817. Independent Study in Forensic Science
Fall, Winter, Spring. 3(0-6) Majors or approval of school.
Directed laboratory work in forensic science.

818. Social Control, Criminal Justice and Community Relations
Winter. 3(3-0) C J 318.
Authority and social control, advanced community relations and criminal justice, and socio-political aspects of criminal justice processes. Field study component required.

820. Crime, Criminal Behavior and Criminology
Spring. 3(3-0) C J 320.
Classical and contemporary explanations for crime and criminal behavior related to criminal justice. Implications of differing theoretical concerns for the criminal justice system. Advanced criminology.

821. Historical and Comparative Criminal Justice
Spring. 3(3-0) Majors or approval of school.
Criminal justice systems are examined on a global basis exclusive of the United States. Emphasis is placed on major different legal philosophies.

825. Criminal Justice Educational Programming
Spring. 3(3-0) Majors or approval of school.
Designed for students preparing for careers as criminal justice educators. Discussion of issues, administrative problems, and curricula for criminal justice programs.

837. Managing Police Organizations
Winter. 3(3-0) C J 812.
Administrative issues in directing, controlling and coordinating law enforcement agencies at supervisory levels. Applications of socio-behavioral concepts. Fundamental issues in police management.

838. Assessment of Police Policies and Operations
Spring. 3(3-0) C J 837.
Critical analysis of recent police policy-related research. Operations research and policy analysis as applied to the deployment of human resources and policing strategies. Efficiency and effectiveness of operational information systems.

840. Highway Traffic Administration
Winter. 3(3-0)
The Federal-state-local partnership in highway traffic administration. Laws, standards and policies regulating the accident prevention and loss reduction countermeasures of governmental agencies and private industry. Problems and needs.

855. Delinquency Prevention and Control
Fall. 3(3-0)
Evaluation of primary and secondary delinquency prevention, control and treatment programs. Critical analysis of current major hypotheses, recent developments, and contributions by operational and academic sources.

856. Adult Corrections
Fall. 3(3-0)
Traditional and contemporary correctional practices. Social, political, economic and organizational factors that determine correctional policies. Current trends in adult corrections.

857. Analysis and Evaluation of Prevention and Correctional Programs
Spring. 3(3-0)
Analysis and evaluation of research relating to adult and juvenile prevention and correctional programming. Application of research design to program evaluation.

861. Law of Corrections
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.

872. Criminal Procedure
Spring. 4(4-0) A law course.
Criminal procedure applied to police and courts. Due process, Bill of Rights, right to counsel, search and seizure, confessions, bail, prosecution, guilty pleas, trial.

874. Law of Administrative Procedure
Spring. 4(4-0) Majors or approval of school.
Powers and procedures of administrative agencies. Procedural issues and legal basis. Problems connected with administrative processes not subject to effective judicial or legislative supervision. Discretion, judicial review of administrative action and jurisdiction.

880. Planning in Criminal Justice
Fall. 3(3-0) C J 492.

881. Project and Program Implementation
Winter. 3(3-0) C J 880 or approval of school.
Managerial strategies and factors involved in the effective implementation of projects and programs. Development and use of information and monitoring systems.

882. Evaluation Research in Criminal Justice
Spring. 3(3-0) C J 880, C J 881.
The conduct and utilization of evaluative research in projects, programs and agencies. Strategies for conducting, interpreting and utilizing operational research.

885. Security Management
Fall. 3(3-0) C J 455 or concurrently, or approval of instructor.
History of and legal bases for protective services. Organization and management of commercial and proprietary security units in business, industry, institutions and government. The systems approach to security.

900. 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.

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

907. Policy Change Paper
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll 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.

909. Master's Thesis Research
Fall, Winter, Spring, Summer. 1 to 12 credits. May reenroll for a maximum of 12 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. Seminar in Criminal Justice and Criminology
Fall. 3 to 5 credits. Graduate students.
Analysis of major research contributions to criminal justice and criminology.

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

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. Soil and Our Environment
Spring, 4(3-2) Not open to students with credit in CSS 210. Non-majors only.
Role of soil in growing plants, water use and conservation, nutrient cycling, fertilizers, environmental quality, animal health, anthropological and food-population dilemma.

210. Fundamentals of Soil Science
Fall, Winter. 5(3-4) CEM 141B. Not open to students with credit in CSS 202.
Nature of soils and their relation to plant growth, water regimes, nutrient cycling, erosion, environmental quality, plant composition, animal health and world food production.

250. Plant and Animal Genetics
Winter. 5S-6 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) CSS 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) CSS 210.
Concepts of soil erosion by water and wind and methods for its control including control of erosion and sedimentation. Interpretation of soil properties for land use decisions.

402. Principles of Weed Control in Field Crops
Fall. 4(3-2) CEM 143, 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.

400. 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) CSS 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
Fall, Winter, Spring, Summer. 1 to 4 credits. May report 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 soil problems in fertility, geography, classification, conservation, management, organic soils and turfgrass soils.

412. Topics in Agronomy
Fall, Winter, Spring, Summer. 3(3-0) 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 crop production, crop physiology, turfgrass management, organic soils, turfgrass soils, soil fertility and genetic analysis.

