ENVS-1000: Introduction to Environmental Science

Fall 2024 Course Prospectus

INSTRUCTOR

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COURSE MEETING TIMES

Lecture: Tues/Thurs, 12:00 – 1:30 pm
Recitation: Once per week (see schedule below)

COURSE DESCRIPTION & GOALS

This course will explore the physical science of the Earth's environment and human interactions with it. Within the course you will be introduced to Earth's various environmental systems (air, water, land, and biosphere), various environmental problems (land use, energy use and its consequences, air and water pollution, and biodiversity), and the direct and indirect causes of these environmental problems (human population, urbanization, economics, risk assessment, and ethics). This course is designed to stimulate thought and action about how the world around you works, how human activities affect the Earth and the organisms living on it, and how to build a sustainable society based upon scientific principles. The goal of the course is to make you environmentally literate and to spark an interest in environmental science. By the end of the course, you should be able to know and do the following:

1. Describe the fundamental physical, chemical, and biological properties and processes of the natural environment that comprise a system of interacting components such as the atmosphere, hydrosphere, lithosphere, and biosphere, operating at different spatial and temporal scales. [**Content**]
2. Analyze environmental problems such as climate change, pollution, environmental degradation, and resource depletion by articulating the various causes and actors involved, distinguishing between those of greater versus lesser importance, and providing specific examples and outcomes. [**Application**]
3. Evaluate and assess environmental properties, processes, and problems by interpreting, analyzing, and generating quantitative data and scientific visualizations. [**Cross-cutting skills**]

COLLEGE/LPS CURRICULUM REQUIREMENTS

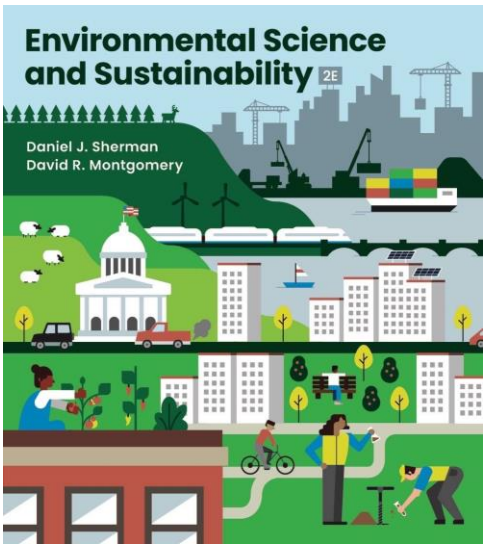
This course fulfills the Sector VI Physical World and Quantitative Data Analysis requirements for all College and LPS Undergraduates.

COURSE PRE-REQUISITES

This is an undergraduate, 1000-level course, and students may be from any program or major. There are no formal pre-requisites for the course, however you will need access to a laptop to bring to recitations and a device that you can use to participate in interactive in-class activities. Please reach out to the instructor if your access to these devices is limited; we can work something out. In addition, as this course fulfills the QDA requirement, you will be required to recall and use some standard math skills, including solving basic equations and plotting graphs. Recognizing that you may not have taken a math course for some time, there are some materials on Canvas that will refresh your memory and bring you up to speed. You will be expected to work through these materials, and both the instructor and the TAs will be available to help.

TEXTBOOK & OTHER RESOURCES

Sherman, D. J., & Montgomery, D. R. (2023) **Environmental Science & Sustainability**, 2nd edition.



This is the primary text for the course and will be used alongside Learning Catalytics. You will need to purchase both the textbook (in either ebook, $70, or paper, $150, format) and a Learning Catalytics account ($12). The text can be purchased via the UPenn Bookstore or directly from the publisher (W.W. Norton & Co.). Links to the book and Learning Catalytics will be available on Canvas.

In addition to the textbook, you will also need to download Microsoft Excel (available online for free via O365 via student license). The desktop version (NOT the online version) is required.

Other resources, such as recitation worksheets and supplemental materials will all be provided via Canvas.

COURSE FORMAT & WORKLOAD

Lectures (Tues/Thurs, 12:00 – 1:30 PM) form the foundation for your learning in this class, teaching key concepts and generating discussion that builds on the assigned reading each week. In addition, you will attend a recitation once a week, beginning in the third week of the semester (see course schedule). Recitations are workshops where you will apply quantitative skills to lecture-related content to develop a deeper understanding of the course material. Recitations are not a review of lecture material. In addition, recitations will help you develop your data literacy skills (thus fulfilling your QDA requirement) including data acquisition, processing, analysis, and visualization. You will register for one recitation section and attend the same section each week, with exceptions granted for illness, family emergencies, and religious observances. Recitation assignments will be started during the in-class time and completed as take-home assignments during the week. Assignments are weighted equally.

