Course Schedule - Fall 2006

Civil and Environmental Engineering

195 ***About Civil Engineering*** Credit: 0 hours.

Civil engineering orientation course including historical developments, education requirements, relation to science, professional practice, and specialties within the profession. Approved for S/U grading only.

CRN	Type	Section	Time	Days	Location	Instructor
29692	discussion-recitation	H	04:00 PM - 04:50 PM	W	room 100 Materials Science and Eng Bld	Lange, D

199 ***Undergraduate Open Seminar*** Credit: 1 to 5 hours.

May be repeated.

CRN	Type	Section	Time	Days	Location	Instructor
40943	lecture-discussion	EH	03:00 PM - 04:50 PM	R	room 203 Transportation Bldg	Herricks, E
40943: Discovery course.						
40943: 2 hoursTopic: First Year Discovery Program Course. Registration restricted to freshmen. Students should enroll in only one Discovery course. Students who enroll in more than one Discovery course may be dropped from the additional Discovery courses. For course descriptions, see the Discovery Program booklet.						

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. Prerequisite: MATH 231 (formerly MATH 230); credit or concurrent registration in MATH 225.

CRN	Type	Section	Time	Days	Location	Instructor
29694	lecture-discussion	NP	10:00 AM - 11:20 AM	TR	room 112 Transportation Bldg	Minsker, B

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. Prerequisite: Recommended: credit or concurrent registration in MATH 241 (formerly MATH 243) or MATH 242.

CRN	Type	Section	Time	Days	Location	Instructor
29696	lecture-discussion	LM	08:30 AM - 09:50 AM	TR	room 112 Transportation Bldg	Song, J

300 ***Behavior of Materials*** Credit: 4 hours.
Mechanical behavior of engineering materials, including metals, ceramics, polymers, concrete, wood, bitumens, and asphaltic concretes; explanations of macroscopic behavior in terms of phenomena at the microscopic level. Lecture/lab format. Same as TAM 324. Prerequisite: Completion of Composition I general education requirement; 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
33358	laboratory	AB1	03:00 PM - 04:50 PM	M	room 1225 Newmark Civil Engineering Bldg	Loo, J
33358: Advanced Composition course.						
33309	laboratory	AB2	10:00 AM - 11:50 AM	T	room 1225 Newmark Civil Engineering Bldg	Martinez, A
33309: Advanced Composition course.						
33325	laboratory	AB3	01:00 PM - 02:50 PM	T	room 1225 Newmark Civil Engineering Bldg	Jacobs, D
33325: Advanced Composition course.						
33337	laboratory	AB4	03:00 PM - 04:50 PM	W	room 1225 Newmark Civil Engineering Bldg	Locicero, A
33337: Advanced Composition course.						
33354	laboratory	AB5	10:00 AM - 11:50 AM	R	room 1225 Newmark Civil Engineering Bldg	Janicki, J
33354: Advanced Composition course.						
34959	lecture	AL1	01:00 PM - 01:50 PM	MWF	room 103 Talbot Laboratory	Struble, L
34959: 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
29699	lecture-discussion	D	11:00 AM - 11:50 AM	MWF	room 1518 Civil Eng Hydrosystems Lab	Tutumluer, E; Ouyang, Y

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
29701	lecture	TW	03:00 PM - 04:50 PM	TR	room 1518 Civil Eng Hydrosystems Lab	Pena-Mora, F; Arboleda, C

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
29702	lecture-discussion	RS	01:30 PM - 02:50 PM	TR	room 1518 Civil Eng Hydrosystems Lab	Morgenroth, E

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
29704	lecture-discussion	C	10:00 AM - 10:50 AM	MWF	room 1518 Civil Eng Hydrosystems Lab	Schmidt, A

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
29706	lecture-discussion	G	03:00 PM - 03:50 PM	MWF	room 119 Materials Science and Eng Bld	Dodds, R

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
42446	lecture-discussion	B1	09:00 AM - 09:50 AM	MWF	room 165 Everitt Elec and Comp Engr Lab	Hashash, Y
29708	lecture-discussion	RS	01:30 PM - 02:50 PM	TR	room 4101 Materials Science and Eng Bld	Olson, S

401 ***Concrete Materials*** Credit: 4 hours.
Examines the influence of constituent materials (cements, water, aggregates and admixtures) on the properties of fresh and hardened concrete, concrete mix design, handling and placement of concrete, and the behavior of concrete under various types of loading and environment. Laboratory exercises, which utilize standard concrete test methods, are an integral part of the course. A few field trips are held during scheduled laboratory sessions. Prerequisite: CEE 300.

