

1: Course Number and Name

- a. **ENGR 1308:** Intro to Geomatics, Summer 2 2022
- b. Lecture Recording Session (students are welcome to join): Section 010 11:00 am – 11:50 am, MTWRF
Lab session recording: Sec 01Z 2:00 pm – 3:40 pm, MWF

2: Credits and Contact Hours

- a. **Credits:** 4
- b. **Contact Hours:** 5 hours/week (classroom) 6 hours/week (Lab)

3: Instructor Information

- a. **Course Coordinator:** Dr. Dick Apronti
- b. **Instructor:** Dr. Dick Apronti, Office number: 325-486-5512, Cell number: 325.650.1977, Email: dick.apronti@angelo.edu, Office: VIN 275.
- c. **Office hours:** All meetings are by appointment only.

4: Course Materials

a. **Textbooks:**

- Chappell, E., (2016) AutoCAD Civil 3D 2016 Essentials. This book is for the lab part of the course and will be used to learn the essentials for creating maps from survey data.

Any one of the two books below is adequate.

- Ghassan Tarakji, (2022) Surveying: A Contemporary Approach, 1st Edition, ISBN 9781792496882.
- 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.

You can get the hard copy, or if you are comfortable reading textbooks on your laptop, tablet, or other electronic devices, you can obtain an e-text of either book. No access code is required for this course.

b. **Additional Materials:**

- Access to a computer or laptop with a good internet connection, a webcam and a microphone.
- Access to a scanner or a scanner app to upload pdf files on Blackboard.
- a calculator meeting NCEES rules.

5: Technology Requirements

To successfully complete this course, you need to have internet access and the ability to use the following online tools: Blackboard, Respondus Lockdown Browser and monitor, 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 the basic principles of surveying data collection, analysis, and application. You will be introduced to the measurement of

elevations, distances, horizontal and vertical angles, and their respective surveying instruments. The course will discuss how these measurements are analyzed to determine latitude, longitude, and elevation in various coordinated systems and measurement errors. Finally, you will apply survey data to engineering design using GIS and 3-D modeling software.

- c. **Prerequisites:** MATH 1314 – College Algebra.
- d. **Required or elective:** Required.

7: Specific Goals for the Course

- a. Course Learning Outcomes:
 1. Identify various survey instruments such as tapes, levels, and total stations, and how they are used in measuring elevations, angles, and coordinates.
 2. Demonstrate how survey data are recorded accurately in field notes.
 3. Determine errors in measurements and the accuracy of a set of measurements by propagating the errors through computations.
 4. Solve common civil engineering survey problems related to leveling, traversing, earthworks, and highway curves.
 5. Create and modify survey maps, contours, and site plans using survey data and descriptions.
 6. Use plane surveying methods to layout engineering constructions such as buildings, roads, and horizontal and vertical curves.
 7. 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	7
1.Solve Problems	X		X	X	X	X	X
2.Design					X		
3.Communication		X			X		
4.Ethics & Professionalism							
5.Teamwork						X	
6.Experimentation							
7.Acquire New Knowledge	X				X		

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 Structure and Communications

9.1: Delivery Method(s)

Instruction for this course shall be carried out completely online using Blackboard Collaborate. Students may choose to attend and participate in live class or watch the video recordings of the class later. However, you are expected to watch all video recordings and complete all class exercises by 9:00 am the next day. The lab sessions will utilize the Virtual Desktop Infrastructure (VDI) resource to access the needed software and tools. Students must have access to a laptop and a good internet connection to use the VDI resources.

We will be using both Blackboard and Piazza to communicate during this course. Lesson materials will be delivered via Blackboard. Piazza will be used for announcements and discussion of course materials. Piazza is recommended for asking questions related to class instead of email since other class members will see my answers when you post on Piazza and they will not ask the same questions.

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 participate at every class meeting on time and prepared. Should you find it necessary to miss a class deadline for any reason, you are expected to notify your instructor by email as early as the absence is known—preferably before the deadline. Class sessions shall be recorded and available for viewing after class. However, opportunities to make up for missing the deadline for an exercise or quiz will only be granted if the instructor was informed about the absence prior to the deadline. Piazza will be the main forum for communicating with your instructor and fellow students. One purpose of the discussions is to inform your instructor about any open questions from the reading or other material. It is important that you provide feedback to your instructor.

Your assignments will be due at the times specified on Blackboard when the assignment was given. Your instructor may assess penalties for late work. Be prepared to answer questions related to previous classes or assigned readings.

