

## 1 Course Number and Name

- a. **CENG 3341:** Geotechnical Engineering, Spring 2022
- b. Lecture: Sec 010 Mon & Wed 12:00—12:50 pm,  
Lab: Sec 01Z Mon 2:00 – 4:50 pm; Sec 02Z Tue 9:30 am – 12:20 pm

## 2 Credits and Contact Hours

- a. **Credits:** 3
- b. **Contact Hours:** 2 hours/week (Classroom) 3 hours/week (Lab)

## 3 Instructor Information

- a. **Course Coordinator:** William Kitch
- b. **Instructor:** William Kitch, 325-486-5501, [William.Kitch@angelo.edu](mailto:William.Kitch@angelo.edu), Office: VIN 268. For office hours see [faculty homepage](#).

## 4 Required Course Materials

- a. **Textbook:** *Geotechnical Engineering: Principles and Practices, 2<sup>nd</sup> Ed.*, Coduto, Yeung & Kitch, Pearson 2011, Hardcover (ISBN 9780132368681) or softcover (ISBN 9789332587427). No other editions are acceptable.
- b. **Lab Manual:** *Geotechnical Engineering Lab Manual*, Kitch 2009, pdf available on Blackboard.
- c. Other supplemental materials posted on Blackboard® Learning Management System

## 5 Technology Requirements

This course requires internet access and the ability to use the following online tools: Blackboard, Gradescope, Blackboard Collaborate, Adobe Acrobat (or another pdf maker), YouTube. Access to some exams or quizzes will be through Respondus Lockdown Browser and will be video recorded via Respondus Monitor. Respondus requires a desktop computer or laptop and a webcam. For best results, use an ethernet cable to connect to your Internet source instead of relying on Wi-Fi. Refer to the Blackboard course for Respondus installation instructions.

## 6 Specific Course Information

- a. **Catalog Description:** Introduction to geotechnical engineering and testing. Identification and classification tests, flow net, principles of settlement, stresses in soils and shear strength testing
- c. **Prerequisites:** ENGR 2332
- b. **Required or Elective Course:** Required

## 7 Specific Goals for the Course

- a. Course Learning Outcomes:
  - 1. Describe three-phased nature of soils, compute weight-volume relationships, and categorize soils using standard classification systems.
  - 2. Describe both laboratory and field compaction methods and apply compaction data to earthwork computations.
  - 3. Compute one- and two-dimensional ground water flow in soils.
  - 4. Describe 3D stresses in soil, and compute both geostatic and induced stresses from common loading conditions.
  - 5. Describe the principles of soil strength, methods of measuring soil strength, and apply strength data to engineering analyses.

6. Describe the sources of settlement in soils and evaluate and predict ultimate consolidation and secondary compression settlements.
  7. Describe the process of consolidation and compute consolidation settlements as a function of time.
  8. Perform standard geotechnical laboratory tests, analyze data, and draw conclusions about soil properties and performance
  9. Analyze a geotechnical case history with ethical implications
- b. Course Learning Outcome Mapping to ABET Criterion 3 Student Outcomes:

**Table 1: Course Learning Outcomes mapped to ABET Student Outcomes**

<b>ABET Student Outcomes</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
1. Solve Problems	X	X	X	X	X	X	X		
2. Design									
3. Communication									X
4. Ethics & Professionalism									X
5. Teamwork									
6. Experimentation								X	
7. Acquire New Knowledge									X

## **8 Topics Covered**

1. Engineering geology & soil formation
2. Drilling and sampling
3. Soil composition and classification
4. Soil compaction
5. Water flow in soil
6. Stress & strain in soil
7. Geostatic and induced stresses in soil
8. Soil consolidation
9. Shear strength of soil

## **9 Course Delivery and Communications**

### **9.1 Delivery Method**

This is a face-to-face course with learning resources and supplemental materials posted in [Blackboard](#)<sup>1</sup>. Accommodations will be made for students who are in quarantine or isolation and are unable to attend.

