

905. Advanced Theory and Design of Reinforced Concrete II
Spring. 3(3-0) C E 805.

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

906. Advanced Structural Steel Design
Spring. 3(3-0) C E 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) C E 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, Pucher's stress function, deformation and bending of shells of revolution and shallow shells.

912. Theory of Plates
Winter. 4(4-0) C E 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 Structure
Spring. 3(3-0) C E 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. 4(4-0) C E 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.

921. Porous Media Flow II
Winter of odd-numbered years. 3(3-0) C E 809, C E 821.

Mathematical formulations for unsteady groundwater flows and convection/dispersion phenomena. Emphasis placed upon finite-difference and finite-element solution techniques, computer based analysis of field data, and design applications.

941. Urban Public Transport: Issues and Technology
Fall of odd-numbered years. 3(3-0) Approval of department.

Planning and operating urban transportation systems; system technology. Regional and rapid rail systems, light rail, buses, paratransit, transportation system management.

999. Doctoral Dissertation Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

Environmental Engineering ENE

800. Environmental Engineering Seminar
(S E 800.) Fall, Winter, Spring. 1(1-0)
May reenroll for a maximum of 3 credits. Graduate major in C E or ENE.

Current research, reports, and literature reviews.

802. Physical Chemical Processes of Environmental Engineering
(S E 802.) Winter. 5(4-3) C E 483.

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
(S E 804.) Winter. 4(4-0) MPH 200, ENE 802.

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

805. Biological Waste Treatment Laboratory
(S E 805.) Spring. 1(0-3) ENE 804.

Treatability studies to develop parameters for design of biological waste treatment systems; reactor kinetics; oxygen uptake; sludge settling rate; biomass production.

816. Hazardous and Industrial Waste Management
(S E 816.) Fall. 3(3-0) Approval of department.

RCRA; waste and process survey, sampling and analysis; treatability studies; process modification; advanced treatment processes; case studies; field trips to industrial sites required.

822. Air Resource Management
(S E 822.) Spring of even-numbered years. 4(4-0) ENE 802.

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

832. Solid Waste Management
(S E 832.) Spring of odd-numbered years. 4(4-0) C E 485 or approval of department.

Generation rates; storage; collection; transfer and transport; processing; resource recovery; landfill; siting; design; operation; closure and monitoring; hazardous waste.

880. Special Problems in Environmental Engineering
(S E 880.) Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 12 credits in C E 880 and ENE 880 combined. Approval of department.

Solution of environmental engineering problems, of limited scope not pertaining to thesis.

899. Master's Thesis Research
(S E 899.) Fall, Winter, Spring, Summer. Variable credit. Approval of department.

916. Advanced Environmental Control
(S E 916.) Spring. 4(1-9) ENE 804.

Design of advanced methods for control of environmental pollutants.

999. Doctoral Dissertation Research
(S E 999.) 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
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.

115. Oral Communication
Fall, Winter, Spring, Summer. 3(3-0) COM 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.

125. Interpersonal Communication
Fall, Winter, Spring, Summer. 3(3-0) COM 100.

Develop students' abilities to become more effective, responsible participants in interpersonal communication relationships, with emphasis on relating communicatively with others.

199. Methods of Inquiry
Fall, Winter, Spring, Summer. 3(3-0) COM 125.

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

205. Persuasion
Fall, Winter, Spring, Summer. 4(4-0) COM 100.

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

210. Leadership and Group Communication
Fall, Winter, Spring, Summer. 4(4-0) COM 100.

Principles and practice in the utilization of communication for effective leadership, with special emphasis on group communication.

250. Argumentation
Fall, Winter, Spring. 4(4-0) COM 199.

Development and use of arguments; recent perspectives in argumentation; rhetorical and empirical study of argumentative messages.

**Descriptions — Communication
of
Courses**

299. Individual Projects

Fall, Winter, Spring, Summer. 1 to 15 credits. May reenroll for a maximum of 15 credits. COM 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

Fall, Winter, Spring, Summer. 4(4-0) Interdepartmental with and administered by the Department of Telecommunication.

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.

315. Organizational Communication

Fall, Winter, Spring. 4(4-0) COM 100. Principles and practice in the management of communication systems, with emphases on conflict resolution, information exchange, innovativeness, and information management.