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

424. Forest Soils
Spring. 3(3-2) CSS 210; Juniors or approval of department. Forestry majors: FOR 305, FOR 402, FOR 425, FOR 429 concurrently. Interdepartmental with and administered by the Department of Forestry.
Interrelationships of forest site and the growth of trees. Properties, classification, inventory, productivity and management of forest soils. Effects of silvicultural and forest management practices on the soil.

425. Forest Soils Laboratory
Spring. 2(2-0) CSS 210; FOR 305, FOR 402, FOR 424, FOR 429 concurrently. Interdepartmental with and administered by the Department of Forestry.
Exercises and field trips relating to properties, classification, inventory, productivity and management of forest soils. Extended field trips required.

430. Soil Fertility and Fertilizers
Spring. 3(3-4) 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. Biosenergetics of the root-soil interface.

470. Soil Classification
Fall, Spring, Summer of odd-numbered years. 4(4) 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. World Soils and Land Use
Spring. 3(2-2) CSS 210 or approval of department.
Nature, geography and use of the world's major soils. Uses emphasized will include agriculture, range, and forestry.

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.

491. Crop Ecology
Winter of even-numbered years. 2(2-0) Approval of department.
World climates affecting crops and cropping systems. Limiting environmental factors for crop distribution and productivity. Physiological basis of stress injury and resistance for chilling, freezing, flooding, drought and salinity.

505. Herbical 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.

511. Advanced Problems
Fall, Winter, Spring, Summer. 1 to 5 credits. May reenroll for a maximum of 8 credits for either a M.S. or Ph.D. degree program, or a maximum of 14 credits for both degree programs, if different topics are taken. Approval of department.
Field crop problems in management, physiology, 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 8 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 540, CSS 850 or approval of department. Interdepartmental with and administered by 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 Magnesiology.
Physiological bases for genetic variation in higher plants including adaptive physiology, quantitative genetics, growth correlations, experimental genetics, hybrid physiology, and geneology.
Courses

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
Winter. 3(3-0) CSS 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) CSS 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.

842. Advanced Soil Microbiology
Fall of odd-numbered years. 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
Fall of odd-numbered years. 2(0-6) MPH 542 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 385; 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.

865. Organic Chemistry of Soils
Spring of odd-numbered years. 3(3-0) CEM 242
Relationship of natural and synthetic organic chemicals to chemical and biochemical processes in the 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 829, or approval of 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.

999. Doctoral Dissertation Research
Fall, Winter, Spring, Summer. Variable credit.

DAIY SCIENCE
See Animal Science.

EARTH SCIENCE
See Geological Sciences.

ECONOMICS

ENCYC

College of Business and Graduate School of Business Administration
Courses are classified as follows:
Money and Banking—318, 330, 470.
International Economics—420.
Public Finance—405, 407, 408.
Price and Value Theory—324, 325, 426.
History of Economic Thought—421, 422.

200. Introduction to Microeconomics
Fall, Winter, Spring, Summer. 4(4-0)
Open to Freshmen. Students may begin sequence with either EC 200 or EC 201. Not open to students with credit in IDC 265.
Economic institutions, reasoning and analysis. Consumption, production, determination of price and quantity in different markets, income distribution, market structure and normative analysis.

210. Fundamentals of Economics
Fall. 4(4-0) MTH 215 or MTH 228, or concurrently. Students may not earn credit in EC 210 if they have credit in either EC 200 or EC 201.
Economic principles, institutions and reasoning using mathematics, when useful, as a tool of analysis. Consumption, production, the market system, income distribution and elements of employment and inflation theory.

251H. Households, Firms and Markets
Fall, Winter, Spring. 4(4-0) Honors College students.
Microeconomic theory and its applications to analysis and policy. Substitutes for EC 201, EC 324, and EC 325.

302H. Macroeconomics and Public Policy
Winter. 5(5-0) Honors College students.
Theory of national income, unemployment, inflation and economic growth and its application to economic analysis and policy. Substitutes for EC 200, EC 320 and EC 327 combined.

305. Industrial Relations and Trade Unions
Fall, Winter, Spring. 4(4-0)
Development, aims, structure, and functions of labor and employer organizations. Their relations to economic, political, and legal institutions and their impact on society. Primary issues in collective bargaining.

306. Government Programs for Workers
(456) Winter. 4(4-0) EC 201. Interdepartmental with Public Affairs Management.
Economics of selected government institutions and programs for workers. Social security, workers' compensation, Unemployment Insur­ ance, OSHA, employment and training programs, wages and hours legislation, anti­ discrimination programs.

318. Money, Credit and Banking
Fall, Winter, Spring. Summer. 4(4-0)
EC 200 or EC 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.

324. Microeconomics I
Fall, Winter, Spring. Summer. 3(3-0) EC 200 and EC 201, or EC 210.
Theory of production and cost. Theory of the firm under varying market structures.

325. Microeconomics II
Fall, Winter, Spring. Summer. 3(3-0) EC 200 and EC 201, or EC 210, and EC 324.