

## **ENSP 101 Introduction to Environmental Science**

**Fall 2016**

T/Th 9:30 – 10:45am

ASY 2203

### **Syllabus**

#### **Instructor:**

Dr. Gregory Schnaar, Lecturer, Environmental Science and Policy Program

Symons 0222

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#### **Office Hours:**

By appointment only during following times using <https://gschnaar.youcanbook.me>

Tuesday 11am-1pm; Thursday 8:30am-9:30am and 11am-12pm

#### **Graduate Teaching Assistants:**

Mengjie Zhang: jenny.zhang3718@gmail.com

Sarah Noe: 72snoe@gmail.com

Leah Schleifer: leahschleifer@gmail.com

#### **Undergraduate Teaching Assistant:**

Will Klajbor: wklajbor@umd.edu

#### **Course Overview:**

Scientific study of the complex and diverse natural environmental systems of the earth is a relatively young human endeavor that has rapidly gained stature as an academic field in the last 40 years, and it is now a high priority worldwide. Quantifying the spatial and temporal dimensions of the atmosphere, the lithosphere, and the hydrosphere is essential to a refined understanding of how these “great earth systems” influence and interact with ecosystems of the biosphere. New knowledge about these systems and their interactions has come from the “parent” basic sciences of environmental science (including chemistry, physics, geology, and biology) and from whole system studies that focus on element cycles, energy flows, and interfaces between diverse components of ecosystems. In addition, increasing concern about the environmental quality of water, air, soil, and ecosystems has led to direct connections between science and environmental public policy worldwide.

ENSP 101 is the required gateway course and introduction to the science component of the Environmental Science and Policy major. It also is approved as a CORE Physical Science (non-lab, category PS) and a General Education Distributive Studies - Natural Sciences (category DSNS) course; and it is an “Environment” course for the College Park Scholars program in Environment, Technology, and Economy (ETE). As an offering in these four curricula, ENSP 101 engages you in learning approaches and methods of inquiry that complement any major, whether in the natural sciences, social sciences, or humanities. You will learn critical thinking skills focusing on the sciences, but also ones

related to current environmental issues and transdisciplinary ways of knowing. You will refine your problem-solving skills using some mathematical approaches and individual creative writing.

### **Learning Outcomes**

The following goals of this introductory course in environmental science will be achieved by engaging you in lectures, small group discussions, readings, papers, and case studies. The key words in bold font identify themes and topics in the course that will recur across the various units during the semester.

1. Develop knowledge and understanding of the **systems, cycles, flows, feedbacks, and interfaces** that characterize and govern the structure, function, and interactions of the atmosphere, lithosphere, hydrosphere, and biosphere.
2. Quantify the natural and anthropogenic processes that influence environmental systems on local, regional, and global **scales** (temporal and spatial)
3. Refine skills in the areas of analysis, synthesis, and evaluation of complex systems. Become familiar with scientific methods and processes by which knowledge is obtained and advanced in environmental science (**scientific epistemology** or ways of knowing).
4. Understand the nature of **scientific knowledge, uncertainty and methods of quantification** for environmental processes and systems
5. Identify and evaluate **human influences on the natural processes** of earth systems, and assess the extent of environmental problems and creative ways to address them.
6. Provide a sound scientific base for the study of **environmental policy and analysis of environmental news** at the introductory level (i.e., ENSP 102 Environmental Policy).

### **Required Reading Material:**

Withgott, J. and M. Laposata, 2014. Environment: The Science Behind the Stories (5<sup>th</sup> Edition).

(available here: <http://www.lib.umd.edu/access/top-textbooks>)

Smil, 2011. Nitrogen cycle and world food production. World Agriculture 2:9-1. [Posted on ELMS]

*Additional readings may be posted during the semester to ELMS-Canvas*

### **Evaluation and Grading Criteria**

There will be two required hour tests (not cumulative in coverage) and a final examination (comprehensive for the whole semester). In addition, three review problem sets and two short papers will provide other means to assess your learning outside of class. You will have the opportunity to earn up to 1000 points in the course, and you can calculate your numerical average at any time during the semester. Individual letter grades for the course will be assigned on a curve if the final class average for the

semester is < 75%, and on the standard basis if the class average is > 75%: 100-98% = A+, 97-92 = A, 91-90 = A-; 89-88 = B+, 87-82 = B, 81-80 = B-; 79-78 = C+, 77-72 = C, 71-70 = C-; 69-68 = D+, 67-62 = D, 61-60 = D-; ≤ 59 = F. **You are advised to keep all graded work throughout the semester in case you have a question about your final course grade.** Also, keep a personal record of your accumulated points as the semester progresses, or consult the Canvas grade book periodically.

