

Welcome to the UCA and UC&T Fall Kick-Off and Info Session!

WEDNESDAY, August 20th

What is Underground Construction and Tunneling and what is UCA?

https://www.youtube.com/watch?v=KBgvBEtzQq4





What is the UCA?

- UCA is the Underground Construction
 Association
- Subsection of the Society for Mining, Metallurgy and Exploration (SME)
- CSM has the only student chapter in the nation
- Through the UCA student chapter you can:
 - Learn about projects and technologies in the tunneling industry
 - Network with industry professionals
 - Learn about tunneling research at CSM





New UCA officers for the 2014-2015 school year:

- President: Laura Porras
- Vice-president: Lisa Mori
- Treasurer: Stephen Semmens
- Secretary (fall): John Kuyt
- Secretary (spring): Jon Marts
- Outreach: Kevin Schaeffer





Plans for the 2014-2015 school year:

- Celebration of Mines
- Field trips to underground construction and tunneling projects
- 2 Community service events
- Networking event
- Biweekly seminars





Visit us at our table at Celebration of Mines!

Join us on OrgSync! (search for UCA)

Learn more about the UCA: http://uca.smenet.org/





Center of Excellence in Underground Construction & Tunneling (UC&T)

Developing Leaders. Advancing Knowledge.



UC&T = Caverns + Shafts + Adits + Excavations + Tunnels



Manhattan Caverns New York City (10 blocks long; under Grand Central Terminal)

Olympic Cavern Hall (Gjøvik, Norway)



UC&T = Caverns + Shafts + Adits + Excavations + Tunnels



UC&T = Caverns + Shafts + Adits + Excavations + Tunnels



Tunnels: Water Conveyance



Tunnels: Wastewater



Tunnels: Transportation

Road

Transit





Tunnels: Multiple Use



SMART Tunnel – Stormwater Management & Road Tunnel (Kuala Lumpur, Malaysia)



A Little Bit about Us...

OLORADOSCHOOLOFMINES

We are a collaborative, interdisciplinary group of faculty and students from:

- Civil and Environmental Engineering
- Geology and Geological Engineering
- Mining Engineering

Additional involvement from: Geophysics, Mechanical Engineering, Electrical Engineering, Computer Science, Economics and Business



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uct.mines.edu

Developing Leaders. Advancing Knowledge.

How Can U Get Involved in UC&T??

- Courses and Degrees
- Research Projects and Positions
- Field Trips
- Scholarships: Information and Deadlines at uct.mines.edu
- Internships: Career Center and Diggernet



Education

- 20+ UC&T Courses
- Undergraduate Minor
- M.S. (Thesis and Non-Thesis)
- Ph.D.

(Only UC&T advanced degrees offered in North America!)

• See CSM Bulletin

(link on uct.mines.edu)

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Undergraduate Minor

The Underground Construction & Tunneling minor consists of a minimum of 18 credit hours

Required Courses

CEEN312	SOIL MECHANICS
MNGN321	INTRODUCTION TO ROCK MECHANICS
MNGN404	TUNNELING
GEGN466	GROUNDWATER ENGINEERING
or GEGN467	GROUNDWATER ENGINEERING

GEGN468 ENGINEERING GEOLOGY AND GEOTECHNICS

Example Electives Offered This Semester

MNGN408	UNDERGROUND DESIGN AND CONSTRUCTION	2.0
MNGN598C	GROUTING IN UNDERGROUND CONSTRUCTION	3.0
CEEN314	STRUCTURAL THEORY	3.0
CEEN415	FOUNDATIONS	3.0
CEEN523	ANALYSIS AND DESIGN OF TUNNELS IN SOFT GROUND	3.0
GEOL309	STRUCTURAL GEOLOGY AND TECTONICS	4.0

3.0 *Offered This Semester

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- 4.0 *Offered This Semester

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Required Minor Courses this Fall



- Soil Mechanics (CEEN 312) Alexandra Wayllace
 - MWF 9-9:50 + Lab
 - Prerequisites: Mechanics of Materials



