991. Selected Topics in Quantum Chemistry  
Fall, Winter. 3(3-0) May reenroll for a maximum of 9 credits if different topic is taken. Approval of department.

Principles of quantum mechanics and application to chemical problems. Selected topics from spectroscopy, properties of atoms and molecules in electric and magnetic fields, and theories of molecular electronic structure.

998. Seminar in Physical Chemistry  
Fall, Winter, Spring. 1(1-0) May reenroll for a maximum of 3 credits.

Discussions of recent advances and reports by graduate students on research problems.

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

Research in analytical, inorganic, organic, and physical chemistry.

CHINESE  
See Linguistics and Germanic, Slavic, Asian and African Languages.

CIVIL AND ENVIRONMENTAL ENGINEERING  
(Name change effective July 1, 1985. Formerly the Department of Civil and Sanitary Engineering.)

College of Engineering  

Civil Engineering  

C E  

251. Elementary Surveying  
Spring. 3(3-0) Not open to majors. Use of the tape, compass, level, and transit with simple maps; traverse closure and area computations. Profiles, cross section and stadia surveys, U.S. land system.

252. Surveying I  
Fall, Spring. 3(4-3) Engineering majors or approval of department.

Instruments, theory of measurements, error analysis, stadia, horizontal and vertical curves, U.S. Public Land System, observation for meridian.

290. Introduction to Environmental Engineering  
Fall, Winter, Spring. 4(4-0) CEM 141A, or CEM 251; MTH 112, CPS 112 or CPS 251.

Hydrology; ground water and surface water supply systems; wastewater treatment, methods of pollution control for solid waste, air, and noise.

305. Structural Analysis I  
Fall, Winter. 3(3-0) MME 211.

Stability and determinacy; linearity; Plane trusses; shear and bending in beams and frames. Virtual work calculation of forces and displacements in statically-determinate plane structures.

306. Structural Analysis II  
Winter, Spring. 3(3-0) C E 305.


308. Engineering Materials I  
Fall, Winter, Spring. 4(3-3) MME 211 or concurrently.

Structure; composition; physical, mechanical and rheological properties of non-metallic construction materials. Emphasis on aggregates, asphalt, inorganic cements, concrete, and wood.

312. Soil Mechanics  
Winter, Spring, Summer. 4(3-3) MME 211.

Engineering properties of soils and their measurement. Effective stress concept; permeability; fluid flow in soils; stress-strain behavior; soil strength; compaction and consolidation of soils; field exploration and design problems.

321. Introductory Fluid Mechanics  
Fall, Winter. 4(3-2) MTH 310.

Fluid properties; hydrostatics; control volume approach to conservation of mass, momentum and energy; dimensional analysis and dynamic similitude; fluid resistance, pipe and open channel flows; boundary layer concepts.

346. Transportation  
Winter, Spring, Summer. 4(4-0) MTH 113.

Planning, design, and evaluation of transportation systems; highway, street, and intersection capacity; basic elements of geometric design.

347. Geometric Design of Highways  
Fall, Winter. 3(3-0) C E 346 or concurrently.

Geometric design of streets and highways as related to capacity, construction costs, and safety. State and national design standards and practice.

370. Cost and Optimization Engineering  
Fall, Winter. 3(3-0) MTH 113.

Formulation of engineering decisions governed by current and future costs and returns. Comparison and optimization of alternative engineering projects, products and processes.

372. Construction Estimating  
Fall, Spring. 3(3-0) Juniors.

Cost studies of construction activities with emphasis on labor productivity and operating characteristics of equipment under various site conditions. Interpretation of drawings and specifications.

374. Legal Aspects of Engineering  
Spring. 3(3-0) Juniors.

The professional engineer's relationship with the legal aspects of engineering. Special emphasis on contract documents.

380. Civil Engineering Analysis  
Fall, Spring. 3(3-0) MTH 310, CPS 112.

Analysis of civil engineering problems by numerical methods. Use of microcomputers to analyze problems. Technical reports to present methods and computed results.

