Karst Hydrogeology
May 17-22, 2026

Instructors: Dr. Chris Groves and Ms. Lee Anne Bledsoe, M.S.
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Course Description: Karst Hydrogeology is a field course that introduces the basics 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 hydrogeology of the South-Central Kentucky Karst region, groundwater tracing and monitoring methods, carbonate geochemistry, and applications of these methods to karst groundwater problems. Field exercises will include surface and cave trips with a particular focus on 'hands-on' participation in groundwater tracing and monitoring using both discrete sampling methods and a variety of data loggers. This course will be held in Bowling Green, Kentucky on the main campus of Western Kentucky University with field trips in the Lost River Basin, Mammoth Cave National Park, and Hidden River Cave. This course is available as a workshop or for credit (undergraduate or graduate). Participants must be in good physical condition to negotiate surface hikes, cave passages, and wade small streams which are a major component of this course.

Attendance: Participants enrolling for academic credit will be expected to participate in all in-class and field sessions. Participants who participate in the majority of class activities will receive a Certificate of Participation. 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 1, 2026.

Grading: This course may be taken as a non-credit workshop or for academic credit. Those wishing to earn academic credit will be expected to develop and complete a karst hydrogeology related project in collaboration with the course instructors and will be graded according to a rubric which will be distributed in class. A standard grading system will be used in the class (90-100% = A, 80-89% = B, 70-79% = C, 60-69% = D, below 60% = F).

Course materials and equipment: There are no required textbooks for the course but participants will receive handouts/publications in electronic format that relate to class topics. Students will have the opportunity to use hand-held and stand-alone data loggers, automatic water samplers, flow meters, a field fluorometer, a peristaltic pump, and electric well tape during this course.

Students are encouraged to bring a laptop computer for data entry and processing (e.g. Excel or Google Sheets), accessing online maps (https://kgs.uky.edu/kygeode/geomap/), and group research activities. Free software for data loggers is available for interested students. There may be a limited number of WKU laptops available for use.

Students are required to have basic field equipment, including sturdy boots, rain gear, and work gloves. Necessary gear (helmets, lights, and scientific equipment) 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.

Course Logistics: The course will be based on the campus of Western Kentucky University and transportation will be provided to field sites near Bowling Green and Mammoth Cave National Park. Transportation for all field trips is provided.

Lodging: More info about accommodations near campus can be found at: https://www.wku.edu/welcomecenter/accommodations.php

Food: There are multiple on-campus (Fresh Food, Starbucks, and others) and nearby off-campus food options (Downtown Bowling Green and adjacent 31-W Bypass). Most are within a very short (3-5 minute) drive or short walk (10-15 minutes). We will share a map with students if needed during orientation. Some days you will need to pack your lunch for the field (convenience stops can be made) and/or you are welcome to bring your lunch each day; a cooler or access to a refrigerator will be provided.

Parking: There are multiple open lots for visitor parking during the summer session. A map will be provided to registrants.

Learning Outcomes. Students will learn:

- Physical and chemical processes in karst systems
- Physical groundwater flow in karst aquifers
- Geochemical properties and variability of karst groundwater
- Vulnerability of karst waters and the environmental challenges to development and resource management.
- Various field and lab techniques used to study karst aquifers (cave/karst feature inventory and mapping, groundwater monitoring and types of tracing, hydrologic field measurements, and data logging)
- Principles and field methods used in near-surface geophysics
- Benefits of integrated karst field studies (climatology/geology/hydrology/ecology)
- How to design and conduct a fluorescent dye trace
- Interpretation of hydrologic data and qualitative and quantitative dye trace results.

Inclusion: Western Kentucky University (WKU) is committed to ensuring all members of our campus community have access to equitable and inclusive learning, working, and living environments. At the heart of our mission, we seek to provide holistic education and employment experiences that prepare students, faculty, and staff to become effective scholars, contributors, and leaders in our diverse and evolving communities. Consistent with our campus purpose statement and creed, this classroom will be a respectful space, welcoming all sexes, races, ages, national origins, ethnicities, gender identities/labels/expressions, intellectual and physical abilities, sexual orientations, faith/non-faith perspectives, income levels and socio-economic classes, political ideologies, educational backgrounds, primary languages, family statuses, military experiences, cognitive styles, and communication styles. If at any time during this course you are excluded or feel a sense of alienation from the course content, please feel free to contact me privately without fear of reprisal.

Students with Disabilities: Because of the nature of the Karst Field Studies program, all participants must be in good physical condition to take these courses. However, in compliance with University policy, students with disabilities who require academic and/or auxiliary accommodations for this course must contact the Student Accessibility Resource Center located in Downing Student Union, Room 1074. The SARC can be reached by phone number at 270-745-5004 [270-745-3030 TTY] or via email at sarc.connect@wku.edu. Please do not request accommodations directly from the professor or instructor without a faculty notification letter (FNL) from The Student Accessibility Resource Center.

Pregnant and Parenting Students: Western Kentucky University does not discriminate against any student or exclude any student from its educational programs or activities, including classes or extracurricular activities, on the basis of pregnancy and/or pregnancy-related conditions such as, but not limited to, childbirth, false pregnancy, termination of pregnancy, or recovery therefrom. Students who seek pregnancy or pregnancy-related accommodations should make their requests as soon as possible via WKU's Title IX Website at www.wku.edu/titleix/ under the heading, "Pregnancy or Pregnancy-Related Conditions." Students can also contact the Title IX Coordinator, Ena Demir, via email at ena.demir@wku.edu or by phone at (270) 745-6867 to request accommodations or seek assistance. We encourage students and faculty to work together to establish a plan that allows the student to complete the class and coursework without jeopardizing academic integrity and course standards. The Title IX Coordinator can help facilitate conversations between students and faculty regarding appropriate and reasonable accommodations. If you are a WKU student and believe that you have experienced an incident(s) of discrimination or harassment based on pregnancy (or pregnancy related conditions or issues), please report it to the Title IX Coordinator via email at ena.demir@wku.edu or by phone at (270) 745-6867. Additional resources for pregnant and parenting students can be found on WKU's Title IX Website at www.wku.edu/titleix/.

