

**827. Switching Theory**  
Spring. 3(3-0) 826.  
Asynchronous and speed independent circuits; static and dynamic hazards; use of race conditions.

**831. Mathematical Theory of Formal Languages I**  
Fall. 3(3-0) 453 or approval of department.  
Definition of grammars; recursive and recursively enumerable sets; decidability and undecidability; regular sets; linear languages and context-free languages.

**832. Mathematical Theory of Formal Languages II**  
Winter. 3(3-0) 831.  
Context-sensitive grammars; scattered context grammars; closure properties of languages; abstract families of languages; derivation restricted grammars.

**833. Mathematical Theory of Formal Languages III**  
Spring. 3(3-0) 832.  
Current literature and advanced topics in formal language theory.

**835. Data Structures in Information Processing**  
Fall. 3(3-0) 453.  
Memory hierarchy and allocation algorithms; information collection; management, processing, retrieval and display; implications for machine, language and problem organization.

**836. Simulation of Stochastic Systems**  
Winter. 3(3-0) 835.  
Computational aspects of the development, verification, and utilizations of algorithms for simulating models of discrete, stochastic systems; processing using Random Walks and Markov Chains.

**837. Computer-Aided Design of Deterministic Systems**  
Spring. 3(3-0) 835.  
Formal language specification of time-dependent, deterministic systems; automatic production, management, and solution of system-associated equations.

**841. Artificial Intelligence and Adaptive Systems I**  
Winter of odd-numbered years. 4(4-0) 300, STT 441.  
Foundations of heuristic methods; syntactic means-end analysis; semantic means-end analysis; adaptive systems.

**842. Artificial Intelligence and Adaptive Systems II**  
Spring of odd-numbered years. 4(4-0) 841.  
Computer representation of information from natural languages; representation of two and three dimensional environments; theory of design of robots; future trends.

**899. Research**  
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

**911. General Automata Theory I**  
(E E 981.) Fall of odd-numbered years. 3(3-0) 453 or 825 or approval of department. Interdepartmental with Electrical Engineering.  
Characterization of machines and programs as automata; mathematical decomposition of finite automata.

**912. General Automata Theory II**  
(E E 982.) Winter of even-numbered years. 3(3-0) 911. Interdepartmental with Electrical Engineering.  
Reliability and redundancy of finite automata. Probabilistic sequential machines. Languages definable by probabilistic and deterministic automata. Axioms for equivalence of regular expressions.

**913. General Automata Theory III**  
(E E 983.) Spring of even-numbered years. 3(3-0) 912. Interdepartmental with Electrical Engineering.  
Degrees of difficulty of computation. Models of parallel computation. Iterative automata.

**999. Research**  
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

## CRIMINAL JUSTICE\* C J

### College of Social Science

**110. Introduction to Criminal Justice**  
Fall, Winter, Spring. 4(4-0)  
Agencies and processes involved in the administration of criminal justice—the legislature, the police, the prosecutor, the courts and corrections. Problems of law enforcement in a democratic society.

**225. Police Science Laboratory I**  
Fall, Winter, Spring. 4(0-8) 110.  
General course in laboratory techniques. Photography, recording of a crime scene, collection and preservation of evidence, and fingerprinting.

**230. Administrative Theory in Criminal Justice**  
(130.) Winter, Spring. 5(3-4) 110.  
Exposition of theories and research relating to organization and management, and their applicability to criminal justice agencies.

**245. Highway Traffic Administration I**  
Fall. 5(5-0) 110.  
Examination of United States transportation system, emphasizing efficient, safe operation. Activities and agencies concerned with increasing efficiency. System's development; components; social, economic and political impacts. Survey of present and future needs.

**246. Highway Traffic Administration II**  
Winter. 5(4-0) 110.  
Organization for traffic control, accident investigation, traffic flow regulation, and accident analysis and interpretation. Survey of traffic law, as related to administration. Violation bureau and traffic court administration.

**247. Highway Traffic Administration III**  
Spring. 5(4-0) 110.  
Highway traffic education at the elementary, secondary and adult levels of instruction. Communication aspects of highway traffic administration. Public support organizations. Motor vehicle fleet safety programs. Traffic safety research.

**318. The Police and Community Relations**  
Fall, Winter, Spring. 4(4-0) 110.  
Interdisciplinary survey of the field of police and community relations, emphasizing police administrative responsibility, with special attention to police role in community relations tension and conflict.

\*Name changed July 1, 1970. Formerly Police Administration and Public Safety.

**327. Police Science Laboratory II**  
Winter. 3(0-6) 225 or approval of school.  
Continuation of 225, including the studies of firearms, hair, microscopy and chemistry.

**328. Police Science Laboratory III**  
Spring. 3(0-6) 327 or approval of school.  
Continuation of 327, including serological examination of minute pieces of evidence, documents, and instrumental analysis.

**335. Police Administration I**  
(235.) Fall. 5(4-1) 230.  
Principles of police administration and organization; administration of staff units; function and activities of police agencies.

