

# Course Schedule - Spring 2007

## Civil and Environmental Engineering

### 201 **Systems Engrg & Economics** Credit: 3 hours.

Introduction to the formulation and solution of civil engineering problems. Major topics are: engineering economy, mathematical modeling, and optimization. Techniques, including classical optimization, linear and nonlinear programming, network theory, critical path methods, simulation, decision theory, and dynamic programming are applied to a variety of civil engineering problems. Credit is not given for both CEE 201 and either GE 330 or IE 310. Prerequisite: MATH 231 (formerly MATH 230); credit or concurrent registration in MATH 225.

CRN	Type	Section	Time	Days	Location	Instructor
31707	lecture-discussion	NP	10:00 AM - 11:20 AM	TR	room 165 Everitt Elec and Comp Engr Lab	Cai, X
31707: 3 hours						

### 202 **Engineering Risk & Uncertainty** Credit: 3 hours.

Identification and modeling of non-deterministic problems in civil engineering design and decision making. Development of stochastic concepts and simulation models, and their relevance to real design and decision problems in various areas of civil engineering. Credit is not given for both CEE 202 and either GE 331 or IE 300. Prerequisite: Recommended: credit or concurrent registration in MATH 241 (formerly MATH 243) or MATH 242.

CRN	Type	Section	Time	Days	Location	Instructor
31708	lecture-discussion	E	01:00 PM - 01:50 PM	MWF	room 119 Materials Science and Eng Bld	Larson, S
31708: 3 hours						

### 300 **Behavior of Materials** Credit: 4 hours.

Examines macroscopic mechanical behavior in terms of phenomena at the nanometer and micrometer levels for the three types of engineering materials (metals, ceramics, and polymers) with emphasis on specific materials used in civil engineering - steel, rocks, clay, portland cement concrete, asphaltic concrete, and wood. Lecture/lab format. Same as TAM 324. Credit is not given for both CEE 300 and either ME 330 or MSE 280. Prerequisite: Completion of Composition I general education requirement; CHEM 104; TAM 251.

This course satisfies the General Education Criteria for a Advanced Composition course.

Students must register for one lab and one lecture section.

CRN	Type	Section	Time	Days	Location	Instructor
36257	laboratory	AB1	10:00 AM - 11:50 AM	M	room 1225 Newmark Civil Engineering Bldg	
36257: Advanced Composition course.						

36258	laboratory	AB2	03:00 PM - 04:50 PM	M	room 1225 Newmark Civil Engineering Bldg	
36258: Advanced Composition course.						
36259	laboratory	AB3	10:00 AM - 11:50 AM	W	room 1225 Newmark Civil Engineering Bldg	
36259: Advanced Composition course.						
36260	laboratory	AB4	12:00 PM - 01:50 PM	R	room 1225 Newmark Civil Engineering Bldg	
36260: Advanced Composition course.						
36261	lecture- discussion	AE1	01:00 PM - 01:50 PM	MWF	room 114 Transportation Bldg	Popovics, J
36261: Advanced Composition course.						

### 310 **Transportation Engineering** Credit: 3 hours.

An introduction to the design, planning, operation, management, and maintenance of transportation systems; integrated multi-modal transportation systems (highways, air, rail, etc.); layout of highways, airports, and railroads with traffic flow models, capacity analysis, and safety. Design of facilities and systems with life cycle costing procedures and criteria for optimization. Prerequisite: TAM 251; credit or concurrent registration in CEE 202.

CRN	Type	Section	Time	Days	Location	Instructor
31699	lecture- discussion	D	11:00 AM - 11:50 AM	MWF	room 114 Transportation Bldg	Buttlar, W; Ouyang, Y
31699: 3 hours						

### 320 **Construction Engineering** Credit: 3 hours.

Introduction to the construction processes: contracting and bonding, planning and scheduling, estimating and project control, productivity models, and construction econometrics. Prerequisite: CEE 201; credit or concurrent registration in CS 101 and CEE 202.

CRN	Type	Section	Time	Days	Location	Instructor
31698	lecture	LM	03:00 PM - 04:50 PM	TR	room 106B8 Engineering Hall	Pena-Mora, F; Arboleda, C
31698: 3 hours						

### 330 **Environmental Engineering** Credit: 3 hours.

Considers the sources, characteristics, transport, and effects of air and water contaminants; biological, chemical,

and physical processes in water; atmospheric structure and composition; unit operations for air and water quality control; solid waste management; and environmental quality standards. Prerequisite: CHEM 104.

