

GeoSPACE Planetary Geoscience Field Course

GLY 4930



COURSE DESCRIPTION AND GOALS

Summer Session A

GeoSPACE provides an opportunity to develop and apply skills in field geology, planetary geoscience and volcanology in Northern Arizona. You can learn more about the course here: <https://sites.google.com/ufl.edu/geospace-field-program>. The goals of the course are:

- Practice rock and landscape interpretation in volcanic and sedimentary landscapes; and apply those skills to interpret features on Earth and other places in the solar system.
- Apply tools and techniques for digital mapping, including digital stratigraphic sections, high precision GPS, and photogrammetry.
- Learn to access and interpret remote sensing data, and how to integrate satellite data into field studies.
- Understand the human and environmental context of field sites and develop good habits of field safety, sustainability and geo-ethics.
- Develop geoscience project management skills – including research question development, project planning and execution, data processing and analysis, and presentation of results.

Prerequisites:

Any three geoscience, planetary or remote sensing courses, Completion of an [application](#), and notification of acceptance to the course.

Class Format

Hybrid, off-campus. Students either attend the field course in person in Arizona, or virtually online. In-Person and Remote groups work closely together throughout the course.

Instructor

Dr. Anita Marshall (she/her)

Email: anita.marshall@ufl.edu, or message through Discord.

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Office Location:
Williamson Hall 255

Program Manager

Yesenia Arroyo (they/she)

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Virtual TA

McKayla Meier (she/her)

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Course Location

In-person: Flagstaff, Arizona

Online: Anywhere you are!

Important Dates

Enrollment deadline: May 16

Field Course: May 28 – June 11

Final Research Projects*: June 21

**For 3 credit hour option. 1 & 2 credit hour option has no work due after June 10.*

Credit Hours

Students may take this course for 1,2 or 3 credit hours. 1-2 credit hours for participating in the pre-field trip meetings and the two-week field course. 3 credit hours can be earned by participating in the field course and completing a research project after the field course with data collected in the field (see course activities for more info).

Course Learning Objectives

In-person and virtual students work together to complete assignments. While we make every effort to make sure all students have a chance to learn every skill, the specific skills emphasized for each group will be slightly different.

Learning Objectives for Virtual Students

- Demonstrate familiarity with remotely sensed planetary datasets of Earth and other terrestrial bodies (e.g., the Moon, Mars).
- Analyze satellite datasets via commonly used techniques (e.g., band ratios or mineral indices).
- Develop hypotheses to explain features observed remotely and identify specific predictions that could be tested in the field to support/refute these hypotheses.
- Practice collaborating with complex, geographically disbursed teams by working with in-person students to make observations via remote sensing and in-person observations, develop tests for proposed hypotheses, and analyze results from both in-field and remote datasets.
- Gain experience processing data sets for kinematic GPS surveys and photogrammetry.
- Synthesize, interpret and communicate results of remote and field observations and data via oral and/or written presentations.

Learning Objectives for In-Person Students

- Demonstrate the ability to collect detailed, coherent field notes and observations.
- Become familiar with remote sensing imagery and how to interpret it.
- Practice collaborating with complex, geographically disbursed teams by working with virtual students to make observations via remote sensing and in-person observations, develop tests for proposed hypotheses, and analyze results from both in-field and remote datasets.
- Gain experience collecting and processing data sets for kinematic GPS surveys and photogrammetry.
- Synthesize, interpret and communicate results of remote and field observations and data via oral and/or written presentations.

YOUR COURSE RESPONSIBILITIES

- Fully participate in the full, 14-day field course to the best of your ability including activities and assignments.
- For 3 credit-hour students: complete a final research presentation after the field course.
- Check the Discord server multiple times a day and check your emails at least

once per day.

- Abide by UF's Academic Honor Code.
- Treat your fellow class members with respect and abide by the GeoSPACE Code of Conduct (provided in a separate document).
- Encourage a Community of Care. If you are struggling, ask for help! If you see someone else struggling, offer to help.

Technology Requirements and Resources

Virtual and in-person students will need regular access to a computer for data processing and collaborative work. You will need a device with a functioning webcam.

Communication during this course is primarily conducted through Discord, which enables everyone to keep up with announcements, chat, stream and share data from the field all in one place. Please create a free Discord account if you don't have one and we will send an invite link to the course server. We use Zoom for our morning and evening meetings.

We will provide iPads to collect digital data, photos, notes, etc. in the field. We also have GoPro cameras available for those that would like to document with video. We will fly UAVs (drones) in locations where it is permitted.

