

848. Transportation Models

Spring. 3(3-0) 448.

Analysis of transportation modeling process, including error propagation and parameter sensitivity analysis. Comparative attributes of zonal size and model sequence decisions on the evaluation of system alternatives.

880. Special Problems in Civil Engineering

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

Research problems of limited scope not pertaining to thesis accomplished under 899 or 999.

899. Research

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

905. Advanced Theory and Design of Reinforced Concrete II

Spring. 3(3-0) 805.

Continuation of 805 with application of theory to analysis and design of tanks, rigid frames, and shells.

906. Advanced Structural Steel Design

Spring. 3(3-0) 406.

Analysis and design of multiple-story building frames, continuous trusses and rigid-frame girder bridges in structural steel. Plastic design.

909. Elastic Thin Shells

Spring. 4(4-0) 804 or MMM 815 or approval of department; MTH 421. Interdepartmental with the Department of Metallurgy, Mechanics and Materials Science.

Elements of differential geometry, membrane theory of shells, Fucher's stress function, deformation and bending of shells of revolution and shallow shells.

912. Theory of Plates

Winter. 4(4-0) 804 or MMM 815 or approval of department; MTH 422. Interdepartmental with and administered by the Department of Metallurgy, Mechanics and Materials Science.

Bending of thin elastic plates with various shapes and boundary conditions; application of energy principles and approximate methods of solution; thick plates; large deflection theory; sandwich plates.

915. Earth Structures

Spring. 3(3-0) 817 or approval of department.

Embankments, earth dams, natural and cut slopes, stability of circular and composite slip surfaces; performance of embankments on soft foundations; seepage through earth dams; instrumentation for field performance evaluation.

916. Soil Dynamics

Winter. 3(3-0) 817 or approval of department.

Characteristics of ground motions during earthquakes; dynamic soil properties; liquefaction and settlement under transient and repeated loadings; foundation design for vibratory loads; wave propagation in soil media.

941. Mass Transit Routing and Scheduling

Fall of even-numbered years. 3(3-0) 848 or approval of department.

Routing algorithms for mass transit vehicles in urban networks; dispatching of vehicles by dynamic programming and other algorithms; variable headway, variable route transit system studies.

999. Research

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

Sanitary Engineering

S E

802. Physical Chemical Processes of Environmental Engineering

Fall. 4(3-3) CE 481 or concurrently.

Analysis of physical and chemical principles which form the basis of air and water pollution control and solid waste disposal; process dynamics, sedimentation, coagulation, filtration, adsorption, absorption, oxidation.

804. Biological Processes of Environmental Engineering

(906.) Winter. 5(4-3) MPH 200, CE 280, S E 802.

Aerobic and anaerobic degradation of liquid and solid wastes. Biochemical reactions; activated sludge and trickling filter kinetics; sludge digestion and composting.

812. Water Treatment Plant Design

(805.) Winter. 4(3-3) CE 370, 483, 828, S E 802.

Theory and design of water treatment processes. Coagulation and flocculation; softening; sedimentation; filtration; disinfection.

814. Wastewater Treatment Plant Design

(806.) Spring. 4(3-3) CE 370, 483, 828, S E 804.

Theory and design of wastewater treatment processes. Racks, screens, sedimentation basins, trickling filters, aeration tanks, digesters.

816. Treatment of Industrial Wastes

(803.) Spring. 3(3-0) 804.

Theory of industrial waste management. Application of physio-chemical and biological treatment to selected industries. Examples include: apparel; food processing; materials processing and chemical industry.

822. Air Resource Management

Fall of even-numbered years. 4(4-0) 802 or concurrently.

Characteristics of air contaminants and noise; sources and source inventory; microclimatology and pollutant transport; pollutant effects, introduction to sampling and control.

899. Research

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

922. Air Pollution Control

Winter of odd-numbered years. 4(3-3) CE 321; S E 802, 822.

