452. Mechanical Language II
Winter. 3(3-0) 451.
453. Mechanical Language III
Spring. 3(3-0) 452.

452. Mechanical Language II
Winter. 3(3-0) 451.

453. Mechanical Language III
Spring. 3(3-0) 452.
Finite state automata; pushdown automata. Ex- tended precedence grammars. Precedence func- tions. LR(K) grammars; LL(K) grammars. Bounded context techniques.

480. Special Problems
Fall, Winter, Spring, Summer. 1 to 5 credits. May re-enroll for a maximum of 9 credits. Advanced standing and approval of instructor. Independent undergraduate research in computer science.

801. Special Problems
Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 9 credits. Approval of department.

810. Introduction to Linear System Theory
Fall. 3(3-0) MTH 214. Interdepartmental with Systems Science and Social Science (College of) and administered by Systems Science.

811. System Methodology and Simulation
Winter. 3(3-0) 810. STT 441. Interdepartmental with Systems Science and Social Science (College of) and administered by Systems Science.

813. System Project
Spring. 3(1-0) 811. Interdepartmental with Systems Science and Social Science (College of) and administered by Systems Science. Individual or team application of simulation methods to system design and/or management.

820. Theory of Digital Machines
Winter. 3(3-0) 825.
Sequential machines; machine specification in terms of states and transitions; decomposition; state minimization and assignment.

827. Switching Theory
Spring. 3(3-0) 826.
Asynchronous and speed independent circuits; state and dynamic hazards; use of race condi- tions.

831. Mathematical Theory of Formal Languages I
Fall. 3(3-0) 453 or approval of de- partment.
Definitions of grammars; recursive and recur­ sively enumerable sets; decidability and unde­ cidability; 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; properties of languages; ab­ stract families of languages; derivation restricted grammars.

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

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

836. Simulation of Stochastic Systems
Winter. 3(3-0) 835.
Computational aspects of the development, verifica- fication, and utilization of algorithms for simu- lation models of discrete, stochastic systems; processing using Random Walks and Markov Chains.

837. Computer-Aided Design of Deterministic Systems
Winter. 3(3-0) 837.
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 analy­ sis; 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
Fall. 3(3-0) 891. Fall of odd-numbered years. 3(3-0) 453 or 825 or approval of de- partment. Interdepartmental with Electrical Engineering.
Characterization of machines and programs as automata; mathematical decomposition of finite automata.

912. General Automata Theory II
Fall. 3(3-0) 912. Interdepartmental with Elec­ trical Engineering.

913. General Automata Theory III
Spring of even-numbered years. 3(3-0) 913. Interdepartmental with Electrical Engineering.

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 admin­ istration 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. Photo­ tography, recording of a crime scene, collection and preservation of evidence, and fingerprinting.

330. Administrative Theory in Criminal Justice
(Winter. 5(3-4) 110.
Exposition of theories and research relating to organization and management, and their ap­ plicability to criminal justice agencies.

245. Highway Traffic Administration I
Fall. 5(3-0) 110.
Examination of United States transportation system, emphasizing efficient, safe operation. Activities and agencies concerned with increasing efficiency. System's development; compo­ nents; 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 inves­ tigation, traffic flow regulation, and accident analysis and interpretation. Survey of traffic law, as related to administration. Violation bureaus 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. Com­ munication aspects of highway traffic adminis­ tration. 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 atten­ tion to police role in community relations ten­ sion and conflict.

*Name changed July 1, 1970. Formerly Police Administration and Public Safety.
327. Police Science Laboratory II
Winter. 3(0-6) 235 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, minuscule 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.

365. Correctional Philosophy, Theory and Practice
Fall, Winter. 5(4-1) 110.

369. Probation and Parole
Spring. 5(4-1) 110. 355, 359, 358; 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 of treatment 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.

381. Industrial Fire Protection, Disaster Control, and Defense Programs
Spring. 4(4-0) 230.
The administration of fire and accident prevention programs. Development of policy, rules and regulations. Operations for fire and accident control. Equipment facilities, inspections, investigations, and records. Special problems and hazards.

395. Criminal Investigation
(325) Fall, Winter. 5(5-0) 110, 375.
Introduction to criminal investigation procedures including theory of an investigation, evidence 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 programs 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. 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. Variable credit. May re-enroll for a maximum of 12 credits. Approval of school.
Planning program of research, observation, study, and work in selected criminal justice agencies. Designed to implement classroom study with constructive participation in the criminal justice system of communities of the United States and foreign nations.

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, Winter. 5(4-1) 110, 355, 358; 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; rules of evidence safeguard individual rights in the administration of criminal justice.

475. Evidence
Winter. 3(3-0) 275.
Concepts, policies and procedures relating to the admission of evidence before judicial tribunals.

490. 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 freedom essential in a democracy.

491. Theft Control in Business, Industry and Institutions
Spring. 3(2-0)
Caution, prevention, and control of robbery, burglary, shoplifting, 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 implement 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(2-2) 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(2-2) 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.

501. Directed Studies
Fall, Winter, Spring. 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.

502. Advanced Security Administration
Fall, Spring. 5(3-0) or 5(4-0) 350 or concurrently, approval of instructor.
Salient problems and issues of concern to professional security administrators with emphasis on business management approaches. Typical problem areas include: contractual security services; employee dishonesty; cost considerations; work simplification.

512. Advanced Law Enforcement and Public Safety Administration
Fall, Spring. 5(3-0) or 5(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.

515. Seminar in Criminal Investigation
Spring. 3(3-0) or 5(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. 3(3-0) or 5(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) or 5(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. 4(4-0) or 8(4-0) 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.

855. 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.

889. Research
Fall, Winter. Summer. Variable credit. Approval of school.

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.

485. Seed Science
Spring. 3(3-0) Approval of department.
Morphological and physiological changes during seed formation, development, maturation and germination. Chemical and biological aspects of seed drying, storage, deterioration, dormancy and quality. Current problems and research in seed science.

Winter. 3(4-0) For course description, see Interdisciplinary Courses.

801. Crop Ecology
Fall. 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(4-0) 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
Fall. 3(3-0) Approval of department.
Opportunity for students to prepare graduate level reports on specific fields.

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 genetics.

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. Genetics systems and quantitative inheritance in relation to the establishment of superior populations.

899. Research
Fall, Winter. Spring. Summer. Variable credit.

904. Seminar
Fall, Winter. Spring. 1(1-0) Required of majors; others: approval of department.
Studies and presentation of research in crop science.

920. Design and Analysis of Agronomic Experiments
Spring. 3(3-0) STT 483 or approval of department.
Constructing and analyzing designs for experimental investigations in the biological sciences.

923. Preservation and Storage of Field Crops
Spring of even-numbered years. 3(2-2) Effects of equilibrium moisture contents, rapidity of establishment of equilibrium, relative humidity, chemical composition, rapidity of fermentation, molding or heating, pressure, temperature, etc., upon the quality of stored crops.