



## Syllabus: GEO 217 – Introduction to Global Positioning Systems (GPS)

### Course Information

**Course Title:** Introduction to Global Positioning Systems (GPS) - ONLINE

**Course Prefix/Number:** GEO 217

**Semester:** Fall 2020

**Class Days/Times:** Online - Asynchronous

**Credit Hours:** 2 credit hours

### Instructor Information

**Name:** Dr. Jason Post, PhD.

**Phone/Voice Mail:** (520) 383-0073

**E-mail:** jpost@tocc.edu

**Office location:** Online via Zoom (Zoom.us Personal Meeting ID 523-232-1995)

**Office hours:** Virtual Office Hours by appointment

### Course Description

This course provides students an introduction to the use of Global Positioning Systems for field mapping and data acquisition. Accuracy, data standards, GPS equipment, and mission planning are explored. Students will progress through different levels of equipment ranging from recreational-grade GPS receivers to professional data loggers and survey-grade receivers. In a field setting, students will learn how to set up and utilize a real-time kinematic (RTK) GPS system with base station and rover. Students will gain valuable hands-on experience through field exercises and practical service-learning projects.

**Course Prerequisite:** None

### Course Learning Materials and Textbook Information

**Required:** *GPS Declassified: From Smart Bombs to Smartphones* Hardcover Ed. 2013 Potomac Books ISBN 978-1612344089

**SINCE THIS IS AN ONLINE COURSE, YOU MUST HAVE ACCESS TO A COMPUTER WITH A RELIABLE INTERNET CONNECTION (SEE TECHNOLOGY MINIMUM REQUIREMENTS SECTION BELOW)**

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## Student Learning Outcomes

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

- Design, plan and execute a GPS mapping mission
- Explain the core concepts of accuracy, precision, dilution of position (DOP), multipath errors, and clock errors
- Demonstrate how to set up a real-time kinematic (RTK) GPS base station and receiver to acquire corrected, survey-grade data
- Explain common sources of errors in GPS and how to remediate them
- Describe available GNSS systems (GPS, Beidou, GLONASS, Galileo, etc.)
- Explain the history of GPS and selective ability
- Prepare data to be shared and integrated with GIS (Geographic Information Systems)
- Demonstrate how to maintain, calibrate, and care for GPS equipment
- Demonstrate the use of a data logger in conjunction with a GPS receiver
- Identify parts of the GPS system
- Recognize what WAAS (wide area augmentation system) is and when to use it
- Implement GNSS planning software to determine optimal times to collect data

## Course Structure

The class consists of lectures, discussions, required readings, assignments, quizzes, and exams. Exams and quizzes test your knowledge and subject mastery. Discussions allow you to interact with your classmates and encounter differing perspectives. Reflections require you to communicate what you have learned, solve practical problems, and apply course material. Additionally, they allow you to develop your opinions and learn about how your own culture, experience, views, and biases affect how you see/interact with the world around you.

Quizzes and Exams cover lecture material, course reading material, and other assigned readings. Weekly course readings are REQUIRED. Discussion posts, and comments to your classmates are imperative to ensure communication, interaction, and dialogue between students and faculty. Participation is expected and graded/required. Video office hours allow students to interact with their faculty “face-to-face”. Video office hours also allow for interactions and discussions between students.

**This is an online course offered in asynchronous format. This means that there will not be regularly scheduled meeting times for lectures. There will be strict deadlines and reading assignments each week. As an online course without regularly scheduled meeting times, it can be easy to fall behind. Falling behind will have a catastrophic effect on your grade. Please ensure you have adequate time and computing resources to complete this course.**

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## Courses Outline and Important Dates

Week	Date	Topics	Assignments	Exams
1	August 24 – August 28	Course Orientation		Syllabus Quiz (Quiz 1)
2	August 31 – September 4	History of GPS, GLONASS, Beidou, Galileo		Quiz 2
	<b>September 7</b>	<b>Labor Day (No Class)</b>		
3	September 7– September 11	GNSS System Components		Quiz 3
	<b>September 15</b>	<b>Last day to drop (with full refund)</b>		
4	September 14– September 18	GPS Signals	Exploratory Activity 1 Due 18 September	
5	September 21– September 25	GPS Errors		Quiz 4
	<b>September 25</b>	<b>O’odham Taş (No Class)</b>		
	<b>September 28 –October 2</b>	<b>Fall Break (No Class)</b>		
6	October 5 – October 9	Datums and Coordinates		Quiz 5
7	October 12- October 16	Accuracy in GPS	Exploratory Activity 2 Due 16 October	
8	October 19 – October 23	GNSS Equipment		Quiz 6
9	October 26 – October 30	Receivers		MIDTERM EXAM DUE 30 OCTOBER by Midnight
10	November 2 – November 6	Static GPS		Quiz 7
	<b>November 11</b>	<b>Last day to withdraw from course with “W”</b>		
11	November 9 – November 13	WAAS and DGPS		Quiz 8

