Spring 2014 Underground Construction & Tunneling (UC&T) Courses:
Undergraduate and Graduate Level

*Required for UC&T Minor          **Required for UC&T MS and PhD

Undergraduate Level Courses and UC&T Minor

**Tunneling** - MNGN 404 - F 6-8:50 pm - Ray Henn
Modern tunneling techniques. Emphasis on evaluation of ground conditions, estimation of support requirements, methods of tunnel driving and boring, design systems and equipment, and safety. Prerequisite: none. 3 hours lecture; 3 semester hours.

**Intro to Rock Mechanics** - MNGN 321 - MW 8-8:50 am - Ugur Ozbay
Lab T 1-2:50 pm
Physical properties of rock, and fundamentals of rock substance and rock mass response to applied loads. Principles of elastic analysis and stress-strain relationships. Elementary principles of the theoretical and applied design of underground openings and pit slopes. Emphasis on practical applied aspects. Prerequisite: CEEN241 or MNGN317. 2 hours lecture, 3 hours lab; 3 semester hours.

**Soil Mechanics** - CEEN 312 - MWF 9-9:50 am - Alexandra Wayllace
Lab A - T 8-10:50 am / Lab B - R 8-10:50 am / Lab C - T 1-2:50 pm
An introductory course covering the engineering properties of soil, soil phase relationships and classification. Principle of effective stress. Seepage through soils and flow nets. Soil compressibility, consolidation and settlement prediction. Shear strength of soils. Prerequisite: CEEN311. 3 hours lecture; 3 semester hours.

**Design of Reinforced Concrete Structures** – CEEN 445 - MWF 9-9:50 am – Joseph Pepper Crocker
This course provides an introduction to the materials and principles involved in the design of reinforced concrete. It will allow students to develop an understanding of the fundamental behavior of reinforced concrete under compressive, tensile, bending, and shear loadings, and gain a working knowledge of strength design theory and its application to the design of reinforced concrete beams, columns, slabs, and footings. Prerequisite: CEEN314. 3 hours lecture; 3 semester hours.

**Earth Retaining Structures / Support of Excavations** - CEEN 498B - MW 2-3:15 pm – Mike Mooney
Analysis, design, construction and monitoring of earth retaining structures and support of excavations used for permanent and temporary support of transportation facilities, bridges, underground structures and tunnels, shafts, waterfront structures, earth slopes and embankments. Includes gravity, semi-gravity, cantilevered, anchored, geosynthetic and ground improvement walls. Addresses fundamental geomechanics required for analysis and design, ASD (allowable stress design) and LRFD (load resistance factor design) design techniques, and construction techniques. Prerequisites: Undergraduate Introduction to Geotechnical Engineering course (i.e., similar to CEEN312) or instructor consent. 3 hours lecture and discussion; 3 semester hours.

**Engineering Geology Design** - GEGN 469 - T 8-8:50am - Jerry Higgins
Lab T 9-11:50 am
This is a capstone design course that emphasizes realistic engineering geologic/geotechnics projects. Lecture time is used to introduce projects and discussions of methods and procedures for project work. Several major projects will be assigned and one to two field trips will be required. Students work as individual investigators and in teams. Final written design reports and oral presentations are required. Prerequisite: GEGN468 or equivalent and EPIC264. 2 hours lecture, 3 hours lab; 3 semester hours.

**Excavation Project Management** - MNGN 410 - F 2-3:50 pm - Ray Henn
Successful implementation and management of surface and underground construction projects, preparation of contract documents, project bidding and estimating, contract awarding and notice to proceed, value engineering, risk management, construction management and dispute resolution, evaluation of differing site conditions claims. Prerequisite: MNGN 210 or Instructor’s consent, 2-hour lecture, 2 semester hours.

**Geological Site Investigation** - GEGN 473 - MW 10-10:50 am - Paul Santi
Lab R 1-3:50 pm
Methods of field investigation, testing, and monitoring for geotechnical and hazardous waste sites, including: drilling and sampling methods, sample logging, field testing methods, instrumentation, trench logging, foundation inspection, engineering stratigraphic column and engineering soils map construction. Projects will include technical writing for investigations (reports, memos, proposals, workplans). Class will culminate in practice conducting simulated investigations (using a computer simulator). 3 hours lecture; 3 semester hours.
Mine Ventilation - MNGN 424 - MW 11-11:50 am - Jurgen Brune
Lab F 10 am -12:50 pm
Fundamentals of mine ventilation, including control of gas, dust, temperature, and humidity; ventilation network analysis and design of systems. Prerequisite: MEGN351, MEGN361 and MNGN314 or Instructor’s consent. 2 hours lecture, 3 hours lab; 3 semester hours.

Foundations - CEEN 415 - MWF 10-10:50 am - Andres Guerra

Rock Fragmentation - MNGN 407- MWF 9-9:50 am - Mark Kuchta

Structural Theory - CEEN 314 - MWF 11-11:50 am - Ruichong Zhang

Graduate Level Courses and UC&T MS and PhD

Advanced Rock Mechanics** - MNGN 508 - MW 8-8:50 am - Ugur Ozbay
Lab T 1-3:40 pm

Earth Retaining Structures / Support of Excavations** - CEEN 520 – MW 2-3:15 pm - Mike Mooney
Analysis, design, construction and monitoring of earth retaining structures and support of excavations used for permanent and temporary support of transportation facilities, bridges, underground structures and tunnels, shafts, waterfront structures, earth slopes and embankments. Includes gravity, semi-gravity, cantilevered, anchored, geosynthetic and ground improvement walls. Addresses fundamental geomechanics required for analysis and design, ASD (allowable stress design) and LRFD (load resistance factor design) design techniques, and construction techniques. Prerequisites: Undergraduate Introduction to Geotechnical Engineering course (i.e., similar to CEEN312) or instructor consent. 3 hours lecture and discussion; 3 semester hours.

Excavation Project Management** - MNGN (course number expected soon) - F 2-3:50 pm - Ray Henn
Successful implementation and management of surface and underground construction projects, preparation of contract documents, project bidding and estimating, contract awarding and notice to proceed, value engineering, risk management, construction management and dispute resolution, evaluation of differing site conditions claims. Prerequisite: MNGN 210 or Instructor’s consent, 2-hour lecture, 2 semester hours.

Geological Site Investigation - GEGN 573 - MW 10-10:50 am - Paul Santi
Lab R 1-3:50
Methods of field investigation, testing, and monitoring for geotechnical and hazardous waste sites, including: drilling and sampling methods, sample logging, field testing methods, instrumentation, trench logging, foundation inspection, engineering stratigraphic column and engineering soils map construction. Projects will include technical writing for investigations (reports, memos, proposals, workplans). Class will culminate in practice conducting simulated investigations (using a computer simulator). 3 hours lecture; 3 semester hours.

Tunneling - MNGN (course number expected soon) - F 6-8:50 pm - Ray Henn
Modern tunneling techniques. Emphasis on evaluation of ground conditions, estimation of support requirements, methods of tunnel driving and boring, design systems and equipment, and safety. Prerequisite: none. 3 hours lecture; 3 semester hours.

Finite Element Methods for Engineers - CEEN 506 – TR 2-3:15 pm – D. Griffiths