GEOG 352 Course Syllabus

Spring 2025

Course Information

Course Number: 352
Course Title: GNSS in the Geosciences
Section: 500, 501, 502
Time: MWF 9:10 am - 10:00 am
Location: HALB 104
Credit Hours: 3

Instructor Details

Instructor: Ms. Joni Kincaid
Office: Eller O&M Building #802B
E-Mail: joni.kincaid@tamu.edu

Office Hours: Wednesdays 10:30 am - 12:00 pm.

They will be held simultaneously for both in-person and Zoom attendees. Priority will be given to those students attending in person. If you are unable to attend the scheduled office hours you may always schedule an appointment to meet with me at another time.

Join Zoom Office Hours: https://tamu.zoom.us/j/5403790322?pwd=GAv2LHoNDRQWp4Mb8OWYcxC8mTiLCw.1Links to an external site.

TA Sections

Subject	Course	Section	Days	Time	Location	TA	Office Hours
GEOG	352	500	M	11:30 am - 1:20 pm	CSA 311	Xiao Guo	Eller O&M Building 707G Mondays: 10:20 am - 11:20 am xguo@tamu.edu
GEOG	352	501	T	12:00 pm - 1:50 pm	CSA 311	Mohammad Imran Hasan	Eller O&M Building 803A Mondays: 2:00 pm - 4:00 pm hasanbdimran@tamu.edu
GEOG	352	502	F	11:30 am - 1:20 pm	CSA 307	Mohammad Imran Hasan	Eller O&M Building 803A Mondays: 2:00 pm - 4:00 pm hasanbdimran@tamu.edu

Course Description

This course introduces students to the theory and operation of Global Navigation Satellite Systems (GNSS) and Global Positioning Systems (GPS), and the application of GNSS for solving research problems common in the Geosciences. Geodesy will be covered in depth. GPS technology is introduced through a review of the fundamental concepts of coordinate systems and geodesy, followed by an in-depth discussion of signal propagation, signal processing, and the limitations of both handheld and differential GPS units. This is followed by a discussion about measurement strategies and an overview of how GPS is used in Geosciences.

Course Prerequisites

Junior Senior Status

Special Course Designation

None

Course Learning Outcomes

At the end of the course, students should be able to:

- Describe and calculate Geodetic Coordinate Systems, Datums, Conversions, and Transformation.
- Name, describe and compare traditional georeferencing, mapping, tracking, navigation, and survey techniques.
- Describe the technology used in Global Navigation Satellite Systems (GNSS), explain how a GNSS system works, and what the limitations are for handheld and differential GPS units.
- Apply GNSS technology and appropriate measurement strategies to design, collect, and analyze research problems common in Geosciences.

Textbook and/or Resource Materials

None

GNSS Unit

Using your own personal Cell Phone a GNSS Application must be downloaded and installed. If you do not have access to a Cell Phone that has GNSS please contact your instructor.

Safety

All labs and projects should be confined to the TAMU property. Students are responsible for their own safety and the safety of others during class activities.

HSSE

Health, Safety, Security & Environment and describes the processes or activities (planning, implementation, control, optimization) that are carried out by companies to ensure health, safety, security and environmental protection, especially in the working environment. HSSE is a Risk Management Science. Order of importance:

1. Humans
2. Earth
3. Asset

Slips-Trips-Fall-

-
    - Conducting surveys in the open with the potential for sunburn, heat exhaustion, insect bites, etc.
    - Setting construction stakes with the potential for bruises
    - Working on and near streets with active traffic
    - Working on and near streets with active traffic
    - Wet and slippery ground could exist after rainfall

Personal Safety Equipment

Students must be careful about their own safety and the safety of others during the lab. To minimize the risk of accidents:

- Use long pants and long-sleeved shirts
- Use closed-toed shoes
- Use sunscreen (if needed)
- Vest and Cones are available when around traffic

Grading Policy

Lab Work: *40%* ***Quizzes:*** *15%* ***Class Activities:*** *5%* ***Exam 1:*** *10%* ***Exam 2:*** *10%* ***Project:*** *15%* ***ePortfolio & Research Papers:*** *5%* ***Bonus points****: 8%* ***Total:*** *108%*	***Letter Grades:*** *A - 90% or above* *B – 80% to <90%* *C – 70% to <80%* *D – 60% to <70%* *F - < 60%*

