

**1: Course Number and Name**

- a. **CENG 4381:** Introduction to Geomatics, Summer 2021
- b. Section 010, Online, MTWRF 4:30 pm – 5:45 pm

**2: Credits and Contact Hours**

- a. **Credits:** 3
- b. **Contact Hours:** 6.25 hours/week (online sessions)

**3: Instructor Information**

- a. **Course Coordinator:** Dr. Dick Apronti
- b. **Instructor:** Dick Apronti, 325-486-5512, [dick.apronti@angelo.edu](mailto:dick.apronti@angelo.edu). Office: VIN 275.
- c. **Office hours:** MTWRF 6:00 pm – 6:30 pm (online on course's Blackboard Collaborate using link posted on Blackboard).

**4: Required Course Materials**

- Ghilani, C.D., (2018) Elementary Surveying: An Introduction to Geomatics 15th Edition, Pearson, ISBN: 9780134604657. The 14th or 13th 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. You do not need to buy the access code.
- Chapell, E., (2015) AutoCAD Civil 3D 2016 Essentials, SYBEX, ISBN: ISBN: 978-1-119-05959-2

**5: Technology Requirements**

To successfully complete this course, you need to have Respondus Lockdown Browser and Monitor (which requires a web cam), Blackboard Collaborate (which also requires a web cam), and remote access to the engineering virtual computer lab to utilize some specialized engineering software. The instructor will post a video providing guidance in setting up or accessing these tools before the first week of class.

**6: Specific Course Information**

- a. **Catalog Description:** In this course, students will learn to recognize and solve problems in surveying as they apply to engineering projects. The class will be introduced to plane surveying terminologies and concepts. Students will apply the plane surveying concepts they learn by utilizing a civil engineering design software in some practical exercises and projects. Additionally, students will be introduced to modern surveying equipment such as levels and total stations.  
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; State Plane Coordinates; and mapping. Computer lab sessions involving hands-on exercises and projects will train students to gain basic skills in a Autodesk Civil 3D software through extensive computer lab sessions.
- c. **Prerequisites:** MATH 1314 – College Algebra.
- d. **Required or elective:** Replaces ENGR 1307 civil engineering requirement on your transcript.

**7: Specific Goals for the Course**

- a. Course Learning Outcomes:
  1. Explain the importance of surveying and differentiate between the different types of surveying specializations.
  2. Determine errors in measurements and the accuracy of a set of measurements by propagating the errors through computations.
  3. Identify common tools and equipment (tapes, levels, and total stations) utilized in surveying indicating the parameters they measure and how the parameters are measured.
  4. Solve common civil engineering survey problems related to leveling, traversing, and area and volume computations.
  5. Describe the components in Global Navigation Satellite Systems and how they are used in surveying.
  6. Explain the need for State Plane Coordinates and how maps are projected.
  7. Use plane survey measurements to create maps, contours, site plans and other engineering descriptions of a given site.
  
- 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>
1. Solve Problems	X	X	X	X	X	X	X
2. Design							X
3. Communication							X
4. Ethics & Professionalism	X						
5. Teamwork				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. Mapping.
14. Introduction to civil engineering design with Autodesk Civil 3D.

## **9: Course Delivery and Communications**

### **9.1: Delivery Method(s)**

This is a 100 percent online course with lecture videos, learning resources, and supplemental materials posted in Blackboard. There shall be no face-to-face meetings for this course.

### **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. Message posted on Piazza will be sent to your ASU email address. Check frequently for announcements and policy changes.

Virtual communication: Office hours and/or advising will be done online using the course's Blackboard Collaborate.

## **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: Lecture Videos, Participation, and Timeliness**

The number one complaint of engineering clients is the timeliness of deliverables (reports, drawings, specifications, etc.). As a professional engineer you will be expected to arrive at scheduled meetings on time and prepared. Late proposals are not generally accepted. Late specifications or drawings may cost the engineer a monetary penalty. Professional engineering standards apply in this course.

You are expected to participate in each lecture. You may be required to post videos or contribute in some discussions posted on Piazza for points. These participation points make up 10% of your final grade. Class lecture videos will be recorded and posted by the specified class time. Students are expected to watch the video and do all associated exercises and activities 24-hours after the beginning of the class time. Should you find it necessary to request for an extension, you are expected to notify your instructor as early as the need is known—preferably before the deadline. It is important that you communicate clearly to your instructors. Your instructor will apply penalties for late work.

### 11.2: Reading Tests

You will be given reading assignments that will be due on the dates indicated in Table 3 (the Course Lesson Outline). Reading assignments will come from the assigned textbook or other materials provided or available via the web. On the due date, a test will be posted on Blackboard based on the reading assignment. You shall have 24 hours after the test is posted to take the test, and you shall be allowed two attempts only for each reading tests.

### 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 in Table 3 (the Course Lesson Outline).

### 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 in Table 3 (the Course Lesson Outline).

### 11.5: Civil Engineering Design Exercises

Follow along video instructions shall be provided that will introduce you to the basics of Civil 3D. Exercises assigned to you shall be submitted on the due dates as indicated on Blackboard or by your instructor.

### 11.6: Exam

There shall be Four exams. The exams will be based on the topics completed prior to the exam. Exam topics are not cumulative and will include only topics covered since the previous exam unless otherwise indicated by the instructor. Students shall be provided with examples of questions to expect in the exam after each topic is completed.

