



Karst Hydrogeology

May 7-13, 2023

GEOG 475, GEOL 475, and GEOS 510

Course Instructor: Dr. Chris Groves & Lee Anne Bledsoe

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WKU KFS Program Leader: Dr. Leslie A. North
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Course Description: Karst Hydrogeology is a field course that introduces the basic features and processes of karst landscape/aquifer systems with an emphasis on methods and techniques relevant to addressing environmental problems as well as general research applications. Topics covered in daily presentations and discussion will include karst hydrogeology, particularly in the context of the Mammoth Cave region, groundwater tracing and monitoring, and applications of these methods to karst groundwater problems. Field exercises will include surface and cave trips with a particular focus on 'hands-on' instruction in qualitative and quantitative dye tracing and groundwater monitoring. This course will be held at the Cave Research Foundation's Hamilton Valley Research Station near Mammoth Cave National Park and although fieldwork will focus in the Park area, discussion about urban karst environmental problems will include a field trip to nearby Bowling Green and/or Horse Cave, Kentucky. This course is available as a workshop or for credit (undergraduate or graduate). Participants must be in good physical condition to negotiate the cave passages and surface hikes which are a major component of this course. Students who take the course for credit will develop an independent research project in consultation with the instructors during the week, which must be completed by August 2023.

Participants are required to follow all safe caving practices!

Required Text and Equipment:

There are no required textbooks for the course but participants will receive software and handouts/publications that relate to class topics. Students will have the opportunity to use hand-held and stand-alone data loggers, automatic water sampler, flow meter, and field fluorometer during this course. Students are required to have basic field equipment, including sturdy boots and rain gear. Necessary gear for caving trips will be provided. However, if you

bring your own personal cave gear, proper White Nose Syndrome decontamination procedures are required of all gear; please do not bring dirty gear.

Attendance: Students are expected to participate in all classes and field trips, except under special conditions (e.g., health). Field trips involve easy to moderately challenging caving. In the rare circumstance that students are unable to fulfill the field requirements they will be invited to drop the course. In general the rigor of the trips are adjusted to the abilities of the class. **All participants will receive a Certificate of Participation on the last day of the class for their full participation in the class. This does not constitute the final grade for those taking the course for academic credit.**

Grading: Courses can be taken as non-credit workshops, Undergraduate and Graduate credit, or for Continuing Education Units. Students who take the course for credit will develop an independent research project in consultation with the instructors during the week, which must be completed by August 2023. Students will need to remain in contact with the instructor for guidance. Project grading is based on the insight and quality of work demonstrated, with some accommodation for those with limited background.

Grade Scale (based mainly on project, but weighted according to participation in class):

A = equivalent to the finest work that is expected of a student at this level

B = good work, but with a few flaws in procedure and interpretation

C = average work

D = poor work, sloppy presentation

F = no redeeming features, or failure to turn in project by deadline

General Class Conduct and Policies: During class periods, cell phones should be turned off and smoking is not allowed. While in cave, safety and conservation are primary concerns. On the surface, it is essential to drive carefully and to obey the speed limit. Beware of snakes, ticks, chiggers, and poison ivy. ** Cell phones should be turned off during class! ** Please treat your colleagues and their desire to learn with appropriate respect.

ADA Statement: Students with disabilities who require accommodations (academic adjustments and/or auxiliary aids or services) for this course must contact the Director of the Karst Field Studies Program, Dr. Leslie North at leslie.north@wku.edu or (270) 745-5982 so proper accommodations can be considered and made as necessary.

Schedule Change Policy: The Department of Earth, Environmental, and Atmospheric Sciences strictly adheres to University policies regarding schedule changes. It is the responsibility of the student to meet all admissions deadlines. Only in exceptional cases will a deadline be waived (you will be required to fill out an appeal form). The form requires a written description of the extenuating circumstances involved and the attachment of appropriate documentation. Poor academic performance, general malaise, or undocumented general stress factors are not considered as legitimate circumstances.

TENTATIVE SCHEDULE

Day 1 (Sunday) – May 7

5:00-7:00PM

Welcome mixer. Mandatory meet and greet. We will spend 1-2 hours introducing ourselves, preparing participants for the coming week, orienting everyone to Hamilton Valley, Mammoth Cave National Park, and addressing any questions and/or concerns. This will also provide participants that have arranged to stay at Hamilton Valley the opportunity to check into their rooms. **The Meet & Greet is mandatory for all participants – not just for those staying at Hamilton Valley.** By addressing questions/concerns, gear-related issues, etc. on Sunday night, we can avoid dealing with these issues on Monday and delaying class and field trips.

Day 2 (Monday) – May 8

9:00 Principles of Karst Hydrogeology
10:15 Break
10:30 Hydrogeology of the MACA region
12:00 Lunch on your own
1:00 Field trip (surface): Why is the world's longest known cave here?
5:00 Dinner on your own
6:30-8:30 Field Trip (in-cave): Historic Area of Mammoth Cave

Day 3 (Tuesday) – May 9

9:00 Introduction to Carbonate Geochemistry
10:00 Groundwater Monitoring Techniques
11:00 Lunch on your own
12:30 Field Trip (surface/in-cave): Great Onyx Groundwater Basin:
hydrogeology/water quality/water quantity
6:00 Dinner on your own

Day 4 (Wednesday) – May 10

9:00 Dye Tracing Tools and Techniques
10:30 Break
10:45 Dye Tracing Applications/Design a Dye Trace
12:00 Lunch on your own
1:30 Field Trip (surface/in-cave): Mammoth Cave Dye Trace
5:30 Dinner on your own
7:00-9:00 Student Presentations

Day 5 (Thursday) – May 11

- 8:00 Field Trip (surface): Environmental Problems and Karst Hazards, Lost River Cave, Bowling Green
- 11:15 Crawford Hydrology Lab Tour and Lab Methods Demonstration
- 11:45 Picnic lunch or pre-order restaurant (Group decision)
- 1:00 Field trip(surface/in-cave): Urban Karst Issues and Applied Hydrogeology – Hidden River Cave, Horse Cave
- 6:30 Dinner on your own (Group decision: restaurant or at HV).

Day 6 (Friday) – May 12

- 8:00-5:00 Field Trip: To the Springs!! Green or Nolin River Canoe Trip (pack your own lunch, coolers will be provided)
- 7:00 Cook-out at Hamilton Valley (Meal provided by Crawford Hydrology Lab).

Day 7 (Saturday) – May 13

Students staying at HV are expected to assist in clean-up of the field station before checking out.