In addition to the lectures and recitations, you will participate in lecture response activities (via Learning Catalytics), post-lecture study quizzes (via InQuizitive), two unit tests spaced throughout the semester (see course schedule), and a final exam.

Table 1: Approximate course workload. Some weeks will entail a little more work than others, but in general you should allow ~7 hrs per week for this class (inclusive of lectures and recitations).

Course Component	**Hours**	**Total hours**
Assigned readings[1]	1.5 hrs per week (x13 weeks)	19.5 hrs
Weekly lectures	1.5 hrs x 26 lectures	39 hrs
Post-lecture quizzes[2]	30 mins per week (x13 weeks)	6.5 hrs
Recitations	1 hr per week (x11 weeks)	11 hrs
Recitation assignments[3]	1 hr per week (x 11 weeks)	11 hrs

Unit tests	1.5 hrs + 6 hrs prep (x2 tests)	15 hrs
Final exam	2 hrs + 10 hrs prep	12 hrs
Total		**114 hrs (~7 hrs/week)**

[1] *These will be assigned from the course textbook: Environmental Science & Sustainability.*

[2] *Weekly quizzes are conducted via InQuizitive, which you will gain access to when purchasing the textbook. The quizzes are low-stakes learning exercises.*

[3] *You will begin working on assignments in recitations, with fellow students and the help of your TA. Assignments will require additional work beyond recitation to be completed, ~1 hr per assignment (note: this is an average).*

GRADING**

Final grades are based on a combination of the components outlined above. The breakdown is as follows:

In-Lecture Response Activities (Learning Catalytics)	10 %
Post-Lecture Study Quizzes (InQuizitive)	10 %
Recitation Assignments	30 %
Unit Test 1	15 %
Unit Test 2	15 %
Final Exam	20 %

***Please note that this is subject to minor changes*

RECITATION SCHEDULE

Table 2: Schedule of recitation section times each week. Recitations meet most weeks throughout the semester (see course schedule below).

Section	**Instructor**	**Day**	**Time**
201	Dr Whadcoat	Monday	1:45 – 2:44 PM
202	TA (TBD)	Monday	3:30 – 4:29 PM
203	TA (TBD)	Tuesday	1:45 – 2:44 PM
204	TA (TBD)	Wednesday	10:15 – 11:14 AM
205	TA (TBD)	Wednesday	12:00 – 12:59 PM
206	TA (TBD)	Wednesday	1:45 – 2:44 PM
207	TA (TBD)	Thursday	1:45 – 2:44 PM

COURSE SCHEDULE

Table 3: Schedule of course (lecture) and recitation topics, with unit test and exam times provided. Recitations in bold involve a take-home graded assignment. Readings will be assigned from the chapters listed. Please note that this is a tentative schedule and subject to minor changes.

Week	Week beginning	Topic	Readings	Recitation
1	Aug 26	Course Introduction Introduction to Environmental Science & Sustainability	Ch. 1, 3	*No recitation*
2	Sep 4	Biodiversity & Conservation	Ch. 4, 5	Quantitative analysis* **Online recitation*
3	Sep 9	Water (The Hydrosphere)	Ch. 7	**Biodiversity**
4	Sep 16	Air (The Atmosphere)	Ch. 8	**Water Quality & Quantity**
5	Sep 23	Systems & Global Change Review/Case Study	Ch. 10	**Air Quality**
6	Sep 30	**Unit Test 1 (Oct 1st)** *No class on Oct 3rd (Fall Break)*	--	*No recitation*
7	Oct 7	Climate	Ch. 11	Global Change
8	Oct 14	Land	Ch. 9	**Climate Change**
9	Oct 21	Food Systems & Agriculture	Ch. 12	**GIS**
10	Oct 28	Waste	Ch. 15	**Agriculture**
11	Nov 4	Review/Case Study **Unit Test 2 (Nov 7th)**	--	*No recitation*
12	Nov 11	Human Population & Urbanization	Ch. 6, 16	**Waste**
13	Nov 18	Energy: Fossil Fuels & Alternatives	Ch. 13, 14	**Urbanization**
14	Nov 25	Environmental Health & Justice *No class on Nov 28 (Thanksgiving)*	Ch. 17	*No recitation*
15	Dec 2	Decision Making Conclusion & Review	Ch. 2, 18, 19, 20	Environmental Justice
16	Dec 9	*Final Exam during final examination period (Dec 12 – 19)*		