

350. Signs and Sign-Behavior I
Fall, Winter, Spring, Summer. 4(4-0)
100; majors must enroll in 350R concurrently.
Theories of man's symbolic behaviors. Semiotics and general semantics.

350R. Signs and Sign-Behavior II
Fall, Winter, Spring, Summer. 1 credit.
Majors. 350 concurrently.
In-depth consideration of signs and sign behavior.

351. Message Analysis
Winter. 4(4-0) 350.
Methods of describing messages and message codes, with emphasis on the concept of information.

352. Non-Verbal Communication
Spring. 4(4-0) 350.
Continuation of 351, with emphasis on non-verbal codes: gesture, expression, time and space, light.

360. Critical Perspectives on Communication
Fall, Winter, Spring. 4(3-0) 100.
Interdependence of communication and other societal factors, emphasizing criteria for ethical and social appropriateness.

399. Seminar
Fall, Winter, Spring, Summer. 4(4-0)
Majors only. 360.
Contemporary issues in communication.

405. Research in Communication Strategies and Styles
Fall, Spring, Summer. 5(5-0) Seniors.
300.
Research literature in communication strategies and styles.

413. Seminar in Communication Education
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. Behavioral Research in Mass Communication
Fall, Spring. 4(4-0)
Current behavioral science theories and research, e.g., media institutions, decision-making, mass media exposure patterns, diffusion of news and influence, effective message strategies, political communication, and mass media in socialization.

822. Interpersonal Communication
Winter, Summer. 4(3-0)
Current theories and research in interpersonal communication with emphasis on persuasion. The role of interpersonal communication in such processes as conflict resolution and information exchange will be considered.

828. Cross-Cultural Communication
Winter, Spring, Summer. 4(4-0)
Role of communication in the economic, social and political development of less developed countries. Problems in communicating across cultural boundaries.

830. Nonverbal Communication
Fall. 4(4-0)
A review of theory and empirical research on nonverbal communication with implications for application.

850. Seminar in Research Utilization
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
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.

COMMUNICATION ARTS CAC (COLLEGE OF)

492. Special Topics
Fall, Winter, Spring. 3 to 5 credits. Approval of department.
Varied topics pertaining to the study of communication processes.

892. Special Topics
Fall, Winter, Spring. 3 to 5 credits. Approval of department.
Varied topics pertaining to advanced study of communication processes.

999. Research
(COM 999.) Fall, Winter, Spring, Summer. Variable credit. Approval of department.
Dissertation research for the doctoral programs in Communication and in Mass Media.

COMMUNITY MEDICINE* C M

College of Osteopathic Medicine

510. Health Behavioral Science I
Fall. 2(1-3)
Relationship of the basic concepts of the social behavioral and behavioral sciences that influence health and medical care. Consideration is given to the impact of social and cultural factors on health behavior.

511. Health Behavioral Science II
Winter. 2(1-3) 510 or approval of department.
Continuation of 510. The mental health issues of today in relation to the dynamics of change and resistance. Concepts of personality development, equilibrium, reaction to stress, reaction to authority, and dependency communication and patient education; the art of communication and interviewing; physician-patient relationships; integration of patient education with medical care services.

512. Health Behavioral Science III
Spring. 2(1-3) 511 or approval of department.
The diagnosis and treatment of various forms of deviant behavior, i.e. alcoholism, neuroses, character disorders, sexual deviations, schizophrenia, affective psychoses, organic and psychosomatic conditions, and mental subnormality. Preceptorship in community mental health.

513. Health Behavioral Science IV
Summer. 2(1-3) 512 or approval of department.
Community-based health surveys. Continuation of preceptorship in community mental health.

514. Health, Medical Care, and Society I
Fall. 2(1-3) 513 or approval of department.
A historical review of medical care programs in the United States. Introduction to health care organization and delivery; health care facilities and financing of medical care; comparative health care systems. Manpower development and utilization; politics of health care; elements of community health planning. Practica on health care agencies and programs.

*Established July 1, 1972.

**Descriptions — Community Medicine
of
Courses**

515. Health, Medical Care, and Society II
Winter. 2(1-3) 514 or approval of department.

Continuation of 514. Medical economics and finance for the general practitioner. Principles of medical management. Field placements with health care agencies and programs.

516. Health, Medical Care, and Society III
Spring. 2(1-3) 515 or approval of department.

Clerkship in community medicine. Consideration is also given to patient care issues. Practical problems of health care delivery are analyzed which occur in clerkship. Some issues are explored directly with the principal parties involved.

517. Health, Medical Care, and Society IV
Summer. 2(1-3)

Community-based studies of health care delivery systems.

620. Directed Studies in Community Medicine

Fall, Winter, Spring, Summer. 1 to 6 credits. May re-enroll for a maximum of 24 credits. Approval of department.

Individual projects on special problems related to community medicine.

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.

124. APL-Computer Programming for Scientists

Fall, Winter, Spring. 3(3-0) LBC 112 or concurrently. Interdepartmental with and administered by Lyman Briggs College.

APL programming; interactive programming techniques; arithmetic, logical, and extended APL operators; functions, applications to concurrent topics in mathematics; principles of operators of time-shared computers.

130. Computers in Society
Fall. 3(2-1)

A non-technical introduction to computers, programming, applications and to the computer revolution. Topics: automation, data banks, privacy, the engineered society.

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.

290. Special Problems

Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 9 credits in 290 and 490 combined. Approval of department.

Independent undergraduate research in computer science.

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.
MTH 113 or concurrently, or approval of department.

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.
MTH 214 or concurrently or approval of department.

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, functions and mappings. Boolean algebra, Boolean matrices, truth tables, minimization. Propositional and predicate calculus, well formed formulas, precedence relations, quantifiers. Applications to computer science.

322. Introduction to Theory of Computing

Winter, Spring. 3(3-0) 321, MTH 215 or 334.

Finite-state machines, stack automata, Turing machines. Effective procedures and computability. Introduction to recursive functions. 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) 311 and 321 or approval of department.

Combinational circuits, Minimization, multiple output, NAND-NOR implementation and iterative circuits.

422. Sequential Circuits

Winter. 3(3-0) 322 or approval of department, 421.

Synchronous and asynchronous machines. Boolean equations, state minimization, races and hazards. Regular expressions, Moore and Mealy models.

423. Computer Architecture

Spring. 3(3-0) 422.

Computer arithmetic algorithms, memory systems, computer design, input-output system design, digital system simulation.

447. Digital Filtering

Spring. 3(3-0) 300, MTH 215.

Background. Sampling theorems. Discrete linear systems. The digital filter. Digital filter design. Discrete Fourier transforms. Applications and generalizations.

451. Design of Language Processors I

Fall. 3(3-0) 313 or concurrently, 322.

Relation between languages and automata. Properties of grammars. Lexical analysis and symbol-table management. Syntactic analysis using top-down parsing, precedence, LR(k) and LL(k). Preliminary design of a compiler.

452. Design of Language Processors II

Winter. 3(3-0) 451.

Continuation of 451. Semantics and generation of intermediate code. Pragmatics of code optimization, register allocation and machine code generation. Macro facilities, compiler generators and interpreters. Implementation of designed compiler.

453. Design of Language Processors III

Spring. 3(3-0) 452.

Continuation of 452. Readings from the current literature. Completion of compiler project.

490. Special Problems

Fall, Winter, Spring, Summer. 1 to 5 credits. May re-enroll for a maximum of 9 credits in 290 and 490 combined. 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.