### **9.2 Communications**

You may communicate with me via Blackboard discussion board, email, phone, or via GroupMe text. See Figure 1 for QR code to join the course GroupMe.

I will respond to email or telephone messages within 24 hours during working hours Monday through Friday. Weekend messages may not be returned until Monday.

Written communication via email: All private communication will be done exclusively through your ASU email address. Check frequently for announcements and policy changes. In your emails to faculty, include the course name and section number in your subject line.

Office hours or advising may be arranged with the assistance of Collaborate, Zoom, or another web meeting platform



Figure 1: Course GroupMe QR Code

## **10 Professionalism**

Professional engineering standards apply in this class. You are expected to demonstrate a behavior consistent with the conduct of an individual practicing in the engineering profession. You are expected to: (1) come prepared for class; (2) respect faculty and peers; (3) demonstrate responsibility and accountability for your own actions; (4) demonstrate sensitivity and appreciation for diverse cultures, backgrounds, and life experiences; (5) offer and accept constructive criticism in a productive manner; (6) demonstrate an attitude that fosters professional behavior among peers and faculty; (7) be punctual to class meetings; (8) maintain a good work ethic and integrity; and (9) recognize the classroom as a professional workplace.

## **11 Graded Material**

### **11.1 Class Attendance, Participation, Timeliness and Teamwork**

You are expected to meet every class meeting on time and prepared. Attendance will be taken. Should you find it necessary to miss a class for any reason, you are expected to notify your instructor as early as the absence is known—preferably before the absence.

Your online assignments will be due at the time specified on Blackboard. Assignments submitted in hard copy are due at the beginning of class on the due date. Your instructor may assess penalties for late work.

Nearly all worthwhile accomplishments from raising a family to launching the space shuttle are the work of teams. Civil engineering is no exception. All significant civil engineering projects are completed by teams. You will be assigned to a team for most labs. The purpose of the teams are to give you practice working together and to provide a support group for you within the class. Outside of class, please collaborate and work with anyone you wish.

### **11.2 Quizzes**

There may be in-class quizzes. The quizzes will be unannounced and unscheduled. The quizzes are intended to determine whether or not you have completed the pre-class work and are prepared for class.

### **11.3 Reading Reviews**

Before nearly every lecture there will be an online reading review. This is designed to a) help you prepare for class and b) let your instructor know what parts of the material are most difficult and need to be covered in the lecture.

### **11.4 Problem Sets**

Problem sets will be due weekly and will be based on the previous week's lecture and lab topics. Check Blackboard for specific due dates. Your lowest submittal grade will be dropped.

**Resubmittals:** If a problem set is submitted on time and is complete, but you are not satisfied with the grade you received, you may make corrections and resubmit your homework for regrading. If your problem set was submitted late or incomplete, you may still resubmit it, but you will still be assessed a late/incomplete penalty by your instructor.

### **11.5 Case History Project**

You will be assigned a case history dealing with a geotechnical issue. You will submit a report documenting your analysis and findings.

### **11.6 Pre-lab Quizzes**

Before each lab you are required to complete a pre-lab quiz. These quizzes are designed to ensure you have read the pre-lab material and are prepared for the lab. If you have not completed the pre-lab quiz before the start of your scheduled lab, you may be asked to leave the lab until such time as you have completed the pre-lab quiz.

### **11.7 Lab Reports**

You will have six lab reports due throughout the course of the semester. Two of these reports will be prepared individually and will be team submitted lab reports.

### **11.8 Module Evaluations**

We will not have traditional in-class exams in this course. Instead, you will have an on-line module evaluation at the end of each course module. Each module evaluation will consist of two parts. The first will be a multiple-choice portion testing concepts from the module. This part will be closed book and closed notes and will have a time limit of 60 min. The second part of each module evaluation will consist of one or two computational questions. This part will be open book and open notes. The second part will be submitted via GradeScope.

## 11.9 Final Exam

The final exam will be the module evaluation for the final module of the course. It will have the same format as other module exams, but will be taken in person.