Make-up exam will only be given for extenuating circumstances unless prior arrangements with the instructor are agreed upon. Proof, such as a doctor's note or other official document, may be required for unexcused absences during the exam. You shall use the Respondus Browser with Monitor for the exam so make sure you have access to a computer and a webcam.

### 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**

<b>Item</b>	<b>Weight</b>
Participation & Reading tests	5%
In-class exercises	10%
Homework	20%
Civil 3D Exercises	10%
Exam 1	10%
Exam 2	15%
Exam 3	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

## **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>1</sup> and [Angelo State University Catalog](#)<sup>2</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>3</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**

The University prohibits discrimination based on sex, which includes pregnancy, sexual orientation, gender identity, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination including: sexual assault, sex-based discrimination, sexual exploitation, sexual harassment, public indecency, interpersonal violence (domestic violence and/or dating violence), and stalking. As a faculty member, I am a Responsible Employee meaning that I am obligated by law and ASU policy to report any allegations I am notified of to the Office of Title IX Compliance.

Students are encouraged to report any incidents of sexual misconduct directly to ASU's Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator at:

**Michelle Boone, J.D.**  
*Director of Title IX Compliance/Title IX Coordinator*  
Mayer Administration Building, Room 210  
325-486-6357, [michelle.boone@angelo.edu](mailto:michelle.boone@angelo.edu)

You may also file a report online 24/7 at [www.angelo.edu/incident-form](http://www.angelo.edu/incident-form)<sup>4</sup>

If you are wishing to speak to someone about an incident in confidence you may contact the *University Health Clinic and Counseling Center at 325-942-2173* or the *ASU Crisis Helpline at 325-486-6345*.

For more information about resources related to sexual misconduct, Title IX, or Angelo State's policy please visit: [www.angelo.edu/title-ix](http://www.angelo.edu/title-ix)<sup>5</sup>.

#### **12.4: Observance of Religious Holy Day**

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>6</sup> for more information.

#### **12.5: 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](#)<sup>7</sup> for more information.

#### **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>8</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>9</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 tentative course outline is presented in the table next page. 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	Reading Due	Assignment Due
1	July 12	Course introduction; Survey definition and applications	Ch. 1.3, 1.6, & 1.10	Assign HW01
	July 13	Units and significant figures	Ch. 2.4, & 2.5	
	July 14	Introduction to theory of errors	Ch. 3.12 – 3.16	Exercise 1
	July 15	Theory of errors (error propagation)	Exam examples	HW01 due
	July 16	Week 1 review and Exam 1 (due by July 18)		
	Weekly Lab	Navigating the Civil 3D User Interface; and leveraging a dynamic environment	Lab instruction video 1	July 18
2	July 19	Methods for measuring distance	Ch. 6.11 – 6.12	Exercise 2
	July 20	Taping, and Electronic Distance Measurement	Ch. 6.22 – 6.22.3	HW02
	July 21	Leveling (equipment, theory, and methods)	Ch. 4.1 – 4.3	
	July 22	Leveling procedures and computations	Ch. 5.7 – 5.11	HW02 Due
	July 23	Week 2 review and Exam 2 (due by July 25)	Exam examples	Leveling Group work
	Weekly Lab	Establishing Existing Conditions Using Survey Data	Lab instruction video 2	
3	July 26	Angles, azimuths, and bearings	Ch. 7.10 – 7.14	
	July 27	Total station, angle observations & traversing	Ch. 8.3	HW03
	July 28	Introduction to traverse computations	Ch. 9.8 – 9.9	
	July 29	Traverse Computations	Ch. 10.14	Exercise 3
	July 30	Traversing Project (due by Aug 1)		HW03 Due
	Weekly Lab	Establishing Existing Conditions Using Survey Data (Part 2)	Lab instruction video 3	
4	Aug 2	Area computations	Ch. 12.9 – 12.12	HW04
	Aug 3	Volume computations	Ch. 26.9	Exercise 4
	Aug 4	Intro to Global Navigation Satellite Systems	Ch. 13.6	
	Aug 5	Global Navigation Satellite Systems		HW04 Due
	Aug 6	Week 4 review and Exam 3 (due by Aug 8)		
	Weekly Lab	Modeling Existing Ground Using Surfaces	Lab instruction video 4	
5	Aug 9	Construction surveys	Ch. 23.11	HW05
	Aug 10	Horizontal curves	Ch. 24.2	

Week	Date	Topic	Reading Due	Assignment Due
	Aug 11	State Plane Coordinates	Ch. 20.5	HW05 Due
	Aug 12	Mapping, and Week 5 review		
	Aug 13	Final Exam		

#### 14: End Notes

<sup>1</sup> <http://www.angelo.edu/student-handbook/>

<sup>2</sup> <http://www.angelo.edu/catalogs/>

<sup>3</sup> <http://www.angelo.edu/services/disability-services/>

<sup>4</sup> <http://www.angelo.edu/incident-form>

<sup>5</sup> <http://www.angelo.edu/title-ix>

<sup>6</sup> <http://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of>

<sup>7</sup> <https://www.angelo.edu/content/files/14197-op-1011-grading-procedures>

<sup>8</sup> <http://www.angelo.edu/student-handbook/community-policies/academic-integrity.php>

<sup>9</sup> [http://www.angelo.edu/dept/writing\\_center/academic\\_honesty.php](http://www.angelo.edu/dept/writing_center/academic_honesty.php)