Title XI Discrimination and Harassment: Western Kentucky University (WKU) is committed to supporting faculty, staff and students by upholding WKU's Sex and Gender-Based Discrimination, Harassment, and Retaliation (#0.070) and Discrimination and Harassment Policy (#0.2040). Under these policies, discrimination, harassment and/or sexual misconduct based on sex/gender are prohibited. If you experience an incident of sex/gender-based discrimination, harassment and/or sexual misconduct, you are encouraged to report it to the Executive Director, Office of Institutional Equity/Title IX Coordinator, Ena Demir, 270-745-6867 or Title IX Investigators or Michael Crowe, 270-745-5429. Please note that while you may report an incident of sex/gender-based discrimination, harassment and/or sexual misconduct to a faculty member, WKU faculty are "Responsible Employees" of the University and MUST report what you share to WKU's Title IX Coordinator or Title IX Investigator. If you would like to speak with someone who may be able to afford you confidentiality, you may contact WKU's Counseling and Testing Center at 270-745-3159.

Academic Integrity/Plagiarism: WKU adheres to a strict policy against plagiarism and cheating (see Scholastic Dishonesty Code in your Handbook). Academic dishonesty of any type will not be tolerated and appropriate penalties will be faced by anyone who violates this policy. Student work may be checked using plagiarism detection software. Representing written work taken from another source as one's own is plagiarism. The academic work of a student must be his/her own. One must give any author credit for source material borrowed. To lift content directly from a source without giving credit is a flagrant act. To present a borrowed passage without reference to the source after having changed a few words is also plagiarism.

Land Acknowledgement: The history of our community and land gives us the opportunity to recognize, respect, and appreciate our place within that history. Western Kentucky University (WKU) honors and acknowledges the Indigenous peoples’ land on which this University was built. All land in the state of Kentucky was once Indigenous territory, which is why it is our duty to acknowledge that WKU exists on Native land. This particular region of Kentucky was home to both the Shawnee (Shawandasse Tula) and Cherokee East (ᏣᎳᎫᏪᏗᏱ Tsalaguwetiyi) tribes.

We also honor and acknowledge the former residents of Jonesville. According to the Jonesville History Project, “Jonesville was a predominantly African American community in Bowling Green, Kentucky, that was demolished in the 1960s to make way for the expansion of the WKU campus. This incident echoed a pattern across the country where the power of eminent domain was utilized to seize property from minority communities for large public works projects under the guise of urban revitalization.”

17-May	**Sunday**		
	10:00	EST 402	Welcome, introductions, and safety review
	10:30	EST 402	Introduction to Karst Landscapes/Aquifer Systems
	11:15	EST 402	Hydrogeology of the southcentral Kentucky karst region
	12:00		Lunch on your own
	1:00	Chestnut North Parking Lot	Field trip (surface): From Ridge to Spring - Karst Hydrology of MACA
	6:00		Dinner on your own
18-May	Monday		
	8:00	EST 402	Techniques in Karst Characterization and Assessment
	9:00	EST 402	Groundwater Monitoring Methods
	10:00	CHL Lounge	Coffee Break
	10:15	EST 402	Introduction to Carbonate Geochemistry
	11:30		Lunch on your own
	12:30	Chestnut North Parking Lot	Field Trip (in-cave): Carmichael to Cathedral Domes
	6:00		Dinner on your own
19-May	Tuesday		
	8:00	EST 402	Environmental Problems in Karst: Local Case Studies
	9:15	CHL Lounge	Coffee Break
	9:30	EST 402	Bowling Green 'Stormwater is Groundwater' Monitoring Network
	10:30	Chestnut North Parking Lot	Field Trip: Urban Karst Challenges, Bowling Green, KY
	1:00		Lunch on your own
	2:30	Lost River Cave	Field Lecture: Under BG - Stormwater Mgmt. with BG Public Works
	3:30	Lost River Cave	Field Trip: Lost River Cave Boat Tour
	5:00		Dinner on your own
20-May	Wednesday		
	9:00	EST 402	Fluorescent Dye Tracing Tools and Techniques
	11:00	CHL Lounge	Coffee Break
	11:15	EST 402	Dye Tracing Case Studies
	12:15		Lunch on your own
	1:45	Chestnut North Parking Lot	Field Trip: Urban dye tracing - Refining the Lost River Basin
	6:00		Dinner on your own
21-May	Thursday		
	8:00	Hidden Rive Cave	Field Trip: Hidden River Cave, Horse Cave, KY
	12:00	MACA Picnic Area	Pack your own lunch (cooler provided)
	1:00	MACA	Field Trip: Great Onyx Groundwater Basin Study, MCNP
	6:00		Dinner on your own
22-May	Friday		
	8:00	EST 402	Data Interpretation and Building a Conceptual Model
	9:00	CHL Lounge	Coffee Break
	9:15	EST 402	Breakout Groups: Design a Dye Trace. Discuss student plans.
	11:15	EST 403	Crawford Hydrology Lab Tour and Demonstration
	12:30	BG	Lunch on your own
	2:00	Chestnut North Parking Lot	Field Trip: Sinkhole Dye Injection and Farewell Ice Cream Stop
	5:00		Class Adjourns.