

**418 Geotechnical Engineering**  
Fall, Spring. 3(3-0) P:M: (CE 312) R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering.

Shallow foundation design: bearing capacity, stress distribution, and settlement analysis. Pile foundations. Design of retaining structures, including rigid walls, braced excavations, and sheet-pile walls. Stability of slopes and embankments.

**421 Engineering Hydrology**  
Fall. 3(2-2) P:M: (CE 321) RB: (STT 351) R: Open only to juniors or seniors or graduate students in the College of Engineering or College of Natural Science or Department of Crop and Soil Sciences.

Hydrologic design of stormwater systems. Equilibrium hydrograph analysis, unit hydrographs, infiltration, hydrograph synthesis, and reservoir routing. Groundwater: Darcy's law, flow nets, well hydraulics, design of capture wells.

**422 Applied Hydraulics**  
Spring. 3(2-2) P:M: (CE 321 or ME 332) R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering or Department of Mechanical Engineering or in the Biosystems Engineering major.

Fundamentals of open-channel flow. Rapidly and gradually varied nonuniform flow analysis. Confined flows past submerged bodies, in pipe networks, and in turbo machinery. Design applications.

**431 Pavement Design and Analysis I**  
Fall. 3(3-0) P:M: (CE 312 and CE 337) R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering.

Highway and airfield pavement structural design. Performance measures. Failure mechanisms. Popular thickness design procedures. Design considerations for surface friction, pavement joints, and drainage.

**432 Pavement Rehabilitation**  
Spring. 3(3-0) P:M: (CE 312 and CE 337) RB: (CE 431) R: Open only to seniors or graduate students in the Department of Civil and Environmental Engineering.

Engineering concepts and information needed to rehabilitate pavements. Network and project survey and evaluation: design of rigid and flexible overlays, other methods of rehabilitation, selection of rehabilitation alternatives. Initial and life cycle cost analysis of various rehabilitation alternatives.

**444 Principles of Traffic Engineering**  
Fall. 3(3-0) P:M: (STT 351 and CE341) R: Open only to juniors or seniors or graduate students in the Civil Engineering major.

Driver and vehicle characteristics affecting traffic flow and safety. Speed, density, capacity relationships. Signal control in street networks. Freeway management systems. Risk management and liability.

**448 Transportation Planning**  
Spring. 3(3-0) P:M: (CE 341 and STT 351)  
Transportation planning process and procedures. Estimation of travel demand using traditional models of trip generation, trip distribution, modal split, and traffic assignment. Use of "quick-response" procedures. Traffic impact of new facilities.

**449 Highway Design**  
Fall, Spring. 3(3-0) P:M: (CE 341) R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering.

Geometric design of highways. Operation, capacity, safety, and geometric features. Alignment, drainage and pavement design. Use of CAD systems in preparing contract plans.

**462 Technical Communication**  
Spring. 3(3-0) RB: Junior status in a degree program in the College of Engineering.

Major modes of technical communication such as letters, memoranda, research reports, analysis/decision papers, presentations, information graphics, procedures. Communication planning, audience analysis, and information design. Case studies, exercises and writing workshops.

**471 Construction Engineering - Equipment, Methods and Planning**  
Spring. 3(3-0) P:M: (CE 305 and CE 312) or (BCM 305 and BCM 322) R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering and the Building Construction Management program.

Engineering and construction fundamentals of earthwork operations, moving of materials, concrete construction, form work, false work and other temporary structures. Relationship to a construction project's constructability, cost and schedule.

**480 Water and Wastewater Analysis Laboratory**  
Fall. 1(0-3) P:M: (CEM 161 or CEM 185H or LBS 171L) and (CE 481 or concurrently) R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering.

Chemical and microbial analysis of water and wastewater.

**481 Environmental Engineering Chemistry**  
Fall. 3(3-0) P:M: (CEM 151 and CEM 152) or (CEM 181H and CEM 182H) or (LBS 171 and LBS 172) and (CEM 251 or CEM 351)

Chemistry of environmental processes including alkalinity, precipitation-dissolution reactions, chemical complexation and redox reactions. Engineering applications to processing plants for water and wastewater.

**483 Water and Wastewater Treatment**  
Fall. 3(3-0) P:M: (CE 280 and CE 321 or concurrently) R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering.

Distribution of water and collection of sewage. Theory and design of water treatment processes.

