

1: Course Number and Name

- a. **ENGR 1307:** Plane Surveying, Fall 2021
- b. Lecture: Section 010 12:00 pm – 12:50 pm, Monday and Wednesday
Lab: Sec 01Z 12:00 pm – 2:50 pm, Friday

2: Credits and Contact Hours

- a. **Credits:** 4
- b. **Contact Hours:** 2 hours/week (classroom) 3 hours/week (Lab)

3: Instructor Information

- a. **Course Coordinator:** Dr. Dick Apronti
- b. **Instructor:** Dick Apronti, 325-486-5512, dick.apronti@angelo.edu. Office: VIN 275.
- c. **Office hours:** MW 2:00 pm – 4:30 pm (Mondays in my office, Wednesdays in Student Hub).

4: Required Course Materials

a. **Textbooks:**

Ghilani, C.D., (2022) Elementary Surveying: An Introduction to Geomatics 16th Edition, Pearson, ISBN: 978-0136822806. The 15th or 14th Edition of the textbook is acceptable. Alternatively, if you are comfortable reading textbooks on your laptop, tablet, or other electronic devices, you can obtain an e-text of the book. No access code is required for this course.

b. **Additional Materials:**

- A surveyor's field notebook,
- a calculator meeting NCEES rules,
- a pencil, a ruler, an engineering pad for in-class exercises and homework.

5: Technology Requirements

To successfully complete this course, you need to have internet access and the ability to use the following online tools: Blackboard, Gradescope, Blackboard Collaborate, Adobe Acrobat (or another pdf maker), YouTube. No specific hardware is required, but access to a computer with webcam is highly encouraged.

6: Specific Course Information

- a. **Catalog Description:** In this course, you will learn to recognize and solve problems in surveying as they apply to engineering projects. You will be introduced to modern surveying equipment such as levels and total stations. You will learn to use these instruments to perform surveys of typical engineering projects.
Topics covered are definition of surveying and the types of surveys; units and significant figures; theory of errors in observations; distance measurement; leveling; angles, azimuths, and bearings; total station instruments; traversing and traverse computations; area and volume; GNSS; and State Plane Coordinates. Computer lab sessions involving hands-on exercises and projects will train students to gain basic skills in an Autodesk Civil 3D software through extensive computer lab sessions.
- c. **Prerequisites:** MATH 1314 – College Algebra.
- d. **Required or elective:** Required.

7: Specific Goals for the Course

- a. Course Learning Outcomes:
 1. Determine errors in measurements and the accuracy of a set of measurements by propagating the errors through computations
 2. Use tapes, levels, and total stations to perform field measurements of elevation and location in the context of engineering projects and document measurements in accurate field notes
 3. Use plane survey measurements to create maps, contours, site plans and other engineering descriptions of a given site.
 4. Use plane surveying methods to layout engineering constructions such as buildings, roads, horizontal and vertical curves.
 5. Solve common civil engineering survey problems related to leveling, traversing, earthworks, and highway curves.
 6. Describe the components in Global Navigation Satellite Systems and how they are used in surveying.

- b. Course Learning Outcome Mapping to ABET Criterion 3 Student Outcomes:

Table 1: Course Learning Outcomes mapped to ABET Student Outcomes

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

8: Topics Covered

1. Units and significant figures.
2. Theory of errors in observations.
3. Distance measurements.
4. Leveling.
5. Angles, azimuths, and bearings.
6. Total station instruments.
7. Traversing and traverse computations.
8. Area and volume.
9. Global Navigation Satellite Systems.
10. Construction surveys.
11. Horizontal and vertical curves.
12. State Plane Coordinates.
13. Introduction to civil engineering design with Autodesk Civil 3D.

9: Course Delivery and Communications

9.1: Delivery Method(s)

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

9.2: Communications

The primary means of communication during this course are Blackboard and Piazza. Lesson materials will be delivered via Blackboard. Piazza will be used for announcements and discussion of course materials. Please do not email your instructor with questions about class—instead, post your questions on Piazza. One reason for using Piazza is for you to benefit from the collective knowledge of your classmates and instructors. You are encouraged to ask questions when you are struggling to understand a concept—you can even do so anonymously or send private messages to the instructor.

The instructor will respond to Piazza messages within six to twelve hours during working hours Monday through Friday. Weekend messages may be responded to within 24 hours or until Monday. Messages posted on Piazza will be sent to your ASU email address. Check frequently for announcements and policy changes.

When face-to-face office hours are not possible, office hours or advising may be arranged with the assistance of Collaborate, Zoom, or another web meeting platform.

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 assess your comprehension of the basic concepts of topics covered, and to determine whether you have completed the pre-class work and are prepared for class.

11.3: In-class Exercises

There will be some exercises in this course that will be categorized as in-class exercises. The exercises will be assigned in class to complete outside class time. The in-class exercises require completion of some computations or providing extensive explanations on a topic covered during a class lecture. The exercises will be due on the dates indicated on Blackboard.

11.4: Homework

There will be homework assignments covering each topic. Each homework is an individual effort that may require reading beyond the discussions presented by the instructor in class. Homework assignments will be due on the dates indicated on Blackboard. Your lowest submission will be dropped.

11.5: Field Lab and Civil Engineering Design Exercise Submittals

Engineers have both an ethical and professional responsibility to take accurate, understandable field notes. Field notes form the basis of both engineering and legal decision making. Your field notebooks will be evaluated for accuracy, completeness and professionalism. All your lab work will be completed in teams. Four of the labs will be evaluated based on post-lab submittals (taping, levelling, traversing, and topo mapping). The remaining labs will be evaluated on your in-field performance and participation.