CRN	Type	Section	Time	Days	Location	Instructor
31700	lecture-discussion	PQ	01:30 PM - 02:50 PM	TR	room 106B8 Engineering Hall	Finneran, K
31700: 3 hours						

**350 *Water Resources Engineering* Credit: 3 hours.**

Quantitative aspects of water in the earth's environment and its engineering implications, including design and analysis of systems directly concerned with use and control of water; quantitative introduction to hydrology, hydraulic engineering, and water resources planning. Prerequisite: CEE 202; credit or concurrent registration in TAM 335 and CEE 201.

CRN	Type	Section	Time	Days	Location	Instructor
31701	lecture-discussion	F	02:00 PM - 02:50 PM	MWF	room 1518 Civil Eng Hydrosystems Lab	Valocchi, A; Garcia, M
31701: 3 hours						

**360 *Structural Engineering* Credit: 3 hours.**

Basic topics in the analysis, behavior, and design of trusses and framed structures under static loads; analysis topics include member forces in trusses, shear and moment diagrams, deflections, simple applications of the force method and slope-deflection; introduction to computer applications. Prerequisite: TAM 251.

CRN	Type	Section	Time	Days	Location	Instructor
31702	lecture-discussion	B	09:00 AM - 09:50 AM	MWF	room 106B8 Engineering Hall	Abrams, D
31702: 3 hours						

**380 *Geotechnical Engineering* Credit: 3 hours.**

Introduction to geotechnical engineering. Classification of soils, compaction in the laboratory and in the field, soil exploration, boring and sampling, permeability of soils, one-dimensional settlement analyses, strength of soil, introduction to foundations. Prerequisite: TAM 251

CRN	Type	Section	Time	Days	Location	Instructor
41439	lecture-discussion	B	01:30 PM - 02:50 PM	TR	room 114 Transportation Bldg	Olson, S

41439: 3 hours

**400 Welding and Joining Processes** Credit: 3 or 4 hours.

The physical principles of fusion welding; heat flow; thermal cycles; physical metallurgy and mechanical properties of welded joints; applications of welding to large structures; testing of welds; nondestructive testing; design, economics, and weld specifications; and laboratory experiments in welding. Same as MSE 444. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: TAM 324 or TAM 206.

CRN	Type	Section	Time	Days	Location	Instructor
40573	lecture-discussion	A	11:00 AM - 11:50 AM	MWF	room 218 Ceramics Bldg	Banas, G
40573: This section is for Graduate students only, you may choose either 3 or 4 credit hours.						
43527	lecture-discussion	B	11:00 AM - 11:50 AM	MWF	room 218 Ceramics Bldg	Banas, G
43527: 3 hours This section is for Junior or Senior Undergraduate students only.						

**406 Pavement Design, I** Credit: 3 or 4 hours.

Analysis, behavior, performance, and structural design of pavements for highways and airfields; topics include climate factors, rehabilitation, life cycle design economics, and traffic loadings. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 310.

CRN	Type	Section	Time	Days	Location	Instructor
31714	lecture-discussion	NP3	10:00 AM - 11:20 AM	TR	room 1233 Newmark Civil Engineering Bldg	Tutumluer, E
31714: 3 hours						
31715	lecture-discussion	NP4	10:00 AM - 11:20 AM	TR	room 1233 Newmark Civil Engineering Bldg	Tutumluer, E
31715: 4 hours						

**407 Airport Design** Credit: 3 or 4 hours.

Basic principles of airport facilities design to include aircraft operational characteristics, noise, site selection, land use compatibility, operational area, ground access and egress, terminals, ground service areas, airport capacity, and special types of airports. 3 undergraduate hours. 3 or 4 graduate hours.

CRN	Type	Section	Time	Days	Location	Instructor
45394	lecture-discussion	C3	01:00 PM - 01:50 PM	MWF	room 1518 Civil Eng Hydrosystems Lab	Apeageyi, A

45394: 3 hours						
45396	lecture-discussion	C4	01:00 PM - 01:50 PM	MWF	room 1518 Civil Eng Hydrosystems Lab	Apeageyi, A
45396: 4 hours						

**415 Geometric Design of Roads** Credit: 4 hours.

Analysis of factors in developing a highway transportation facility; traffic estimates and assignment; problems of highway geometrics and design standards; planning and location principles; intersection design factors; street systems and terminal facilities; programming improvements; drainage design; structural design of surface; concepts of highway management and finance; and highway maintenance planning. Prerequisite: CEE 310.