**336. Police Administration II**  
(236.) Winter. 5(4-1) 335.  
Administration of police line operations; including patrol as the basic police function, investigation, juvenile, traffic and special operational units. Liaison between units, enforcement policy, manpower distribution, and analysis of operations.

**355. Delinquency Prevention and Control**  
Fall, Spring. 5(4-1) 230.  
Problem of juvenile delinquency, theories of causation and prevention programs. Police prevention programs, juvenile courts, institutional treatment, community resources for prevention, federal and state programs.

**356. Organization and Administration of Delinquency Prevention Programs**  
Winter. 5(4-1) 355.  
Prevention programs in general. Police prevention programs—historical development, present status, organization and administration areas of operation, personnel, training, relationship to other agencies. Application of organizational scheme to other agencies.

**368. Correctional Philosophy, Theory and Practice**  
Fall, Winter. 5(4-1) 110.  
Introductory survey of philosophy, theory and practice involved in the treatment of convicted law violators of all ages. Appraisal of the impact of correctional treatment upon post-correctional behavior.

**369. Probation and Parole**  
Spring. 5(4-1) 110, 355, 368; or approval of school.  
Treatment of convicted law violators by the correctional field services before and after prison. The role of probation and parole counselors. Appraisal of effectiveness. Prediction of behavior during and after probation and parole.

**375. Criminal Law**  
(275.) Fall, Winter, Spring. 4(4-0) 110.  
Survey of substantive criminal law as a means of attaining certain socially desirable ends like the preservation and protection of life and property; emphasis on historical and philosophical concepts.

**380. Industrial Security Administration**  
Fall. 5(4-1) 230.  
The organization and management of industrial security units including government security. The protection of commercial and industrial manpower, facilities, and installations. Security and police operations. Administrative, legal and technical problems. Specialized programs for factories, railroads, retail stores, insurance companies, credit bureaus, etc.

**395. Criminal Investigation**

(325.) Fall, Winter. 4(4-0) 110, 375.

Introduction to criminal investigation procedures including theory of an investigation, conduct at crime scenes, collection and preservation of physical evidence; methods used in police science laboratory; fingerprints, ballistics, documents, serology, photography, and related forensic sciences.

**400H. Honors Work**

Fall, Winter, Spring, Summer. Variable credit. 110, 230, and 10 additional criminal justice credits.

Open only to qualified students. Individually selected program of supervised group or individual study dealing with some phase of police administration and public safety.

**401. Case Studies in Criminal Justice**

Fall, Winter, Spring, Summer. 1 to 6 credits. May re-enroll for credit. 110, 230, and 10 additional criminal justice credits.

Surveys and applied research as approved by students' major professor.

**409. Special Issues in Criminal Justice**

Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 4 credits. Majors: 110, others: approval of school.

Forum for special course offerings focusing on special issues in criminal justice by visiting instructors or regular faculty.

**425. Alcohol: A Social Dilemma**

Winter. 3(3-0) Seniors.

Current problems related to alcohol use and abuse including: physiology, psychological aspects, medical aspects, alcohol and road safety, religious considerations, attitude of the beverage industry and the role of Alcoholics Anonymous.

**429K. Fundamentals of Traffic Law**

Fall, Summer. 3(3-0) Interdepartmental with and administered by the College of Education.

Nature, function and application of traffic law as it applies to the safe and efficient movement of people and goods in a broadly conceived traffic accident prevention program.

**453. Case Analysis in Prevention Programs**

Spring. 5(4-1) 356.

Factors to be considered in determination of referral action for delinquent youth. Estimating significance of behavior and home situation. The referral process, selection of agency, preparation for referral, follow-up.

**465. Administration of Correctional Institutions**

Fall. 5(4-1) 110, 355, 368; or approval of school.

Treatment, security, custody and discipline of the convicted law violator in correctional institutions. Social structure of the prison community; inmate social systems and interaction. Correctional clinic records. Correctional research and decision making.

**471. Criminal Procedure**

Fall, Spring. 4(4-0) 375.

Study of the constitutional right of the people to be secure from unreasonable searches and seizures; how rules of evidence safeguard individual rights in the administration of criminal justice.

**475. Evidence**

Winter. 3(3-0) 375.

Concepts, policies and procedures relating to the admission of evidence before judicial tribunals.

**480. Internal Security in a Democracy**

Winter. 4(4-0)

Approaches to the control of "subversive activities" and their effectiveness from the standpoint of security and freedoms essential in a democracy.

**481. Theft Control in Business, Industry and Institutions**

Spring. 3(2-0)

Causation, prevention, and control of robbery, burglary, shop-lifting, pilferage, embezzlement, and employee dishonesty in private and public institutions. Social science theory and research methods.

**490. Criminal Justice Practicum**

Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 12 credits. Approval of school.

