CENG 2336 – Geomatics

Term: Fall 2025

Course Times:

- Monday, Wednesday, and Friday: 1:25 PM to 2:20 PM
- RBS 1031

Professor: Dr. Kyudong Kim

Email: kkim@uttyler.edu (Preferred communication method)

Email subject: [CENG 2336] Topic (e.g., HW 3)

Office Hours: *TBD*

Office: RBN 1008

Course Dates: Aug. 25, 2025 – Dec. 13, 2025

Course Overview

This course is designed to provide you with a comprehensive foundation in geomatics principles and applications. Throughout the semester, you will engage with challenging material that bridges theoretical concepts with practical engineering applications in surveying and spatial data management. The course encompasses fundamental topics essential to modern geomatics practice, including:

- Introduction to surveying principles and methodologies
- Distance measurement techniques and associated corrections
- Leveling procedures and applications
- Measurement and analysis of angles and directions
- Traverse adjustment methodologies
- Volume calculations and computational techniques
- Cross-section analysis and area computations
- Design and layout of horizontal and vertical curves
- Error theory and uncertainty analysis

The curriculum emphasizes the integration of contemporary technologies and software applications used in professional geomatics practice. Students will gain proficiency in:

- Microsoft Excel for data analysis and computational applications
- Global Positioning System (GPS) technologies and applications
- Geographic Information Systems (GIS) for spatial data management and analysis

Particular emphasis will be placed on GIS applications, reflecting the increasing importance of spatial data analysis in modern engineering and surveying practice.

Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- Explain and apply fundamental surveying concepts to a variety of real-world applications
- Demonstrate the ability to analyze and interpret field survey data with accuracy and precision
- Apply trigonometric principles to calculate angles and distances in surveying applications
- Describe the leveling process and recognize its applications in determining elevations and establishing grades
- Determine the area of closed traverses using appropriate computational methods
- Compute earthwork volumes required for real-world construction and engineering applications
- Explain fundamental GPS and GIS concepts and their applications to real-world problems, including coordinate systems, datums, and latitude/longitude systems

Course Materials

Required textbook:

- Mastering ArcGIS 8th Edition, Price, Maribeth. McGraw Hill. ISBN 978-1-259-92965-6, 2019.

Recommended textbook:

- Surveying 6th Edition, McCormac, Jack; Sarasua, Wayne; Davis, William. John Wiley & Sons, Inc. ISBN 978-0-470-49661-9, 2013.

Grading Structure

Content	Percentage %
Attendance and commitment	5%
Homework	15%
Individual project (ESRI Web Course)	5%
Team project	15%
Exam 1	20%
Exam 2	20%
Final Exam	20%
Total	**100%**

Attendance and Commitment

- Participation Grade Components (5% of total grade):
    - Individual and group projects (2%)
        - 2%: Complete and submit both projects
        - 1%: Complete and submit one project
        - 0%: No projects submitted
    - Homework assignments (3%)
        - 3%: Submit more than 80% of assignments
        - 2%: Submit 60 - 80% of assignments
        - 1%: Submit 40 - 59% of assignments
        - 0%: Submit less than 40% of assignments

Homework

- Homework assignments cover all course content, including lectures, textbook readings, and class discussions.
- **Upload assignments to Canvas** as a single file in PDF, Photo (e.g., JPG), or Word (e.g., docx)

Exams

- Three exams will be given: Exam 1, Exam 2, and Final Exam, all comprehensively covering lectures, textbook material, assigned readings, homework, and class discussions
- Closed book format - Only writing instruments, erasers, and NCEES-approved calculators allowed
- Topics announced one week prior in class and Canvas
- No practice exams provided - Use textbook end-of-chapter problems for self-practice

Individual Project

- You are required to complete an online GIS course and obtain a completion certificate as an individual project. ***(Note: enroll by October 1 and finish by October 31)***
- This course must be completed independently to demonstrate your proficiency in GIS applications relevant to geomatics practice.

