TED UNIVERSITY

CE 342
FOUNDATION ENGINEERING I

SYLLABUS – FALL 2023[1]

[1] Version 1.0. Subject to change depending upon the latest developments/circumstances, suggestions from students/administrators, recommendations, rules, and regulations.

Course Information

Required or Elective	☑ Required ☐ Elective	**Date**	October 2023
Semester	Fall 2023	**Class Hours and Classrooms**	**Lectures and Recitations** All lectures and recitation sessions will be conducted both face-to-face and synchronously using online sessions. Zoom links are accessible through the course LMS page (requires login with TEDU credentials): **Lectures** Mondays 10 to 11 am @G201 Tuesdays 4 to 6 pm @GB05 **Recitations** Wednesdays 10 am to 12 pm (noon) @G101 Additional or replacement meetings may be scheduled as necessary, required, or requested.
Course/ECTS Credits	(3+0+0) **3** / **6**	**Pre-requisite**	CE 341 – Soil Mechanics
Level of Course	Junior	**Language of Instruction**	☑ English ☐ Turkish
Instructor and Office Hours	Dr. Cem Akgüner (cem.akguner@tedu.edu.tr) Instead of fixed/physical office hours, I have an "always may e-mail to schedule or just drop-by" policy. At any time, you may come to my office or send me a message with your questions/comments/concerns/requests. I will try my best to respond as soon as possible within reason. Obviously, you may expect some delays outside of regular working hours.		
Teaching Assistant	Ömer Can Pamuk (omer.pamuk@tedu.edu.tr) (same policy outlined above for office hours)		

Suggested / Recom-mended Readings	1) *Principles of Foundation Engineering with MindTap* - SI Edition – 10th Ed. (2023) by B. M. Das – Cengage Learning 2) Turkish Structure Earthquake Code – Türkiye Bina Deprem Yönetmeliği (relevant sections, 2018) Additional material will be provided through CE 342 Moodle page as deemed necessary. 3) Foundation Design: Principles and Practices – 3rd Edition (2016) by D. P. Coduto, W. A. Kitch, M. R. Yeung – Pearson 4) Canadian Foundation Engineering Manual – 4th Edition (2006) by The Canadian Geotechnical Society – BiTech Publishers 5) Soil Mechanics and Foundations – 3rd Edition (2010) by M. Budhu – Wiley 6) Soil Strength and Slope Stability – 2nd Edition (2014) by J. M. Duncan, S. G. Wright, T. L. Brandon – Wiley 7) Geotechnical Engineering Design – 1st Edition (2016) by M. Xiao – Wiley 8) Zemin İncelemesi ve Temel Tasarımı – 3. Baskı (2018) by S. Yıldırım, Ş. Adatepe – Birsen Yayınevi
Selection of Some Useful Website References (among many others, you may use these to find other similar ones)	•American Pile Driving Equipment http://www.americanpiledriving.com/ver2/default.asp •Association of Drilled Shaft Contractors https://www.adsc-iafd.com/ •California Department of Transportation Manuals http://www.dot.ca.gov/manuals.htm •Dakota Drilling, Denver Colorado http://www.dakotadrilling.com/ •Deep Foundation Institute http://www.dfi.org/ •Drilling and sampling in geotechnical practice http://cee.engr.ucdavis.edu/faculty/boulanger/video/DrillingAndSampling.mpg •FHWA Pier and Pile Insp. Tutorials http://www.fhwa.dot.gov/infrastructure/tccc/tutorial/piles/index.htm •Florida Department of Transportation Publications •Geotechnical News (USA and Canada) http://www.bitech.ca/news.htm •GRL Engineers http://www.pile.com/ •Ground Engineering (UK) http://www.geplus.co.uk/ •Naval Facilities Engineering Command Foundations and Earth Structures Design Manual 7.02 http://www.ce.washington.edu/~geotech/courses/cee523/manuals/NAVFAC72.pdf •Procedures for Foundation Design of Buildings and Structures Soil Mechanics Design Manual 7.01 •http://www.geotechnicaldirectory.com/publications/Dm701.pdf •Florida State Department of Transportation Geotechnical Publications •http://www.dot.state.fl.us/geotechnical/publications.shtm •Pile Driving Contractors Association http://piledrivers.org/

