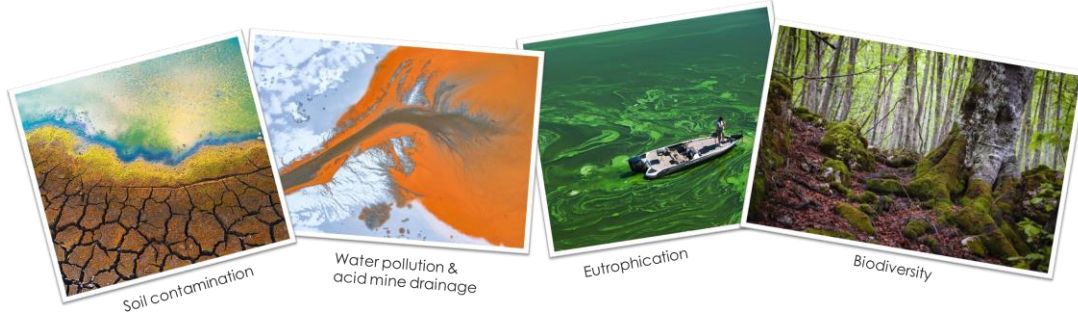


## GEOL 250: ENVIRONMENTAL GEOLOGY (3-credit), Fall 2024

Colonnade Natural and Physical Sciences with applied/lab component (NS & SL)



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### PROFESSOR INFORMATION

Dr. Nahid Gani, Associate Professor

Department of Earth, Environmental, and Atmospheric Sciences (EEAS)

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**Office hours:** Tuesday/Thursday 1:15-2:15 pm or by appointment

**Inclusion Statement:** 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.

**Land Acknowledgement Statement:** WKU honors and acknowledges the Indigenous peoples' land on which this University was built. This region of Kentucky was home to both the Shawnee and Cherokee East 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."

**Religious & Cultural Observations Policy:** In the spirit of inclusion, WKU has a policy that everyone should be aware of: <https://www.wku.edu/dei/calendars/observances.php>

**Course Format:** GEOL 250 Environmental Geology is an online (web) course that will be fully administered through WKU Blackboard at <https://wku.blackboard.com/>. You will need an internet connection to log in to Blackboard and access all lectures and lab contents. Any changes to the web course delivery, grading categories/percentage, content, labs, timeline, or any other part of this syllabus will be communicated to students through email and/or Blackboard.

**Regular and Substantive Interaction (RSI):** The U.S. Department of Education requires that distance education courses must include regular and substantive interaction between students and faculty. In this course, regular and substantive interaction will take place in the following ways:

- Assessing or providing feedback on a student's coursework.
- Providing information or responding to questions about the content of this course.
- Providing weekly announcements.

**Course Description:** This course is designed to understand the important interplay between geologic principles, environments, humans, and the Earth. The course addresses the most pressing environmental concerns encountered by humanity on the Earth's systems today, which are not only controlled by internal and external Earth processes but also by the global footprint of the world's growing population and their increasingly affluent lifestyle. In this course, the use of fundamental geologic knowledge is investigated in the remediation of these challenges and better management of the Earth as a sustainable planet. Students will gain an in-depth understanding of the Earth's various systems and its natural and anthropogenic processes that control environmental changes and increase societal risk and vulnerability. Examples include current global warming, anthropogenic and natural pollution, loss of habitat and wetland, increased geologic hazards, extreme climate, erratic hydrologic cycle, the environmental effect on human health, and environmental disasters due to the exploitation of geologic resources (i.e., water, soil, energy).

**Colonnade and Geological Sciences Program Credits:** GEOL 250 satisfies the Colonnade Natural and Physical Sciences with applied/lab component (NS & SL). This is a core course for the Environmental Earth Science concentration and an elective course for the Geology and General concentration of the Geological Sciences program.

**Colonnade Explorations Learning Outcomes:** The course objectives are designed to meet Colonnade's four specific learning objectives in the Natural and Physical Sciences Explorations subcategory as stated below. Hands-on exercises constitute an essential applied learning component in this course. Students will:

1. Demonstrate an understanding of the methods of scientific inquiry.
2. Explain basic concepts and principles in one or more of the sciences.
3. Apply scientific principles to interpret and make predictions in one or more of the sciences.
4. Explain how scientific principles relate to issues of personal and/or public importance.