Team Project

- The group project involves the collection of GPS points and the development of a map using GIS
- You will complete this as a group and present your map to the class

Grading Policies

- Late HW submissions: While homework serves as a learning process rather than purely an evaluation tool, clear deadlines and policies are necessary to ensure fairness for all students and maintain academic structure.
    - 0-24 hours late: 25% deduction of earned grade

    - 24-48 hours late: 50% deduction of earned grade
    - More than 48 hours late: No credit
- Re-grade Requests: Grade inquiries must be addressed during office hours within **15 days** of grade posting. Monitor your grades regularly on Canvas to track your progress.
- For all homework and exam solutions, you must present your work in a clear, organized format that includes:
    - Formulae used in the solution
    - Variable values with proper identification
    - Step-by-step intermediate calculations
    - Final answers with appropriate units
    - A box drawn around your final answer
- Failure to include any of these components will result in point deductions. Proper documentation of your solution process is essential for receiving full credit.
- There will be no makeup work or extra credit allowed/granted at the end or during the semester unless allowed/granted to everyone by the instructor.

AI Policies:

- This course encourages responsible AI use that enhances your learning while maintaining academic integrity.

DOs	DON'Ts
• Research and brainstorming • Writing assistance (e.g., grammar check) • Code debugging • Concept explanation • Data analysis guidance	• Having AI complete entire assignments • Submitting AI work without disclosure • Using AI for exams

- When you use AI for your work, you have to:
    - **Clearly indicate and cite**, including the specific tool and date of use, when and how you used AI tools in your assignments
    - Always **fact-check AI-generated information** using reliable sources, and **cite those original sources**
    - Ensure your final work **reflects your own understanding and analysis**

Grading Scale

➔ **A** - (90% or higher)
➔ **B** - (80 - 89%)
➔ **C** - (70 - 79%)
➔ **D** - (60 - 69%)
➔ **F** - (Below 60%)

A grade of 69 (D) or below will be a failure to complete the course for graduation in the department.

Attendance Policy:

Regularly attending lectures is essential for success in this class. Punctual attendance at all lectures is mandatory.

Calendar of Topics, Readings, and Due Dates

Week #	Date	Class Topic	Readings	HW Assigned	HW Due
Week 1	8/25	Course overview			
	8/27	Introduction	S1		
	8/29	Measurement and analysis	S2		
Week 2	9/1	No class (Labor Day)			
	9/3	Distance measurements	S3		
	9/5	Distance measurement corrections	S4	HW 1	
Week 3	9/8	Introduction to leveling	S6		
	9/10	Differential leveling	S7		
	9/12	Profile and cross-section leveling	S8	HW 2	HW 1
Week 4	9/15	Angles and directions	S9		
	9/17	Introduction to total station angle measurements	S10		
	9/19	Error measurements on angles	S11	HW 3	HW 2
Week 5	9/22	Traverse adjustment	S12		
	9/24	Area calculations	S12		
	9/26	Topographic surveys	S14	HW 4	HW 3
Week 6	9/29	*Guest lecture – tentative*			
	10/1	Volume calculations	S20		
	10/3	Volume calculations	S20	HW 5	HW 4
Week 7	**10/6**	Exam 1 review			
	10/8	**Exam 1**			
	10/10	Horizontal curves	S22	HW 6	HW 5
Week 8	10/13	Vertical curves	S23		
	10/15	Land and property surveying	S21		
	10/17	*Guest lecture – tentative*		HW 7	HW 6
Week 9	10/20	GPS	S15		
	10/22	GPS applications	S16		
	10/24	ArcGIS – GIS data	G1	HW 8	HW 7
Week 10	10/27	ArcGIS – GIS data	G1		
	10/29	ArcGIS – GIS data	G1		
	10/31	ArcGIS – Managing GIS data	G2	HW 9	HW 8
Week 11	**11/3**	ArcGIS – Managing GIS data	G2		
	11/5	Exam 2 review			
	11/7	**Exam 2**		HW 10	HW 9
Week 12	11/10	ArcGIS – Coordination systems	G3		
	11/12	ArcGIS – Coordination systems	G3		
	11/14	ArcGIS – Mapping GIS data	G4	HW 11	HW 10
Week 13	11/17	ArcGIS – Mapping GIS data	G4		
	11/19	ArcGIS – Presenting GIS data	G5		
	11/21	ArcGIS – Presenting GIS data	G5	HW 12	HW 11
Week 14	11/24	No Class (Thanksgiving)			
	11/26				
	11/28				
Week 15	12/1	Team project workshop			HW 12
	12/3	Final exam review			
	12/5	**Team project presentations**			
Final Exam	**TBD**				

Note: **This schedule is tentative and subject to change.** Monitor the course page regularly for current deadlines. In case of university closures or extended absences, course schedules and assignments will be adjusted as needed.