CRN	Type	Section	Time	Days	Location	Instructor
31716	lecture-discussion	B	02:00 PM - 03:50 PM	MWF	room 1233 Newmark Civil Engineering Bldg	Roesler, J
31716: 4 hours						

**417 Urban Transportation Planning** Credit: 4 hours.

Same as UP 430. See UP 430.

CRN	Type	Section	Time	Days	Location	Instructor
37268	lecture-discussion	A	06:00 PM - 08:50 PM	M	room 225 Temple Hoyne Buell Hall	Kim, T

**420 Construction Productivity** Credit: 3 or 4 hours.

Introduction of the application of scientific principles to the measurement and forecasting of productivity in construction engineering. Conceptual and mathematical formulation of labor, equipment, and material factors affecting productivity. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 320.

CRN	Type	Section	Time	Days	Location	Instructor
39554	lecture-discussion	3	03:00 PM - 04:20 PM	TR	room 1233 Newmark Civil Engineering Bldg	Liu, L
39554: 3 hours						
39555	lecture-discussion	4	03:00 PM - 04:20 PM	TR	room 1233 Newmark Civil Engineering Bldg	Liu, L
39555: 4 hours						

**421 Construction Planning** Credit: 3 or 4 hours.

Project definition; scheduling and control models; material, labor, and equipment allocation; optimal schedules; project organization; documentation and reporting systems; and management and control. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 320.

CRN	Type	Section	Time	Days	Location	Instructor
31712	lecture-discussion	LM3	08:00 AM - 09:20 AM	TR	room 1518 Civil Eng Hydrosystems Lab	El-Rayes, K
31712: 3 hours						
31713	lecture-discussion	LM4	08:00 AM - 09:20 AM	TR	room 1518 Civil Eng Hydrosystems Lab	El-Rayes, K
31713: 4 hours						

**432 Stream Ecology** Credit: 3 hours.

Description of physical, chemical, and biological characteristics in streams and rivers including an integrated study of the environmental factors affecting the composition and distribution of biota; emphasizes the application of ecological principles in aquatic ecosystem protection and management. Same as IB 450. Prerequisite: CEE 430.

CRN	Type	Section	Time	Days	Location	Instructor
40291	lecture-discussion	NP	10:00 AM - 11:20 AM	R	room 206 Transportation Bldg	Herricks, E
	lecture-discussion	NP	10:00 AM - 11:20 AM	T	room 169 Everitt Elec and Comp Engr Lab	Herricks, E
: 3 hours						

**437 Water Quality Engineering** Credit: 3 hours.

Fundamental theory underlying the unit processes utilized in the treatment of water for domestic and industrial usage, and in the treatment of domestic and industrial wastewaters. Prerequisite: CEE 330; credit or concurrent registration in TAM 335.

CRN	Type	Section	Time	Days	Location	Instructor
31720	lecture-discussion	F	10:30 AM - 11:50 AM	TR	room 343 Altgeld Hall	Strathmann, T
31720: 3 hours						

**440 Solid and Hazardous Waste** Credit: 3 hours.

Investigation of the regulatory and technical issues affecting solid and hazardous waste management, with an emphasis on the principles governing the transport, fate, and remediation of solid and hazardous waste in the subsurface, including advection, dispersion, sorption, interphase mass transfer, and transformation reactions. Prerequisite: CEE 330.

CRN	Type	Section	Time	Days	Location	Instructor
31718	lecture	NP	09:00 AM - 10:20 AM	TR	room 441 Altgeld Hall	Werth, C
31718: 3 hours						

**444 Env Eng Principles, Biological** Credit: 3 hours.

Application of principles of biochemistry and microbiology to air and water quality, wastes, and their engineering management; biological mediated changes in water and in domestic and industrial wastewater. Prerequisite: CEE 443.

CRN	Type	Section	Time	Days	Location	Instructor
31723	lecture-discussion	LM	08:30 AM - 09:50 AM	MW	room 1233 Newmark Civil Engineering Bldg	Zilles, J
31723: 3 hours						

**445 Air Quality Modeling** Credit: 3 hours.

Overview of practical and advanced approaches to air pollution modeling, including aspects of pollutant transport, transformation, and loss. Models considered include: Gaussian plume, chemical mass balance, chemical reaction, grid and trajectory. Evaluation of models and the development of efficient control strategies are also discussed. Same as ATMS 425. Prerequisite: CEE 330 and credit or concurrent registration in TAM 335; or ATMS 401.