	•U.S. Department of Transportation http://www.fhwa.dot.gov/infrastructure/tccc/tutorial/shafts/index.htm •United Facilities Criteria (UFC) http://www.wbdg.org/ccb/DOD/UFC/ufc_3_220_01n.pdf •Vulcan Hammer http://www.vulcanhammer.net/
Course Web Pages and Communication	You are already enrolled all of you to the Moodle course information system (2023F_CE342 on TEDU LMS). Please make a habit of regularly following these pages to have access to course materials and contribute to class discussions. I also recommend the Moodle mobile application as a good alternative to the website version. We will use e-mail as our primary communication tool.

Course Description

Subsurface exploration. Earth retaining structures. Performance requirements. Shallow and deep foundation design. Slope stability.

Course Objective

This course focuses on evaluating the appropriate components of subsurface exploration including in-situ and laboratory activities leading to a selection of relevant data in designing and analyzing foundation engineering applications in accordance with a set of constraints and expected/stated limits of performance requirements, and on assessing the effect of soils and relevant improvement methodologies on support systems and natural as well as man-made slopes.

Course Learning Outcomes

Upon successful completion of this course, students will be able to:

1. evaluate appropriate components of subsurface exploration including in-situ and laboratory activities,
2. select relevant data for design and analysis in foundation engineering applications,
3. design foundations to meet the inherent constraints and expected/required performance limits,
4. assess the effect of soils and relevant improvement methodologies under varying conditions on support systems and natural/man-made slopes.

Relationship to Program Outcomes

This course contributes to fulfillment of the following program outcomes (3 count / 5 weights):

PO2: Apply knowledge of mathematics, science, and engineering to design and implement original, innovative, and sustainable civil engineering systems or processes to meet desired needs within a greater societal context (2)
PO6: Identify, formulate, and solve engineering problems (2)
PO11: Employ state-of-the-art engineering techniques and computing tools necessary for creative engineering solutions (1)

Course Assignments

A. ***Homework and Quizzes (20%):*** Homework (10%) assigned, and quizzes (10%) given are within this category.
B. ***TEQ Code (2018) Summaries (5%):*** Summaries of Turkish Earthquake Code (TBDY, 2018) related to topics covered during the semester are evaluated under this section.
C. ***Create an Online Blog, and Digital Portfolio of Failure Cases from Turkey (7.5%):*** **BLOG**: You will create your own online blog on your choice of platform (or use the one you already have, **deadline to provide the link for the blog is October 13, 2023 @ 5 pm**) and make **regular** postings with your educated comments/conclusions/lessons (minimum of two per week) related to Civil Engineering/Geotechnical Engineering that is acceptable. It will be nice to have material in line with our covered topics. **PORTFOLIO**: You will be collecting, summarizing, analyzing, and critically evaluating three cases of failure from Turkey involving mistakes and shortcomings related to Geotechnical Engineering. The cases should be rather new (**from January 1st, 2022 on**) and may be collected from online/printed/TV news, videos, images, social media messages, and other relevant sources. You should include within your portfolio a lessons-learned section for each case. The deadline for uploading your selfie and portfolio on your blog is **January 03, 2024 (Wednesday @ 5 pm)**.
D. ***Exams I, II, & III (37.5%):*** We will have three exams (each 12.5%) during the semester which I will try my best to give within class hours although many times it is not possible. Approximate dates of the exams are shown in the weekly schedule. Exact dates will be announced during the semester.
E. ***Final Exam (30%):*** There will be a **comprehensive** final during the final exam weeks starting on January 08, 2024, running through January 21, 2024. The exact date of the final will be announced by the university towards the end of the semester. Final exam will be given in class (face-to-face) with mandatory presence required for all students.