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Revised Fall 2020

GEO 217 – Intro to GPS Course Syllabus

12	November 16 – November 20	RTK GPS	Exploratory Activity 2 Due 20 November	
	<b>November 23 – November 27</b>	<b>Remembrance of English Invasion of Wampanoag Lands aka “Thanksgiving” (No Class)</b>		
13	November 30 – December 4	Data Processing		<b>Quiz 9</b>
14	December 7 – December 11	GPS Applications		<b>Quiz 10</b>
15	December 14 – December 18	Course Review Final Exams		<b>FINAL EXAM DUE 14 DECEMBER (by Midnight)</b>
	<b>DEC 15</b>	<b>Final Grades Due</b>		
	<b>TBD</b>	<b>Graduation</b>		

**Evaluations and Grading & Assignments:**

Your grade will be determined by the following:

Syllabus Quiz	10 pts
Midterm Exam	240 pts
Final Exam	250 pts
Participation and Weekly Discussion Posts**	100 pts
Weekly Quizzes	100 pts
Exploratory Activities (3)	300 pts (100 pts. each)
<b>TOTAL</b>	<b>1000 pts.</b>

\*\*Participation includes active interaction with other students through course discussions. Participation also includes responding to emails, asking questions, and attending virtual office hours.

**Course grading scale:**

- A = 900 - 1000
- B = 800 - 890
- C = 700 - 790
- D = 600 - 690
- F < 600

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Revised Fall 2020

## Himdag Cultural Component

GPS and acquired spatial data are key tools to empower the Tohono O’odham Nation because they are used for solving community issues, managing cultural and natural resources, and uphold sovereignty by defining and managing Nation lands. GPS, geospatial technologies, and maps transcend many aspects of Himdag and directly relates to Himdag through the following concepts:

### T-Ki:dag – Community

Solving community issues, improving quality of life (emergency services, medicine, access to utilities, etc.), instilling a sense of resilience, belonging and “place” within communities; empowering communities to acquire data, manage data, and solve problems at a local scale, communicating important features within the community via maps

### Ha’icu Huki Ga:gida – Harvesting and Hunting

Managing natural resources, healthy populations of plants and animals, preserving native habitat, managing water resources sustainably, mapping plant harvesting and hunting lands

### Jewed c Jewed We:gac Ha’icu – Land and Environment

Mapping and managing natural resources, sustainably managing water resources and equitable access to utilities

## Policies and Expectations

### Grading Policy

I believe in fair and transparent grading. Student work is evaluated for completeness, accuracy and effort. All work must be submitted on time. You may discuss your grade and any concerns with me at any time. I do not curve grades in my classes. Please let me know of any major issues that may impact your course performance PRIOR to any deadlines. Emergencies happen, please communicate with me AS SOON AS POSSIBLE to discuss fair and reasonable accommodations. You may also discuss emergencies/personal issues affecting (or that may affect) your academic performance with your advisor or the Dean of Students. I am always flexible and willing to work with you, provided that you have documentation for your absence. If you feel that you have been graded unfairly, please discuss this with me. Your rights to contest a grade are stated in the Student Handbook.

**NO LATE WORK WILL BE ACCEPTED WITHOUT DOCUMENTATION OF AN EXTENUATING CIRCUMSTANCE.**

### **Attendance Policy**

You are expected to arrive to class on time and be prepared to participate in each class period. Four unexcused absences may result in withdrawal and a “W” or “Y” will be recorded. You may request to be excused from class for religious observances and practices, for illness, for school or work-related travel or for personal or family emergency. If you will be absent, please notify the instructor as soon as possible.

Since this is an online course, attendance is not possible in the same way it is in a face-to-face classroom. Participation in discussions and virtual office hours is expected and required.

**YOU ARE EXPECTED TO LOGIN TO YOUR COURSE CANVAS PAGE AND CHECK YOUR TOCC EMAIL AT LEAST TWO TIMES A DAY.**

### **Incomplete Policy**

Incomplete (I) grades are not awarded automatically. The student must request an "I" from the instructor who can choose to award an Incomplete only if all three of the following conditions are met:

1. The student must be in compliance with the attendance policy.
2. The student must have unavoidable circumstance that would prohibit the student from completing the course.
3. The student must have completed over 75% of the course requirements with at least a “C” grade.

Incompletes are not a substitute for incomplete work due to frequent absences or poor academic performance. Incomplete grades that are not made up by the end of the ninth week of the following semester will be automatically changed to an F if the agreed upon work, as stipulated on the written form signed by the instructor and the student when the I grade is awarded, is not completed.