CRN	Type	Section	Time	Days	Location	Instructor
29713	laboratory	AB1	11:00 AM - 12:50 PM	W	room 1225 Newmark Civil Engineering Bldg	Roesler, J
42478	laboratory	AB2	01:00 PM - 02:50 PM	R	room 1225 Newmark Civil Engineering Bldg	Roesler, J
29721	lecture	AL1	02:00 PM - 02:50 PM	MWF	room 1225 Newmark Civil Engineering Bldg	Roesler, J

405 ***Asphalt Materials, I*** Credit: 3 or 4 hours.
Properties and control testing of bituminous materials, aggregates for bituminous mixtures, and analysis and design of asphalt concrete and liquid asphalt cold mixtures; structural properties of bituminous mixes; surface treatment design; and recycling of mixtures. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 310.

CRN	Type	Section	Time	Days	Location	Instructor

31541	laboratory	3A	09:00 AM - 10:50 AM	F	room 1225 Newmark Civil Engineering Bldg	
	lecture	3A	10:00 AM - 10:50 AM	MW	room 1233 Newmark Civil Engineering Bldg	Buttlar, W
: 3 hours						
41753	laboratory	3B	11:00 AM - 12:50 PM	F	room 1225 Newmark Civil Engineering Bldg	
	lecture	3B	10:00 AM - 10:50 AM	MW	room 1233 Newmark Civil Engineering Bldg	Buttlar, W
: 3 hours						
31543	laboratory	4A	11:00 AM - 12:50 PM	F	room 1225 Newmark Civil Engineering Bldg	
	lecture	4A	10:00 AM - 10:50 AM	MW	room 1233 Newmark Civil Engineering Bldg	Buttlar, W
: 4 hoursThis section is reserved for graduate students only.						
41752	laboratory	4B	09:00 AM - 10:50 AM	F	room 1225 Newmark Civil Engineering Bldg	
	lecture	4B	10:00 AM - 10:50 AM	MW	room 1233 Newmark Civil Engineering Bldg	Buttlar, W
: 4 hoursThis section is reserved for graduate 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
29731	lecture-discussion	3	08:00 AM - 08:50 AM	MWF	room 1518 Civil Eng Hydrosystems Lab	Al-Qadi, I
29731: 3 hours						
40934	lecture-discussion	4	08:00 AM - 08:50 AM	MWF	room 1518 Civil Eng Hydrosystems Lab	Al-Qadi, I

40934: 4 hoursThis section is reserved for graduate students only.

416 ***Traffic Capacity Analysis*** Credit: 3 or 4 hours.
Study of fundamentals of traffic engineering; analysis of traffic stream characteristics; capacity of urban and rural highways; design and analysis of traffic signals and intersections; traffic control; traffic impact studies; and traffic accidents. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 310.

CRN	Type	Section	Time	Days	Location	Instructor
29733	lecture-discussion	3	09:00 AM - 09:50 AM	MWF	room B218 Newmark Civil Engineering Bldg	Benekohal, R
29733: 3 hours						
40935	lecture-discussion	4	09:00 AM - 09:50 AM	MWF	room B218 Newmark Civil Engineering Bldg	Benekohal, R
40935: 4 hoursThis section is reserved for graduate students only.						

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
29736	lecture-discussion	3	03:00 PM - 04:20 PM	TR	room 1233 Newmark Civil Engineering Bldg	Liu, L
29736: 3 hours						
40936	lecture-discussion	4	03:00 PM - 04:20 PM	TR	room 1233 Newmark Civil Engineering Bldg	Liu, L
40936: 4 hoursThis section is reserved for graduate students only.						

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
29738	lecture-discussion	3	08:00 AM - 09:20 AM	TR	room 1233 Newmark Civil Engineering Bldg	El-Rayes, K

29738: 3 hours						
40937	lecture-discussion	4	08:00 AM - 09:20 AM	TR	room 1233 Newmark Civil Engineering Bldg	El-Rayes, K
40937: 4 hoursThis section is reserved for graduate students only.						