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- Intro to Rock Mechanics (MNGN 321) Ugur Ozbay
 - MW 9-9:50 + T 1-3:50
 - Prerequisites: Statics or Dynamics for Mining Engineers



- Groundwater Engineering (GEGN466) Kamini Singha
 - TR 11-12:15

- Prerequisites: Calculus, Differential Equations, Structural Geology,
 - Sedimentology & Stratigraphy, Geologic Fluid Mechanics or Fluid Mechanics

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- Engineering Geology and Geotechnics (GEGN468) Jerry Higgins
 - MWF 10-10:50 + R 1-3:50
 - Prerequisites: Intro to Rock Mechanics and Soil Mechanics



Elective Minor Courses this Fall

- Underground Design and Construction (MNGN408) Priscilla Nelson
 - F 8-9:50
 - Prerequisites: Soil Mechanics or Intro to Rock Mechanics
- Grouting in Underground Construction (MNGN598C) Ray Henn
 - F 1-3:50
 - Prerequisites: none
- Analysis and Design of Tunnels in Soft Ground (CEEN532) Mike Mooney
 - MW 2-3:15
 - Prerequisites: Soil Mechanics or similar, Structural Analysis, Reinforced Concrete Design (preferred)
- Structural Theory (CEEN314) Susan Reynolds
 - MWF 11-11:50
 - Prerequisites: Mechanics of Materials
- Foundations (CEEN415) Vaughan Griffiths
 - TR 12:30-1:45
 - Prerequisites: Soil Mechanics
- Structural Geology and Geotechnics (GEOL309) Bruce Trudgill

- MW 1-3:50
- Prerequisites: Earth and Env. Systems, Engineering Terrain Analysis, Geologic Principles & Processes, Adv. Physical Geology Lab, and Earth Materials or Intro to Geophysics

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MS and/or PhD in UC&T

Required Courses for M.S. Thesis, M.S Non-Thesis and Ph.D. Degrees

The following 21 credit hours are required. Students are required to attend the UC&T seminar series and **M.S. non-thesis and Ph.D. students must complete an internship-related project**, registering as an independent study in the home department of the faculty advisor (CEEN 599, GEGN 599, or MNGN 599)

GEGN468	ENGINEERING GEOLOGY AND GEOTECHNICS	4.0	*Offered This Semester
CEEN512	SOIL BEHAVIOR	3.0	*Offered This Semester
MNGN508	ADVANCED ROCK MECHANICS	3.0	*Offered This Semester
CEEN523	ANALYSIS AND DESIGN OF TUNNELS IN SOFT GROUND	3.0	*Offered This Semester
MNGN504	TUNNELING	3.0	*Spring 2015
CEEN520	EARTH RETAINING STRUCTURES / SUPPORT OF EXCAVATIONS	3.0	*Spring 2015
MNGN509	EXCAVATION PROJECT MANAGEMENT	2.0	*Spring 2015



MS and/or PhD in UC&T

Example Elective Courses

CEEN510	ADVANCED SOIL MECHANICS	3.0
CEEN541	DESIGN OF REINFORCED CONCRETE STRUCTURES	3.0 *Offered This Semester
GEGN466	GROUNDWATER ENGINEERING	3.0 *Offered This Semester
GEGN573	GEOLOGICAL ENGINEERING SITE INVESTIGATION	3.0
GEGN581	ANALYTICAL HYDROLOGY	3.0
GEGN673	ADVANCED GEOLOGICAL ENGINEERING DESIGN	3.0
MNGN424	MINE VENTILATION	3.0
MNGN506	DESIGN AND SUPPORT OF UNDERGROUND EXCAVATIONS	3.0
MNGN507	ADVANCED DRILLING AND BLASTING	3.0
		2.0 *Offerred This Competer



Required UC&T Grad Degree Courses this Fall



- Engineering Geology and Geotechnics (GEGN468) Jerry Higgins
 - MWF 10-10:50 + R 1-3:50
 - Prerequisites: Intro to Rock Mechanics and Soil Mechanics



- Soil Behavior (CEEN512) Judith Wang
 - TR 12:30-1:45
 - Prerequisites: Soil Mechanics