## 11.10 Grades: Weighting and Letter Grades

The weighting system shown in Table 2 will be used in determining final grade for the course

**Table 2: Grade Weighting**

Item	Count	Pts Each	Total Pts	Percent
Quizzes	7	10	70	6%
Reading Reviews	26	5	130	10%
Problem Sets	11	20	220	18%
Pre-Lab quizzes	10	5	50	4%
Lab report	6	20	100	10%
Case History Report	1	50	50	4%
Final Exam	6	100	600	48%
Total			1240	100%

The instructor will determine letter grades for the course using his professional judgment, and the following standards as described in the University Catalog:

A = excellent work      B = good work      C = average work      D = poor work      F = failing work

## 12 Classroom and University Policies and Student Support

### 12.1 General Policies

All students are required to follow the policies and procedures presented in the [Angelo State University Student Handbook](#)<sup>2</sup> and [Angelo State University Catalog](#)<sup>3</sup>.

### 12.2 Student Disability Services

ASU is committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs or activities of the university, or be subjected to discrimination by the university, as provided by the Americans with Disabilities Act of 1990 (ADA), the Americans with Disabilities Act Amendments of 2008 (ADAAA) and subsequent legislation.

Student Disability Services is located in the Office of Student Affairs, and is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability. It is the student's responsibility to initiate such a request by contacting an employee of the Office of Student Affairs, in the Houston Harte University Center, Room 112, or contacting the department via email at [ADA@angelo.edu](mailto:ADA@angelo.edu). For more information about the application process and requirements, visit the [Student Disability Services website](#)<sup>4</sup>. The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

Dallas Swafford  
Director of Student Disability Services  
Office of Student Affairs  
325-942-2047  
[dallas.swafford@angelo.edu](mailto:dallas.swafford@angelo.edu)  
Houston Harte University Center, Room 112

### **12.3 Title IX at Angelo State University**

Angelo State University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from sex discrimination of any kind. In accordance with Title VII, Title IX, the Violence Against Women Act (VAWA), the Campus Sexual Violence Elimination Act (SaVE), and other federal and state laws, the University prohibits discrimination based on sex, which includes pregnancy, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination and unwelcome behavior of a sexual nature. The term includes sexual harassment, nonconsensual sexual contact, nonconsensual sexual intercourse, sexual assault, sexual exploitation, stalking, public indecency, interpersonal violence (domestic violence or dating violence), sexual violence, and any other misconduct based on sex.

You are encouraged to report any incidents involving sexual misconduct to the Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator, Michelle Miller, J.D. You may submit reports in the following manner:

Online: [Incident Reporting Form](#)<sup>5</sup>

Face to Face: Mayer Administration Building, Room 210

Phone: 325-942-2022

Email: [michelle.miller@angelo.edu](mailto:michelle.miller@angelo.edu)

Note, as a faculty member at Angelo State, I am a mandatory reporter and must report incidents involving sexual misconduct to the Title IX Coordinator. Should you wish to speak to someone in confidence about an issue, you may contact the University Counseling Center (325-942-2371), the 24-Hour Crisis Helpline (325-486-6345), or the University Health Clinic (325-942-2171).

For more information about resources related to sexual misconduct, Title IX, or Angelo State's policy please visit the [Title IX website](#).<sup>6</sup>

### **12.4 Student Absence for Observance of Religious Holy Days**

A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. See ASU Operating Policy 10.19 Student Absence for [Observance of Religious Holy Day](#)<sup>7</sup> for more information.

### **12.5 Information About COVID-19**

Please refer to ASU's [COVID-19 \(Coronavirus\) Updates](#)<sup>8</sup> web page for current information about campus guidelines and safety standards as they relate to the COVID-19 pandemic.

### **12.6 Student Conduct Policies**

#### **12.6.1 Academic Integrity**

Students are expected to maintain complete honesty and integrity in all work. Any student found guilty of any form of dishonesty in academic work is subject of disciplinary action and possible expulsion from ASU.