COURSE ACTIVITIES

Participation: You will need to demonstrate consistent engagement in the course, but participation is not defined by a rigid set of rules. Full participation will look different depending on your needs, and if you are participating virtually or in person. For many students, timely and consistent attendance for all activities is the most straightforward way to demonstrate participation. For those that can't regularly participate in events in real time, please work with the faculty to develop alternate plans to stay engaged. Together we can work out what full participation looks like for you. The Participation grade also reflects your demonstration of a collegial, collaborative approach to your interactions with others. *Note: If taking this course to satisfy Quest 3 Requirements, the instructor will attach a written summary of your participation to your reflection essay, which will be verified by the geology department's Experiential Learning Coordinator.*

Assignments: You will need to demonstrate that you are taking in the information and landscapes we visit (in person or virtually) throughout the course. Each group may be documenting different things, but in-person and virtual students will both need to take notes. The primary way students attending in-person will do this is through daily field notes. For virtual students, this will be assessed through daily activity logs and/or summaries. There is a real art to field notes and proper documentation during a project, and these are important skills you will develop and practice during the field course. The mode of notetaking is up to you, but digital notes are preferred. You are welcome to use a good old fashioned field notebook for notes, but you will need to take pictures of your pages and submit those online. Assignment types include:

- Field Notes: Some activities early in the course will have worksheets to guide your notes, but most will not have a structured document for you to fill out. We will provide training sessions and links to helpful resources and will provide timely feedback during the course to help you improve your field observation and documentation skills.

- **Daily summaries:** Virtual students will document activities with a brief daily summary. The summary should include an overview of work completed, your role in those activities and any questions that you may have. 1-2 paragraphs will suffice unless instructed differently for specific activities. In-person students can include a brief summary at the end of their field notes for the day.

Assessments: Small group presentations throughout the course will be used to determine how well students are meeting the learning goals of the course. Presentation teams will be comprised of in-person and remote students, as a synthesis of information and data from both teams will be required to address research questions. Presentations during the field course will be delivered via Zoom so everyone can be part of the presentation regardless of location. *Remote students:* if you cannot present in real time at scheduled presentation times, please make sure your work is evident in the final presentation! There are many ways to do this. For example, pre-recording your part of the presentation, or helping with data processing, slide creation or other aspects of the presentation. Teams should be actively working to make sure everyone is part of the preparations and presentations – learning how to effectively collaborate, regardless of challenges (like distance or time zones) is an important part of GeoSPACE.

Individual Reflection Essay: At the end of the course, you will write a reflection essay with a minimum of 500 words about your experience during the field course. This is your chance to gather your thoughts on what you learned and how you grew academically and personally during your time with the GeoSPACE project. *UF students satisfying Quest 3 requirements will need to “explicitly connect how what they have learned at UF prior to Quest 3 informs their experience and how the present experience has influenced their future goals, hopes and expectations”.* A detailed grading rubric will be posted on Canvas.

Research Project: Students taking the course for 3 credit hours will complete an additional research presentation, due shortly after the conclusion of the field course. The topic and scope will be developed by the student and approved by instructors and will utilize data or materials collected during the field course. This project should be manageable in the short time frame available (1.5 weeks after the conclusion of the field course) yet demonstrate a strong grasp of data processing or analysis, the ability to synthesize concepts and ideas relevant to the project topic, and good presentation skills. More detailed instructions will be available in a separate document.

Assignment Expectations

Plagiarism of other student’s work or published materials is not allowed (see UF Policy section at the end of this document for details). However, collaboration with other students is a fundamental part of this course. You can and should be working together on assignments, but you are responsible for your own assignments, or your part in a group assignment. Use your own words, and when appropriate to quote others, give credit where due and cite your sources.

Citations: I’m not a stickler for which format to use for citations, as long as you are consistent and use the same format throughout an assignment. Consider establishing an agreed upon citation format with your working group at the start of the course.

Late Policy & Missed Work: We will do our best to work with you if you start to fall behind or need more time on an assignment. However, the short duration of this course, and the fact that most assignments are collaborative, makes late work difficult to accommodate. Notify the instructors or TAs right away if you start to fall behind.

COURSE SCHEDULE

The field course runs from May 28 – June 11, 2023. The field course starts and ends in Phoenix, Arizona. Activities officially end June 10th at 4:00 pm. Final projects for students enrolled for 3 credit hours are due Jun 21.

The following is a general overview schedule. Most days will have a morning meeting at 8:00 am, debrief at 5:00pm. Dinner will be served around 6:00 pm, unless stated otherwise. A detailed schedule is provided in a live Google doc that articulates exactly what each group (in-person and remote) will be doing throughout the day.

