

**Descriptions – Civil and Sanitary Engineering
of
Courses**

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 C E 899 or C E 999.

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

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.

941. Mass Transit Routing and Scheduling
Fall of even-numbered years. 3(3-0) C E 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. Doctoral Dissertation Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

Sanitary Engineering S E

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

802. Physical Chemical Processes of Environmental Engineering
Fall. 5(4-3) C E 481, C E 483 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
Winter. 4(4-0) MPH 200, 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
Winter. 4(3-3) C E 370, C E 483, C E 828, S E 802.
Theory and design of water treatment processes. Coagulation and flocculation; softening; sedimentation; filtration; disinfection.

814. Wastewater Treatment Plant Design
Spring. 4(3-3) C E 370, C E 483, C E 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
Spring. 4(3-3) S E 804.
Theory of industrial waste management. Application of physico-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) S E 802 or concurrently.
Characteristics of air contaminants and noise; sources and source inventory; microclimatology and pollutant transport; pollutant effects, introduction to sampling and control.

880. Special Problems in Environmental Engineering
Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 12 credits in C E 880 and S E 880 combined. Approval of department.
Solution of environmental engineering problems, of limited scope not pertaining to thesis.

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

922. Air Pollution Control
Winter of odd-numbered years. 4(3-3) C E 321, S E 802, S E 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) S E 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. Doctoral Dissertation 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) COM 100.
Continuation of COM 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) 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.

199. Methods of Inquiry
Fall, Winter, Spring, Summer. 3(3-0) Majors and minors only. COM 101.
Major theoretic orientations toward communication. Primary tools of scholarly inquiry.

205. Persuasion
Fall, Winter, Spring, Summer. 4(4-0) COM 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, Summer. 4(4-0) COM 100.
Principles and practice in the utilization of communication for effective leadership.

299. Individual Projects
Fall, Winter, Spring, Summer. Variable credit. 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 I**
Fall, Winter, Spring, Summer. 4(3-0)
Majors must enroll in COM 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. COM 300 concurrently.
In-depth consideration of effects of communication.
- 315. Organizational Communication**
Fall, Winter, Spring. 4(4-0) COM 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**
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)
COM 100; majors must enroll in COM 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. COM 350 concurrently.
In-depth consideration of signs and sign behavior.
- 351. Message Analysis**
Winter. 4(4-0) COM 350.
Methods of describing messages and message codes, with emphasis on the concept of information.
- 352. Non-Verbal Communication**
Fall. 4(4-0) COM 350.
Continuation of COM 351, with emphasis on non-verbal codes: gesture, expression, time and space, light.
- 360. Critical Perspectives on Communication**
Fall, Winter, Spring. 4(3-0) COM 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 reenroll 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) 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 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) COM 101.
Principles and practice in message-media construction and selection.
- 499. Special Projects**
Fall, Winter, Spring, Summer. Variable credit. 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)
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**
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 with implications for application.
- 850. Seminar in Research Utilization**
Summer. 4(3-0) May reenroll 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.
- 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. Variable credit. May reenroll for a maximum of 45 credits. Approval of department.
Theoretic and research issues in communication.

**Descriptions - Communication
of
Courses**

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**

510. Health, Medical Care and Society
Summer. 2 to 5 credits. Admission to a college of medicine or approval of department.
The role of social, cultural and psychological variables in health and illness and in health care delivery. Special attention to patient/physician behavior and health maintenance, health education and patient compliance.

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 I
Summer. 2 to 5 credits. Admission to a college of medicine or approval of department.
Medical economics, health care financing and organization, manpower utilization, resource allocation, health services administration, patterns of medical practice, politics of health care. Continuing field experiences and seminars in community medicine.

515. Topics and Issues in Health Care Delivery II
Fall. 2 to 5 credits. Admission to a college of medicine or approval of department.
Continuation of CMS 514.

516. Field Experience in Community Medicine I
Winter. 1 to 5 credits. Admission to a college of medicine or approval of department.
Continuation of CMS 515 field experiences and seminars.

517. Field Experience in Community Medicine II
Spring. 1 to 5 credits. Admission to a college of medicine or approval of department.
Continuation of CMS 516 field experiences and seminars.

518. Aging: Clinical and Community Perspectives
(H M 534.) 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.

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.

607. Ambulatory Care Clerkship
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 9 credits. H M 602. Interdepartmental with the departments of Family Practice, Medicine, and Pediatrics and Human Development. Administered by the Department of Family Practice.
Outpatient experience, lasting an equivalent of 48 half days over a period of six months or more, emphasizing continuous and comprehensive patient care under the supervision of appropriate physicians.

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.