422 ***Construction Cost Analysis*** Credit: 3 or 4 hours.
Introduction to the application of scientific principles to costs and estimates of costs in construction engineering; concepts and statistical measurements of the factors involved in direct costs, general overhead costs, cost markups, and profits; and the fundamentals of cost recording for construction cost accounts and cost controls. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 320.

CRN	Type	Section	Time	Days	Location	Instructor
29740	lecture-discussion	3	01:30 PM - 02:50 PM	TR	room 1233 Newmark Civil Engineering Bldg	Boukamp, F
29740: 3 hours						
40938	lecture-discussion	4	01:30 PM - 02:50 PM	TR	room 1233 Newmark Civil Engineering Bldg	Boukamp, F
40938: 4 hoursThis section is reserved for graduate students only.						

430 ***Ecological Quality Engineering*** Credit: 2 hours.
Examines the characteristics of rivers and lakes which affect the management of domestic and industrial wastewaters; includes assessment of chemical hazards, and introduction to surveillance and biomonitoring, and a review of regulations governing effluents. Prerequisite: CEE 330.

CRN	Type	Section	Time	Days	Location	Instructor
29742	lecture-discussion	LM	08:30 AM - 09:50 AM	TR	room 344 Mechanical Engineering Bldg	Herricks, E

434 ***Environmental Systems, I*** Credit: 3 hours.
Introduction to the concepts and applications of environmental systems analysis. Application of mathematical programming and modeling to the design, planning, and management of engineered environmental systems, regional environmental systems, and environmental policy. Economic analysis, including benefit-cost analysis and management strategies. Concepts of tradeoff, non-inferior sets, single- and multi-objective optimization. Practical application to case studies to convey an understanding of the complexity and data collection challenges of actual design practice. Prerequisite: CEE 201 or GE 330; CEE 330.

CRN	Type	Section	Time	Days	Location	Instructor
29744	lecture-	C	10:00 AM - 10:50	MWF	room 206	Eheart, J

	discussion		AM		Transportation Bldg	

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
29749	lecture-discussion	F	02:00 PM - 02:50 PM	MWF	room 1518 Civil Eng Hydrosystems Lab	Clark, M

442 ***Env Eng Principles, Physical*** Credit: 3 hours.
Analysis of the physical principles which form the basis of many water and air quality-control operations; sedimentation, filtration, inertial separations, flocculation, mixing, and principles of reactor design. Prerequisite: CEE 437.

CRN	Type	Section	Time	Days	Location	Instructor
29746	lecture-discussion	B	09:00 AM - 09:50 AM	MWF	room 106B1 Engineering Hall	Clark, M

443 ***Env Eng Principles, Chemical*** Credit: 4 hours.
Application of principles of chemical equilibrium and chemical kinetics to air and water quality. Chemistry topics are thermodynamics, kinetics, acid/base chemistry, complexation, precipitation, dissolution, and oxidation/reduction. Many applications are also presented. Prerequisite: CEE 437.

CRN	Type	Section	Time	Days	Location	Instructor
29750	lecture-discussion	NP	10:00 AM - 11:50 AM	TR	room 1233 Newmark Civil Engineering Bldg	Strathmann, T

446 ***Air Quality Engineering*** Credit: 3 hours.
Description and application of chemical and physical principles related to air pollutants, aerosol mechanics, attenuation of light in the atmosphere, air quality regulation, generation of air pollutants, methods to remove gaseous and particulate pollutants from gas streams, and atmospheric dispersion. Prerequisite: CEE 330; credit or concurrent registration in TAM 335.

CRN	Type	Section	Time	Days	Location	Instructor
29752	lecture-discussion	D	11:00 AM - 11:50 AM	MWF	room 112 Transportation	Hashisho, Z; Rood, M

					Bldg	

450 ***Surface Hydrology*** Credit: 3 hours.
Study of descriptive and quantitative hydrology dealing with the distribution, circulation, and storage of water on the earth's surface; discusses principles of hydrologic processes and presents methods of analysis and their applications to engineering and environmental problems. Prerequisite: CEE 350.

CRN	Type	Section	Time	Days	Location	Instructor
29758	lecture-discussion	F	02:00 PM - 02:50 PM	MWF	room 112 Transportation Bldg	Kumar, P

451 ***Environmental Fluid Mechanics*** Credit: 3 hours.
Incompressible fluid mechanics with particular emphasis on topics in analysis and applications in civil engineering areas; primary topics include principles of continuity, momentum and energy, kinematics of flow and stream functions, potential flow, laminar motion, turbulence, and boundary-layer theory. Prerequisite: TAM 335.

