490. Special Problems
Fall, Winter, Spring, Summer. 1 to 5 credits. May re-enroll for a maximum of 8 credits. Advanced standing and approval of instructor. Independent undergraduate research in computer science.

810. Introduction to Linear System Theory
(812.) Fall. 3(3-0) MTH 214. Interdepartmental with Systems Science and Social Science (College of) and administered by Systems Science. A first course in system theory for students from a range of disciplines. Mathematical representation of system variables, transform and state space method of analysis, introduction to control theory, applications to physical, economic and social systems.

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. Problem definition, design of abstract models for system design and control, simulation of systems described by differential and difference equations, development of variable, simulation of discrete object stochastic systems, simulation languages, applications to physical, economic and social systems.

813. System Project
Spring. 3(1-6) 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.

817. Parametric Pattern Recognition
Winter. 3(3-0) STT 441, computer programming. The decision-theoretic approach to pattern recognition using decision rules, parameter estimation, sub-optimum strategies, optimum strategy without learning, learning, and sequential recognition.

818. Nonparametric Pattern Recognition
Spring. 3(3-0) 817. The non-statistical approach to pattern recognition. Discriminant functions, clustering, non-parametric learning, and algorithms for recognition.

825. Theory of Combinatorial Circuits
Fall. 3(3-0) 423 or approval of department. Switching algebra and related group and lattice theory; decomposition; the synthesis of multiple-output switching functions using multi-level combinational circuits.

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

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-free 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 program organization.

836. Simulation of Stochastic Systems
Winter. 3(3-0) 835. Computational aspects of the development, verification, and utilization 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 893.) 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 893.) 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 893.) 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

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(4-0) 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
Fall, Winter, Spring. 5(5-0) 110. Examination 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(5-0) 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(5-0) 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.

*Names changed July 1, 1970. Formerly Police Administration and Public Safety.
327. Police Science Laboratory II
Winter. 3(0-8) 253 or approval of school.
Continuation of 225, including the studies of firearms, hair, microscopy and chemistry.

328. Police Science Laboratory III
Spring. 3(0-8) 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 policies, manpower distribution, and analysis of operations.

338. Delinquency Prevention and Control
Fall, Winter. 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) 335.
Prevention programs in general. Police prevention programs—historical development, present status, organization and administration of areas of operation, personnel, training, relationship to other agencies. Application of organizational scheme to other agencies.

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

399. Probation and Parole
Spring. 5(4-1) 110, 355, 356; 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) 930.
The organization and management of industrial security units including government security. The protection of non-essential and industrial manpower, facilities, and installations. Security and police operations. Administrative, legal and technical problems of specialized programs for factories, railroads, retail stores, insurance companies, credit bureaus, etc.

381. Industrial Fire Prevention, Disaster Control, and Defense Programs
Spring. 4(3-0) 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. 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. May re-enroll for a maximum of 12 credits. Approval of school.

401. Case Studies in Criminal Justice
Fall, Winter, Spring, Summer. 1 to 6 credits. May re-enroll 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.

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.

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 system of transportation. Problems of 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 young offenders. Estimation of 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 and cultural structure of the prison community; inmate social systems and interactions. 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(0-8) 375.
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's essentials in a democracy.

481. Theft Control in Business, Industry and Institutions
Spring. 3(2-0)
Causation, 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 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, 365, 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.