326. Communication in Business

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

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

Theories of symbolic behavior. Language structure and communicative functions.

352. Nonverbal Communication

Fall. 4(4-0) COM 100. Major nonverbal communication codes and functions they perform. Codes: body movement, touch, physical appearance, paralanguage, use of space, time, artifacts. Opportunities to analyze nonverbal communication of self and others.

399. Special Topics in Communication

Fall, Winter, Spring, Summer. 4(4-0) May reenroll for a maximum of 8 credits. Juniors. Contemporary issues in communication.

405. Quantitative Strategies in Communication Research

Fall, Spring. 4(4-0) 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) Majors 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 growth.

413. Seminar in Communication Education

Winter, Summer. 4(4-0) T E 322. Philosophies of curricular and co-curricular programs in communication education. Internship experience in those programs.

425. Communication Campaign Analysis

Fall. 4(4-0) COM 300 or approval of department. Design of persuasive and information campaigns. Techniques and strategies for analyzing and influencing mass audience. Principles and practice in constructing messages and selecting media. Political and public service campaign focus.

430. Information and Technology

Winter. 4(4-0) COM 315 or approval of department. Concepts and principles of information and information technology, with emphasis on effects on organizational processes.

431. Conflict in Communication

Winter. 4(4-0) COM 125 or approval of department. Elaboration of theories in conflict resolution; development of strategies to resolve conflict situations; personal analysis of communication patterns that can affect conflict.

460. Critical Perspectives on Communication

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

475. Relational Communication

Spring. 4(4-0) COM 125. Theories and current research on relational communication, including stages of relational communication development; verbal and nonverbal relational messages of intimacy, similarity, arousal, privacy and dominance; role of culture and context.

499. Special Projects

Fall, Winter, Spring, Summer. 1 to 15 credits. May reenroll for a maximum of 15 credits. Approval of project proposal by department. Independent research, group research, student-directed group projects.

805. Communication Research

Fall. 4(4-0) First year graduate 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

Fall. 4(4-0) COM 805; second year graduate majors. Continuation of COM 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. 4(4-0) 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) Interdepartmental with and administered by the Department of Telecommunication. 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(4-0) Current theories and research in interpersonal communication. The role of interpersonal communication in such processes as conflict resolution and information exchange will be considered.

828. Cross-Cultural Communication

Fall, 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

Winter. 4(4-0) A review of theory and empirical research on nonverbal communication. Emphasis on social functions such as impression management, regulation and social influence.

860. Persuasive Communication

Spring. 4(4-0) Use of communication to gain compliance and effect social change. Study of persuasion and attitude change from classical theories to contemporary situations.

870. Communication and Change: The Diffusion of Ideas and Information

Fall, Winter. 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.

880. Message Behavior, Signs and Communication

Spring. 4(4-0) Language and message behavior. The nature of messages, their structure, and the contexts (e.g. dyads, groups, organizations) that promote certain message behavior.

890. Special Problems

Fall, Winter, Spring, Summer. 1 to 6 credits. Approval of department. Special problems as arranged with instructor.

899. Master's Thesis Research

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

905. Communication Research Design
Fall, Winter, Spring. 4(4-0) May reenroll for a maximum of 16 credits.

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. 2 to 8 credits. May reenroll 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. Doctoral Dissertation Research

Fall, Winter, Spring, Summer. 1 to 36 credits. Approval of department.

COMMUNICATION ARTS AND SCIENCES CAS (COLLEGE OF)

492. Special Topics

Fall, Winter, Spring, Summer. 1 to 6 credits. Approval of department.

Varied topics pertaining to the study of communication processes.

892. Special Topics

Fall, Winter, Spring, Summer. 1 to 6 credits. Approval of department.

Varied topics pertaining to advanced study of communication processes.

999. Doctoral Dissertation Research

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

Dissertation research for the doctoral program in Mass Media.

COMMUNITY HEALTH SCIENCE CMS

**College of Human Medicine
College of Osteopathic Medicine**

512. Epidemiology and Biostatistics

Fall. 2 to 5 credits. Admission to a college of medicine or approval of department.

Epidemiology and biostatistics in clinical medicine and health care delivery. Evaluation of medical investigations. Applicability to preventive medicine and health maintenance. Field experiences and seminars in community medicine.