CRN	Type	Section	Time	Days	Location	Instructor
29761	lecture-discussion	G	06:00 PM - 09:00 PM	TR	room 1518 Civil Eng Hydrosystems Lab	Parker, G

457 ***Groundwater*** Credit: 3 hours.
Physical properties of groundwater and aquifers, principles and fundamental equations of porous media flow and mass transport, well hydraulics and pumping test analysis, role of groundwater in the hydrologic cycle, groundwater quality and contamination. Prerequisite: CEE 350 and TAM 335.

CRN	Type	Section	Time	Days	Location	Instructor
43780	lecture-discussion	RS	01:30 PM - 02:50 PM	TR	room 206 Transportation Bldg	Valocchi, 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
29767	lecture-discussion	LM	08:00 AM - 09:50 AM	TR	room 1518 Civil Eng Hydrosystems	Fahnestock, L

					Lab	

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
29770	lecture-discussion	NP	10:00 AM - 11:50 AM	TR	room 1518 Civil Eng Hydrosystems Lab	Abrams, D

462 ***Steel Structures, II*** Credit: 3 or 4 hours.
Metal members under combined loads; connections, welded and bolted; moment-resistant connections; plate girders, conventional behavior, and tension field action. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 460.

CRN	Type	Section	Time	Days	Location	Instructor
29772	lecture-discussion	3	01:00 PM - 01:50 PM	MWF	room 1233 Newmark Civil Engineering Bldg	Hajjar, J
29772: 3 hours						
40939	lecture-discussion	4	01:00 PM - 01:50 PM	MWF	room 1233 Newmark Civil Engineering Bldg	Hajjar, J
40939: 4 hoursThis section is reserved for graduate students only.						

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
29775	lecture-discussion	C	10:00 AM - 10:50 AM	MWF	room B218 Newmark Civil Engineering Bldg	Gavlin, N
29775: 3 hoursThis section is reserved for undergraduate students only.						

468 ***Prestressed Concrete*** Credit: 3 or 4 hours.

Study of strength, behavior, and design of prestressed reinforced concrete members and structures, with primary emphasis on pretensioned, precast construction; emphasis on the necessary coordination between design and construction techniques in prestressing. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 461.

CRN	Type	Section	Time	Days	Location	Instructor
45939	lecture-discussion	LM3	08:00 AM - 09:50 AM	TR	room 1105 Siebel Center for Comp Sci	Gurfinkel, G
45939: 3 hours						
45940	lecture-discussion	LM4	08:00 AM - 09:50 AM	TR	room 1105 Siebel Center for Comp Sci	Gurfinkel, G
45940: 4 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. Prerequisite: CEE 360.

CRN	Type	Section	Time	Days	Location	Instructor
29778	lecture-discussion	RS	01:00 PM - 02:50 PM	TR	room 112 Transportation Bldg	Stanciulescu Panea, I

471 ***Structural Mechanics*** Credit: 3 or 4 hours.

Beams under lateral load and thrust; beams on elastic foundations; virtual work and energy principles; principles of solid mechanics, stress and strain in three dimensions; static stability theory; torsion; computational methods. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: MATH 385 and TAM 251.

CRN	Type	Section	Time	Days	Location	Instructor
29780	lecture-discussion	3	10:00 AM - 10:50 AM	MWF	room 112 Transportation Bldg	Hjelmstad, K
29780: 3 hours						
40940	lecture-discussion	4	10:00 AM - 10:50 AM	MWF	room 112 Transportation Bldg	Hjelmstad, K
40940: 4 hoursThis section is reserved for graduate students only.						

472 ***Structural Dynamics*** Credit: 3 or 4 hours.

Analysis of the dynamic response of structures and structural components to transient loads and foundation

excitation; single-degree-of-freedom and multi-degree-of-freedom systems; response spectrum concepts; simple inelastic structural systems; and introduction to systems with distributed mass and flexibility. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 360 , MATH 385, and TAM 212.