Lecture

Lectures will be provided in class. Attendance to lectors is required. Random Quizzes will be given to ensure students' attendance. Lectures will cover GNSS and Geodesy topics and important connections to the required geoscience industry body of knowledge needed to obtain Professional Texas Professional Geoscientist, Certified Environmental Scientist, Certified Photogrammetrist, Geospatial Information Science Professional, Professional Land Surveyor, and/or other licenses and certifications.

Quizzes

The class participation grade will be determined by weekly quizzes throughout the semester. Quizzes are designed to test the student's understanding of GNSS and Geodetic concepts from recent material. All quizzes must be completed individually (students cannot work together).

Lab Assignments

Labs build on previous work and are due to CANVAS by the end of the day specified in the syllabus Course Outline (unless otherwise specified). Lab material will be introduced in the lab-assigned room at the scheduled time and location. It is the student's responsibility to read the lab instructions posted on CANVAS. All labs must be completed individually. The times assigned for each section are listed on the first page of the syllabus.

Exams

There are two exams in the course, each worth 200 points. Exam questions will be a combination of multiple-choice, multiple-select, true/false, fill-in-the-blank, short answer, and essay. Exams will cover all material up to the date of the exam. Suspected cases of academic dishonesty will be referred to the Aggie Honor System Office.

Semester Project- Poster Session

The purpose of the semester project is to demonstrate your knowledge and ability to use GNSS and Geodesy to address an interesting and relevant research question. You will work to (1) formulate a physical or social science research question with at least one testable hypothesis, (2) design an appropriate research methodology to address your question, (3) report your results, and (4) explain how your results can be interpreted and what they mean in a broader context. This project is designed for you to demonstrate your GNSS and Geodesy knowledge and skills about the theory and application of GNSS and Geodesy in geoscience.

You can conduct an Individual Semester Project or a Team Semester Project. Team Semester Project can only have 5 members.

1. Team Meeting Notes: 50pts
2. Final Poster: 200pts
3. Video Presentation: 50pts

Total: 300pts

Bonus Points

There are two distinct types of assignments that offer opportunities to earn bonus points. These include the Exam 1 Retake (5%) and completion of three short online certificates (1% each). The bonus points earned from these assignments will be assessed and directly integrated into the final grades. They will be added manually at the end of the semester.

Late Work Policy

The due dates for all assignments are posted in Canvas. Scores for late assignments, including labs, will be deducted 10% per day.

In general, labs will be due one week after they are assigned. Labs turned in one week after the due date will receive no credit. *However, each student will be allowed to turn one lab in*

late without penalty. To use this "late pass" on an assignment, you must notify your Teaching Assistant by the date that lab would otherwise be due.

In past years, failure to complete labs in a timely manner has been the primary cause of poor performance in this class. It is your responsibility to keep up with lab assignments. You should talk to your Teaching Assistant and or the instructor BEFORE late labs become a problem

Work submitted by a student as makeup work for an excused absence is not considered late work and is exempted from the late work policy (Student Rule 7).

***Missed Lab: Make-up** labs will be arranged only in the case of excused absence (see Absences statement). Contact your TA if you need make-up labs.*

Course Schedule

Lecture Topics and Schedule

This schedule is tentative. Updates will be posted on Canvas, as needed.

Wk	Date	Topic	Lab	Quiz	Project	In Class Assignment
1	M 1/13	**Module 1.0 Course Intro**	No Lab			CA 1
	W 1/15	**Module 1.1 GNSS Intro**				CA 2
2	M 1/20	Martin Luther King, Jr. Day - No Class	No Lab		**Paper 1 Due**	
	W 1/22	**Module 2.1: Measurements**				CA 3
3	M 1/27	**Module 2.2 Measurements**	Lab 0 Lab 1	Q1 Q2		CA 4