CRN	Type	Section	Time	Days	Location	Instructor
31721	lecture-discussion	D	11:00 AM - 11:50 AM	MWF	room B218 Newmark Civil Engineering Bldg	Bond, T
31721: 3 hours						

**447 Atmospheric Chemistry** Credit: 3 hours.

Course will present current knowledge of the biochemical cycles of atmospheric trace gases, their interactions on global and regional scales, and their significance for the chemistry in the atmosphere. The important fundamental concepts that are central to understanding air pollutants, e.g., the formation of aerosols and the transformation and removal of species in the atmosphere, will be introduced. Same as ATMS 420 and ENVS 450. Prerequisite: CHEM 104; either CEE 330 or ATMS 401.

CRN	Type	Section	Time	Days	Location	Instructor
31724	lecture-discussion	B	09:00 AM - 10:20 AM	TR	room 109 Atmospheric Sciences Bldg	Wuebbles, D

**449 *Environmental Engineering Lab*** Credit: 3 hours.

Combination of lecture and laboratory designed to provide exposure to the use of traditional analysis tools and techniques in analysis, control, and design of natural and engineered environmental systems including air, water, wastewater, solid and hazardous waste, and ecological systems. Prerequisite: CEE 437 or CEE 446.

CRN	Type	Section	Time	Days	Location	Instructor
31717	laboratory-discussion	RAM	12:00 PM - 12:50 PM	TR	room B218 Newmark Civil Engineering Bldg	Marinas, B
	laboratory-discussion	RAM	01:00 PM - 02:50 PM	TR	room B222 Newmark Civil Engineering Bldg	Marinas, B
: 3 hours						

**452 *Hydraulic Analysis and Design*** Credit: 3 hours.

Hydraulic analysis and design of engineering systems: closed conduits and pipe networks; hydraulic structures, including spillways, stilling basins, and embankment seepage; selection and installation of hydraulic machinery. Prerequisite: TAM 335.

CRN	Type	Section	Time	Days	Location	Instructor
31727	lecture-discussion	C	10:00 AM - 10:50 AM	MWF	room 1518 Civil Eng Hydrosystems Lab	Wilkerson, G
31727: 3 hours						

**453 *Urban Hydrology and Hydraulics*** Credit: 3 hours.

Hydraulic analysis and design of urban, highway, airport, and small rural watershed drainage problems; discussion of overland and drainage channel flows; hydraulics of storm-drain systems and culverts; determination of design flow; runoff for highways, airports, and urban areas; design of drainage gutters, channels, sewer networks, and culverts. Prerequisite: CEE 350.

CRN	Type	Section	Time	Days	Location	Instructor
31728	lecture-discussion	TW	03:00 PM - 04:50 PM	TR	room 1518 Civil Eng Hydrosystems Lab	Schmidt, A

**460 Steel Structures, I** Credit: 3 hours.

Introduction to the design of metal structures; behavior of members and their connections; and theoretical, experimental, and practical bases for proportioning members and their connections. 3 undergraduate hours. No graduate credit. Prerequisite: CEE 360

CRN	Type	Section	Time	Days	Location	Instructor
31703	lecture-discussion	LM	08:00 AM - 09:50 AM	TR	room 1233 Newmark Civil Engineering Bldg	Fahnestock, L
31703: 3 hours						

**461 Reinforced Concrete, I** Credit: 3 hours.

Study of the strength, behavior, and design of reinforced concrete members subjected to moments, shear, and axial forces; extensive discussion of the influence of the material properties on behavior. 3 undergraduate hours. No graduate credit. Prerequisite: CEE 360

CRN	Type	Section	Time	Days	Location	Instructor
31704	lecture-discussion	NP	10:00 AM - 11:50 AM	TR	room 1518 Civil Eng Hydrosystems Lab	Lafave, J
31704: 3 hours						

**463 Reinforced Concrete, II** Credit: 3 or 4 hours.

Study of the strength, behavior, and design of indeterminate reinforced concrete structures, with primary emphasis on slab systems; emphasis on the strength of slabs and on the available methods of design of slabs spanning in two directions, with or without supporting beams. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 461.

CRN	Type	Section	Time	Days	Location	Instructor
31730	lecture-discussion	B3	09:00 AM - 09:50 AM	MWF	room 1518 Civil Eng Hydrosystems Lab	Andrawes, B
31730: 3 hours						
40085	lecture-discussion	B4	09:00 AM - 09:50 AM	MWF	room 1518 Civil Eng Hydrosystems Lab	Andrawes, B
40085: 4 hours						

**465 Design of Structural Systems** Credit: 3 or 4 hours.

The whole structural design process including definition of functional requirements, selection of structural scheme, formulation of design criteria, preliminary and computer-aided proportioning, and analysis of response, cost, and value. 3 undergraduate hours. 4 graduate hours. Prerequisite: Credit in either CEE 460 or CEE 461 with concurrent registration in the other.