CRN	Type	Section	Time	Days	Location	Instructor
29782	lecture-discussion	TW3	03:00 PM - 04:20 PM	TR	room B218 Newmark Civil Engineering Bldg	Spencer, B
29782: 3 hours3 Hours SECTION TW3:STRUCTURAL DYNAMICS PREREQ: TAM 212, MATH 385, and CEE 360						
47439	lecture-discussion	TW4	03:00 PM - 04:20 PM	TR	room B218 Newmark Civil Engineering Bldg	Spencer, B
47439: 4 hours4 Hours SECTION TW4: STRUCTURAL DYNAMICS, PREREQ: TAM 212, MATH 385, and CEE 360.						

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
29784	lecture-discussion	TW	03:00 PM - 04:20 PM	TR	room 112 Transportation Bldg	Long, J

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
31545	laboratory	AB1	01:00 PM - 02:50 PM	T	room B218 Newmark Civil Engineering Bldg	Mesri, G
31546	laboratory	AB2	10:00 AM - 11:50 AM	R	room B218 Newmark Civil Engineering Bldg	Mesri, G
31547	lecture	AL1	01:00 PM - 01:50 PM	MWF	room B218 Newmark Civil Engineering Bldg	Mesri, G

495 ***Professional Practice*** Credit: 0 hours.
Series of lectures by outstanding authorities on the practice of civil engineering and its relations to economics, sociology, and other fields of human endeavor. 0 undergraduate hours. No graduate credit. Approved for S/U grading only. Prerequisite: Junior standing.

CRN	Type	Section	Time	Days	Location	Instructor
29793	lecture	H	04:00 PM - 04:50 PM	W	room 1320 Digital Computer Laboratory	Valocchi, A

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: Senior or graduate standing; consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
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
44194	laboratory-discussion	BP	02:30 PM - 05:20 PM	W	room B222 Newmark Civil Engineering Bldg	Finneran, K
	laboratory-discussion	BP	03:00 PM - 03:50 PM	M	room B222 Newmark Civil Engineering Bldg	Finneran, K
: 3 hoursSection BP: Biological Principles Laboratory. PREREQ: MCB 300 (or equivalent) and CHEM 104 (or equivalent) or CEE 444.						
31549	lecture-discussion	RT3	03:00 PM - 04:20 PM	MF	room 1233 Newmark Civil Engineering Bldg	Barkan, C
31549: 3 hoursSection RT3: Railway Transportation Operating Efficiency. PREREQ: CEE 310 or Consent of Instructor.						
41720	lecture-discussion	RT4	03:00 PM - 04:20 PM	MF	room 1233 Newmark Civil Engineering Bldg	Barkan, C

41720: 4 hoursSection RT4: Railway Transportation Operating Efficiency. PREREQ: CEE 310 or consent of instructor. 4 Hours of Graduate Credit.						
47398	lecture-discussion	SUE	01:00 PM - 02:20 PM	MW	room 252 Mechanical Engineering Bldg	Werth, C
47398: 3 hours3 HOURS Sustainable Urban Engineering Section SUE: Sustainable Urban Engineering. PREREQ:CHEM 104						

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
29797	lecture-discussion	D	09:00 AM - 09:50 AM	MWF	room 1233 Newmark Civil Engineering Bldg	Popovics, J
29797: 4 hoursTopic: Durability of Construction Materials. Prereq: CEE 300 or Consent of Instructor. 4 hours.						

509 ***Transportation Soils*** Credit: 4 hours.
Occurrence and properties of surficial soils, soil classification systems, soil variability; subgrade evaluation procedures, repeated loading behavior of soils; soil compaction and field control; soil moisture, soil temperature, and frost action; soil trafficability and subgrade stability for transportation facility engineering. Prerequisite: CEE 483.

CRN	Type	Section	Time	Days	Location	Instructor
29804	lecture-discussion	LM	08:30 AM - 09:50 AM	TR	room 1225 Newmark Civil Engineering Bldg	Tutumluer, E

516 ***Sys Method and Network Techniq*** Credit: 4 hours.
Same as IE 512. See IE 512.

CRN	Type	Section	Time	Days	Location	Instructor
35425	lecture-discussion	N	10:00 AM - 11:50 AM	TR	room 260 Mechanical Engineering Bldg	Peng, J

537 ***Water Quality Control Proc, I*** Credit: 4 hours.
Theory and basic design of processes used in water and wastewater treatment, including adsorption, ion exchange, chemical oxidation and reduction, disinfection, sedimentation, filtration, coagulation, flocculation, and chemical precipitation. Prerequisite: Credit or concurrent registration in CEE 442 and CEE 443.

