Description — Civil and Environmental Engineering
der of Courses

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

801. Dynamics of Environmental Systems
Fall. 4(4-0) ECE 481.
Thermodynamics, kinetics, and mass transfer of environmental transformations; environmental modeling, systems analysis, reactor theory, and process design. Applications to air, water and soil pollution, waste treatment, and hazardous waste management.

802. Physical Chemical Processes of Environmental Engineering
May reenroll for a maximum credit. Graduate major in C E or ENE.
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 200.
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 pollution transport; pollutant effects, introduction to sampling and control.

832. Solid Waste Management
(S E 832.) Spring of odd-numbered years. 4(4-0) ECE 485 or approval of department.
Generation rates; storage, collection; transfer and transporation system management; 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 15 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(4-0) ENE 804.
Design of advanced methods for control of environmental pollutants.

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
Fall, Winter, Spring, Summer. 3(3-0).
Principles underlying human communication behavior. Practice in analyzing communication situations and in speaking and writing.

115. Oral Communication
Fall, Winter, Spring. 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; resistant perspectives in argumentation; rhetorical and empirical study of argumentative messages.

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. 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 emphasis on conflict resolution, information exchange, innovativeness, and information management.

326. Communication in Business
Fall, Winter, Spring. 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 function.

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 repeat 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 congress.

413. Seminar in Communication Education
Spring. 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.

450. Fund Raising and Grant Writing
Fall of even-numbered years. 4(4-0) Juniors.
Fund raising for nonprofit organizations: corporate, individual, and foundation giving. Grant writing.

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 135.
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.

825. 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.

889. 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. 1 to 6 credits. Approval of department. Special problems as arranged with instructor.

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

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