

# Underground Construction & Tunneling

## Programs Offered

Minor in Underground Construction and Tunneling (18.0 credit hours) and an Area of Special Interest (ASI) (12.0 credit hours).

## Program Educational Objectives

Underground Construction and Tunneling is a growing discipline involving knowledge in the disciplines of mining engineering, geological engineering and civil engineering, among others. The Departments of Mining Engineering, Geology & Geological Engineering and Civil and Environmental Engineering offer an interdisciplinary Minor or Area of Special Interest (ASI) course of study that allows students from these departments to take a suite of courses providing them with a basis for work and further study in this field.

The objectives of the minor and ASI are to supplement an engineering background with a formal approach to subsurface engineering that includes site characterization, design and construction of underground infrastructure, including water, storm water, highway or subway tunnels and subsurface facilities.

The Mines guidelines for Minor/ASI can be found in the Undergraduate Information section of the Mines Catalog.

## Curriculum

### Underground Construction & Tunneling Engineering Minor and ASI

The Underground Construction & Tunneling Engineering minor consists of a minimum of 18 credits of coursework from the list below. An Area of Special Interest (ASI) in Underground Construction & Tunneling requires 12 credits of coursework from the list below. A student's advisor may authorize a student's Minor or Area of Special Interest (ASI) application. For questions about the minor and to request consideration of additional courses including independent study, students should meet with a UC&T faculty member. The petition process requires one month to complete. See the following page for CSM's Minor and ASI requirements.

#### Program Requirements:

##### Required Courses (Minor)

CEEN312	SOIL MECHANICS	3.0
MNGN321	INTRODUCTION TO ROCK MECHANICS	3.0
MNGN404	TUNNELING	3.0

##### Electives (Minor)

CEEN314	STRUCTURAL THEORY	3.0
CEEN350	CIVIL AND CONSTRUCTION ENGINEERING MATERIALS	3.0
CEEN360	INTRODUCTION TO CONSTRUCTION ENGINEERING	3.0
CEEN499	INDEPENDENT STUDY	1-6

GEGN466	GROUNDWATER ENGINEERING	3.0
GEGN468	ENGINEERING GEOLOGY AND GEOTECHNICS	4.0
GEGN473	GEOLOGICAL ENGINEERING SITE INVESTIGATION	3.0
GEGN499	INDEPENDENT STUDY IN ENGINEERING GEOLOGY OR ENGINEERING HYDROGEOLOGY	1-6
MNGN314	UNDERGROUND MINE DESIGN	3.0
MNGN410	EXCAVATION PROJECT MANAGEMENT	2.0
MNGN424	MINE VENTILATION	3.0
MNGN499	INDEPENDENT STUDY	1-6

## Program Requirements

### Area of Special Interest in Underground Construction and Tunneling:

#### Required Courses

CEEN312	SOIL MECHANICS	3.0
MNGN321	INTRODUCTION TO ROCK MECHANICS	3.0
MNGN404	TUNNELING	3.0

#### Electives

Students may choose one course from the required Minor courses or elective courses listed above.

## Department of Civil & Environmental Engineering

Marte Gutierrez, Professor

Reza Hedayat, Associate Professor

Michael Mooney, Professor

Lori Tunstall, Assistant Professor

## Department of Geology & Geological Engineering

Gabriel Walton, Associate Professor

Wendy Zhou, Professor

## Department of Mining Engineering

Rennie Kaunda, Assistant Professor

Priscilla Nelson, Professor

Jamal Rostami, Professor