CRN	Type	Section	Time	Days	Location	Instructor
29807	lecture	LM	08:00 AM - 09:50 AM	TR	room B218 Newmark Civil Engineering Bldg	Marinas, B

545 ***Aerosol Sampling and Analysis*** Credit: 4 hours.
Studies principles of sampling for particles and gases in the field of air pollution; examines instrumental techniques relevant to the design of sampling systems used in process control, ambient air monitoring, and laboratory experiments; methods of sample analysis and their limitations. Same as ATMS 535, ENVS 545, and ME 516. Prerequisite: MATH 385 and CEE 446.

CRN	Type	Section	Time	Days	Location	Instructor
36025	laboratory-discussion	TW	03:00 PM - 04:50 PM	TR	room B222 Newmark Civil Engineering Bldg	Bond, T

559 ***Sediment Transport*** Credit: 4 hours.
Physical processes of transportation and deposition of sediment particles in liquid bodies with particular emphasis on fluvial sediment problems; sediment in desilting basins; reservoirs and delta formation; erosion; stable channel design; and river morphology. Prerequisite: CEE 551.

CRN	Type	Section	Time	Days	Location	Instructor
39913	lecture-discussion	E	01:00 PM - 01:50 PM	MWF	room 1518 Civil Eng Hydrosystems Lab	Garcia, M

560 ***Steel Structures, III*** Credit: 4 hours.
Theories of ultimate behavior of metal structural members with emphasis on buckling and stability of members and frames; theory of torsion applied to beam torsion, lateral-torsional buckling, curved beams with emphasis on design criteria; post-buckling strength of plates and post-buckling versus column behavior. Prerequisite: CEE 462.

CRN	Type	Section	Time	Days	Location	Instructor
29813	lecture-discussion	A	08:00 AM - 08:50 AM	MWF	room 1233 Newmark Civil Engineering Bldg	Lafave, J

561 ***Reinforced Concrete, III*** Credit: 4 hours.
In-depth study of the behavior of reinforced concrete members, including the relationships between behavior and building code requirements. Prerequisite: CEE 463.

CRN	Type	Section	Time	Days	Location	Instructor

39917	lecture-discussion	D	11:00 AM - 11:50 AM	MWF	room 1233 Newmark Civil Engineering Bldg	Kuchma, D

571 ***Plates and Shells*** Credit: 4 hours.
Classical plate bending theory; emphasis on methods of solution including series expansions, variational procedures, and finite element techniques applicable to plate-type structures commonly encountered in practice; consideration of inplane loads, large deflections, buckling, and anisotropy. Prerequisite: CEE 471.

CRN	Type	Section	Time	Days	Location	Instructor
48086	lecture-discussion	LM	08:00 AM - 09:50 AM	TR	room 260 Everitt Elec and Comp Engr Lab	Duarte, C
48086: 4hours Prerequisite: CEE 471						

581 ***Earth Dams*** Credit: 4 hours.
Fundamentals of problems of slope stability; seepage in composite sections and anisotropic materials; methods of stability analysis; mechanism of failure of natural and artificial slopes; compaction; and field observations. Prerequisite: Credit or concurrent registration in CEE 484.

CRN	Type	Section	Time	Days	Location	Instructor
29681	lecture-discussion	LM	08:30 AM - 09:50 AM	TR	room B222 Newmark Civil Engineering Bldg	Stark, T

582 ***Consolidation of Clays*** Credit: 4 hours.
Elastic solutions relevant to soil mechanics; permeability; general application of Terzaghi's theory of one-dimensional consolidation; advances in consolidation theories; mechanism of volume change; delayed and secondary compressibility and creep; theory of three-dimensional consolidation and solutions; radial flow and design of sand drains; and analysis and control of settlement. Prerequisite: CEE 483.

CRN	Type	Section	Time	Days	Location	Instructor
39915	lecture-discussion	G	03:00 PM - 03:50 PM	MWF	room B218 Newmark Civil Engineering Bldg	Mesri, G

585 ***Deep Foundations*** Credit: 4 hours.
Ultimate capacities and load-deflection of piles and drilled shafts subjected to compressive loads, tensile loads, and lateral loads; effects of duration of load, soil-structure interaction; two- and three-dimensional analysis of pile groups with closely-spaced piles; effects of installation; inspection of deep foundations and full-scale field tests. Prerequisite: CEE 484.