ALL TIMES ARE Mountain Standard Time (MST) unless otherwise noted.

	In Person Students	Remote Students
Mon 5/15	Summer A Session begins, Canvas page opens.	
Fri 5/26	Field course pre-reading assignment due.	
Sun 5/28	Travel Day to Phoenix. Evening Orientation session.	Remote sensing 101. Evening Orientation session.
Mon 5/29	Travel to Flagstaff with stops at Sunset Point, Montezuma's Castle, and Montezuma's Well.	Follow along w in-person group via livestreams. Work on JMARS data sets.
Tue 5/30	Morning: Field work and UAV flights at Cinder Lake simulated lunar surface. Afternoon: Meteor Crater, rim tour and museum tour.	Cinder Lake activity. Livestreams from Meteor crater rim tour and museum tour. Prep Sunset Crater briefing
Wed 5/31	Morning: Volcanic mapping exercises at Sunset Crater. Afternoon: Stratigraphy practice at Walnut Canyon National Monument. Virtual students work on 1st mission briefing	Present Sunset Crater briefing. Prep SP Crater briefing. Stratigraphy practice virtually at Walnut Canyon.
Thu 6/1	Morning: SP Crater collaborative field work. Afternoon: Visit to USGS Astrogeology Center.	Present SP Crater Briefing. Open work time. Livestream tour from USGS cntr.
Fri 6/2	All Day: Grand Canyon. Morning: Stratigraphy exercise on the Trail of time, Afternoon: Desert view geomorphology, geo ethics and indigenous sovereignty issues related to mining and extraction activities.	Grand Canyon and Valles Marineris data sets. Livestreams throughout the day from Grand Canyon.
Sat 6/3	Rest and Reset Day. Open work time to work, do laundry, nap, etc. Group Presentations on topics from the Holey Tour in the evening. Optional Stargazing activity at night.	
Sun 6/4	Equipment training: Kinematic GPS, ground-based photogrammetry and related data processing	Prep for v235 briefing. Intro to Photogrammetry & GPS 101 w in-person group.

Mon 6/5	Morning: Visit a phreatomagmatic crater to practice volcanic stratigraphy and photogrammetry. Afternoon: Flexible collaborative work time to process 3D models and refine stratigraphic columns and descriptions.	Present v235 briefing. Prep Sproul/Grand falls briefing. Open work time w in person team members, process field data.
Tues 6/6	Morning: Practice interpreting volcanic features at the Sproul / Merriam Crater. Afternoon: Optional activities (options vary by year).	Present Sproul/Grand Falls briefing. Prep "Mystery Site" briefing. Optional activities (TBD)
Wed 6/7	Morning: Introduce the "mystery site". Practice setting up and executing an aerial photogrammetry survey. Afternoon: Data processing and 3D model construction from morning survey. Develop research questions and plan for field work at the mystery site.	Present Mystery site briefing. Participate in virtual site scouting. Collaborative time with teams to plan field work for next day.
Thu 6/8	Morning: Execute Field work at the Mystery Site. Afternoon: Flexible – more field work if needed, and/or work time for data processing and analysis, 3D model construction, etc.	Livestreams from the field, collaborative site analysis.
Fri 6/9	Morning: Collaborative work time. 3-Credit hour students meet w faculty to define final research projects. In-person group pack and prep to depart Flagstaff. Afternoon: Final mystery site presentations.	
Sat 6/10	Check out of Flagstaff Hotel. Morning: Visit Sedona via Oak Creek Canyon. Depart Sedona at 1:00 pm. Afternoon: Field course ends at 4:00 pm or upon arrival in Phoenix. Flights after 6:00 pm are ok or depart the next morning.	Wrap up meeting, follow along with road trip through Sedona on Discord.
Sun 6/11	Travel home from Pheonix	
Wed 6/21	Final Research Projects due (for 3 credit hour students)	

Reading Materials and Resources

There is no required textbook. All reading material will be provided in a Share Drive folder. The following resources will be used in the course, and additional relevant materials may be added as the course progresses.

Bezy, John V., 2003. A Guide to the Geology of the Flagstaff Area. Arizona Geological Survey, Down-to-Earth 14.

Earle, S. 2015. Chapter 4: Volcanics, in *Physical Geology*. Victoria, B.C.: BCcampus. Retrieved from <https://opentextbc.ca/geology/>

Hodges, K.V., and Schmitt, H.H., 2011, A new paradigm for advanced planetary field geology developed through analog experiments on Earth, in Garry, W.B., and Bleacher, J.E., eds., *Analogues for Planetary Exploration: Geological Society of America Special Paper 483*, p. 17–31, doi:10.1130/2011.2483(02).