CRN	Type	Section	Time	Days	Location	Instructor
31731	lecture-discussion	TW3	03:00 PM - 04:20 PM	TR	room B218 Newmark Civil Engineering Bldg	Gavlin, N
31731: 3 hours						

**470 Structural Analysis** Credit: 4 hours.

Direct stiffness method of structural analysis; fundamentals and algorithms; numerical analysis of plane trusses, grids and frames; virtual work and energy principles; introduction to the finite element method for plane stress and plane strain. Credit is not given for both CEE 470 and ME 471. Prerequisite: CEE 360.

CRN	Type	Section	Time	Days	Location	Instructor
31729	lecture-discussion	RS	01:00 PM - 02:50 PM	TR	room 1518 Civil Eng Hydrosystems Lab	Duarte, C
31729: 4 hours						

**480 Foundation Engineering** Credit: 3 hours.

Analysis and design of foundations, bearing capacity and settlement of foundations; stability of excavations and slopes; ground movements due to construction; analysis and design of excavations, retaining walls, slopes, and underground structures in soil and rock. 3 undergraduate hours. No graduate credit. Prerequisite: CEE 380.

CRN	Type	Section	Time	Days	Location	Instructor
31706	lecture-discussion	TW	03:00 PM - 04:20 PM	TR	room 229 Natural History Bldg	Stark, T
31706: 3 hours						

**483 Soil Mechanics and Behavior** Credit: 4 hours.

Composition and structure of soil; water flow and hydraulic properties; stress in soil; compressibility behavior and properties of soils; consolidation and settlement analysis; shear strength of soils; compaction and unsaturated soils; experimental measurements. Prerequisite: CEE 380.

CRN	Type	Section	Time	Days	Location	Instructor
31734	laboratory	AB1	10:00 AM - 11:50	T	room B218	

			AM		Newmark Civil Engineering Bldg	
31735	laboratory	AB2	10:00 AM - 11:50 AM	R	room B218 Newmark Civil Engineering Bldg	
31736	lecture	AL1	01:00 PM - 01:50 PM	MWF	room B218 Newmark Civil Engineering Bldg	Mesri, G

**484 Applied Soil Mechanics** Credit: 4 hours.

Application of soil mechanics to earth pressures and retaining walls, stability of slopes, foundations for structures, excavations; construction considerations; instrumentation. Prerequisite: CEE 483.

CRN	Type	Section	Time	Days	Location	Instructor
31737	lecture-discussion	F	01:30 PM - 02:50 PM	TR	room 1233 Newmark Civil Engineering Bldg	Lenzini, P
31737: 4 hours						

**491 Decision and Risk Analysis** Credit: 3 or 4 hours.

Development of modern statistical decision theory and risk analysis, and application of these concepts in civil engineering design and decision making; Bayesian statistical decision theory, decision tree, utility concepts, and multi-objective decision problems; modeling and analysis of uncertainties, practical risk evaluation, and formulation of risk-based design criteria, risk benefit trade-offs, and optimal decisions. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 202.

CRN	Type	Section	Time	Days	Location	Instructor
31740	lecture-discussion	D3	02:00 PM - 02:50 PM	MWF	room 245 Everitt Elec and Comp Engr Lab	Song, J
31740: 3 hours						
44798	lecture-discussion	D4	02:00 PM - 02:50 PM	MWF	room 245 Everitt Elec and Comp Engr Lab	Song, J
44798: 4 hours						

**497 Independent Study** Credit: 1 to 16 hours.

Individual investigations or studies of any phase of civil engineering selected by the student and approved by the department. 1 to 4 undergraduate hours. 1 to 16 graduate hours. Prerequisite: Consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
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10474	independent study		ARRANGED			
10474: Instructor Approval Required						

**498 *Special Topics*** Credit: 1 to 4 hours.

Structured presentations of new and developing areas of knowledge in civil engineering offered by the faculty to augment the formal courses available. Prerequisite: Individually identified for each offering under this course number; see Schedule.