Course Assessments & Learning Outcomes Matrix

Assessment Methods	Course Learning Outcomes
Weekly Homework / In-class Activities	#1, #2, #3, #4, #5, #6, #7
Exams I & II	#1, #2, #4, #6, #7
Final Exam	#2, #4, #6, #7
Term Projects / Competition	#3, #4, #5, #6, #7
Portfolio of Failure Cases	#2, #3, #4, #6, #7

Teaching Methods & Learning Activities

☑ Telling/Explaining
☑ Discussions/Debates
☑ Questioning
☑ Reading
☐ Peer Teaching
☐ Scaffolding/Coaching
☑ Demonstrating
☑ Problem Solving
☑ Inquiry
☑ Collaborating
☐ Think-Pair-Share
☑ Predict-Observe-Explain
☐ Microteaching
☐ Guest Speakers
☑ Hands-on Activities
☐ Service Learning
☑ Web Searching
☑ Case Study/Scenario Analysis
☑ Simulations & Games
☐ Video Presentations
☑ Oral Presentations/Reports
☑ Concept Mapping
☐ Brainstorming
☐ Drama/Role Playing
☐ Seminars
☑ Field Trip(s)
☐ Experiments
☐ Other(s)

Student Workload

☑ Lectures .....**42** .. hrs.
☑ Course Readings .....**25**... hrs.
☐ Workshop .... hrs.
☐ Online Discussion .... hrs.
☐ Debate .... hrs.
☐ Work Placement..... ..... hrs.
☑ Field Trips/Visits.....**2** .... hrs.
☐ Observation..... ..... hrs.
☐ Lab Applications..... ..... hrs.
☐ Hands-on Work..... ..... hrs.
☑ Quizzes .....**42** .. hrs.
☑ Case Study Analysis.....**15** ....hrs.
☐ Oral Presentation ....hrs.
☐ Resource Review.....…… hrs.
☐ Research Review .... hrs.
☑ Report on a Topic ..... **15** ... hrs.
☐ Poster Presentation .... hrs.
☑ Demonstration ..... **10** ... hrs.
☐ Web Designs .... hrs.
☐ Mock Designs .... hrs.
☐ Team Meetings .... hrs.
☑ Other: Homework ..... **25**... hrs.
TOTAL..... **176**... hrs.

Assessment Methods

☑ Test/Exam
☑ Quiz
☑ Oral Questioning
☑ Performance Project
☑ Written ☐ Oral
☑ Observation
☐ Self-evaluation
☐ Peer Evaluation
☐ Portfolio
☐ Presentation (Oral, Poster)
☑ Other(s): Homework and in-class activities

Tentative Course Outline

A tentative course outline for the lectures and exam dates is given below. Any changes and updates will be announced on the Moodle web page for the course.

Week	Date	Topic(s)	Chapters from Suggested Book*
1	02-03/10	Introduction to Foundation Engineering. Review of fundamental concepts – index and classification properties, water flow, effective stress concept, consolidation behavior, shear strength of soils – undrained and drained conditions. Subsurface exploration – sampling/characterization methods and reporting, variability.	1.1 – 1.8 2.1 – 2.23 See also CE 341 lecture notes and textbook) 3.11 – 3.29
2	09-10/10	Subsurface exploration – sampling/characterization methods and reporting, variability. Lateral loads (at-rest, active and passive pressures).	3.11 – 3.29 16.1 – 16.14
3	16-17/10	Earth retaining structures and excavations – walls (gravity/cantilever, mechanically-stabilized, sheet-piled, anchored) braced cuts, drainage/dewatering.	17.1 – 17.10 18.1 – 18.18 Hand-outs
4	23-24/10	Earth retaining structures and excavations – walls (gravity/cantilever, mechanically-stabilized, sheet-piled, anchored) braced cuts, drainage/dewatering.	17.1 – 17.18 18.1 – 18.18 Hand-outs
5	30-31/10	Geosynthetics – types and functions, basics of design Performance requirements – applied loads based on codes, and selection of foundations.	17.11 – 17.18 Hand-outs
6	06-07/11	Geosynthetics – types and functions, basics of design Performance requirements – applied loads based on codes, and selection of foundations. **EXAM I**	17.11 – 17.18 Hand-outs
7	13-14/11	Shallow foundation design – types (spread, strip, and mat/raft), bearing capacity and settlements (elastic/initial, consolidation, allowable/tolerable), testing and evaluation.	7.1 – 7.13
8	20-21/11	Shallow foundation design – types (spread, strip, and mat/raft), bearing capacity and settlements (elastic/initial, consolidation, allowable/tolerable), testing and evaluation.	7.1 – 7.13
9	27-28/11	Shallow foundation design – types (spread, strip, and mat/raft), bearing capacity and settlements (elastic/initial, consolidation, allowable/tolerable), testing and evaluation.	9.1 – 9.16 10.1 – 10.8
10	04-05/12	Deep foundation design – types (methods, configuration, materials), bearing capacity (axial and lateral) and settlements, testing and evaluation. **EXAM II**	12.1 – 12.28
11	11-12/12	Deep foundation design – types (methods, configuration, materials), bearing capacity (axial and lateral) and settlements, testing and evaluation.	13.1 – 13.13
12	18-19/12	Deep foundation design – types (methods, configuration, materials), bearing capacity (axial and lateral) and settlements, testing and evaluation.	14.1 – 14.3
13	25-26/12	Slope stability – natural slopes, man-made slopes (excavations and fills). **EXAM III**	Hand-outs
14	02-03/01	Slope stability – natural slopes, man-made slopes (excavations and fills).	Hand-outs