### **GEOL 250 learning outcomes:**

Upon completion of this course, students will be able to:

1. Demonstrate an understanding of data collection, interpretation, and conclusion of natural and anthropogenic processes that are relevant to humans and the environment.
2. Explain physical, chemical, and biological processes occurring at or near the earth's surface, including natural hazards, nitrogen, and carbon cycles, trophic levels and food chains, and water cycles and budgets.
3. Apply plate tectonic principles to analyze the relationship between continental and oceanic plate motion and predict the increased risk of earthquake and volcanic hazards relevant to human, environmental, and ecosystem health problems.
4. Scrutinize how the earth system process is instrumental in formulating public policy or law to deal with a variety of environmental problems.

### **Textbook (recommended):**

Keller, E.A., 2011, Environmental Geology, 9<sup>th</sup> edition, by Edward Keller, Prentice-Hall, Pearson Education, Inc. Upper Saddle River, New Jersey. ISBN 978-0321643759

### **Required Materials Needed for this Class:**

- A computer or a laptop with internet access to take the exams and complete the lab assignments on Blackboard. You can reserve a laptop from WKU IT at no cost; <https://toppertech.wku.edu/reservations>
- Make sure that you have installed a full version of 'Microsoft Excel' software on your laptop, as it is required for some lab assignments to create charts or graphs and read values from these. If you do not have it installed, please download this from WKU IT; <https://www.wku.edu/its/software/>
- For Blackboard assistance, please contact Help/WKU IT Help Desk: Phone 270-745-7000; <https://www.wku.edu/its/service-desk/>

## Evaluation and Grading:

*The final Letter Grade will be determined based on your score of 100% in the below categories where,*

A = (90-100) %; B = (80-89) %; C = (70-79) %; D = (60-69) %; F = 59% and below

Categories	(%)
Exams (3x20%)	60
Lab Assignments (#6)	40
<b>Total</b>	<b>100</b>

Grades are based on the percentages tabulated above (there will be NO curving of the grades). Scores in all the categories mentioned above will be regularly posted on Blackboard. I encourage you to keep track of your overall percentage grade to monitor your progress in the class. There are no options for any extra credit activities.

**Exams (60%):** A total of three exams account for 60% of your overall final grade. These exams will cover material primarily from class lectures and discussions. You will need to understand each concept covered in class thoroughly. The exams will consist of a combination of general and critical thinking questions, including but not limited to multiple-choice questions, feature identification in diagrams/pictures, matching, hot spot questions, multiple answers, fill-in-the-blank questions, calculations, and either/or questions. Active class participation is an excellent way to engage with the material and clarify concepts for the exams.

**Lab Assignments (40%):** Successful completion of six timely lab assignments accounts for 20% of your overall final grade. These six lab assignments will be posted on Blackboard. They are an integral part of this course's scientific inquiry into various geologic phenomena. In these assignments, you will contextualize these phenomena within a human context, analyze, synthesize, and interpret real-time and real-world environmental data to enhance your quantitative reasoning and geological understanding. You have roughly one week to complete and submit each lab. Each lab assignment is due on Sunday at 11:59 PM Central Day Time.

## Class Rules & Policies:

**Academic integrity:** Students are expected to conduct themselves according to the principles defined in the WKU Student Code of Conduct at <https://www.wku.edu/studentconduct/student-code-of-conduct.php>. Students who commit any act of academic dishonesty may receive from the instructor a failing grade in that portion of the course work in which the act is detected or a failing grade in a course without the possibility of withdrawal. No student shall receive or give assistance not authorized by the instructor in taking an examination or in the preparation of an essay, laboratory report, problem assignment or other project, which is submitted for purposes of grade determination. Any student or group found to have committed an act of academic dishonesty shall have their case turned over to the Office of Student Conduct for disciplinary action. Academic dishonesty includes, but is not limited to cheating, plagiarism, fabrication, or misrepresentation, and being an accessory to an act of academic dishonesty. For more, see <https://www.wku.edu/handbook/academic-dishonesty.php>. Student Handbook is available at <https://www.wku.edu/handbook/>.

**ChatGPT and Generative AI Statement: AI tools prohibited:** Artificial intelligence (AI) tools are not permitted for any type of work in this class. If you choose to use these tools, your actions will be considered academically dishonest and a violation of the [WKU Student Code of Conduct](#).

**Schedule Change Policy:** The EEAS Department strictly adheres to University policies regarding schedule changes. It is your responsibility to meet deadlines for drop/add. Only in exceptional cases will a deadline be waived (you would 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.