CRN	Type	Section	Time	Days	Location	Instructor
31741	laboratory	KUC	03:00 PM - 04:50 PM	WF	room 1234 Newmark Civil Engineering Bldg	Kuchma, D
31741: 4 hours Experimental Methods in Structures and Materials. Section KUC: Experimental Methods in Structures and Materials. PREREQ: CEE 360. 4 Hours.						
31742	lecture-discussion	RC3	03:00 PM - 04:20 PM	TR	room 1225 Newmark Civil Engineering Bldg	Uzarski, D
31742: 3 hours Railroad Civil Engineering Section RC3: Railroad Civil Engineering PREREQ: CEE 310, CEE 498 RT, or consent of instructor. 3 HOURS.						
40626	lecture-discussion	RC4	03:00 PM - 04:20 PM	TR	room 1225 Newmark Civil Engineering Bldg	Uzarski, D
40626: 4 hours Railroad Civil Engineering Section RC4: Railroad Civil Engineering. PREREQ: CEE 310, CEE 498 RT, or consent of instructor. 4 HOURS. See instructor for requirements for 4 Hours Credit.						
40646	lecture-discussion	RO3	04:00 PM - 05:20 PM	MW	room 1233 Newmark Civil Engineering Bldg	Barkan, C
40646: 3 hours Railroad Signal & Operation Section RO3: Railroad Signaling & Operation. PREREQ: CEE 310, CEE 498 RT, or consent of the instructor. 3 Hours.						
40647	lecture-discussion	RO4	04:00 PM - 05:20 PM	MW	room 1233 Newmark Civil Engineering Bldg	Barkan, C
40647: 4 hours Railroad & Signal Operation Section RO4: Railroad Signaling & Operation. PREREQ: CEE 310, CEE 498 RT, or consent of instructor. 4 HOURS. See Instructor for requirements for 4 Hours credit.						

**500 *Advanced Topics in Materials*** Credit: 1 to 4 hours.

Lectures and discussions related to advanced topics in the science and technology of materials used in civil engineering construction. May be repeated in the same or separate terms to a maximum of 16 graduate hours. Prerequisite: As specified for each section; see Schedule.

CRN	Type	Section	Time	Days	Location	Instructor
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40184	lecture-discussion	E	02:00 PM - 02:50 PM	MWF	room 1225 Newmark Civil Engineering Bldg	Struble, L
40184: 4 hours SECTION E: Constr Matls Characterization. Additional 2 hours/week of laboratory as ARR. Prereq: CEE 300						

**506 *Pavement Design, II* Credit: 4 hours.**

Development of models for and analysis of pavement systems; use of transfer functions relating pavement response to pavement performance; evaluation and application of current pavement design practices and procedures; analysis of the effects of maintenance activities on pavement performance; and economic evaluation of highway and airport pavements. Prerequisite: CEE 406.

CRN	Type	Section	Time	Days	Location	Instructor
31744	lecture-discussion	B	09:00 AM - 09:50 AM	MWF	room B218 Newmark Civil Engineering Bldg	Roesler, J
31744: 4 hours						

**535 *Environmental Systems, II* Credit: 4 hours.**

Fundamental concepts of uncertainty, risk, and reliability applied to environmental and water resources decision making. Chance constraints, Markov and Monte Carlo modeling, geostatistics, unconditional and conditional simulation, genetic algorithms, neural networks, simulated annealing, and a review of relevant portions of basic probability and statistical theory. Many techniques are applied to a real-world environmental decision making problem initially developed in CEE 434. Prerequisite: CEE 202 and CEE 434.

CRN	Type	Section	Time	Days	Location	Instructor
31745	lecture-discussion	RS	02:00 PM - 02:50 PM	MWF	room 256 Mechanical Engineering Bldg	Eheart, J

**538 *Water Quality Control Proc, II* Credit: 4 hours.**

Theory and its application for design and operation of processes used in water and wastewater treatment; emphasis is on biological treatment processes and related processes for gas transfer, sludge dewatering, sludge disposal, and solids separations. Prerequisite: CEE 442 and CEE 443; credit or concurrent registration in CEE 444.

CRN	Type	Section	Time	Days	Location	Instructor
31746	lecture-discussion	C	10:00 AM - 11:50 AM	MW	room 1233 Newmark Civil Engineering Bldg	Morgenroth, E
31746: 4 hours						

**546 *Air Quality Control* Credit: 4 hours.**

Application of principles describing the generation, separation, and removal of air contaminants from gas streams generated by stationary sources. Local field trips typically occur each term to see the application of the air quality control devices in the field. Same as ME 515. Prerequisite: CEE 442 and CEE 446.

CRN	Type	Section	Time	Days	Location	Instructor
31747	lecture-discussion	C	10:00 AM - 10:50 AM	MWF	room 305 Materials Science and Eng Bld	Rood, M

**570 *Finite Element Methods*** Credit: 4 hours.

Theory and application of the finite element method; stiffness matrices for triangular, quadrilateral, and isoparametric elements; two- and three-dimensional elements; algorithms necessary for the assembly and solution; direct stress and plate bending problems for static, nonlinear buckling and dynamic load conditions; displacement, hybrid, and mixed models together with their origin in variational methods. Same as CSE 551. Prerequisite: CEE 471 or TAM 551.

