

- 413. Seminar in Communication Education**
(S T 413.) Fall, Winter, Spring, Summer. 4(4-0) ED 436.
Philosophies of curricular and co-curricular programs in communication education. Internship experience in those programs.
- 420. Message Design**
Winter. 4(4-0) 101.
Principles and practice in message-media construction and selection.
- 499. Special Projects**
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 15 credits. Approval of project proposal by department.
Independent research, group research, student-directed group projects.
- 805. Communication Research**
Fall. 5(4-2) Majors.
Communication research strategy and methodology. Scientific process, bases for derivation and verification of hypotheses, and basic methods of designing research in communication.
- 806. Communication Research**
Winter. 5(4-0) 805.
Continuation of 805.
- 815. Organizational Communication**
Winter, Spring. 4(4-0)
Structure and function of communication in organizations, with emphasis on concepts and principles needed for effective management of organizational communication processes.
- 820. Communication Theory and Process**
Fall, Summer. 3(3-0)
Theoretic models of communication, with emphasis on the applications of communication theory to various professional communication areas.
- 821. Mass Communication Theory and Research**
(921.) Fall, Spring. 4(3-0)
Current theories and research in mass communication.
- 822. Interpersonal Communication**
(920.) Winter, Summer. 4(3-0)
Current theories and research in interpersonal communication, with emphasis on persuasion.
- 828. Cross-Cultural Communication**
(428.) Winter, Summer. 4(4-0)
Role of communication in the economic, social and political development of less developed countries. Problems in communicating across cultural boundaries.
- 850. Seminar in Research Utilization**
(950.) Winter, Summer. 4(3-0) May re-enroll for a maximum of 8 credits. Approval of department.
Applications of communication research to professional practice in such areas as teaching, change agencies, information system management, etc.
- 870. Communication and Change: The Diffusion of Ideas and Information**
(470.) Fall, Spring. 4(4-0)
Research traditions underlying the diffusion of ideas and information, and acceptance of innovation and change. Strategic principles for introduction of change through the use of communication.

- 890. Special Problems**
Fall, Winter, Spring, Summer. 1 to 6 credits. Approval of department.
Special problems as arranged with instructor.
- 899. Research**
Fall, Winter, Spring, Summer. Variable credit. Approval of department.
- 905. Communication Research Design**
Fall, Winter, Spring. 4(4-0) May re-enroll for a maximum of 12 credits. 806.
Methods of data collection and analysis in communication research. Designing exploratory studies of the communication process. Interviewer training and bias. Content analysis of the mass media. Writing and critiquing research reports.
- 940. Seminar in Communication Theory and Research**
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 45 credits. Approval of department.
Theoretic and research issues in communication.
- 990. Special Problems**
Fall, Winter, Spring, Summer. 1 to 6 credits. Approval of department.
- 999. Research**
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

COMPUTER SCIENCE CPS

College of Engineering

- 110. Introduction to Computer Programming**
Fall, Winter, Spring, Summer. 3(3-0)
Students may not receive credit in both 110 and 120.
FORTRAN programming, number systems and basic computer structure. Applications from various areas including business and social science.
- 120. Computer Programming for Engineers and Scientists**
Fall, Winter, Spring, Summer. 3(3-0)
MTH 111 concurrently. Students may not receive credit in both 110 and 120.
FORTRAN programming, number systems and basic computer structure. Applications from engineering, mathematics and physical science.
- 255. Computer Models in Science and Engineering**
Spring. 3(3-0) 110 or 120 or equivalent FORTRAN. Interdepartmental with and administered by the Mechanical Engineering Department.
Problem-solving; development of student's ability to formulate computable models based on finite physical elements, examples from statics, dynamics, electrical resistance, and conduction heat transfer.
- 300. Computer Programming**
Fall, Winter, Spring, Summer. 3(2-1) 110 or 120; MTH 108 or 111.
Development and implementation of numeric and non-numeric algorithms using FORTRAN. Number systems and representations of data. Concepts of storage, processors and compilers.
- 305. List Processing Languages**
Winter. 3(3-0) 300 or approval of department.
Development and implementation of computer programs in string and list processing languages.
- Emphasis upon non-numeric applications. Structure of a simple list processing language. Comparison of list processing languages.
- 306. COBOL Programming**
Spring. 3(3-0) 110 or 120.
The mechanics of COBOL, a business data processing language; presented with illustrative problems.
- 311. Assembly Language and Machine Organization**
(301.) Fall, Winter. 4(3-1) 300.
Machine structure, registers and operations. Programming in assembly language. Discrimination of assembler, loader and execution tasks. Comparison with interpretive processing. Introduction to program and data structures. Subprogram linkage.
- 312. Generative Coding and Information Structures**
(302.) Winter, Spring. 4(3-1) 311.
Macro facilities, conditional assembly, interaction with monitor, assembly language I/O. Use of buffer, stack, queue, deque, tree and list data structures. Interpreters, recursive routines.
- 313. Introduction to System Programming**
(303.) Fall, Spring, Summer. 4(3-1) 312.
Loaders and operating systems. Study of existing batch and time-sharing systems. Design and implementation of part of an operating system. Segments, overlays, multi-processing and multi-programming.
- 321. Introduction to Discrete Structures**
Fall, Winter. 3(3-0) 300, MTH 113.
Set operations, relations and functions. Deductive and mathematical proofs. Algebraic systems. Applications to computer science.
- 322. Introduction to Theory of Computing**
Winter, Spring. 3(3-0) 321.
Finite-state machines, Turing machines. Effective procedures and algorithms. Symbol manipulation systems.
- 411. Information Theory**
Winter. 3(3-0) 110 or 120; 322 recommended; STT 351 or 441.
Measures of information content and flow. Channel capacity and theoretical limits on information transmission. Applications to coding and computer related studies.
- 421. Combinational Circuits**
Fall. 3(3-0) 300, 321; 322 desirable; MTH 215.
Combinational circuits. Minimization, multiple output, NAND-NOR implementation and iterative circuits.
- 422. Sequential Circuits**
Winter. 3(3-0) 311, 421.
Synchronous and asynchronous machines. State minimization, flip-flops, Boolean equations, races and hazards.
- 423. Computer Architecture**
Spring. 3(3-0) 422.
Computer arithmetic algorithms, memory systems, computer design, input-output system design, digital system simulation.
- 451. Mechanical Language I**
Fall. 3(3-0) 311; MTH 215; 321 or PHL 337 and MTH 324; 322 recommended.
Classification of grammars and their properties. BNF, trees, relations, top-down parsing. Simple precedence grammars using matrix techniques.

452. Mechanical Language II

Winter. 3(3-0) 451.

Floyd-Evans productions. Assignment of a two-term project on compiler writing. Lexical analysis, semantics, register allocation, code of optimization, hashing and other searching techniques. Dynamic storage techniques.

453. Mechanical Language III

Spring. 3(3-0) 452.

Finite state automata; pushdown automata. Extended precedence grammars. Precedence functions. LR(K) grammars; LL(K) grammars. Bounded context techniques.

490. 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 8 credits. Approval of department.

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, generation of random variables, 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 Combinational 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; decomposition; 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-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.