**485 Solid and Hazardous Waste Management**  
Spring. 3(3-0) P:M: (CE 280) R: Open only to juniors or seniors or graduate students in the College of Engineering.

Design of solid waste collection and disposal systems. Definition of hazardous waste problems and selection of treatment alternatives.

**487 Microbiology for Environmental Health Engineering**  
Spring. 3(3-0) P:M: (CHE 201) R: Open only to juniors or seniors or graduate students in the College of Engineering or graduate students in the College of Natural Science.

Use and control of microorganisms for the protection of public health and the environment. Thermodynamics of microbial populations and microbial transformations.

**490 Independent Study**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to juniors or seniors in the Department of Civil and Environmental Engineering. Approval of department.

Civil engineering problem of specific interest to the student and a faculty member. May be analysis or design.

**491 Civil Engineering Design Project**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to juniors or seniors in the Department of Civil and Environmental Engineering. Approval of department.

Planning, specification, and design of a civil engineering project or facility.

**492 Selected Topics in Civil Engineering**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Approval of department.

Selected topics related to construction engineering, environmental engineering, fluid mechanics, geotechnical engineering, hydrology, pavements, structural engineering, or transportation engineering.

**495 Senior Design in Civil Engineering**  
Fall, Spring. 3(1-3) P:M: (CE 321 or CE 341) and (CE 280 or CE 337) and (CE3 05 and CE 312) and (CE 405 or CE 406 or CE 485 or CE 418 or CE 421 or CE 422 or CE 431 or CE 444 or CE 448 or CE 449 or CE 483)

Preliminary design. Application of design concepts in civil engineering. Integrated design solutions for situations with geotechnical, hydrological, pavement, structural, environmental and transportation considerations. Planning the design process. Design specifications. Cost. Written and oral presentations.

## CLASSICAL STUDIES CLA

### Department of French, Classics, and Italian College of Arts and Letters

**120 Latin and Greek Roots of English Words**  
Spring of even years. 3(3-0)  
Prefixes, suffixes, and roots of English vocabulary from Greek and Latin word elements.

**140 Greek and Roman Mythology**  
Fall. 3(3-0)  
Introduction to Greek and Roman myths, with emphasis on myth as social discourse and as an influence on ancient poets and thinkers.

**160 Myth, Legend, and J.R.R. Tolkien**  
Spring. 3(3-0)  
Myth and myth-making in Tolkien's The Lord of the Rings and his other works. Ways of reading myth and legends that served as Tolkien's sources and inspiration.

## Classical Studies—CLA

- 210 Greek Civilization**  
Fall. 3(3-0)  
General survey of salient aspects of ancient Greek civilization and modern approaches to its study.
- 211 Roman Civilization**  
Spring. 3(3-0) SA: CLA 310  
Ancient Roman civilizations and modern approaches to their study.
- 292 Introduction to Ancient Studies**  
Fall. 2(1-2) Interdepartmental with Arts and Letters; History of Art; History. Administered by College of Arts and Letters.  
Methods and current trends in the study of the Greek and Roman world. Visits to library and museum collections.
- 350 Greek and Roman Literature in English Translation**  
Fall of even years. 3(3-0) R: Not open to freshmen.  
Representative works of major Greek and Roman authors.
- 360 Ancient Novel in English Translation**  
Spring of odd years. 3(3-0) R: Not open to freshmen.  
Translation of the ancient Greek and Roman novel. Interpretation of assigned novels. The role of popular literature in Greco-Roman society.
- 400 Women in Classical Greek Society**  
Spring of odd years. 3(3-0) Interdepartmental with Women's Studies. R: Not open to freshmen or sophomores.  
Image, role, and status of women in Greek society as seen through literary sources.
- 491 Topics in Classical Studies**  
Spring of even years. 3(3-0) RB: (CLA 210) R: Open only to juniors or seniors.  
Special topics supplement regular course offerings.

- 499 Senior Thesis**  
Fall, Spring. 3(3-0) RB: (LTN 402) R: Approval of department.  
Scholarly research and writing with a focus on specific problems, under faculty supervision.

## COMMUNICATION COM

### Department of Communication College of Communication Arts and Sciences

- 100 Human Communication**  
Fall, Spring, Summer. 3(3-0)  
Process and functions of communication. Principles underlying communication behavior. Practice in analyzing communication situations and in speaking and writing.
- 200 Methods of Communication Inquiry**  
Fall, Spring, Summer. 4(4-0) RB: Completion of University mathematics requirement.  
Nature and conduct of communication inquiry. Significant questions about communication and finding systematic answers.