- Advanced Rock Mechanics (MNGN508) Ugur Ozbay
 - MW 9-9:50 + T 1-3:50
 - Prerequisites: Intro to Rock Mechanics
- Analysis and Design of Tunnels in Soft Ground (CEEN532) Mike Mooney
 - MW 2-3:15
 - Prerequisites: Soil Mechanics or similar, Structural Analysis, Reinforced Concrete Design (preferred)



Elective UC&T Grad Degree Courses this Fall







- Design of Reinforced Concrete Structures (CEEN541) Joseph Crocker
 - MWF 8-8:50
 - Prerequisites: Design of Reinforced Concrete
- Groundwater Engineering (GEGN466) Kamini Singha
 - TR 11-12:15
 - Prerequisites: Calculus, Differential Equations, Structural Geology, Sedimentology & Stratigraphy, Geologic Fluid Mechanics or Fluid Mechanics
- Grouting in Underground Construction (MNGN598C) Ray Henn
 - F 1-3:50
 - Prerequisites: none



New Faculty

-PPN

- -Rennie Kaunda
- -Elizabeth Holley
- -Hope to search for 2 or 3 additional faculty members during Fall 2014



Classes in MNGN

- -333 Explosives Engineering (Petr)
- -350A Geothermal Energy (Nakagawa)
- -404 UG Design and Construction (Nelson)
- -498 Water and Environment in Mining (Kaunda)
- -598 Heat Mining (Nakagawa)
- -598 Grouting for Tunneling and Underground Construction (Henn)



- MN Graduate Seminar Thursdays at 4 pm
- Special Lectures by Dr. Charlie Li, Visiting Scientist from Norwegian University of Science and Technology on In Situ Stress measurement.

September 2 and 4, 9 to 10:15 am in BB206, in the Heat Mining Class)

Short Courses (check SPACE for agenda, students invited but do not eat or drink anything)

- Sept. 3 5: Shotcrete
 - Field Demo Thursday the 4th, 1:30 5 pm, EMI
- Sept. 15 17: Tunneling



Earth Mechanic Institute Mining Engineering Department Brian Asbury

Mechanical Excavation Tunneling, Mining, Drilling, etc. Rock Mechanics Testing Laboratory Full-Scale Testing Machine Performance Modeling



Novel Excavation Methods (water jet, thermal/chemical/laser



Research Projects – UC&T Undergraduates Fall 2014

Undergraduates in Civil, Geological, Mining, Mechanical, Electrical, Geophysics, Computer Science, etc. - join us and participate in applied research such as site investigation and characterization, ground imaging, numerical modeling, tunnel boring machine performance prediction and more!

5-15 hours per week; \$11-\$14/hr; flexible schedule; possible site visits

See flyer for full information, sign up for email notification or email uct@mines.edu

Applications due August 28, 2014



Scholarships – UC&T Students

Scholarships related to the field of UC&T will be listed on the website at **uct.mines.edu**.

Examples:

UCA of SME Scholarship - Application Deadline January 8, 2014

Established to encourage undergraduate and graduate academic pursuits and careers in the field of tunneling and underground construction and associated disciplines involved in the development, planning, design, and construction of underground infrastructure.

ASA Graduate Scholarship – Application Deadline November 3, 2014 The purpose of the ASA Graduate Scholarship Brogram is to attract, identify, and as

The purpose of the ASA Graduate Scholarship Program is to attract, identify, and assist outstanding graduate students pursuing careers within the field of concrete with a significant interest in the shotcrete process.



Internships

Ten UC&T students were employed this summer by ten companies!

- Kiewit
- J.F. Shea Construction
- Jay Dee
- Traylor Bros.
- Arup
- Golder Associates
- Atkinson Construction
- Moretrench
- USGS
- CTL Thompson



THOMPSON



Please work with the CSM Career Center and our UC&T Center Coordinator to find your opportunity, and let's increase that number!



Next Seminar: Wednesday 8/27 @ Noon

UC&T Student Research Presentations







Rick Bearce – PhD, Civil Jet Grout Monitoring

Jacob Grasmick – PhD, Civil

Ground Deformation Monitoring Lisa Mori – PhD, Mining Soil Conditioning