Student Resources:

Resources available to UT Tyler Students

- UT Tyler Counseling Center (available to all students)
- MySSP App (24/7 access to Student Support Program counseling through phone or chat and online wellness resources available in a variety of languages)
- Student Assistance and Advocacy Center
- Military and Veterans Success Center (supports for our military-affiliated students)
- UT Tyler Patriot Food Pantry
- UT Tyler Financial Aid and Scholarships
- UT Tyler Student Business Services (pay or set up payment plans, etc.)
- UT Tyler Registrar's Office
- Office of International Programs
- Title IX Reporting
- Patriots Engage (available to all students. Get engaged at UT Tyler.)

University Policies and Information

Withdrawing from Class

Students may withdraw (drop) from this course using the Withdrawal Portal. Withdrawing (dropping) this course can impact your Financial Aid, Scholarships, Veteran Benefits, Exemptions, Waivers, International Student Status, housing, and degree progress. Please speak with your instructors, consider your options, speak with your advisor, and visit the One-Stop Service Center (STE 230) or email enroll@uttyler.edu to get a complete review of your student account and the possible impacts to withdrawing. We want you to make an informed decision. UT Tyler faculty and staff are here for you and often can provide additional support options or assistance. Make sure to carefully read the implications for withdrawing from a course and the instructions on using the Withdrawal portal..

Texas law prohibits students from dropping more than six courses during their entire undergraduate career*. The six courses dropped includes those from other 2-year or 4-year Texas public colleges and universities. Consider the impact withdrawing from this class has on your academic progress and other areas, such as financial implications. We encourage you to consult your advisor(s) and Enrollment Services for additional guidance. **CAUTION #1**: Withdrawing before census day does not mean you get a full refund. Please see the Tuition and Fee Refund Schedule. **CAUTION #2**: All international students must check with the Office of International Programs before withdrawing. All international students are required to enroll full-time for fall and spring terms. **CAUTION #3:** All UT Tyler Athletes must check with the Athletic Academic Coordinator before withdrawing from a course. CAUTION #4: All veterans or military-affiliated students should consult with the Military and Veterans Success Center.

* Students who began college for the first time before 2007 are exempt from this law.

Artificial Intelligence Statement

UT Tyler is committed to exploring and using artificial intelligence (AI) tools as appropriate for the discipline and task undertaken. We encourage discussing AI tools' ethical, societal, philosophical, and disciplinary implications. All uses of AI should be acknowledged as this aligns with our commitment to honor and integrity, as noted in UT Tyler's Honor Code. Faculty and students must not use protected information, data, or copyrighted materials when using any AI tool. Additionally, users should be aware that AI tools rely on predictive models to generate content that may appear correct but is sometimes shown to be incomplete, inaccurate, taken without attribution from other sources, and/or biased. Consequently, an AI tool should not be considered a substitute for traditional approaches to research. You are ultimately responsible for the quality and content of the information you submit. Misusing AI tools that violate the guidelines specified for this course is considered a breach of academic integrity. The student will be subject to disciplinary actions as outlined in UT Tyler's Academic Integrity Policy. *Refer to the About This Course section of the UT Tyler Syllabus Module for specific information on appropriate use of AI in your course(s).*

Final Exam Policy

Final examinations are administered as scheduled. If unusual circumstances require that special arrangements be made for an individual student or class, the Dean of the appropriate college, after consultation with the faculty member involved, may authorize an exception to the schedule. Faculty members must maintain student final examination papers for a minimum of three months following the examination date.

Incomplete Grade Policy

If a student, because of extenuating circumstances, is unable to complete all of the requirements for a course by the end of the semester, then the instructor may recommend an Incomplete (I) for the course. The "I" may be assigned in place of a grade *only when **all** of the following conditions are met*: (a) the student has been making satisfactory progress in the course; (b) the student is unable to complete all coursework or final exam due to unusual circumstances that are beyond personal control and are acceptable to the instructor, and (c) the student presents these reasons before the time that the final grade roster is due. The semester credit hours for an Incomplete will not be used to calculate the grade point average.
The student and the instructor must submit an Incomplete Form detailing the work required and the time by which the work must be completed to their respective department chair or college dean for approval. The time limit established must not exceed one year. Should the student fail to meet all of the work for the course within the time limit, then the instructor may assign zeros to the unfinished work, compute the course average for the student, and assign the appropriate grade. If a grade has yet to be assigned within one year, then the Incomplete will be changed to an F, or NC. If the course was initially taken under the CR/NC grading basis, this may adversely affect the student's academic standing.

