0)
BOT 427, 428, or approval of department;
Interdepartmental with the Department of Anti-
culture.
Application of cytogenetic principles to plant
breeding. Significance of recombination, role
of induced mutations, polyploid, chromosome
culture.

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, parti-
Agricultural and applied genetics.

999. Research
Fall, Winter, Spring, Summer. Vari-
able credit.

DAIRY SCIENCE

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 manage-
ment 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 mainte-
nance and record systems for dairy herds.

324. Dairy Cattle Judging
Spring. 3(3-0)
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(0-0) 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(3-2)
Analysis of dairy farm organization and opera-
tions. 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(3-4) ANS 481.
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. Interde-
partmental 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 pro-
duction 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; physio-
logical, pathological and management factors
affecting lactation.

445. Endocrinology and Reproduction of
Farm Animals
Fall, 4(5-0) PSL 440. Interde-
partmental and administered jointly with the De-
partment of Physiology.
Endocrine and reproductive systems are pre-
seated 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. Vari-
able credit. May re-enroll for a maximum of 10
credits. Approval of department.

1DC. The Impact of Animal Resource
Management Upon the World’s
Developing Nations
For course description, see Interdisci-
plinary Courses.

850. Topics in Dairy Science
Fall, Winter, Spring. Variable credit.
May re-enroll for credit. Approval of depart-
ment.
Topics from breeding, management, nutrition, or
physiology, changing from term to term to in-
clude recent technical advances.

899. Research
Fall, Winter, Spring, Summer. Vari-
able credit. Approval of department.

925. Advanced Ruminant Nutrition
Fall of even-numbered years. 4(4-0)
BCH 459, PSL 801 or approval of department.
Microbiology, physiology and biochemistry of
ruminal 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 hor-
mones. Gonadal, hypothalamic and pituitary
development of reproductive potential. Ovula-
tion, fertilization, implantation and placentation
will be studied. Relationships of conceptus,
uterus and corpus luteum. Parturition.

999. Research
Fall, Winter, Spring, Summer. Vari-
able credit. Approval of department.

EARTH SCIENCE

See Geology.

ECONOMICS

College of Business
Courses are classified as follows:
Labor Economics and Industrial Relations—
385, 455, 458, 457.

Money and Banking—318, 320, 470.
International Economics—427.
Public Finance—406, 407, 408.
Price and Value Theory—324, 325, 428.
Income and Employment Theory—323, 451,
470.
History of Economic Thought—421, 425.
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 deter-
mination of national income; the multiplier; the
accelerator; fiscal policy; deficit spending; monex-
tory policy; banks creation of money; interna-
tional 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 determina-
tion (demand, supply), applications to agricul-
tural policy; diminishing returns; behavior of the
firm (determination of quality of output, hiring of
factors) aspects of international trade.

210. Fundamentals of Economics
Fall, Winter. 4(4-0) MTH 215 or
223; or concurrently. Students may not earn
credit in 210 if they have credit in either 200 or
201.
Introductory course in economic theory, employ-
ing mathematics, when useful, as a tool analysis.
Covers consumer and business behavior, markets
and the price system, income distribution, and
elements of employment theory.

1DC. Introduction to Latin America
III
For course description, see Interdisci-
plinary Courses.

251H. Households, Firms and Markets
Fall. 5(5-0) Honors College students.
Microeconomic theory and its applications to
analysis and policy. Substitutes for 261, 324
and 325.

253H. Aggregative Economics and
Public Policy
Winter. 5(5-0) Honors College stud-
ents.
Theory of national income and its application to
analysis and policy. Substitutes for 200, 320,
and 331.

305. Industrial Relations and Trade
Unionism
Fall, Winter, Spring, Summer. 5(5-0)
Development, aims, structure, and functions of
labour and employer organizations. Their rela-
tion 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.