812. Advanced Law Enforcement and Public Safety Administration
Fall. 3(3-0) or 3(3-3) 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. 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.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Semester(s)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>251</td>
<td>Plant and Animal Genetics Laboratory</td>
<td>3</td>
<td>Spring</td>
<td>Approval of department.</td>
</tr>
<tr>
<td>301</td>
<td>Forage Crops</td>
<td>3</td>
<td>Fall, Spring, Summer</td>
<td>Sophomores. Distribution, morphology, identification, physiology, management and utilization of forage crops for hay silage, and pasture for livestock and soil improvement and conservation.</td>
</tr>
<tr>
<td>380</td>
<td>Ecology and Physiology of Agricultural Plants</td>
<td>3</td>
<td>Spring</td>
<td>Approval of department.</td>
</tr>
<tr>
<td>402</td>
<td>Principles of Weed Control</td>
<td>3</td>
<td>Fall, Spring, Summer</td>
<td>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.</td>
</tr>
<tr>
<td>406</td>
<td>Crop Improvement and Seed Production</td>
<td>3</td>
<td>Winter</td>
<td>Approval of department.</td>
</tr>
<tr>
<td>407</td>
<td>Special Crop Problems</td>
<td>3</td>
<td>Fall, Winter, Spring</td>
<td>May re-enroll for a maximum of 6 credits. Independent comprehensive study of some areas of crop science.</td>
</tr>
<tr>
<td>408</td>
<td>Principles of Plant Breeding</td>
<td>3</td>
<td>Spring</td>
<td>Interdepartmental and administered jointly with the Horticulture Department. Application of genetics and other sciences to breeding and improvement of agronomic and horticultural crops.</td>
</tr>
<tr>
<td>415</td>
<td>Tallgrass Management</td>
<td>3</td>
<td>Spring</td>
<td>Approval of department.</td>
</tr>
<tr>
<td>420</td>
<td>Seminar</td>
<td>1</td>
<td>Winter</td>
<td>May re-enroll for a maximum of 6 credits. Interdepartmental and administered jointly with Soil Science.</td>
</tr>
<tr>
<td>483</td>
<td>Seed Science</td>
<td>3</td>
<td>Spring</td>
<td>Approval of department.</td>
</tr>
<tr>
<td>488</td>
<td>The Impact of Animal Resource Management Upon the World's Developing Nations</td>
<td>3</td>
<td>Winter</td>
<td>For course description, see Interdisciplinary Courses.</td>
</tr>
<tr>
<td>501</td>
<td>Crop Ecology</td>
<td>3</td>
<td>Spring</td>
<td>Approval of department.</td>
</tr>
<tr>
<td>801</td>
<td>Crop Physiology</td>
<td>3</td>
<td>Spring</td>
<td>Approval of department.</td>
</tr>
<tr>
<td>805</td>
<td>Herbicidal Action and Metabolism</td>
<td>3</td>
<td>Spring</td>
<td>Approval of department.</td>
</tr>
<tr>
<td>814</td>
<td>Advanced Field Crop Studies</td>
<td>3</td>
<td>Fall, Winter, Summer</td>
<td>Opportunity for students to prepare graduate level reports on specific fields.</td>
</tr>
<tr>
<td>830</td>
<td>Physiological Genetics</td>
<td>3</td>
<td>Winter</td>
<td>Approval of department.</td>
</tr>
<tr>
<td>851</td>
<td>Quantitative Genetics in Plant Breeding</td>
<td>3</td>
<td>Fall, Winter, Spring</td>
<td>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.</td>
</tr>
<tr>
<td>899</td>
<td>Research</td>
<td>1</td>
<td>Fall, Winter, Spring</td>
<td>Variable credit. Approval of department.</td>
</tr>
<tr>
<td>904</td>
<td>Seminar</td>
<td>1</td>
<td>Fall, Winter, Spring</td>
<td>Required for majors; approval of department. Studies and presentation of research in crop science.</td>
</tr>
<tr>
<td>920</td>
<td>Design and Analysis of Agronomic Experiments</td>
<td>3</td>
<td>Spring</td>
<td>Approval of department.</td>
</tr>
<tr>
<td>951</td>
<td>Cytogenetics in Plant Breeding</td>
<td>3</td>
<td>Spring</td>
<td>Approval of department.</td>
</tr>
<tr>
<td>952</td>
<td>Plant Breeding Biometrics</td>
<td>3</td>
<td>Winter</td>
<td>Approval of department.</td>
</tr>
</tbody>
</table>

**Notes:****
- The courses are offered in various semesters: Fall, Winter, Spring, and Summer.
- Approval of department may be required for some courses.
- Some courses require pre-requisites or concurrent studies.
- Variable credits may be offered for certain courses.