	W 1/29	**Module 3.0 Geodetic Hz Datums**				CA 5
4	M 2/3	**Module 4.0: Geodetic Vt Datums**	Lab 2	Q3		CA 6
	W 2/5	**Module 4.0: Geodetic Vt Datums, cont**				CA 7
5	M 2/10	**Module 5.1: GNSS**	Lab 3	Q4		CA 8 CA 9
	W 2/12	**Module 5.2: GNSS cont.**				CA 10
6	M 2/17	**Module 5.3: GNSS cont.**	Lab 4	Q5	**Paper 2 Due**	CA 11
	W 2/19	**Module 5.4: GNSS cont.**				CA 12
7	M 2/24	**Test Review 1**	**NO LAB Exam 1 Online**			CA 13
	W 2/26	**Test Review 2**				
8	M 3/3	**Module 6: GNSS Processing**	Lab 5			
	W 3/5	**Module 6: GNSS Processing, cont.**				
9	M 3/10	Spring Break				
	W 3/12	Spring Break				

10	M 3/17	**Module 7: PLSS**	Lab 6	Q6	**Paper 3 Due**	CA 14
	W 3/19	**Module 8.1: GNSS in Photogrammetry**				
11	M 3/24	**Module 8.2: GNSS in Photogrammetry, cont.**	Lab 7	Q7		
	W 3/26	**Module 9.1 GNSS in Geology**				
12	M 3/31	**Module 9.2: GNSS in Geology, cont.**	Lab 8	Q8	**Paper 4 Due**	
	W 4/2	**Module 10: GNSS in Environmental Monitoring**				
13	M 4/7	**Module 11: GNSS in Water Resources**	Lab 9 Lab 10	Q9 Q10		
	W 4/9	Project				
14	M 4/14	Project	Project	Project Meeting		
	W 4/16	Project				
15	M 4/21	Project	Project	Project Meeting		
	W 4/23	Project				

16	M 4/28	Project	**Exam 2 Online**			
	W 4/30	Reading Day - No Class				
17	F 5/2	Project			**Presentation Due** **Poster Due**	

University Policies

This section outlines the university level policies. The TAMU Faculty Senate established the wording of these policies.

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.

Please refer to Student Rule 7 in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to Student Rule 7 in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor" **(**Student Rule 7, Section 7.4.1**).**

"The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" **(**Student Rule 7, Section 7.4.2).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. **(**See Student Rule 24**).**

Academic Integrity Statement and Policy

"An Aggie does not lie, cheat or steal, or tolerate those who do."

"Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" (Section 20.1.2.3, Student Rule 20).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at aggiehonor.tamu.edu.

Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Resources office on your campus (resources listed below). Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

Disability Resources is located in the Student Services Building or at (979) 845-1637 or visit https://disability.tamu.edu/.

Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences,

observes, or becomes aware of an incident that meets the following conditions **(**see University Rule 08.01.01.M1):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, a person who is subjected to the alleged conduct will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University's goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns related to mental and/or physical health in a confidential setting are encouraged to make an appointment with University Health Services or download the TELUS Health Student Support app for 24/7 access to professional counseling in multiple languages. Walk-in services for urgent, non-emergency needs are available during normal business hours at University Health Services locations; call 979.458.4584 for details.

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's Title IX webpage.

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors influencing a student's academic success and overall wellbeing. Students are encouraged to engage in healthy self-care practices by utilizing the resources and services available through University Health Services. Students needing a listening ear can call the Texas A&M Helpline (979.845.2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends for mental health peer support while classes are in session. The TELUS Health Student Support app provides access to professional counseling in multiple languages anytime, anywhere by phone or chat, and the 988 Suicide & Crisis Lifeline offers 24-hour emergency support at 988 or 988lifeline.org.

Students needing a listening ear can contact University Health Services (979.458.4584) or call the Texas A&M Helpline (979.845.2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends while classes are in session. 24-hour emergency help is also available through the 988 Suicide & Crisis Lifeline (988) or at 988lifeline.org.

Food/Housing Insecurity: Any student who faces challenges securing their food or housing and believes this may affect their academic performance is urged to contact the instructor. As your instructor, I will do my best to provide you with any resources or services I may be aware of.