Meeting Times: Tuesday/Thursday 5:30 p.m. – 7:30 p.m. Room 0407 State Hall (and occasionally in Room 0319 Old Main)

Instructor: Lawrence D. Lemke
Room 0224 Old Main
Phone: 313-577-6412
ldlemke@wayne.edu

Office Hours: Tuesday 2-3 p.m., and by appointment

Course Materials:
* this book is available online through the WSU library system

Course Grading:
Final grades will be determined using the following weighting scheme:
- Homework/Lab Assignments: 25%
- Quizzes: 5%
- First Exam: 15%
- Final Exam: 20%
- Oral Presentation and Class Participation: 15%
- Term Project: 20%

Grades are to be handed in at the beginning of class on their assigned due date. Late assignments will be penalized 10% per day up to 5 days late. After 5 days beyond the due date, late assignments will not be accepted for credit unless permission is given by the instructor prior to the due date.

Grades will be assigned based on the following scale:
- 85-100: A
- 75-85: B
- 65-75: C
- 55-65: D
- <55: F

The instructor may take class participation, effort, and improvement over the semester into account when assigning final grades for students whose average score sits close to the borderline between two grades.

Course Prerequisites:
- Required: Physical Geology (GEL 1010); Elementary Functions (MAT 1800 or equiv.)
- Recommended: Organic Chemistry (CHM 1240), General Physics (PHY 2130 and 2140)
- Students may not receive credit for both GEL 1000 and GEL 3100.

Special Assistance:
If you have a documented disability that requires accommodations, you will need to register with Student Disability Services (SDS) for coordination of your academic accommodations. The SDS office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577-3365 (TDD only). Once you have your accommodations in place, I will be glad to meet with you privately to discuss your special needs.
Course Objectives

In this course, students will:

1. Increase their understanding of primary Earth systems and processes in the atmosphere, hydrosphere, lithosphere, and biosphere.
2. Explore applications of Environmental Science to societal issues involving global change, natural resources, waste management, ecosystems, and ecological and human health.
3. Gain a foundation for additional studies in Earth and/or Environmental Sciences, with a particular emphasis on quantitative skills and systems analysis.

By the end of this semester, students should be able to:

1. Describe physical and chemical components of common surficial Earth processes.
2. Apply quantitative analysis techniques to a wide variety of environmental systems.
3. Trace the cycling of carbon and other elements through each of the major Earth systems.
5. Understand relationships between waste disposal, pollution, and health.

Academic Integrity

Each student in this course is expected to abide by the WSU Student Code of Conduct: [http://doso.wayne.edu/assets/codeofconduct.pdf](http://doso.wayne.edu/assets/codeofconduct.pdf)

Any work submitted for academic credit by a student in this course must be the student's own work. Collaboration on homework and laboratory assignments is allowed in GEL 3100 in the following instances:

- Students are encouraged to study together and to discuss information and concepts covered in lecture and course readings with other students.
- Students can give "consulting" help to or receive "consulting" help from other students. This permissible cooperation should never involve one student having possession of a copy of all or part of any work done by someone else (in the form of computer file, an email, an email attachment, or a hard copy, etc.), however.
- Any and all work you turn in for credit must be your own work.

During examinations and quizzes, you must do your own work. Talking or discussion is not permitted during exams. You may not compare papers, copy from others, or collaborate in any way. Any unauthorized collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

The final exam is scheduled as designated in the WSU Schedule of Classes for this term. No other time will be available, and no exceptions will be made for conflicts such as student travel plans. Any disputes that cannot be resolved using syllabus guidelines will be resolved by the University Student Code of Conduct.