Grade Appeal Policy

Disputes regarding grades must be initiated within sixty (60) days from the date of receiving the final course grade by filing a Grade Appeal Form with the instructor who assigned the grade. A grade appeal should be used when the student thinks the final course grade awarded does not reflect the grades earned on assessments or follow the grading scale as documented in the syllabus. The student should provide

the rationale for the grade appeal and attach supporting document about the grades earned. The form should be sent via email to the faculty member who assigned the grade. The faculty member reviews the rationale and supporting documentation and completes the instruction section of the form. The instructor should return the form to the student, even if a grade change is made at this level. If the student is not satisfied with the decision, the student may appeal in writing to the Chairperson of the department from which the grade was issued. In situations where there is an allegation of capricious grading, discrimination, or unlawful actions, appeals may go beyond the Chairperson to the Dean or the Dean's designee of the college from which the grade was issued, with that decision being final. The Grade Appeal form is found in the Registrar's Form Library.

NOTE: The Grade Appeal Form is different from the Application for Appeal form submitted to the Student Appeals Committee, which does not rule on grade disputes as described in this policy.

Disability/Accessibility Services

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA), the University of Texas at Tyler offers accommodations to students with learning, physical, and/or psychological disabilities. If you have a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or a history of modifications or accommodations in a previous educational environment, you are encouraged to visit https://hood.accessiblelearning.com/UTTyler/ and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with the Assistant Director Student Accessibility and Resources/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at https://www.uttyler.edu/disability-services, the SAR office located in the Robert Muntz Library, LIB 460, email saroffice@uttyler.edu, or call 903.566.7079."

Military Affiliated Students

UT Tyler honors the service and sacrifices of our military-affiliated students. If you are a student who is a veteran, on active duty, in the reserves or National Guard, or a military spouse or dependent, please stay in contact with your faculty member if any aspect of your present or prior service or family situation makes it difficult for you to fulfill the requirements of a course or creates disruption in your academic progress. It is important to make your faculty member aware of any complications as far in advance as possible. Your faculty member is willing to work with you and, if needed, put you in contact with university staff who are trained to assist you. The Military and Veterans Success Center (MVSC) has campus resources for military-affiliated students. The MVSC can be reached at MVSC@uttyler.edu or via phone at 903.565.5972.

Students on an F-1 Visa

To remain in compliance with Federal Regulations requirements you must do the following:

- Traditional face-to-face classes: Attend classes on the regular meeting days/times.
- Hybrid Classes: Attend all face-to-face classes convened by the instructor according to the schedule set for your specific course.

- Online course: Only one online course can count toward your full-time enrollment. Students are expected to be fully engaged and meet all requirements for the online course.

Academic Honesty and Academic Misconduct

The UT Tyler community comes together to pledge that "Honor and integrity will not allow me to lie, cheat, or steal, nor to accept the actions of those who do." Therefore, we enforce the Student Conduct and Discipline policy in the Student Manual Of Operating Procedures (Section 8).

FERPA

UT Tyler follows the Family Educational Rights and Privacy Act (FERPA) as noted in University Policy 5.2.3. The course instructor will follow all requirements to protect your confidential information.

Absence for Official University Events or Activities

This course follows the practices related to Excused Absences for University Events or Activities as noted in the Catalog.

Absence for Religious Holidays

This course follows the practices related to Excused Absences for Religious Holy Days as noted in the Catalog.

Absence for Pregnant Students

This course follows the requirements of Texas Laws SB 412, SB 459, SB 597/HB 1361 to meet the needs of pregnant and parenting students. Part of the supports afforded pregnant students includes excused absences. Faculty who are informed by a student of needing this support should make a referral to the Parenting Student Liaison. NOTE: Students must work with the Parenting Student Liaison in order to receive these supports. Students should reach out to the Parenting Student Liaison at parents@uttyler.edu and also complete the Pregnant and Parenting Self-Reporting Form.

Campus Carry

We respect the right and privacy of students who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at http://www.uttyler.edu/about/campus-carry/index.php.