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 periodically assigned to a team to complete submittals. The purpose of the teams is 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 and Lab Submittals

There may be quizzes for each class meeting. 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. The quizzes include submission of assigned Civil 3D lab work. Scores from the quizzes will contribute to 10% of the total grade score.

11.3: Homework and In-class Exercises

Homework assignments will be due at times indicated on Blackboard. The homework will be based on the previous day's lecture topics. The mode of submission and the due dates will be indicated in the homework. Late submissions will attract penalties. Some exercises may be assigned to be done in class individually or in groups. Scores from the in-class assignments and homework will contribute to 15% and 20% of your total grade score, respectively.

Late submissions: Submissions before the due date and time can earn the total score for the assignment. Late submissions will be penalized. For each day after the submission day, you will lose 20% of the total points that can be earned.

11.1: Lab and Civil Engineering Design Project 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. You will practice recording in field notebooks that will be evaluated for accuracy, completeness, and professionalism in a lab project. The lab work will be completed in teams. You will need access to the remote computer lab to complete this lab.

You shall be assigned some raw survey data and required to plot them on Civil 3D as your final project. The project requires work related to understanding the basics of Civil 3D which will be covered in the lab meetings. Submissions from completing the Civil 3D project and the lab exercise will make up 20% of your total grade score.

11.2: Exam

The course will have two exams – Exam 1 in the middle of the semester and a final exam. The topics covered by the two exams are exclusive and will not overlap. Exam 1 and the Final Exam shall be worth 15% and 20% of the total grade score, respectively.

11.3: 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 and Lab Submittals	10%
In-class exercises	10%
Homework	20%

Item	Weight
Lab and Civil 3D Project	25%
Exam 1	15%
Final Exam	20%
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

11.4: 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](#)¹ 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](#)² and [Angelo State University Catalog](#)³.

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](#).⁴ 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](#)⁵

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](#).⁶

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](#)⁷ for more information.

12.4: Information About COVID-19

Please refer to ASU's [COVID-19 \(Coronavirus\) Updates](#)⁸ 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](#)⁹ 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](#)¹⁰.

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		Lab
1	07/11	Survey definition & Survey Application	Quiz 1	Navigating the Civil 3D User Interface
	07/12	Significant Figures	HW1	
	07/13	Units	Quiz 2	Leveraging a Dynamic Environment
	07/14	Theory of Errors in Observations - Definitions	HW2	
	07/15	Theory of Errors in Observations – Probability and Precision	Quiz 3	Establishing Existing Conditions Using Survey Data
2	07/18	Theory of Errors in Observations – Error Propagation	Quiz 4	Modeling Existing Ground Using Surfaces
	07/19	Distance measurements – taping and taping errors	HW 3	
	07/20	Distance Measurements – Other Methods	Quiz 5	Designing and Analyzing Boundaries Using Parcels
	07/21	Distance Measurements – EDM		
	07/22	Week 1 & 2 Recap & Prep for Exam 1		Displaying and Annotating Parcels
3	07/25	Exam 1		Designing New Terrain
	07/26	Leveling - Methodology	HW 4	
	07/27	Leveling – Field book entry and computations	Quiz 6	Analyzing, Displaying, and Annotating Surfaces
	07/28	Lab 1 – Leveling (virtual lab)		
	07/29	Azimuths and Bearings	HW 5	

Week	Date	Topic		Lab
4	08/01	Magnetic Declination & Lab 2 – Total Station (virtual lab)	Quiz 7	Civil 3D Project Assignment
	08/02	Traverse Computations (Part 1)	HW 6	
	08/03	Traverse Computations (Part 2)	Quiz 8	
	08/04	Coordinate Geometry in Surveying Calculations	HW 7	
	08/05	Mapping Surveys	Quiz 9	
5	08/08	Control Surveys and Geodetic Reductions	HW 8	Civil 3D Project Due
	08/09	Area & Volumes	Quiz 10	
	08/10	GNSS Overview (Part 1)		
	08/11	GNSS Overview (Part 2)	Quiz 11	
	08/12	Final Exam		

14: End Notes

¹ <https://www.angelo.edu/content/files/14197-op-1011-grading-procedures>

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

³ <https://www.angelo.edu/academics/catalog/>

⁴ <https://www.angelo.edu/current-students/disability-services/>

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

⁶ <https://www.angelo.edu/title-ix>

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

⁸ <https://www.angelo.edu/covid-19/>

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

¹⁰ http://www.angelo.edu/dept/writing_center/academic_honesty.php