CENG 4381: Intro to Geomatics, Live Lectures on Collaborate on MTWRF from 9:00 am-9:25 am; 10:00 am-10:25 am; and 11:00 am-11:25 am. Times are in CDT.

1: Instructor: Dick T. Apronti
   - Email: dick.apronti@angelo.edu
   - Phone: 325-486-5512
   - Office Hours: MTWRF (on Blackboard Collaborate) 12:00 pm – 12:30 pm

2: Required Materials
   - Windows or Apple computer for exams. Software used for the exam cannot be installed on Chromebooks.
   - Access to a scanner or a scanner app to upload pdf files on Blackboard.
   - Access to internet during class times, a webcam and microphone to participate in Blackboard collaborate sessions.
   - You will need access to Lynda.com. You can get this access for free with a Tom Green County library card. You must visit a library branch in person to get your card. If you want you can pay for access either directly to Lynda.com or via LinkedIn. More info on these options is posted on Blackboard.

3: Prerequisites
   - MATH 1314 – College Algebra or equivalent academic preparation

4: Course Description
In this course, you will learn the basic principles of surveying data collection, analysis and application. You will be introduced to 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 as well as measurement errors. Finally, you will apply survey data to engineering design using GIS and 3-D modeling software.

5: Student Learning Outcomes
All participants in this course meet the requisites for the class and thus have ability to succeed in this class. As a student, you are guaranteed an excellent performance in this class if you work hard, and persevere until the end.

When you complete this class, you should be able to:
1. Determine errors in measurements and the accuracy of a set of measurements by propagating the errors through computations.

2. Describe surveying measurements for levels and total stations.

3. Use field measurements obtained from surveying instruments such as levels, total stations and theodolites to solve common civil engineering survey problems related to leveling, traversing, earthworks, and highway curves.

4. Describe the process for and limitations of using digital data within software environments such as Civil 3D and Geographic Information Systems software.

5. Apply Civil 3D and Geographic Information System software as engineering tools to solve civil engineering problems and to visually communicate problem solutions.

6: Course outcome mapping

The mapping of the course outcomes to the ABET Criterion 3 student outcomes is shown in Table 1.

Table 1: Course Outcome Mapping

<table>
<thead>
<tr>
<th>ABET Criterion 3</th>
<th>Student Learning Outcome Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1. Solve Problems</td>
<td>X</td>
</tr>
<tr>
<td>2. Design</td>
<td></td>
</tr>
<tr>
<td>3. Communication</td>
<td></td>
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<tr>
<td>4. Ethics &amp; Professionalism</td>
<td></td>
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<tr>
<td>5. Teamwork</td>
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<tr>
<td>6. Experimentation</td>
<td></td>
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<tr>
<td>7. Acquire New Knowledge</td>
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</tr>
</tbody>
</table>

7: Course Structure and Communication

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.

8: Professionalism

Professional engineering standard 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.

9: Graded Material

9.1: 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.

9.2: Homework & In-class Problems

Homework assignments will be due on dates indicated on Blackboard. The homework will be based on the current or previous week’s lecture topics. 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 10% and 25% 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.

9.3: Projects

The course will have two projects covering the topics of surveying, Civil 3D, and Geographic Information Systems. Each project will be equally weighted towards final grade.

9.4: Exams

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 20% and 25% of the total grade score, respectively.

9.5: 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

<table>
<thead>
<tr>
<th>Item</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects (two)</td>
<td>20%</td>
</tr>
<tr>
<td>Homework</td>
<td>25%</td>
</tr>
<tr>
<td>In-class problems &amp; Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Exam 1</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

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

10: Classroom and University Policies and Student Support

10.1: General Policies

All students are required to follow the policies and procedures presented in the *Angelo State University Student Handbook* and *Angelo State University Catalog*.

10.2: 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. For more information about the application process and requirements, visit the Student Disability Services website. 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  
Houston Harte University Center, Room 112

10.3: 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
Face to face: Mayer Administration Building, Room 210
325-942-2022, michelle.boone@angelo.edu

You may also file a report online 24/7 at www.angelo.edu/incident-form.