513. Medical Jurisprudence

Fall. 2 to 5 credits. Admission to a college of medicine or approval of department.

Basic concepts of the legal process and the health care system. Law suits, malpractice, statutory and case law. Insurance and tax consideration. Continuing field experiences and seminars in community medicine.

514. Topics and Issues in Health Care Delivery

Fall. 2 to 5 credits. Admission to a college of medicine or approval of department.

Medical economics, health care financing and organization, personnel utilization, resource allocation, health services administration, patterns of medical practice, politics of health care. Continuing field experiences and seminars in community medicine.

518. Aging: Clinical and Community Perspectives

Spring. 4(3-3) Medical student or approval of instructor.

Multi-dimensional aspects of aging and their application to long-term, continuing care of the chronically ill older adult.

519. Health Education in Clinical Settings

Spring. 3(2-3) Approval of instructor.

Application of concepts from social and behavioral sciences to clinical health education through laboratory and classroom experiences including development of a model educational plan for a specific health problem.

520. Biostatistical and Epidemiological Reasoning

Fall. 4(4-0) Approval of instructor. Interdepartmental with the Department of Statistics and Probability.

Concepts and principles from biostatistics and epidemiology to facilitate critical reading literature relevant to clinical medicine and community health. Emphasis on design and interpretation.

521. Evaluation of Health Services

Spring. 2 to 4 credits. Approval of instructor. Interdepartmental with the College of Nursing.

Use of experimental and quasi-experimental designs. Cost benefit and efficiency models. Assessment of health services delivery.

522. Principles of Gerontology for Medical Practice

Spring. 3(3-0) Admission to a college of medicine or approval of department.

An introductory course relating the biological, psychological and social implications of aging to health care of elderly.

530. Care of the Elderly

Fall, Spring. 3(2-2) Student in H M, OST or other clinical program or approval of instructor. Interdepartmental with and administered by the Department of Family Practice.

Case studies of the care of the elderly based on the physician patient-interaction with elderly persons and their families. Family systems applications to health care. Associated clinical experience.

543. Health and Adaptation of the Elderly

Fall. 3(3-0) Baccalaureate degree in health science; approval of instructor. Interdepartmental with and administered by the College of Nursing.

Health and adaptation of the aged individual experiencing the normative biophysiological and psychodevelopmental changes related to the aging process.

590. Special Problems in Community Medicine

Fall, Winter, Spring, Summer. 1 to 8 credits. May reenroll for a maximum of 32 credits. Approval of department.

Each student will work under direction of a faculty member on an experimental, theoretical or applied problem.

600. Preventive Medicine and Public Health Clerkship

Fall, Winter, Spring, Summer. 2 to 12 credits. Successful completion of first two years of medical school.

Clinical and community experiences in personal and community health services, environmental health, and other health and medical programs which meet health needs of various population groups.

605. Occupational Health Clerkship

Fall, Winter, Spring, Summer. 6 to 12 credits. May reenroll for a maximum of 12 credits. Grade P in all courses offered in terms 1 through 8.

The occupational health program in an industrial setting. Exposure to delivery of medical care to workers, treatment of industrial accident injuries. Review of safety and preventive medicine programs.

610. Geriatric Clerkship

Fall, Winter, Spring, Summer. 2 to 12 credits. Successful completion of first two years of medical school.

Clinical and community experiences including history taking, patient assessment, development and use of management and care plan and use of community resources for the long term care of the aged.

619. Clinical Health Education Clerkship

Fall, Winter, Spring, Summer. 6 to 12 credits. May reenroll for a maximum of 12 credits. Grade P in all courses offered in terms 1 through 8.

Clinical experiences for developing and applying skills in patient and family health education. Identification of behavioral components of health care. Assessment of educational needs of patient and family.

620. Directed Studies in Community Medicine

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

Individual projects on special problems related to community medicine.

630. Alcoholism Clerkship

Fall, Winter, Spring, Summer. 2 to 12 credits. May reenroll for a maximum of 12 credits. COM students: Satisfactory completion of terms 1 through 8. CHM students: Satisfactory completion of Phase II.

Diagnosis, inpatient and outpatient management of alcoholics.