Planned program of research, observation, study, and work in selected criminal justice agencies. Designed to supplement classroom study with constructive participation in the criminal justice system of communities of the United States and foreign nations.

**492. Methods of Criminal Justice Research**

Fall, Spring. 4(3-2) 110.

Elements of scientific perspective; interaction of research and theory. Introduction to research design, data collection, analytic and statistical techniques, use of data processing resources, and preparation of research reports.

**493. Problems and Techniques of Criminal Justice Research**

Winter. 4(3-2) 492 or approval of school.

Continuation of 492 to provide depth in the various elements of research; extension to more sophisticated research models, and the relevance of findings for criminal justice program innovation and evaluation.

**499. Seminar in Criminal Justice**

Fall, Winter, Spring, Summer. 5(3-0) 230, 355, 368, 375, 492.

Discussion and evaluation of criminal justice policies and practices. Preparation of undergraduate senior research paper.

**801. Directed Studies**

Fall, Winter, Spring, Summer. 1(0-2) to 6(0-12) Approval of school.

Individual research and study in student's field of interest as approved and directed by major professor.

**809. Special Issues in Criminal Justice**

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

Course offerings focusing on special issues in criminal justice by guest instructors or regular faculty.

**812. Advanced Criminal Justice Administration**

Fall, Spring. 4(4-0) Approval of school.

Framework through which the objectives of the process of social control (criminal justice) are obtained. The administrative, political and social milieu in which this machinery operates.

**815. Seminar in Criminal Investigation**

Spring. 3(3-0) Approval of school.

Seminar in investigative techniques; criminalistics; case studies; including discussion on quantum of proof in criminal investigations and probative value of physical evidence.

**820. Advanced Police Administration**

Winter. 4(3-0) Approval of school.

Depth analysis of the line and staff functions within a law enforcement agency. Problems of program development, execution, and evaluation.

**822. Comparative Law Enforcement Administration**

Spring. 3(3-0) Approval of school.

Comparative study of police organization and administration in various governmental and social systems. Evaluation of government's role, its limitations, the selection and training of leaders.

**823. Community Relations in the Administration of Justice**

Fall. 5(5-0) Approval of school.

Seminar in the field of community relations, encompassing the spectrum of the administration of justice and community responsibility, utilizing the interdisciplinary approval in case and situational analysis.

**840. Seminar in Highway Traffic Administration**

Winter. 3(3-0) or 5(3-0) Approval of school.

Traffic problems in their broad social setting. Inventory and critical review of the traffic safety movement and role of various professions therein. Future problems and developments.

**868. Review and Evaluation of Correctional Research**

Winter. 3(3-0) or 5(3-0) Approval of school.

Correctional research systems review, analysis and critical evaluation of correctional research findings and conclusions pertaining to correctional decision making in the treatment process.

**870. Administration of Criminal Law**

Winter. 4(4-0) Approval of school.

Major provisions of the Constitution of the United States that safeguard personal liberties. Judicial processes are examined in the light of historical experience, and social change.

**875. Seminar in Deviant Behavior**

Spring. 3(3-0) or 5(3-0) Approval of school.

Evaluation of current major hypotheses, review of recent developments, contributions by agencies and academic institutions and review of current literature in the field of deviant behavior.

**890. Field Training**

Fall, Winter, Spring, Summer. 1(0-4) to 6(0-24) Approval of school.

Field service training provided with federal, state, and local enforcement agencies; crime laboratories; commercial, industrial, and financial organizations with security programs; agencies working in crime and delinquency prevention; correctional agencies; and organizations engaged in highway safety.

**899. Research**

Fall, Winter, Spring, Summer. Variable credit. Approval of school.

**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.

**CROP SCIENCE** CSC  
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.

250. **Plant and Animal Genetics**  
Spring. 4(4-0) 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**  
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.

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**  
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)

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 9 credits. Approval of department.

Independent study in any of the following specialties: special crop problems, production, physiology, ecology, weed control, turfgrass management, crop storage and preservation, and seed studies.

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 Soil Science.

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.

488. **The Impact of Animal Resource Management Upon the World's Developing Nations**  
Winter. 3(4-0)

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. 3(3-0) Approval of department.

Role of physiological factors determining maximum crop yields and quality.

805. **Herbicidal Action and Metabolism**  
Spring. 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.

814. **Advanced Field Crop Studies**  
(914.) Fall, Winter, Spring, Summer. 1 to 3 credits. May re-enroll for a maximum of 6 credits. Approval of department.

Advanced work in any of the following specialties: advanced field crop studies, management, physiology, ecology, breeding, turfgrass culture, weed control, nutritional quality, tropical crops, crop extension, and seed studies.

820. **Seminar**  
Fall, Winter, Spring. 1(1-0) May re-enroll for a maximum of 3 credits. Interdepartmental with and jointly administered with Soil Science.

Studies and presentation of research in crop and soil sciences.

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 of odd-numbered years. 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.

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 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.

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.

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**  
(471.) 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.