392. Civil Engineering Fundamentals for Planners  
Winter. 4(4-0) Junior Urban Planning and Landscape Architecture majors.

Site planning; utility systems; subdivision review including street design, grading, density, and costs; transportation planning, and project evaluation.

400. Structural Mechanics I  
Fall. 4(4-0) C E 306, C E 390.

Miscellaneous topics in displacement calculation by virtual work. Matrix formulation of the general principles of framed structural analysis. Exhaustive study of the flexibility and stiffness methods.

405. Structural Design in Steel  
Fall. Winter, 4(4-0) C E 306 or concurrently, C E 390.

Beams, columns, tension and compression members, connections. Elastic, plastic and ultimate strength concepts.

406. Structural Design in Concrete  


407. Structural Design Concepts  
Spring. 3(3-0) C E 405, C E 406.

Develop and expand design concepts through study, investigation and project design of various structural systems. Criteria for material selection and creative design of unusual structural systems pursued.

410. Structural Mechanics II  
Winter. 4(4-0) C E 400, CPS 112.

Continuation of C E 400. Matrix analysis of framed structures with extensive use of computer programs.

418. Foundation Engineering  
Fall, Spring. 3(3-0) C E 312, C E 390.

Bearing capacity and settlement of shallow foundations; analysis and design of single piles and pile groups; stress distribution in soil masses; site investigation, data evaluation for field and laboratory tests.

419. Stability of Soil Masses  
Winter. 3(3-6) C E 312, C E 390.

Stability of natural and cut slopes; design of embankments and fills; soil placement and compaction; seepage through soil masses; slope stabilization techniques; lateral earth pressures, retaining walls, and braced excavations.

421. Hydrology I  
Fall. 4(3-2) C E 280, C E 321, C E 390.

Engineering hydrology; frequency and precipitation analysis; streamflow analysis and the unit hydrograph; flood prediction; rainfall-runoff correlations; urban hydrology.

422. Open Channel Flow I  
Winter. 3(3-2) C E 321 or M E 333, C E 390 or M E 351.

Fundamentals of free surface flow; steady uniform and nonuniform concepts; energy and momentum principles; subcritical and supercritical regimes; gradually and rapidly varied flows; design applications; laboratory assignments.
Description — Civil and Environmental Engineering

423. Closed Conduit Hydraulics
Spring. 3(2-1) C E 321 or M E 333, C E 390 or M E 531.
Steady flow in piping; numerical analysis of pipe networks; theory of turbomachinery; fluid measurements; design of water supply systems; introduction to unsteady flow; laboratory assignments.

441. Highway Operations
Fall, 3(3-0) C E 346, STT 351 or approval of department.
Driver and vehicle characteristics affecting traffic flow; traffic flow density, headway and speed measurements; signing and signal control for efficient intersection operation; parking characteristics and capacity analysis.

442. Airport Planning and Design
Fall, Spring. 4(3-2) C E 346.
The planning and design of the components of the airport system including ground access facilities; aircraft characteristics; the air traffic control system; airport configuration; capacity analysis; management systems.

448. Transportation Planning
Winter. 3(3-0) C E 346 or C E 392; STT 351 or approval of department.
Urban transportation facilities needs and programs; Design of transportation models for urban highways and public transit including trip generation, trip distribution, mode split and traffic assignment. Transport agencies function and services.

449. Highway Engineering
Spring. 4(3-2) C E 308, C E 347.
Design concepts of roadways, facilities, drainageage and pavement design. Maintenance, construction and supervision methods and procedures.

471. Scheduling Construction Activities
Winter. 3 credits. Approval of department.
Techniques for coordinating and controlling construction projects. Scheduling under the constraints of deadlines, uncertain time estimates and limited resources. Computer programs and data files for effective management.