Part of your lab includes work related to understanding the basics of Civil 3D. Submissions from completing Civil 3D exercises assigned to you shall be evaluated by your instructor.

11.6: Exam

There will be two in-class exams and one final exam. The first and second exams will be 120 minutes and scheduled to take place during lab sessions. The final exam will be 120 minutes and scheduled per the university final exam calendar. All exams will be closed book. You will be allowed to bring in a limited amount of handwritten notes.

11.7: Grades: Weighting and Letter Grades

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

Table 2: Grade Weighting

Item	Weight
Quizzes	5%
In-class exercises	10%
Homework	20%
Lab and Civil 3D Exercises	20%
Exam 1	15%
Exam 2	15%
Final Exam	15%
Total	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

11.8: Incomplete Grade Policy

It is policy that incomplete grades be reserved for student illness or personal misfortune. Please contact faculty if you have serious illness or a personal misfortune that would keep you from completing course work. Documentation may be required. See ASU Operating Policy 10.11 [Grading Procedures](#)² for more information.

12: Classroom and University Policies and Student Support

All students are required to follow the policies and procedures presented in the [Angelo State University Student Handbook](#)³ and [Angelo State University Catalog](#)⁴.

12.1: Accommodations for Students with Disabilities

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. For more information about the application process and requirements, visit the [Student Disability Services website](#).⁵ The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

Dr. Dallas Swafford
Director of Student Disability Services
Office of Student Affairs
325-942-2047
dallas.swafford@angelo.edu
Houston Harte University Center, Room 112

12.2: 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](#)⁶

Face to Face: Mayer Administration Building, Room 210

Phone: 325-942-2022

Email: 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](#).⁷

12.3: 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](#)⁸ for more information.

12.4: Information About COVID-19

Please refer to ASU's [COVID-19 \(Coronavirus\) Updates](#)⁹ web page for current information about campus guidelines and safety standards as they relate to the COVID-19 pandemic.

12.5: Student Conduct Policies

12.5.1: 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.

12.5.2: Plagiarism

Plagiarism is a serious topic covered in ASU's [Academic Integrity policy](#)¹⁰ 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](#)¹¹.

12.5.3: 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 tentative course outline is presented in Table 3. Detailed reading and homework assignments along with updates to this schedule will be provided via Bb. The following schedule may be modified as the semester progresses.

Table 3: Course Lesson Outline

Week	Date	Topic	Assignments
1	Aug 23	Course introduction	HW01
	Aug 25	Survey definition	
	Aug 27	Measuring Distances (Lab)	
2	Aug 30	Survey Applications	Exercise 1
	Sept 1	Significant figures	HW02
	Sept 3	Taping I (Lab)	
3	Sept 6	Holiday	Exercise 2
	Sept 8	Significant figures	HW03
	Sept 10	Intro to Leveling (Lab)	
4	Sept 13	Units	Exercise 3
	Sept 15	Errors	
	Sept 17	Leveling I (Lab)	
5	Sept 20	Error Computations	HW04
	Sept 22	Distance Measurement	
	Sept 24	Leveling II (Lab)	
6	Sept 27	Leveling Computation	HW05
	Sept 29	Angles, azimuths, and bearings	
	Oct 1	Exam 1	
7	Oct 4	Introduction to traverse computations	Exercise 4
	Oct 6	Traverse Computations	
	Oct 8	Angles (Lab)	
8	Oct 11	Area computations	HW06
	Oct 13	Volume computations	
	Oct 15	Closed Traverse (Lab)	
9	Oct 18	Intro to Global Navigation Satellite Systems	HW07
	Oct 20	Global Navigation Satellite Systems I	
	Oct 22	Closed Traverse Lab & Computations	
10	Oct 25	Global Navigation Satellite Systems II	

Week	Date	Topic	Assignments
	Oct 27	Construction surveys	
	Oct 29	Exam 2	
11	Nov 1	Horizontal curves	Exercise 5
	Nov 3	Horizontal curve problems	HW08
	Nov 5	Topo Survey (Lab)	
12	Nov 8	Vertical curves	HW09
	Nov 10	Vertical curve problems	
	Nov 12	Topo Survey (Lab)	
13	Nov 15	Coordinate Geometry I	HW10
	Nov 17	Coordinate Geometry II	
	Nov 19	Leveraging the Civil 3D dynamic environment	
14	Nov 22	State Plane Coordinates	
	Nov 24	Thanksgiving Holiday Break	
	Nov 26	Thanksgiving Holiday Break	
15	Nov 29	Establishing Existing Conditions Using Survey Data	
	Dec 1	Modeling Existing Ground Using Surfaces	
	Dec 3	Civil 3D Project	
16	Dec 6	Final Exam @ 1:00 PM – 3:00 PM	

14: End Notes

¹ angelo.blackboard.com

² <https://www.angelo.edu/content/files/14197-op-1011-grading-procedures>

³ <http://www.angelo.edu/student-handbook/>

⁴ <https://www.angelo.edu/academics/catalog/>

⁵ <https://www.angelo.edu/current-students/disability-services/>

⁶ <https://www.angelo.edu/incident-form>

⁷ <https://www.angelo.edu/title-ix>

⁸ <http://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of>

⁹ <https://www.angelo.edu/covid-19/>

¹⁰ <http://www.angelo.edu/student-handbook/community-policies/academic-integrity.php>

¹¹ http://www.angelo.edu/dept/writing_center/academic_honesty.php