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 Title IX in general you may visit www.angelo.edu/title-ix.

10.4: 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 for more information.

10.5: 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 for more information.

10.6: Student Conduct Policies

10.6.1: 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.

The College of Science and Engineering adheres to the university’s Statement of Academic Integrity.

10.6.2: Plagiarism

Plagiarism is a serious topic covered in ASU’s Academic Integrity policy 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. Resources to help you understand this policy better are available at the ASU Writing Center.

10.6.3: 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.
11: Course Outline

The course outline is presented in Table 3. Homework assignments along with updates to this schedule will be provided via Bb. The schedule may be modified as the semester progresses.

Table 3: Course Lecture Schedules

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Class Exercises</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 07/06</td>
<td>Course introduction</td>
<td></td>
<td>HW01 (Significant errors &amp; units)</td>
</tr>
<tr>
<td>T 07/07</td>
<td>Significant figures, units, and field notes</td>
<td>Class ex 01</td>
<td></td>
</tr>
<tr>
<td>W 07/08</td>
<td>Theory of errors</td>
<td></td>
<td>HW02 (theory of errors)</td>
</tr>
<tr>
<td>R 07/09</td>
<td>Theory of errors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F 07/10</td>
<td>Measuring distances - Taping</td>
<td></td>
<td>HW03 (distance measurement)</td>
</tr>
<tr>
<td>M 07/13</td>
<td>Measuring distances - EDM</td>
<td>Class ex 03</td>
<td></td>
</tr>
<tr>
<td>T 07/14</td>
<td>Leveling: theory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W 07/15</td>
<td>Leveling methods and instruments</td>
<td></td>
<td>HW04 (Leveling)</td>
</tr>
<tr>
<td>R 07/16</td>
<td>Angles, azimuths, bearing</td>
<td>Class ex 04</td>
<td></td>
</tr>
<tr>
<td>F 07/17</td>
<td>Problem Solving</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M 07/20</td>
<td>Magnetic declination</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T 07/21</td>
<td>Intro to virtual survey lab</td>
<td></td>
<td>HW05 (Leveling methods)</td>
</tr>
<tr>
<td>W 07/22</td>
<td>Exam 1</td>
<td>Class ex 05</td>
<td></td>
</tr>
<tr>
<td>R 07/23</td>
<td>Leveling lab</td>
<td></td>
<td>HW06 Angles and Bearings</td>
</tr>
<tr>
<td>F 07/24</td>
<td>Leveling calculations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M 07/27</td>
<td>Traversing lab</td>
<td></td>
<td></td>
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<tr>
<td>T 07/28</td>
<td>Traversing calculations</td>
<td>Project 1</td>
<td></td>
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<tr>
<td>W 07/29</td>
<td>Area</td>
<td></td>
<td>HW07 (Traverse computations)</td>
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<tr>
<td>R 07/30</td>
<td>Volumes &amp; Introduction to Civil3D</td>
<td>Project 2</td>
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</tr>
<tr>
<td>F 07/31</td>
<td>SPC &amp; other map projections</td>
<td></td>
<td>HW08 (SPC, map projections &amp; GNSS)</td>
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<tr>
<td>M 08/03</td>
<td>GNSS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T 08/04</td>
<td>Exam review</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W 08/05</td>
<td>Final Exam</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

End Notes

1 https://www.lynda.com
2 https://www.linkedin.com
3 https://blackboard.angelo.edu
4 http://www.angelo.edu/student-handbook/
5 http://www.angelo.edu/catalogs/
6 http://www.angelo.edu/services/disability-services/
7 http://www.angelo.edu/incident-form
8 http://www.angelo.edu/title-ix
9 http://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of
10 http://www.angelo.edu/student-handbook/community-policies/academic-integrity.php
11 http://www.angelo.edu/dept/writing_center/academic_honesty.php