- 225 An Introduction to Interpersonal Communication**  
Fall, Spring, Summer. 3(3-0)  
Principles and practices of interpersonal communication. Emphasis on effective and responsible interpersonal communication.

- 240 Introduction to Organizational Communication**  
Fall, Spring, Summer. 4(4-0)  
Theories, systems, structures and processes of organizational communication. Organizational cultures. Communication in multinational organizations and in individual, leadership, supervisor-subordinate and small group situations.

- 275 Effects of Mass Communication**  
Fall, Spring, Summer. 3(3-0)  
Major social effects of mass media on audience behavior. Political communication. Media effects on children. Message strategies producing attitude change. Interrelationships between mass media and interpersonal communication.

- 315 Information Gathering and Interviewing Theories**  
Fall of odd years. 3(3-0) P:M: (COM 200 or concurrently) R: Open only to juniors or seniors in the Communication major.  
Information gathering as a relational process. Interaction through the asking and answering of questions.

- 325 Interpersonal Influence and Conflict**  
Fall, Spring. 3(3-0) P:M: (COM 200 or concurrently) R: Open only to juniors or seniors in the Colleges of Business, Communication Arts and Sciences, and Education.  
Theories, processes and models of interpersonal influence and conflict. Conflict resolution, persuasion, and compliance-gaining.

- 340 Leadership and Group Communication**  
Spring. 3(3-0) P:M: (COM 200) R: Open only to juniors or seniors in the Colleges of Business, Communication Arts and Sciences, and Education.  
Theory and research on dyadic and group relations within organizations. Leadership, motivation, networks, decision making, and organizational taxonomy.

- 375 Audience Response to Media Entertainment**  
Spring. 3(3-0) P:M: (COM 200) R: Open only to juniors or seniors in the Colleges of Business, Communication Arts and Sciences, and Education.  
Theory and research on audience responses to media entertainment. Models of audience responses, reactions to violence in media, and children and the media.

- 391 Topics in Verbal, Intercultural, or Gender Communication**  
Fall, Spring. 4(4-0) A student may earn a maximum of 8 credits in all enrollments for this course. P:M: (COM 200) RB: One 200 level course in Communication. R: Open only to juniors or seniors in the Colleges of Business, Communication Arts and Sciences, and Education.  
Verbal interaction, cultural diversity or gender communication.

- 399 Special Topics in Communication**  
Spring. 3(3-0) A student may earn a maximum of 6 credits in all enrollments for this course. P:M: (COM 200) R: Open only to juniors or seniors in the Colleges of Business, Communication Arts and Sciences, and Education.  
Contemporary issues in communication.

- 425 Communication in Close Relationships (W)**  
Fall, Spring. 4(4-0) P:M: (COM 225 or COM 325 or COM 200) RB: Completion of Tier I writing requirement. R: Open only to juniors or seniors or graduate students in the Department of Communication.  
In-depth treatment of current research and of theoretical and methodological issues.

- 440 Organizational Communication Structure (W)**  
Fall. 4(4-0) P:M: (COM 200 and COM 240) RB: Completion of Tier I writing requirement. R: Open only to juniors or seniors or graduate students in the Department of Communication.  
Systems approaches to information processing and communication structures in organizations.

- 475 Communication Campaign Design and Analysis (W)**  
Fall. 4(4-0) P:M: (COM 275 and COM 200) RB: Completion of Tier I writing requirement. R: Open only to juniors or seniors or graduate students in the Department of Communication.  
Design and analysis of campaigns presented through mediated channels including electronic and print media.

- 490 Independent Study**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 3 credits in all enrollments for this course. R: Not open to freshmen or sophomores. Approval of department; application required.  
Directed study under faculty supervision.

- 493 Internship**  
Fall, Spring, Summer. 1 to 7 credits. A student may earn a maximum of 7 credits in all enrollments for this course. R: Open only to juniors or seniors in the Department of Communication. Approval of department; application required.  
Supervised practical experience in a professional environment.

- 494 Practicum in Communication Research and Instruction**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to sophomores or juniors or seniors in the Department of Communication. Approval of department; application required.  
Structured participation in departmental research teams and applied practice in the community.