481. Water and Wastewater Analysis
Fall. 4(3-0) C E 380, STT 351.
Quantitative analysis; bacteriologic and chemical characteristics of water and wastewater; principles of softening, iron removal, coagulation and chlorination; laboratory examination of water and wastewater including turbidity, solids, coliforms, chlorine, etc.

483. Water and Wastewater Treatment
Winter. 4(2-1) C E 289, C E 321 or concurrently, C E 390.
Water treatment theory and design including sedimentation, coagulation, softening, iron removal and chlorination; wastewater treatment theory and design including grit chambers, activated sludge, trickling filters, and anaerobic digesters.

488. Environmental Health Engineering
Spring. 4(3-2) MPH 390, C E 280, C E 321 or concurrently, STT 351.
Design of small water, waste water and solid waste facilities. Epidemiology of communicable disease transmission by air, water, food and arthropods. Engineering measures to control disease spread.

494. Civil Engineering Design Project
Fall, Winter, Spring. 3(2-1) May enroll for a maximum of 6 credits. Seniors, approval of department.
Planning, specifications and design of a civil engineering project or facility.

499. Civil Engineering Projects
Fall, Winter, Spring, Summer. 1 to 4 credits. May enroll for a maximum of 6 credits. Approval of department.
Original civil engineering problem of specific interest to the student and a faculty member. Student's proposal describing problem required prior to approval.

501. Structural Modeling and Experimental Methods
Fall. 3(2-3) C E 406, MMM 405 or approval of department.

502. Structural Dynamics I
Fall. 3(3-0) C E 405, C E 406, or approval of department.
Basic concepts in structural dynamics: dynamic loading on structures due to blasts and earthquakes; dynamic properties of structures; methods of analysis; design approach to blast and earthquake resistant structures; dynamic behavior of bridges and other topics.

504. Advanced Structural Theory I
Winter. 4(4-0) C E 405, or approval of department.

505. Advanced Reinforced Concrete
Winter. 3(3-0) C E 406.
Analysis and design of two-way slabs, floor systems, deep beams, shear walls and footings. Limit state, yield line and deflection analysis. Continuity, full buildings and seismic design. Tension.

506. Prestressed Concrete Design
Spring. 3(3-0) C E 406.

509. Finite Element Method
Fall, Winter, Spring. 4(4-0) Approval of department. Interdepartmental with the departments of Metallurgy, Mechanics, and Materials Science and Agricultural Engineering. Administered by the Department of Metallurgy, Mechanics, and Materials Science.
Theory and application of the finite element method to the solution of continuum type problems in heat transfer, fluid mechanics and stress analysis.

512. Rock Mechanics
Fall of odd-numbered years. 3(3-0) MMM 211, C E 312.

815. Principles of Highway and Airport Soils
Fall. 4(4-0) C E 347.
Foundation problems related to highways and airports, relation of subsoil conditions to design and construction, analytical review of laboratory and field results.

817. Mechanical Properties of Soils
Fall. 4(3-3) C E 419 or approval of department.
Mechanical properties of soil including stress-strain behavior; conditions of failure and shear strength; consolidation theory and permeability. Laboratory determination of soil properties including interpretation of experimental data for use in practice.

818. Advanced Soil Mechanics
Winter. 4(4-0) C E 419; C E 817 recommended.
Foundations and earth retaining structures; bearing capacity, lateral resistance and settlement of deep foundations; earth pressures on braced excavations and sheet pile walls; design of caissons and cofferdams.

819. Soil Stabilization in Geotechnical Engineering
Summer. 3(3-0) C E 419.
Techniques to improve the performance of soil in engineering applications; compaction, blending, admixture, grouting, electronness, vibration, compaction piles, thermal treatment, load bearing and hydraulic fills, precompression, reinforced earth.