<u>Requirement</u>	<u>No.</u>	<u>Points/unit</u>	<u>Total Points</u>
Hour Exams	2	150	300
Final Exam	1	300	300
Problem Sets	3	25/25/50	100
Papers	2	125	250
Participation/engagement	1	50	<u>50</u>
TOTAL			1000

There will be opportunities to earn up to 50 extra credit points during the semester based on writing brief papers reviewing professional seminars on campus, analyzing newspaper articles, and interviewing alumni of ENSP. Details will be forthcoming. Any extra credit points earned will be added to your total points for the semester, not averaged in with required work; therefore, extra credit work cannot penalize you. In the past, these extra credit points have made a significant difference in students' learning and final grades, especially in compensating for a low score on an exam or paper.

The examinations will comprise problem-oriented essays and short answer questions (not multiple choice) and will be based on material covered in lecture and supported by assigned readings in the textbook. The lectures will follow the textbook format and topics, but much will be added that is not covered in the text. **Success in this course begins by attending lectures and discussion classes, taking good notes, and questioning what you hear in lecture and read in the book.**

The problem sets and papers will account for 35% of your grade. These will be coordinated with the lecture material as much as possible, and they will provide some mathematical and social science perspectives on the science covered in the lectures. Your participation/engagement grade for the semester will be decided by your TA and the instructor at the end of the semester based on the quality and frequency of your contributions in the discussion classes, and to some extent, the lectures. "Participation" is broadly defined and comprises work on case studies in small groups, role playing, email communications, extra initiatives taken outside of class, and one-on-one communications with the TAs and instructor during the semester.

### **Tips for Success in ENSP 101:**

1. Attend all classes throughout the semester and arrive on time. I will start lecturing at 11:00 and will end at 11:50, and your TAs will be punctual and efficient in the use of their class time. Plan to devote 6-9 hours each week outside of class to this course.
2. Ask questions of the instructor and teaching assistants; don't be shy about this.

3. Take careful notes in lecture and discussion, and review them soon after class. There will be some handouts given out in lecture if needed; there will be lots of others posted on Canvas and not copied onto paper. Save them electronically, if you wish.
4. Ensure that you know why you missed all points on exams and assigned work; if you do not, consult with the instructor or TA.
5. Communicate and study with fellow students, but always produce your own work. Do not plagiarize. Cite all your sources in the text of your papers and in a Works Cited section. Be especially assiduous and careful about using information from the Web—cite the source, and do not cut and paste text without attribution and quotation marks. **Please see this Web site for information on plagiarism and citing references:**  
  
<http://www.lib.umd.edu/rc/citation-tools>
6. Use all resources available to you in this course and at UMCP. Meet with and send email questions to the instructor and TAs; use the libraries on- and off-campus; access the Web; and follow the latest environmental news.
7. Be looking for linkages between this course and your major and personal interests.
8. Write in clear, grammatically-correct English. Post papers and problem sets that are neatly formatted and free of spelling errors, and that demonstrate attention to detail. Produce polished, professional work.
9. During lecture, you are permitted to use an iPad or computer to take notes, but I exhort you not to do any emailing, messaging, downloading, posting, Skyping, texting, tweeting, surfing, listening to music, watching videos, or any other activity unrelated to my lecture. I will enforce this policy, if necessary. Also, please put all telephones in vibrate mode or turn them off. Do not check for incoming calls or use them for any other purpose. Such extraneous activities with computers and phones are distracting to your seat neighbors and inconsiderate of them; and they indicate that you are not paying attention to me!

### **Discussion Section Information**

<u>Section #</u>	<u>Meeting Time</u>	<u>Meeting Place</u>	<u>TA Name</u>
0101	Th 2:00pm - 2:50pm	HBK 1112	Lea Schleifer
0102	F 10:00am - 10:50am	PLS 1146	Sarah Noe
0103	F 1:00pm - 1:50pm	SYM 0215	Sarah Noe
0104	F 1:00pm - 1:50pm	PLS 1119	Mengjie Zhang
0105	Th 2:00pm - 2:50pm	EGR 1102	Sarah Noe
0106	F 10:00am - 10:50am	WDS 1130	Mengjie Zhang
0107	Th 2:00pm - 2:50pm	ITV 1111	Mengjie Zhang

### **Course Policies:**

#### **Late work, attendance, grade appeals, and make-up exams:**

Problem sets and papers will lose 5% of the assigned points for each day that the work is posted late,

unless a valid excuse is approved by the TA or instructor before the due date. **Papers and problem sets are due by electronic posting on Canvas on specified dates by 5 pm.**

Make-up exams will be given only if a valid excuse for missing the originally-scheduled exam is approved by the instructor prior to the exam time. All three exams will be in-class.

If you believe that any grade you have received in this course is not correct or fair, you are entitled to appeal your grade by scheduling an in-person meeting with Dr. Schnaar.

### **Attendance and Absences:**

Attendance will not be taken at lecture, but will be taken in each week in discussion. Since the course content and thinking skills will be developed in the lectures and refined through your participation in the discussions, you are strongly encouraged to attend all lectures and the weekly discussions. Each week, your TA will note the quality of your participation.