CRN	Type	Section	Time	Days	Location	Instructor
31749	lecture-discussion	D	11:00 AM - 11:50 AM	MWF	room 1518 Civil Eng Hydrosystems Lab	Paulino, G
31749: 4 hours						

**572 *Earthquake Engineering*** Credit: 4 hours.

Study of the effects of earthquakes on constructed works and of the design of structures to resist earthquake motions; earthquake ground motions and mechanisms; response of structures to earthquake motion; behavior of materials, elements, assemblages, and structures subjected to earthquake motion; principles of earthquake resistant design; and special topics. Prerequisite: CEE 472.

CRN	Type	Section	Time	Days	Location	Instructor
46693	lecture-discussion	NP	10:00 AM - 11:50 AM	TR	room 134 Astronomy Bldg	Elnashai, A

**580 *Excavation and Support Systems*** Credit: 4 hours.

Classical and modern earth pressure theories and their experimental justification; pressures and bases for design of retaining walls, bracing of open cuts, anchored bulkheads, cofferdams, tunnels, and culverts. Prerequisite: Credit or concurrent registration in CEE 484.

CRN	Type	Section	Time	Days	Location	Instructor
31751	lecture-discussion	RS	01:00 PM - 01:50 PM	MWF	room 1225 Newmark Civil Engineering Bldg	Long, J

31751: 4 hours

**583 Shear Strength of Soils** Credit: 4 hours.

Physico-chemical properties of soils; fabric and structure of soil; mechanism of shearing resistance; residual shear strength of overconsolidated clays and clay shales; long-term shear strength of overconsolidated clays; Hvorslev shear strength parameters; and undrained shear strength of clays. Prerequisite: CEE 483.

CRN	Type	Section	Time	Days	Location	Instructor
39561	lecture-discussion	G	03:00 PM - 03:50 PM	MWF	room B218 Newmark Civil Engineering Bldg	Mesri, G
39561: 4 hours						

**588 Geotechnical Earthquake Engrg** Credit: 4 hours.

Seismic hazard analysis, cyclic response of soils and rock; wave propagation through soil and local site effects; liquefaction and post liquefaction behavior, seismic soil-structure of foundations and underground structures, seismic design of retaining walls, underground structures and tunnels. Construction and machine vibrations. Blasting. Prerequisite: CEE 472 and CEE 483.

CRN	Type	Section	Time	Days	Location	Instructor
39562	lecture-discussion	LM	08:30 AM - 09:50 AM	TR	room 203 Transportation Bldg	Hashash, Y
39562: 4 hours						

**595 Seminar** Credit: 0 to 1 hours.

Discussion of current topics in civil and environmental engineering and related fields by staff, students, and visiting lecturers. Approved for S/U grading only. May be repeated.

CRN	Type	Section	Time	Days	Location	Instructor
31753	lecture-discussion	AG	12:00 PM - 12:50 PM	R	room 1518 Civil Eng Hydrosystems Lab	Werth, C
31753: SECTION 595 AG: Environmental Ph.D. students and second year M.S. students must enroll in CEE 595 AG each semester.						
31755	lecture-discussion	F	ARRANGED			Mesri, G
31755: Geotechnical Engrg Seminar						
31756	lecture-discussion	G	04:00 PM - 04:50 PM	M	room 1518 Civil Eng	Finneran, K

					Hydrosystems Lab	
31756: SECTION G: Environmental first year M.S. students must enroll in CEE 595 G each semester.						
31757	lecture-discussion	S	04:00 PM - 05:20 PM	M	room 1320 Digital Computer Laboratory	Paulino, G; Masud, A
31757: Structural Engr Seminar						
31758	lecture-discussion	W	12:00 PM - 12:50 PM	F	room 1518 Civil Eng Hydrosystems Lab	Garcia, M
31758: Hydro Seminar						

**597 Independent Study** Credit: 1 to 16 hours.

Individual investigations or studies of any phase of civil engineering selected by the student and approved by the adviser and the staff member who will supervise the investigation. Prerequisite: Consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
10476	independent study		ARRANGED			
10476: Instructor Approval Required						

**598 Special Topics** Credit: 1 to 4 hours.

Structured presentations of new and developing areas of knowledge in civil engineering at an advanced graduate level. Prerequisite: Individually identified for each offering under this course number; see Schedule.