820. Geotechnical Engineering for Cold Regions
Spring. 3(3-0) C E 419 or approval of department.
Physical and thermal properties of ice and frozen soils; ground thermal regime; mechanical properties of frozen ground; thaw consolidation problems; foundation design; slope stability problems; and artificial freezing for construction.

821. Porous Media Flow I
Fall. 3(3-0) C E 422 or approval of department.

823. Hydrology II
Winter of even-numbered years. 3(3-0) C E 421, C E 422, STT 351 or approval of department.

824. Coastal Engineering
Fall of even-numbered years. 3(3-0) C E 422 or approval of department.

826. Environmental Fluid Mechanics I
Winter of even-numbered years. 3(3-0) C E 422 or approval of department.
Fundamentals: the convective-diffusion equation; solution methods; analytical solutions; simplified solutions, numerical modeling. Molecular diffusion; momentum, mass and heat transport; turbulent diffusion; the effects of stratification.
827. Environmental Fluid Mechanics II
Winter of odd-numbered years. 3(3-0)
C E 826 or approval of department.
Continuation of C E 826 showing adaptation of theory to describe transport in environments selected from the following: rivers, lakes, estuaries, groundwater, the atmosphere, nearfield regions. Physical modeling.

828. Open Channel Flow II
Spring, 3(3-0) C E 429 or M E 333 or approval of department.
Advanced topics in steady flow analysis. Unsteady flow phenomena; method of characteristics; propagation of discontinuities; gradually- and rapidly-varied unsteady flow analysis; computer based design applications.

829. Fluid Transients
Fall, 3(3-0) M E 333 or approval of department. Interdepartmental with the Department of Mechanical Engineering.
Application of unsteady flow concepts and wave mechanics to hydraulic engineering; method of characteristics, surges and waterhammer in piping systems; resonance phenomena.

830. Intermediate Fluid Mechanics
Fall, 3(3-0) M E 332 or C E 321. Interdepartmental with and administered by the Department of Mechanical Engineering.
Deformable control volumes, Navier-Stokes equations, dimensionless variables, vorticity and circulation, turbulent flow, inviscid flow, and boundary layer theory.

840. Pavement Design
Spring of even-numbered years. 3(3-0)
C E 449 or approval of department.
Pavement types and wheel loads, stresses in flexible pavements, stresses in rigid pavements, pavement behavior under loads; climate effects on pavement performance, evaluation of compaction and strength, subgrades, and pavement design criteria.

841. Optimization of Urban Traffic Flow
(SYS 841.) Fall of even-numbered years. 3(3-0)
C E 346, STT 351 or approval of department. Interdepartmental with Systems Science.
Traffic flow models used in design of computerized traffic control systems. Optimal freeway ramp metering algorithms. Offline and online optimization of traffic signal timing.

842. Pavement Rehabilitation
Spring of odd-numbered years. 4(4-0)
C E 446 or approval of department.
Strengthening existing pavements, pavement overlay design criteria, epoxy and polyester resin repair and rehabilitation, evaluation of resurfacing practices for bituminous and cement pavements.

843. Traffic Engineering Characteristics
Winter, 3(3-0) C E 346, STT 351 or approval of department.
Safety analyses, flow and capacity characteristics, statistical properties of traffic, queuing characteristics at intersections, delay characteristics and analyses.

844. Highway and Traffic Safety
Spring of odd-numbered years. 3(3-0)
C E 843.
Highway safety improvement programs; identification of hazardous locations; selection and evaluation of countermeasures; programming improvements.

845. Environmental Impacts of Transportation Facility Design Decisions
Spring of even-numbered years. 3(3-0)
C E 346 or C E 392, C E 448, or approval of department.
The context in which current transportation planning and design decisions are made; legislation; socio-economic effects; air, noise, and water pollution; preperation of environmental impact statements.

846. Statewide Transportation Planning
Fall of odd-numbered years. 3(3-0)
C E 346 or approval of department.
Highway inventory, road use studies and programming, analysis of highway costs, economic considerations in location and design.