CRN	Type	Section	Time	Days	Location	Instructor
29683	lecture-discussion	NP	10:00 AM - 11:20 AM	TR	room B222 Newmark Civil Engineering Bldg	Long, J

586 ***Rock Mechanics and Behavior*** Credit: 4 hours.
Physical properties and classification of intact rock, theories of rock failure, state of stress in the earth's crust, stresses and deformations around underground openings assuming elastic, plastic, and time-dependent behavior; effect of geologic discontinuities on rock strength; and introduction to stability analyses in rock. Prerequisite: CEE 483, GEOL 550, and TAM 451.

CRN	Type	Section	Time	Days	Location	Instructor
29687	lecture-discussion	RS	01:00 PM - 02:50 PM	TR	room B222 Newmark Civil Engineering Bldg	Fernandez-Delgado, G

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
36094	lecture-discussion	AG	12:00 PM - 12:50 PM	R	room 1518 Civil Eng Hydrosystems Lab	Werth, C
36094: Topic: Advanced Environmental Engineering. Environmental Ph.D. students and second year M.S. students must enroll in CEE 595 AG each semester.						
36095	lecture-discussion	CM	12:00 PM - 12:50 PM	R	room 1233 Newmark Civil Engineering Bldg	Liu, L
36095: Topic: Construction Management.						
36096	lecture-discussion	F	ARRANGED			Mesri, G
36096: Topic: Geotechnical Engineering						
36097	lecture-discussion	G	04:00 PM - 04:50 PM	M	room 1518 Civil Eng Hydrosystems Lab	Finneran, K
36097: Topic: Environmental Engineering. Environmental first year M.S. students must enroll in CEE 595 G each semester.						
36098	lecture-discussion	S	04:00 PM - 05:20 PM	M	room 1320 Digital Computer Laboratory	Paulino, G; Masud, A

36098: Topic: Structures. All Structures graduate students are required to register for CEE 595 S each semester.						
36099	lecture-discussion	W	12:00 PM - 12:50 PM	F	room 1518 Civil Eng Hydrosystems Lab	Cai, X
36099: Topic: Hydraulics and Water Resources.						

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
47400	lecture-discussion	CB3	10:00 AM - 11:50 AM	TR	room 214 Ceramics Bldg	Hashash, Y; Mwafy, A
47400: 3 hours3 hours Consq-Based Erthqk Engr. Section CB3: Consquence-Based Earthquake Engineering. PREREQ: Graduate Students in CEE The course will include an option for students with non-engineering backgrounds.						
47401	lecture-discussion	CB4	10:00 AM - 11:50 AM	TR	room 214 Ceramics Bldg	Hashash, Y; Mwafy, A
47401: 4 hours4 Hours Consq-Based Erthqk Engr. Section CB4: Consquence-Based Earthquake Engineering. PREREQ: Graduate Students in CEE. The course will include an option for students with non-engineering backgrounds. A project is required.						
45663	lecture-discussion	CEL	01:30 PM - 02:50 PM	TR	room 204 Transportation Bldg	Stark, T
45663: 4 hoursSection CEL: Construction and Engineering Law. PREREQ: CEE 320, CEE 420, CEE 421, CEE 422, or consent of instructor. 4 HOURS.						
43789	lecture-discussion	CS	04:30 PM - 05:50 PM	TR	room 1233 Newmark Civil Engineering Bldg	Liu, L
43789: 4 hoursSection CS: Construction Case Studies PREREQ: CEE 420, CEE 421, AND CEE 422. 4 Hours.						
48110	lecture-	FEC	02:00 PM - 03:20	MW	room 114	Masud, A

	discussion		PM		Transportation Bldg	
48110: 4 Hours Section FEC: Nonlinear Continuum Finite Element Method. PREREQ- CEE 471						
43836	lecture-discussion	WTS	02:00 PM - 03:50 PM	MWF	room 203 Transportation Bldg	Snoeyink, V
43836: 3 hours3 Hours Section WTS: Water Treatment Case Histories. PREREQ: CEE 537 or consent of an instructor.						

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						