### **Instructor Withdrawals**

Students who have missed four consecutive classes (or the equivalent) not submitted any assignments nor taken any quizzes by the 45th day census report, due on **8 OCTOBER 2020** are assumed NOT to be participating in the class and may be withdrawn at the faculty member’s discretion.

### **Student Withdrawals**

Students may withdraw from class at any time during the first 2/3 of the semester without instructor permission and without incurring any grade penalty (**15 SEPTEMBER 2020**). Please be sure to withdraw yourself by **9 NOVEMBER 2020** if you do not expect to complete the class, otherwise you may receive a grade of “F”.

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### **Special Withdrawals (Y) Grade**

The “Y” grade is an administrative withdrawal given at the instructor’s option when no other grade is deemed appropriate. Your instructor must file a form stating the specific rationale for awarding this grade. “Y” grades are discouraged since they often affect students negatively. Your instructor will not award a “Y” grade without a strong reason.

### **Academic Integrity**

Violations of scholastic ethics are considered serious offenses by Tohono O’odham Community College, the Student Services Department, and by your instructor. Students may consult the TOCC Student Handbook sections on student code of conduct, on scholastic ethics and on the grade appeal procedure. Copies are available at Tohono O’odham Community College.

Each student must do their own homework and case studies. Discussion among students on homework and cases is encouraged for clarification of assignments, technical details of using software, and structuring major steps of solutions - especially on the course's Web site. Students must do their own work on the homework and exam. Cheating and Plagiarism are strictly forbidden. Cheating includes but is not limited to: plagiarism, submission of work that is not the student's own, submission or use of falsified data, unauthorized access to exam or assignment, use of unauthorized material during an exam, supplying or communicating unauthorized information for an assignment or exam.

**PLAGIARISM INCLUDES THE FAILURE TO PROPERLY CITING DATA OR MATERIAL THAT YOU DID NOT COLLECT OR CREATE YOURSELF. WHEN IN DOUBT, CITE IT!**

All work done for this class must be your own, or the original work of your group. While you may discuss assignments with other class members, the final written project must clearly be original. You may use work from books and other materials if it is properly cited. Copying from a book without proper reference or from a person under any circumstances will result in an “F” for the assignment, and at the instructor’s discretion, possibly an “F” for the course. If you are uncertain about proper citations ask your instructor or the librarian.

Any issues of academic dishonesty will be referred to the Dean of Students for disciplinary action. A finding that a student violated the student code of conduct or was responsible for an act of plagiarism or cheating, will be given a grade of F for the course. SEE STUDENT HANDBOOK FOR FURTHER INFORMATION AND STUDENT CONDUCT POLICY.

### **Course Feedback**

All assignments will be graded and returned to the students promptly, typically within a week after the assignment is closed for handing in. Emails will be returned within two days. A student or the instructor may request a student conference at any time during the semester. Quarterly grade reports will be provided to each student, either in person, by email or via the electronic system of Canvas.

## **Equal Access Statement/Disability Accommodations**

### **ADA Compliance**

Tohono O’odham Community College strives to comply with the provisions of the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. If you have a learning problem, physical disability, or medical illness that requires you to have any special arrangements, please inform your instructor at the beginning of the semester so your academic performance will not suffer because of the condition, or disability.

### **ADA Statement**

Tohono O’odham Community College seeks to provide reasonable accommodations for qualified individuals with disabilities. The College will comply with all applicable regulations, and guidelines with respect to providing reasonable accommodations as required to ensure an equal educational opportunity. This process includes self-identifying as a student with a disability, providing supporting documentation of their disability, and being approved for services through the Disability Resources Office (DRO). It is the student's responsibility to make known to their instructor(s) the student’s specific needs within the context of each class in order to receive appropriate accommodations. We will work together in order to develop an accommodation plan specifically designed to meet the individual student's requirements.

For more information or to request academic accommodations, please contact: Anthony Osborn, TOCC Disabilities Resource Coordinator, aosborn@tocc.edu, or 520-383-0033 for additional information and assistance.

### **Title IX**

Tohono O'odham Community College encourages each student to have the knowledge and skills to be an active bystander who intervenes when anyone is observed or being harassed or endangered by sexual violence. Sexual discrimination and sexual violence can undermine students’ academic success and quality of life on campus and beyond. We encourage students who have experienced or witnessed any form of sexual misconduct to talk about their experience and seek the support they need.

**Confidential support and academic advocacy can be found with: Student Services Title IX Coordinator/Counselor, Alberta Espinoza, M.Ed. located in I-We:mta Ki: Room 18. Phone 520-383-0033 email: aespinoza@tocc.edu**

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A person may also file a complaint of sex discrimination with the United States Department of Education's Office for Civil Rights regarding an alleged violation of Title IX by visiting [www2.ed.gov/about/offices/list/ocr/complaintintro.html](http://www2.ed.gov/about/offices/list/ocr/complaintintro.html) or by calling 1-800-421-3481.