Field Trips

Two day-long field trips are planned during the semester to allow us to observe engineered environmental systems such as drinking water treatment systems, wastewater treatment plants, solid waste landfills, fossil fuel energy conversion, or waste to energy plants. Trips will be scheduled on Fridays to minimize conflicts with other classes. It is expected that all students will attend at least one field trip and extra credit will be awarded to students who attend both field trips. In the event that a student has unavoidable conflicts, arrangements can be made with the instructor to substitute alternative experiences, provided that arrangements are made at least two weeks in advance of the scheduled trip.
# Fall 2013 Course Outline

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<th>Homework/ Labs Due</th>
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<td>2</td>
<td>Environmental Systems</td>
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<td>Daisyworld/Math Review</td>
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<td>Global Energy Balance, Climate Feedbacks</td>
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<td>Lab 1: Mass and Gas (24-Sept) Atmospheric Circulation Systems</td>
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<td>6</td>
<td>Ocean Circulation Carbon and Nutrient Cycling</td>
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<td>The Carbon Cycle Lab 2: Properties of CO₂ (10-Oct)</td>
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¹ Course Text: Kump et al., The Earth System, 3rd ed.

Note: with a few exceptions, we will generally have weekly quizzes on Tuesdays and HW due on Thursdays. Office hours are on Tuesdays…

- **Term Project Proposals Due: Tuesday, Sep 24th**
- **Term Projects Due: Monday, Dec 9th – no exceptions!**
- **Final Exam: Thursday, December 12th, 5:30 p.m. - 7:30 p.m.**

Note: The instructor reserves the right to modify the course content and schedule as the semester progresses in order to take into account changing needs of the students or instructor, weather-related closures, power outages, or any other unforeseen circumstances.
Guidelines for GEL 3100 Term Projects and Oral Presentations

Final Projects are due on Monday, Dec 9th – no exceptions!

1. Topic
Each student will choose a specific environmental system to form the basis for his or her term project. The project must involve a quantitative analysis of some aspect of that system. Potential topics include (but are not limited to):

- Energy efficiency
- Geothermal home heating
- Transportation alternatives
- Nutrient cycling
- Emerging contaminants of concern
- Humans as geologic agents
- Dam construction/decommissioning
- Mercury in aquatic systems
- Landfill energy systems
- Biosphere 2
- Forest recovery after a wildfire
- Carbon footprints
- Solid/liquid/gaseous waste disposal
- Living Buildings Challenge
- Product life cycles
- Human body systems (respiratory, etc.)
- Groundwater aquifer depletion
- Sea ice attrition
- PCBs in water or sediments
- Municipal waste incineration
- Grand Canyon sediment removal
- Carbon storage in arctic tundra

2. Project Format
Students are to design a homework or laboratory assignment intended for GEL 3100 students. The point is to demonstrate your knowledge of the chosen subject by developing an exercise that will inform and then challenge your fellow students to work with the information you provide. [Many of the GEL 3100 homework assignments are good examples.] The exercise should include real data or information and must involve some form of calculation, graphing, analysis and the drawing of conclusions from the information presented.

Your exercise should be organized into the following sections:

- MATERIALS
- OBJECTIVES
- INTRODUCTION (background information needed to frame the problem)
- EXERCISE (subdivided, as appropriate)
- REFERENCES (include at least 5 refs and use a consistent citation/bibliographic style)
- ANSWER KEY

You will not, in most instances, be documenting your own original research in this paper. It is therefore essential that you cite the sources of the information you include in a thorough and appropriate manner. Use a citation format such as GSA Bulletin or AAPG Bulletin and include references for all citations. **EndNote** is a VERY helpful tool for managing references!

3. Term Project Proposal
On or before Tuesday, September 24th, you are required to submit a one-paragraph summary of your chosen term project topic along with 5 or more non-web page references. Topics will be assigned on a first-come first-served basis, so get your proposals in as early as possible to avoid disappointment.

4. Oral Presentation
During the last two weeks of class, each student is responsible for delivering a 15-minute PowerPoint presentation summarizing his or her environmental topic to the entire class. **Your objective is to teach the rest of us the essential information we should know in order to understand your topic from an environmental systems standpoint.** By this point in the semester, you should be an expert on your topic so everyone else in the class will benefit from your expertise.