CRN	Type	Section	Time	Days	Location	Instructor
31759	lecture-discussion	ABM	08:30 AM - 09:50 AM	TR	room B222 Newmark Civil Engineering Bldg	Buttlar, W
31759: 4 hoursAdvanced Bituminous MatlsSection ABM: Advanced Bituminous Materials. PREREQ: CEE 405. 4 Hours.						
46694	lecture-discussion	AD	03:00 PM - 04:20 PM	TR	room B222 Newmark Civil Engineering Bldg	Spencer, B
46694: Advanced Structural Dynamics4 Hours Section AD: Advanced Structural Dynamics. PREREQ CEE 472						
39737	lecture-discussion	CCR	11:30 AM - 12:50 PM	TR	room 1233 Newmark Civil Engineering Bldg	Pena-Mora, F; Arboleda, C
39737: 4 hoursConst Confl Res & Col TheorSection CCR: Construction Conflict Resolution and Collaboration Theories. PREREQ: Consent of Instructor. 4 Hours.						

45020	lecture-discussion	CDM	01:30 PM - 02:50 PM	TR	room 330 Armory	Boukamp, F
45020: 4 hoursConst Proc & Data ModelingSection CDM: Construction Process and Data Modeling. PREREQ: Two out of CEE 420, CEE 421, CEE 422. 4 Hours.						
47548	lecture-discussion	DK	10:00 AM - 11:50 AM	TR	room 256 Mechanical Engineering Bldg	Klabjan, D
47548: 4 Hours Topic: Dynamic Programming for Asset Management; 4 credit hour; course restricted to graduate students.						
44955	lecture-discussion	DS	12:00 PM - 01:50 PM	MW	room 1233 Newmark Civil Engineering Bldg	Gavlin, N
44955: 4 hoursDesign of Struct Systems, IISection DS: Design of Structural Systems II. PREREQ: Credit Or Concurrent Registration in both CEE 462 AND CEE 463. 4 Hours.						
44756	lecture-discussion	HHV	02:30 PM - 03:50 PM	TR	room 329 Davenport Hall	Sivapalan, M
44756: 4 hoursHydraulic & Hydro Variablt4 Hours Section HHV: Hydraulic & Hydroclimatic Variability. PREREQ: CEE 350, CEE 450 OR EQUIVALENT. Meets with GEOG 595, Section HHV.						
46696	lecture-discussion	IR	08:30 AM - 09:50 AM	TR	room 1225 Newmark Civil Engineering Bldg	Lange, D
46696: Repair of Civil Infrastructure4 Hours Section IR: Repair of Civil Infrastruture. PREREQ: CEE 300						
44458	lecture-discussion	LSA	02:00 PM - 02:50 PM	MWF	room B218 Newmark Civil Engineering Bldg	Ouyang, Y
44458: 4 hoursLogistics System AnalysisSection LSA: Logistics Systems Analysis. PRE-REQ: None 4 Hours						
46695	lecture-discussion	NFM	10:00 AM - 11:20 AM	TR	room 1225 Newmark Civil Engineering Bldg	Stanciulescu Panea, I
46695: Nonlinear Finite Element Mthd4 Hours Section NFM: Nonlinear Finite Element Method PREREQ: CEE 470 or Equilavent.						
46698	lecture-discussion	NLH	08:00 AM - 09:50 AM	TR	room B218 Newmark Civil Engineering Bldg	Kumar, P
46698: 4 HOURS Section NLH: Non-Linear Methods in Hydrology and Hydraulics. PREREQ: CEE 450 or Equivalent.						
44816	lecture	RMD	06:00 PM - 08:50 PM	TR	room 1518 Civil Eng Hydrosystems Lab	Parker, G
44816: 4 hoursRiver MorphodynamicsSection RMD: River Morphodynamics. PREREQ: Basic Understanding of Open Channel Flow. 4 Hours.						
46697	lecture-discussion	TCI	02:00 PM - 03:20 PM	MW	room 214 Ceramics Bldg	Masud, A

46697: 4 Hours Section TCI:Computational Inelasticity						
46699	lecture-discussion	TSS	10:00 AM - 10:50 AM	MWF	room B218 Newmark Civil Engineering Bldg	Benekohal, R
46699: Traffic Signal Systems4 HOURS Section TSS: Traffic Signal Systems. PREREQ: CEE 416						

599 **Thesis Research** Credit: 0 to 16 hours.  
May be repeated. Approved for S/U grading only.

CRN	Type	Section	Time	Days	Location	Instructor
10478	independent study		ARRANGED			
10478: Instructor Approval Required						