#### **12.6.2 Plagiarism**

Plagiarism is a serious topic covered in ASU's [Academic Integrity policy](#)<sup>9</sup> in the Student Handbook. Plagiarism is the action or practice of taking someone else's work, idea, etc., and passing it off as one's own. Plagiarism is literary theft.

In your discussions and/or your papers, it is unacceptable to copy word-for-word without quotation marks and the source of the quotation. It is expected that you will summarize or paraphrase ideas giving appropriate credit to the source both in the body of your paper and the reference list.

Papers are subject to be evaluated for originality via Turnitin or SafeAssign. Resources to help you understand this policy better are available at the [ASU Writing Center](#)<sup>10</sup>.

### **12.6.3 Copyright Policy**

Students officially enrolled in this course should make only one printed copy of the given articles and/or chapters. You are expressly prohibited from distributing or reproducing any portion of course readings in printed or electronic form without written permission from the copyright holders or publishers.

### 13 Course Outline

The lecture lesson outline is presented in Table 3. The lab lecture outline is present in Table 4. Detailed reading and homework assignments along with updates to this schedule will be provided via Bb. The schedules may be modified as the semester progresses.

**Table 3: Lecture Lesson Outline**

Lsn	Date	Topic	Reading†	Assignment Due
1	Wed, Jan 19	Course Introduction	Text 1.1 – 1.5	RR01
2	Mon, Jan 24	Engineering Geology & Soil Formation	Text 2.1 – 2.7	RR02
3	Wed, Jan 26	Soil Composition & 3-phase diagrams	Text 4.3 – 4.4	RR03, PS01
4	Mon, Jan 31	Clay mineralogy	Text 4.5 - 4.8	RR04
5	Wed, Feb 02	Soil Classification part 1	Text 5.1 – 5.3	RR05, PS02
6	Mon, Feb 07	Soil Classification part 2	Text 5.4 – 5.6	RR06
7	Wed, Feb 09	Earth work	Text 6.1 – 6.2	RR07, PS03
8	Mon, Feb 14	Lab Compaction tests	Text 6.3 – 6.4	RR08
9	Wed, Feb 16	Field compaction control	Text 6.5 – 6.9	RR10
10	Mon, Feb 21	1-D Flow	Text 7.1 – 7.3	RR11, PS04
11	Wed, Feb 23	2-D Flow part 1	Text 8.1 – 8.2 to p 303	RR12
12	Mon, Feb 28	2-D Flow part 2	Text 8.2 pp 303-319	RR13
13	Wed, Mar 02	Stress-Strain & Mohr Circle	Text 9.1 – 9.3	RR14
14	Mon, Mar 07	Geostatic & Induced Stresses	Text 9.4 – 9.6	RR15, PS05
15	Wed, Mar 09	Superposition	Text 9.7	RR16
	Mar 9 - 13	Spring Break		
16	Mon, Mar 21	Effective Stress	Text 9.8 – 9.9	RR17, PS06
17	Wed, Mar 23	Stress, Strain & Settlement	Text 10.1 – 10.2	RR18
18	Mon, Mar 28	Consolidation Process	Text 10.3 – 10.4	RR19, PS07
19	Wed, Mar 30	Soil conditions in the field	Text 10.5 – 10.6	RR20
20	Mon, Apr 04	Consolidation predictions	Text 10.7 – 10.13	RR21
21	Wed, Apr 06	Terzaghi's consolidation theory	11.1	RR22, Prj P1
22	Mon, Apr 11	Computing rate of consolidation	11.2	RR23, PS08
23	Wed, Apr 13	Soil strength & failure	12.1 – 12.2	RR24
24	Mon, Apr 18	Volume change during shear	12.3	RR25, PS09
25	Wed, Apr 20	Mohr-Coulomb model	12.4	RR26, Prj P2
26	Mon, Apr 25	Strength of sand & gravel	12.5	RR27, PS10
27	Wed, Apr 27	Shear strength of clay	12.6	RR28
28	Mon, May 02	Shear strength of clay	12.6	RR29
29	Wed, May 04	Final review		PS11
	Mon, May 09	Final Exam 1:00 – 3:00 pm		PS11