### **Copyright Protection for Class Materials**

Commercial firms have been paying students to take notes and collect course materials, which are then copied and sold. Course materials that exist in a tangible medium, such as written or recorded lectures, Power Point presentations, handouts and tests, are copyright protected. Students **may not** copy and distribute such materials except for personal use and with the instructor's permission.

### **Course Evaluation**

Your participation in the evaluation of courses through CourseEvalUM is a responsibility you hold as a student member of our academic community. Your feedback is confidential and important to the improvement of teaching and learning at the University. By completing all of your evaluations each semester, you will have the privilege of accessing online, at Testudo, the evaluation reports for the thousands of courses online at Testudo. Evaluations can be completed at [www.courseevalum.umd.edu](http://www.courseevalum.umd.edu).

**Additional Policies:** <http://www.ugst.umd.edu/coursereLATEDpolicies.html>

## **The Concept of Sustainability for Human Societies, Economies, and Their Supporting Natural Resources: Links to Your Education at the University of Maryland**

In this course, you will engage in learning about natural living ecosystems, abiotic resources, and humans as members of natural eco-regions. Through a balance of conservation and preservation, humans forge modern complex societies that rely on ecosystem services and natural resources. However, if modern societies significantly alter ecosystems and deplete natural resources faster than they are replenished, they affect the potential for future human cultures to meet their basic needs and for ecological systems to maintain their essential material cycles and energy flows. The concept of *sustainability* embodies these ideas and has become a central tenet of environmental science and policy in recent years.

In 1987, the World Commission on Environment and Development published *Our Common Future* (Oxford University Press), also known as the Brundtland Report (after its chair, Gro Harlem Brundtland, former Prime Minister of Norway). Sustainable development is defined in this seminal report in this way:

*"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."*

Many current human activities in the biosphere, including agriculture, forestry, urban development, energy use, and water management, may affect sustainability and the potential for future generations to meet their needs. In this course, you will have the opportunity to incorporate new thinking and learning related to sustainability into your intellectual growth.

The Office of Sustainability at the University of Maryland has initiated the Chesapeake Project to infuse the undergraduate experience with learning and thinking surrounding sustainability at many levels, from individual courses to program curricula, campus life, regional issues, and global concerns. Their website is <http://www.sustainability.umd.edu/>. The International Institute for Sustainable Development has an excellent website for general information on sustainability at <http://www.iisd.org/sd/>. You are encouraged to consult these and other resources during the semester and after completion of this course.

## Course Agenda

Week	Dates	Course Unit(s)/Notes	Discussion Topic	Reading
1	August 29 – September 2	Nature of Environmental Science  <b>Post paper #1 assignment</b>	No discussion class	Chapter 1; Chapter 2 (optional)
2	September 6 – September 9	Cycles and Systems	Earth on Edge video (watch before class)	Chapter 5
3	September 12 – September 16	Cycles and Systems  <b>Post problem set #1 and extra credit opportunities</b>	Paper drafts	Smil, 2011 (on ELMS/Canvas)
4	September 19 – September 22	Communities and Biomes  <b>Tuesday September 20: Paper #1 Due</b>	Biomes	Chapter 4
5	September 26 – September 30	Energy  <b>Thursday September 29: Problem Set #1 Due</b>	Ecology	Chapter 19
6	October 3 – October 7	Energy (cont.)  <b>Thursday October 6: Exam #1</b>	No discussion class	Chapters 20-21
7	October 10 – October 14	Atmosphere  <b>Tuesday October 11: Post Problem Set #2</b>	Atmosphere	Chapter 17
8	October 17 – October 21	Atmosphere (cont.)  <b>Thursday October 20: Problem Set #2 Due</b>	Atmosphere; discuss paper #1 results; return & discuss exam #1	Chapter 18
9	October 24 – October 28	Freshwater  <b>Tuesday October 25: Post Paper #2 Assignment</b>	Freshwater	Chapter 15
10	October 31 – November 4	Freshwater (cont.)  <b>Thursday November 3: Exam #2</b>	No discussion class	<i>TBD</i>

Week	Dates	Course Unit(s)/Notes	Discussion Topic	Reading
11	November 7 – November 11	Oceans	Oceans; deadline for selection of articles for paper #2 and extra credit paper	Chapter 16
12	November 14 – November 18	Biodiversity	Biodiversity; return exam #2	Chapter 11
13	November 21 – November 22	Population [Lea Schleifer] <b>Tuesday November 22: Paper #2 Due</b>  <b>Thursday November 24: Thanksgiving Break</b>	No discussion class	Chapter 3, Chapter 8
14	November 28 – December 2	Lithosphere  <b>Tuesday November 29: Hand out Problem Set #3</b>  <b>Friday December 2: Final Deadline for major extra credit paper</b>	Population	Chapter 23
15	December 5 – December 9	Lithosphere (cont.)  <b>Thursday December 8: Problem Set #3 Due</b>	Lithosphere	Chapter 9
	Thursday December 15, 8am-10am	Final Exam		