### **Conduct: Bias, Bullying, Discrimination and Harassment**

Tohono O'odham Community College faculty and staff are dedicated to creating a safe and supportive campus environment as a core value. Harassment based on age, class, color, culture, disability and ability, ethnicity, gender, gender identity and expression, immigration status, marital status, political ideology, race, religion/spirituality, sex, sexual orientation, or tribal sovereignty status will not be tolerated.

Please bring any instances of harassment, discrimination, bullying, hate speech, violence, or any other concerns that occur in this classroom to my attention immediately. These behaviors are not tolerated.

I have a strong commitment to ensure my classroom is inclusive and safe for everyone. All students in my classroom are welcome regardless of race, ethnicity, religion, creed, nationality, immigration status, gender identity or expression, sexuality, ability/disability, income, employment, veteran's status, age, opinions, or beliefs. Let me know if you have any questions or concerns about inclusivity in my classroom. If you feel concerned or unsafe for any reason, please let me know.

### **Classroom Behavior**

All discussions, comments, responses, and interactions in the course are expected to be conducted in a responsible and professional manner. You will encounter differing opinions and perspectives. You will also encounter different cultures, languages, religions, and beliefs in this course.

### **DISRESPECTFUL BEHAVIOR, BULLYING, OR DISCRIMINATORY/HATE SPEECH OF ANY KIND HAS NO PLACE IN MY CLASSROOM AND WILL NOT BE TOLERATED.**

- Visitors may be only allowed at class sessions or on field trips with instructor approval, visitor's safety and behavior are the responsibility of the student.
- Possession of drugs, alcohol or firearms on college property is illegal.
- Food and beverages are allowed in classrooms at discretion of the instructor.
- Cellphones should be turned off during class, unless the instructor is allowing students to use their tools (calculator, internet access).
- Students creating disturbances that interfere with the conduct of the class or the learning of others will be asked to leave.
- Student behavior is also detailed in student handbook under Student Code of Conduct Violations.

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*Revised Fall 2020*

Students are expected to adhere to the T-so:son (core values). Students should ensure they:

**Are respectful**  
**Are cooperative**  
**Consider the group well-being**  
**Honor core beliefs**

**T-Pi:k Elida**  
**T-I-We:mta**  
**T-Apedag**  
**T-Wohocudadag**

Violations of the Student Code of Conduct (SEE STUDENT HANDBOOK), will be referred to the Dean of Students for disciplinary action.

**Make-up policy:**

Late assignments that can be made up will be accepted but will be penalized 25%. Laboratories cannot be made up except in the case of college closure. At the instructor’s discretion, extra credit opportunities and optional activities may be provided.

**Technology Minimum Requirements**  
**Per TOCC Information Technology Department**

Software capabilities:

- Ability to run Google Chrome Version 78+
- Updated virus protection, if using PC or Mac. (TOCC recommends the free Windows Defender for Windows machines)
- Security: Must have a password/passcode (login) to access the device. This is responsible computing. Students will be bound by the TOCC IT Policy related to passwords, security, and appropriate usage.

Is there specific software that needs to be installed?

- TOCC recommends installing the Google Chrome browser as it works well with G Suite. Students collaborate with Google Docs and Microsoft 365 on a regular basis.

Can I use Alternative Browsers?

- Firefox, Internet Explorer, Opera, and other unlisted browsers will not be supported.

Which Operating System should the device run?

The decision for the student's device is a matter of personal preference, but the device needs to be able to run the Google Chrome, Microsoft Edge, or Apple Safari Browser. Devices can run Windows, Mac OS, or Chrome OS as long as the minimum requirements listed here:

- Operating System:
  - Windows 8.1, 10
  - MacOS 10.11 or Higher
  - Chrome Version 78 or Higher
- Battery life: 5 hours
- Startup time: No longer than 120 seconds
- Wireless: Integrated
- Keyboard: Integrated, but can be wireless
- Audio: Headphone jack with headphones/earbuds
- Microphone: Integrated
- Camera: Integrated
- Processor: 1.6 GHZ or faster 64-bit processor
- Memory: 4 GB RAM or higher
- Disk Space: 16gb GB or higher
- Screen Size: 10 inches or larger
- Monitor Resolution: 1024 x 768

**In order to complete the course via the course Canvas page, students must login with their TOCC credentials. Emails regarding course information will not be sent will NOT be sent to non-TOCC email addresses. To ensure compliance with FERPA (Family Education Rights and Privacy Act) grades, and sensitive student information should NOT be transmitted via email.**

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