

Spring 2019

CE 614-852: Underground Construction

Alan Slaughter

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New Jersey Institute of Technology

Department of Civil and Environmental Engineering

CE 614 Underground Construction

E-Learning

Section: 852

Spring 2019

Prof. Alan Slaughter, P.E., P.P.

Contact:slaughte@njit.edu, note which course you are inquiring about.

Office Hours: Office hours do not apply to this course, but I can be contacted by email.

Text: Introduction to Tunnel Construction, 2nd Edition; **Authors:** David Chapman, Nicole Metje and Alfred Stark; **Publisher:** CRC Press; **Paperback ISBN13:** 978-1-4987-6624-1

Prerequisites: Undergraduate course in soil mechanics.

Course Description: The course covers the various aspects of underground construction including rock and soft ground tunnel construction, shaft construction, inspection and rehabilitation of existing structures, open cut construction, blasting, and immersed tube tunnel construction.

Course Outline

<u>Week No. /Date</u>	<u>Topics</u>	<u>Chapter Reading</u>
1/ Jan. 22	Introduction – History <i>Introduction to Tunneling Wk.</i>	Chapt. 1 <i>Part 1,2</i>
2/ Jan. 28	Geotechnical & Shafts <i>Wk. 2 and 3 Geotechnical & Shafts</i>	Chapt. 2.2 to 2.3 <i>Parts 1, 2</i>
3/ Feb. 4	Geotechnical & Shafts <i>Wk. 2 and 3 Geotechnical & Shafts</i>	Chapt. 2.4 to 2.5 <i>Parts 3, 4</i>

4/ Feb. 11	Tunnel Analyses	Chapt. 3
5/ Feb. 19	Groundwater Control and Open Cut <i>(paragraph on term paper is due)</i> Wk. 4 Tunnels	Chapt. 4 Parts 1, 2, 3
6/ Feb. 25	Inspection of Tunnels Wk.5 Inspection	Parts 1,2
7/ Mar. 4	Rock Excavation – Blasting Wk. 6 Blasting	Chapt. 5.6 Parts 1,2
8/ Mar. 11	Midterm Examination	
Mar.17 thru Mar. 24 Spring Break		
9/ Mar. 25	Tunnel Boring Machine TBM	Chapt. 5.5 Parts 1, 2
10/ April 1	Earth Tunneling Shield Tunneling Methods Soft Ground	Chapt. 5.1, 5.2, 5.3, 5.4, Parts 1, 2
11/ Apr. 8	Tunnel Linings Soft Ground	Parts 1, 2
12/ Apr. 15	Immersed Tube Tunnels Microtunneling Immersed Tube and Microtunneling	Chapt. 5.7 to 5.12 Parts 1, 2
13/ Apr. 22	Safety Safety	Chapt. 6
14/ Apr. 29	Ground Movements and Monitoring Term Paper Due Apr. 22	Chapt. 7
15/ May 6	Case Studies	Chapt. 8
May 11	Final Examination	

Homework

Homework will be assigned during the semester, on moodle. Each assignment will be due the following week.

Term Projects

A list of potential project subjects will be provided. Students must select a project either from the list provided or some other source. On Week 4 or before, students will submit a one paragraph topic description on moodle.

The project report will be **10** pages, including text, photos, drawings and the like. The report will be prepared in an organized and professional manner. (*Neatness counts*)

Grading

1. Homework	15%
2. Midterm	25%
3. Term Project	30%
4. Final	<u>30%</u>
Total	100%

Important Notes:

1. The NJIT Honor Code will be upheld in this course. Any violations will be brought to the immediate attention of the Dean of Students.
2. Any modifications or deviations to the syllabus throughout the semester will be made through consultation and agreement with the class.