Application of physical and chemical principles to control of gaseous and particulate air pollutants. Cyclones, bag houses, electrostatic precipitators, adsorption, absorption, combustion.

924. Air Sampling and Analysis

Spring of odd-numbered years. 4(3-3) 922.

Theory and design of air sampling programs. Quantitative analysis of ambient air samples and stack samples. Analysis for sulfur oxides, nitrogen oxides and particulates.

999. Research

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

CLASSICAL STUDIES

See Romance and Classical Languages

COMMUNICATION COM

College of Communication Arts and Sciences†

100. Human Communication I

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

Process and functions of communication. Principles underlying communication behavior. Practice in analyzing communication situations and in speaking and writing.

101. Human Communication II

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

Continuation of 100, with greater emphasis on speaking and writing, and on analyzing increasingly complex communication situations.

115. Oral Communication

Fall, Winter, Spring, Summer. 3(3-0) 100 or approval of department.

Principles and practice in adapting to audiences, creating and structuring messages, and developing effective delivery of formal and informal speeches. Critical evaluation of speeches by instructor and peers.

199. Methods of Inquiry

Fall, Winter, Spring, Summer. 3(3-0) Majors and minors only. 101.

Major theoretic orientations toward communication. Primary tools of scholarly inquiry.

205. Persuasion

Fall, Winter, Spring, Summer. 4(4-0) 101.

Process of influencing human behavior through persuasive communication. Experience in creating persuasive messages and in evaluating the acceptability of persuasive attempts.

210. Leadership

Fall, Winter, Spring. 4(4-0) 100.

Principles and practice in the utilization of communication for effective leadership.

299. Individual Projects

Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 15 credits. 199, approval of project proposal by department.

Independent research, experience in communication laboratories, or tutorial work in communication skills.

300. The Effects of Mass Communication I

Fall, Winter, Spring, Summer. 4(3-0) Majors must enroll in 300R concurrently.

Major social effects of mass media on audience behavior. Political communication. Media effects on children. Message strategies producing attitude change. Interrelationship between mass media and interpersonal communication. Decision making in mass media.

300R. Effects of Communication II

Fall, Winter, Spring, Summer. 1 credit. Majors. 300 concurrently.

In-depth consideration of effects of communication.

†Name changed effective July 1, 1975. Formerly College of Communication Arts.

**Descriptions — Communication
of
Courses**

315. Organizational Communication
Spring. 4(4-0) 101.

Principles and practice in the management of communication systems, with emphases on conflict resolution, information exchange, innovativeness, and information management.

326. Communication in Business
(BIO 326.) Fall, Winter, Spring, Summer. 4(4-0) Juniors.

Study and analysis of business and industrial communication problems; extensive instruction and practice in writing.

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. Special Topics in Communication
Fall, Winter, Spring, Summer. 4(4-0) May re-enroll for a maximum of 8 credits. Juniors. Contemporary issues in communication.

405. Quantitative Strategies in Communication Research
Fall, Spring. 5(5-0) Seniors.

Design and statistical strategies in communication research. Project design and evaluation schema. Basic data handling and presentation.

410. Classroom Communication
Spring. 3(3-0) Majors and minors or approval of department.

Classroom as a communication system with emphasis on operationalizing philosophies of education in the environment, teacher and student roles and styles, affective and cognitive interactions, methods of systematic observation.

411. Directing the Debate and Forensic Program
Fall. 3(3-0) Major and minors or approval of department.

Principles of and practice in argumentation; methods of coaching debate and individual events and managing tournaments; observation of high school tournaments, practices, and student congress.

413. Seminar in Communication Education
Winter, Summer. 4(4-0) ED 327.

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. 4(5-0) 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
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. 5(4-2) May re-enroll for a maximum of 15 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 AND SCIENCES* CAS (COLLEGE OF)

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

892. Special Topics
Fall, Winter, Spring, Summer. 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.

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