Text = Textbook, RR = Reading Review, PS = Problem Set, Prj = project



**Table 4: Lab Schedule**

Week	Date	Topic	Reading†
1	Mon, Jan 17	Martin Luther King Holiday	
1	Tue, Jan 18	Lab 2: Drilling & Sampling Demo. Common time for both labs	Text 3.1 – 3.9 to p96, 4.1 – 4.2
2	Mon, Jan 24	Lab 1: Experiential lab	LM Appendix A
2	Tue, Jan 25	Lab 1: Experiential lab	LM Appendix A
3	Mon, Jan 31	Lab 3: Atterberg limits	LM Ch 5; Text 4.6
3	Tue, Feb 01	Lab 3: Atterberg limits	LM Ch 5; Text 4.6
4	Mon, Feb 07	Lab 4: Sieve	LM Ch 6; Text 4.4
4	Tue, Feb 08	Lab 5: Hydrometer	LM Ch 7; Text 4.4
5	Mon, Feb 14	Lab 5: Hydrometer	LM Ch 7; Text 4.4
5	Tue, Feb 15	Lab 4: Sieve	LM Ch 6; Text 4.4
6	Mon, Feb 21	Lab 6: Proctor	LM Ch 8; Text 6.4, through p. 223
6	Tue, Feb 22	Lab 6: Proctor	LM Ch 8; Text 6.4, through p. 223
7	Mon, Feb 28	Lab 7: Sand Cone	LM Ch 9; Text 6.5, through p. 231
7	Tue, Mar 01	Lab 7: Sand Cone	LM Ch 9; Text 6.5, through p. 231
8	Mon, Mar 07	Labs 8 & 9: 1 & 2D Flow	Handout; Text 7.4
8	Tue, Mar 08	Labs 8 & 9: 1 & 2D Flow	Handout; Text 7.4
	Mon, Mar 14	Spring Break	
	Tue, Mar 15	Spring Break	
9	Mon, Mar 21	Lab 10: Triax CU P1	Handout; Text 12.9 through p. 579
9	Tue, Mar 22	Lab 11: Consol P1	Handout; LM Ch 10; Text 10.5
10	Mon, Mar 28	Lab 10: Triax CU P2	
10	Tue, Mar 29	Lab 11: Consol P2	
11	Mon, Apr 04	Lab 10: Triax CU P3	
11	Tue, Apr 05	Consol Data Reduction	
12	Mon, Apr 11	Triax Data Reduction	
12	Tue, Apr 12	Lab 10: Triax CU P1	Handout; Text 12.9 through p. 579
13	Mon, Apr 18	Lab 11: Consol P1	Handout; LM Ch 10; Text 10.5
13	Tue, Apr 19	Lab 10: Triax CU P2	
14	Mon, Apr 25	Lab 11: Consol P2	
14	Tue, Apr 26	Lab 10: Triax CU P3	
15	Mon, May 02	Consol Data Reduction	
15	Tue, May 03	Triax Data Reduction	

LM = Lab Manual, Text = Textbook

## 14 End Notes

<sup>1</sup> [angelo.blackboard.com](http://angelo.blackboard.com)

<sup>2</sup> <http://www.angelo.edu/student-handbook/>

<sup>3</sup> <http://www.angelo.edu/catalogs/>

<sup>4</sup> <http://www.angelo.edu/services/disability-services/>

<sup>5</sup> <https://www.angelo.edu/incident-form>

<sup>6</sup> <https://www.angelo.edu/title-ix>

<sup>7</sup> <http://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of>

<sup>8</sup> <https://www.angelo.edu/covid-19/>

<sup>9</sup> <http://www.angelo.edu/student-handbook/community-policies/academic-integrity.php>

<sup>10</sup> [http://www.angelo.edu/dept/writing\\_center/academic\\_honesty.php](http://www.angelo.edu/dept/writing_center/academic_honesty.php)