Greeley, R., 2011. The “Holey Tour” planetary geology field trip, Arizona. *GSA Special Paper 483*, p. 377-391.

GRADES

Grades will be weighted as follows for students taking the course for 3 credit hours. If you are enrolled for 1 or 2 credit hours, the Research project is omitted, and the grades weighted more heavily on Assignments and Assessments:

Participation	10%
Assignments	25%
Assessments:	25%
Final Reflection:	20%
Research Project:	20%
Total:	100%

Final Grades: See <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx> for UF grading policies. Final grades will be assigned with the following criteria:

% Grade	Letter Grade	GPA Value
90-100	A	4.0
85-89.9	B+	3.5
80-84.9	B	3.0
75-79.9	C+	2.5
70-74.9	C	2.0
69.9 - 59	D	1
< 58.9	E	0

ACCESSIBILITY, INCLUSION & RESPECT

Respect & Inclusion: In this course, everyone should feel welcome. You deserve to be called by the name and pronouns you prefer, so please correct us if we get it wrong! You will be treated with respect, and we expect you to treat others with respect (see the Code of Conduct for details on what this means). If something in the course material, instruction or class interactions make you feel excluded or uncomfortable, please let an instructor know right away so we can address it.

Field courses can be challenging, especially for those who are new to working in a desert climate. There is a no-shame ethos encouraged in our field course. You are not less of a geologist if you can't do a physical activity! Just let us know so we can adapt. We can find alternative means of participation if an activity just doesn't work for you. GeoSPACE encourages a culture of care, which means we take care of ourselves and each other. If you are struggling, speak up! If you see someone struggling, offer to help.

UF Statement on Accommodating Students with Disabilities: Students with disabilities who experience learning barriers and would like to request academic

accommodations should connect with the disability Resource Center. Click here to get started with the Disability Resource Center: <https://disability.ufl.edu/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

GeoSPACE Statement on Accessibility: This course is designed by and for people with disabilities. But everyone, whether you identify as disabled or not, learns differently and has unique needs. You don't have to have a formally recognized disability to find yourself having difficulty with some aspect of the college learning environment, especially a field course. We take accessibility seriously, so please let us know if something in the course material or format presents a barrier to your participation – *even if you don't have, or don't yet have, a formal accommodation letter.*

If you indicate a disability on your application for the course, we will follow up via email and/or meetings to determine what we need to do to facilitate your participation. We will adapt the course to your needs. Collaborative meetings are held on Zoom with automatic live captioning available. Please let us know if you have other access needs for the collaborative meetings or any other part of the course. The sooner you explain what you need, the better prepared we can be to assist.

UF POLICIES

University Policy on Academic Misconduct: Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Conduct Code: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>, which includes the Honor Pledge.

UF Undergraduate Student Handbook: The student handbook has all the details on UF policies for students. <https://dso.ufl.edu/resources/student-handbook/>

NEED HELP?

Help with course material: GeoSPACE is a Capstone-level course. You may be challenged by some parts of the material, so be sure to ask questions as often as you need! Posting on Discord lets us answer frequent questions for everyone, and your fellow class members can also contribute answers. The instructors, Project Manager, and virtual Teaching Assistant are all here to help with questions you don't want to post publicly – just send a direct message or talk to us face to face.

Canvas Technical Support: For issues with technical difficulties for E-learning, please contact the UF Help Desk: <http://helpdesk.ufl.edu> or (352) 392-4357.

Mental Health and well-being: Sometimes being a college student can take a toll on your mental health. If you are a UF student that is mentally or emotionally struggling for any reason, you can contact the [Counseling and Wellness Center](#). They have one-click access to people who can help you connect to the right resources for your situation. If these struggles are negatively impacting your performance your courses, I encourage you to contact the [Dean of Students Care Area](#) to connect with a support team that can help with temporary accommodations, authorization to make up missing course work, etc. Additionally, if you are comfortable doing so, please reach out to me and I will provide any accommodations in this course that I can.

Food Pantry: The Field and Fork Pantry is a resource on the University of Florida campus committed to supporting anyone in the UF community experiencing food insecurity. While this course takes place off-campus, and you will eat very well during the course, it's good to know this resource exists. <https://pantry.fieldandfork.ufl.edu/>

Financial Assistance: UF's [Aid-A-Gator](#) program has small grants available to help students with unexpected financial needs.

Resources for UF Online students: A variety of support resources for online students are consolidated on this page: <http://www.distance.ufl.edu/getting-help>

STUDENT FEEDBACK & COURSE EVALUATION

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

Whew - That was a lot of info! Thanks for reading all the way to the end.