847. Advanced Geometric Design of Highways
Winter of even-numbered years. 3(3-0)
C E 347.
Advanced geometric design of highways and freeways, including the redesign of existing systems with development and evaluation of geometric alternatives.

848. Travel Demand Forecasting
Fall of even-numbered years. 3(3-0)
C E 448.
Advanced topics in travel demand; disaggregate and behavioral models, error analysis, and model sensitivity.

849. Design of Research Programs I
Spring, 2(2-0) Approval of department.
To receive credit C E 849 and C E 850 must be completed satisfactorily except by prior arrangement with instructor.
Two term sequence to design a major research program not thesis related, e.g., response to a request for a proposal. Includes experiment design, detailed literature review and synthesis.

850. Design of Research Programs II
Summer, 2(2-0) C E 849.
To receive credit C E 849 and C E 850 must be completed satisfactorily except by prior arrangement with instructor.
Continuation of C E 849.

851. Environmental Impacts of Transportation Facility Design Decisions
Spring of even-numbered years. 3(3-0)
C E 346 or approval of department.
The context in which current transportation planning and design decisions are made; legislation; socio-economic effects; air, noise, and water pollution; preparation of environmental impact statements.

852. Statewide Transportation Planning
Fall of odd-numbered years. 3(3-0)
C E 346 or approval of department.
Highway inventory, road use studies and programming, analysis of highway costs, economic considerations in location and design.

853. Advanced Geometric Design of Highways
Winter of even-numbered years. 3(3-0)
C E 347.
Advanced geometric design of highways and freeways, including the redesign of existing systems with development and evaluation of geometric alternatives.

854. Travel Demand Forecasting
Fall of even-numbered years. 3(3-0)
C E 448.
Advanced topics in travel demand; disaggregate and behavioral models, error analysis, and model sensitivity.

855. Design of Research Programs I
Spring, 2(2-0) Approval of department.
To receive credit C E 849 and C E 850 must be completed satisfactorily except by prior arrangement with instructor.
Two term sequence to design a major research program not thesis related, e.g., response to a request for a proposal. Includes experiment design, detailed literature review and synthesis.

856. Design of Research Programs II
Summer, 2(2-0) C E 849.
To receive credit C E 849 and C E 850 must be completed satisfactorily except by prior arrangement with instructor.
Continuation of C E 849.

857. Special Problems in Civil Engineering
Fall, Winter, Spring, Summer. 1 to 8 credits. May be repeated for a maximum of 12 credits in C E 850 and S E 880 combined. Approval of department.
Research problems of limited scope not pertaining to thesis accomplished under C E 850 or C E 900.

858. Porous Media Flow II
Winter of odd-numbered years. 3(3-0)
C E 809, C E 821.
Mathematical formulations for unsteady groundwater flow and convection/dispersion phenomena. Emphasis placed upon finite-difference and finite-element solution techniques, computer based analysis of field data, and design applications.

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

860. Advanced Theory and Design of Reinforced Concrete II
Spring, 3(3-0) C E 865.
Continuation of C E 805 with application of theory to analysis and design of tanks, rigid frames, and shells.

861. 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.

862. 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, Puecher's stress function, deformation and bending of shells of revolution and shallow shells.

863. 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.

864. Earth Structure
Winter, 3(3-0) C E 877 or approval of department.
Embarkments, 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.

865. Soil Dynamics
Spring, 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.

866. Special Topics in Civil Engineering
Fall, Winter, Spring, Summer. 2 to 4 credits. May reenroll for a maximum of 9 credits. Approval of department.
Selected topics in new or developing areas of civil engineering.
Description — Civil and Environmental Engineering of Courses

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

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 of 3 credits. Analyzes 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) E E 485 or approval of department. Generation rates; storage; collection; transfer and transportation; 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 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  
(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 theoretical 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. 4(4-0) COM 199. Development and use of arguments, essay 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, 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 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.