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Spring 2-1-2022

### GEO 597.00: Advanced Problems (Hydrogeodsy)

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#### Recommended Citation

White, Alissa; Martens, Hilary; and Gardner, William Payton, "GEO 597.00: Advanced Problems (Hydrogeodsy)" (2022). *University of Montana Course Syllabi, 2021-2025*. 427.

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# Geo 597: Advanced Problems (Hydrogeodesy)

## Instructor information

Dr. Alissa White

Email: [alissa.white@umontana.edu](mailto:alissa.white@umontana.edu)

Office hours: M and Th 1-2 pm (via Zoom; in person by appt)

Dr. Hilary Martens

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Office hours: T 10-11 am & W 11-12 pm (via Zoom; in person by appointment)

Dr. Payton Gardner

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## Course description:

We will explore the emerging field of hydrogeodesy through the presentation and discussion of foundational papers as well as through computational workshops on new advances in data processing and modeling. Hydrogeodesy uses geodetic observations and models (e.g., GNSS, InSAR, gravity) to improve our understanding of Earth's water cycle, including the storage and movement of water through various terrestrial hydrologic reservoirs. *Prerequisites:* Graduate standing or consent of instructor. 1 credit. Late-start seminar course.

## Learning Outcomes:

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

1. Read, evaluate, and discuss scientific literature
2. Describe conceptually and in basic terms geodetic methods used to investigate hydrologic phenomena
3. Summarize and articulate key results from foundational studies in hydrogeodesy
4. Broadly examine the advantages and limitations of using geodesy to constrain water storage and movement
5. Complete basic applications in deformation modeling and hydrological data processing
6. Consider future directions in hydrogeodesy

## Course Calendar:

The course will run for 9 weeks, beginning in the week of February 28<sup>th</sup>.

Topics of discussion will be driven by student and group interest. Students will choose a different topic for discussion each week. We will also complete two additional group workshops to apply methods discussed in class. Each workshop will require students' participation for an additional three hours of in-class time to meet the hourly requirement for the semester.

## Required assignments:

Each student will select and review at least one relevant publication from the literature; summarize the motivation, methods, and key results in a presentation to the class; and help to facilitate class discussion about their chosen publication. Depending on the size of the class, it may be necessary to select, review, and lead discussion on more than one paper.

Each student will also read every assigned article prior to class and actively participate in class discussions of publications selected by others. Students are expected to create an annotated bibliography including citation, brief summary, and assessment/reflection for each week's

reading. This small weekly assignment should be submitted via Moodle before the start of each week's meeting time. Our hope is that students will begin to build an organizational resource of hydrogeodesy literature that they can refer to later, as well as to cultivate strong literature review habits they can employ in future research.

Each student will participate in two additional python-based class workshops to provide hands-on application of some methods discussed in class. Each workshop will require students' participation for three additional hours of in-class time.

### **Required textbooks:**

*No textbooks are required for the course.* We will read and discuss publications from the literature. A pdf of the article of the week will be sent to all students prior to that week's course meeting.

### **Course guidelines and policies:**

#### **Diversity, Equity, and Inclusion**

It is our intent that this course addresses the learning needs of all students and we welcome suggestions providing ways to improve the effectiveness of the course for you, specific student groups, or the students as a whole. The instructors value diversity and appreciate the power of bringing together diverse perspectives, especially in an inter-disciplinary and collaborative discussion-based course such as this. We strive to create and maintain an inclusive, welcoming, and respectful environment for all students. Please let us, or a trusted resource, know if anything happens in class that makes you feel uncomfortable so we can address and correct it. We look forward to productive discussions, fun conversations, and collaborative learning.

#### **Land Acknowledgment**

The University of Montana acknowledges that we are in the aboriginal territories of the Salish and Kalispel people. Today, we honor the path they have always shown us in caring for this place for the generations to come.

#### **Student Conduct Code**

All students are expected to abide by The University of Montana's Student Conduct Code: [https://www.umt.edu/vpsa/policies/student\\_conduct.php](https://www.umt.edu/vpsa/policies/student_conduct.php)

#### **Grading policy**

This class will be graded as credit/no credit (CR/NCR).

Attendance, annotated bibliography, and active participation (workshops & discussions): 50%  
Paper selection, summary presentation, and discussion facilitation: 50%

The course expectation is that participants will come to class prepared and ready to discuss each paper. The course will be largely student driven, based on student interest. Students will take turns selecting a publication (at least one week in advance of the class discussion), sharing a summary of the main points with the class, and then facilitating class discussion.

#### **Attendance**

This course is seminar-style and requires active participation and discussion. Regular attendance (either in person or via Zoom) is mandatory\*\* due to the late start of the course and

the discussion-based nature of the class. If you need to miss a class, please inform the instructor(s) in advance.

\*\* Missing more than one class without an instructor-approved excuse will result in failing the class and receiving a grade of NCR. One unexcused absence will result in a 20% deduction off the course grade. Given the discussion/participation nature of the course, more than two total absences (including excused absences) may be grounds for failing the course (NCR). Extenuating circumstances will be considered on a case-by-case basis by the instructors.

### **Assignment expectations**

The seminar course involves the reading, evaluation, and discussion of publications from the literature. Students are expected to create an annotated bibliography for each week's reading. This weekly assignment should be submitted via Moodle *before* the start of each week's meeting time. There will be no exams. The course includes two computational workshops. Workshop attendance and participation are mandatory.

**Late assignments will not be accepted.** Students are responsible for submitting assignments on time. Given that circumstances sometimes arise that are beyond our control, students will be allowed one grace period of no more than one week for one annotated bibliography submission.

More information on UM's academic policies and procedures:  
<https://catalog.umt.edu/academics/policies-procedures>

### **Health and Safety**

- Mask use is required within the classroom.
- If you feel sick and/or are exhibiting COVID symptoms, please do not come to class. Contact the Curry Health Center at 406.243.4330.
- If you are required to isolate or quarantine, you will receive support in the class to ensure continued academic progress. We encourage you to attend class virtually if you feel well enough. Please let the instructors know in advance that you plan to attend virtually.

### **Course withdrawal**

Please refer to Institute policy on adding, dropping, and withdrawing from courses:  
<https://www.umt.edu/registrar/students/dropadd.php>

### **Disability modifications**

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and [Office for Disability Equity](#). If you think you may have a disability adversely affecting your academic performance, and you have not already registered with the Office for Disability Equity (ODE), please contact ODE in Lommasson Center 154 or call 406.243.2243. We will work with you and ODE to provide an appropriate modification.

### **Additional Information and resources:**

#### **Student Academic Resources**

Office for Disability Equity (ODE): <https://www.umt.edu/disability/>

Office for Student Success: <http://www.umt.edu/oss/>

Career Services: <http://www.umt.edu/career/>

Mansfield Library: <http://www.lib.umt.edu>

UM Writing and Public Speaking Center: <http://www.umt.edu/writingcenter/>

## Student Health and Wellbeing

Curry Health Center (physical health, pharmacy, health promotion, and mental health):

<http://www.umt.edu/curry-health-center/>

Mental Health Resources: <https://www.umt.edu/diversity/resources/mental-health.php>

Campus Recreation: <http://www.umt.edu/crec/>

Student Activity Groups: [http://TDwww.umt.edu/asum/student\\_groups/](http://TDwww.umt.edu/asum/student_groups/)