* Principles of Foundation Engineering with MindTap - SI Edition – 9th Ed. (2018) by B. M. Das & N. Sivakugan – Cengage Learning.

Course Policies and Some Remarks

Instructor Absence

I might have to miss some teaching activities during the semester due to unfortunate circumstances or for administrative/professional responsibilities. I will try my best to make-up the missed lectures during the semester through additional sessions as needed.

Attendance

I encourage you to be a part of all lectures and problem sessions. I will be collecting attendance for each hour of lecture/problem session. I expect you to behave in a responsible and appropriate manner while you are in class.

Classes and recitation sessions start on time. Please be respectful of your classmates by being on time. Please do not undertake any unrelated activities (homework for some class, use of your cell phones etc.) during class time.

Guidelines as what constitutes an acceptable medical letter can be found in the TEDU Student Affairs website (https://www.tedu.edu.tr/sites/default/files/docs/2019-ogrenci_saglik_raporlari_uygulama_esaslari.pdf).

Plagiarism

Collaboration on non-collected homework and in studying is strongly encouraged; however, the work you hand in must be solely your own. Sharing written work before it is turned in to be graded is academic dishonesty. For more information on TEDU policy on intellectual integrity, see the link: https://ds.tedu.edu.tr/sites/default/files/content_files/tedu_ogrenci-el-kitabi.pdf

Make Ups

In general, no make-ups will be offered. If unexpectedly you will be missing any of the assignments/quizzes, then you must inform the instructor as soon as possible for arrangements.

Also please read the document given in the link below for the TEDU Academic Rules and Regulations for Undergraduate Study:
http://www.tedu.edu.tr/sites/default/files/content_files/docs/Yonetmelikler/TEDU_Academic_Rules_Regulations_Undergraduate_Study.pdf

Student Services

Student Development and Psychological Counseling Center (SDPCC)

The SDPCC is a service mandated for providing crisis intervention and supportive listening services to the campus community. he Center conducts individual counseling, group guidance studies, workshops, seminars, and orientation studies for all students in need. You may apply to the Center to deal with all your current problems.

You may contact the SDPCC through e-mail or consult their website through the following links: ogrencidanismamerkezi@tedu.edu.tr, http://csc.tedu.edu.tr/

TEDU Without Barriers Unit

Please inform the TEDU Without Barriers Unit and the instructor of the course about the specific issues in case you have a physical or mental disability and are having trouble with anything related to this course, such as accessing the material, participating in the class, taking notes, preparing for, attending, or managing to complete the exams. Your situation will be reviewed by the Unit, in accordance with the principle of confidentiality, and if deemed appropriate, facilitating measures will be taken so that you can take the course more efficiently.

Please refer to the following e-mail address and website for further information and/or questions: engelsiz@tedu.edu.tr, https://www.tedu.edu.tr/engelsiz-tedu