**Academic assistance through The Learning Center (TLC):** Should you require academic assistance with your WKU courses, The Learning Center (located in the Downing Student Union, 2141) provides free supplemental education programs for all currently enrolled WKU students. The Learning Center at Downing Student Union offers certified, one-on-one tutoring in over 200 subjects and eight academic skill areas by appointment or walk-in. Online tutoring is offered to distance learners. TLC is also a quiet study area (with side rooms designated for peer-to-peer tutoring) and a computer lab to complete academic coursework. Please call TLC in the Downing Student Union at (270) 745-5065 for more information or to schedule a tutoring appointment. <https://www.wku.edu/tlc/>

**ADA accommodation:** 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](mailto: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.

**Title IX/discrimination & 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.



## Tentative Course Chapters

### Phase I: Foundations of Environmental Geology

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- Fundamental Concepts of Environmental Geology Human, and the Earth Systems
  - Solid Earth Processes and Earth's Materials
  - Soil, Critical Zone, and the Environment
  - Biosphere, Ecology, Geology, and the Environment
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### Phase II: Hazardous Earth Processes

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- Rivers and Flooding
  - Earthquake Hazard Risk and Human Society
  - Volcanic Environment, Health, and Society
  - Coastal Environment, Erosion, and Pollution
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### Phase III: Resources and Pollution

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- Freshwater/water resources and pollution/Hydrologic hazards at the earth's surface
  - Sustainable Energy Resources and Environment
  - Mineral Resources, Environment, and Society
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### Phase IV: Environmental Management, Global Perspectives & Society

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- Climatic and Environmental Changes/ Human-Induced Global Climate Change
  - Geology, Society, and the Future/Waste Management/the Anthropocene
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\*\*\*\*\*Enjoy your semester with Environmental Geology Fun\*\*\*\*\*

## Tentative Course Contents in Detail

(Subject to change by me; any changes will be announced in class and posted on Blackboard and TopNet)

Week/Units		Lecture Topics	Ch	Lab Assignments
<b>Phase I: Foundations of Environmental Geology</b>				
Week 1/Unit 1		Fundamental Concepts of Environmental Geology Human, and the Earth Systems	1	
Week 2/Unit 2		Solid Earth Processes and Earth's Materials Current environmental case study	2	
Week 3/Unit 3		Soil, Critical Zone, and the Environment	3	<b>LAB 1 : Soil Respiration a the Critical Zone (Open on 9/5/24; Due on 9/15/24)</b>
Week 4/Unit 4		Biosphere, Ecology, Geology, and the Environment	4	
<b>Phase II: Hazardous Earth Processes</b>				
Week 5/Unit 5		<b>EXAM 1 on 9/17 – Tuesday (1 hour duration)</b> Rivers and Flooding	6	
Week 6/Unit 6		Earthquake Hazard Risk and Human Society Current environmental case study	8	<b>LAB 2: Lake Metabolism (Open on 9/24/24; Due on 10/6/24)</b>
Week 7/Units 7		Volcanic Environment, Health, and Society	9	
Week 8/Unit 8		Coastal Environment, Erosion, and Pollution	10	<b>LAB 3: Sea Level Change (Open on 10/10/24; Due on 10/20/24)</b>
<b>Phase III: Resources and Pollution</b>				
Week 9/Unit 9		Freshwater/water resources and pollution/Hydrologic hazards at the earth's surface	12, 13	<b>LAB 4: Water Quality (Open on 10/17/24; Due on 10/27/24)</b>
Week 10/Unit 10		<b>EXAM 2 on 10/24 – Thursday (1 hour duration)</b>		
Week 11/Unit 11		Sustainable Energy Resources and Environment	15	
Week 12/Unit 12		Mineral Resources, Environment, and Society	14	<b>LAB 5: Nutrient Loading (Open on 10/31/24; Due on 11/3/24)</b>
<b>Phase IV: Environmental Management, Global Perspectives &amp; Society</b>				
Week 13/Unit 13		Climatic and Environmental Changes/Human- Induced Global Climate Change	16	<b>LAB 6: Climate Change (Open on 11/14/24; Due on 11/24/24)</b>
Week 14/Unit 14		Geology, Society, and the Future/Waste Management/the Anthropocene	17	
Week 15/Unit 15		Mandatory Assessment Due (not part of the grade)		
Week 16/Unit 16		<b>EXAM 3 on 12/4 Wednesday (1 hour duration)</b>		
		<b>*Enjoy your semester with Environmental Geology fun*</b>		