

Environmental Sciences II: Life Sciences (ENRP 6102, 3 credits)

Instructor: Prof. Keryn Gedan

Email: kgedan@gwu.edu

Office hours: by appointment, also available by phone or Skype

Course hours and location:

1 x 2.5 hour class per week, 6:10 - 8:40pm, Tuesdays, Blackboard Virtual Classroom

Distribution of work: Students will have approximately 150 minutes (2.5 hours) of direct instruction per week and approximately 300 minutes of out of class work. Total time commitment will amount to approximately 112.5 hours over the 15 week semester.

Course overview

This course will provide a comprehensive overview of the Life Sciences. The first half of the course will focus on the hierarchical organization of living materials, in cells, tissues, organisms, and populations, and of biodiversity in genes, species, and ecosystems. The second half of the course will emphasize applied biology. Biological applications include understanding environmental issues and the advances in biology that have allowed people to prosper in agriculture and medicine.

Learning objectives

Upon completion of the course students should be able to:

1. Describe the processes that sustain life for cells, organisms, and populations.
2. Explain how species are linked within an ecosystem, and how ecosystems are linked within the biosphere.
3. Apply biological principles to environmental challenges such as habitat destruction, global climate change, biological invasions and extinction.
4. Analyze readings from the primary literature and critically evaluate their findings.

Readings:

All required readings will be provided on the course website in the Electronic Reserves folder.

Attendance: Planned absences must be approved at the beginning of the semester. A doctor's note or other documentation will be required to excuse a missed class period without preapproval. Students who have pre-approved or excused absences will be given the opportunity to make up exams. In the case of prolonged illness or absence, please contact the instructor to discuss an appropriate course of action.

Student responsibilities: Complete each week's reading assignment, and come prepared for discussion. Please arrive to class on time. If you miss class, please get class notes from a classmate.

Grading: You will be scored for participation out of five points each class period; please contribute to each class with questions and discussion. There will be three homework assignments, in addition to weekly readings. You will each do two presentations, each with a

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partner, on a sub-topic related to one of our weekly themes (sign up at first class). There will be one midterm exam and one term paper, each worth 100 points.

<i>5 pts for participation x 14 classes=</i>	<i>70</i>
<i>10 pts x 3 homework assignments =</i>	<i>30</i>
<i>50 pts x 2 oral presentations =</i>	<i>100</i>
<i>100 pts x 1 midterm exam =</i>	<i>100</i>
<i>100 pts x 1 term paper =</i>	<i>100</i>

400 points possible

Grades

A	94-100%	Excellent mastery, outstanding scholarship
A-	90-93	
B+	87-89	Good mastery, good scholarship
B	84-86	
B-	80-83	
C+	77-79	Acceptable mastery, usual achievement
C	74-76	
C-	70-73	
F	<70	Unacceptable performance, failure to understand the subject or engage in the course.

University Policy on Religious Holidays

1. Students should notify faculty during the first week of the semester of their intention to be absent from class on their day(s) of religious observance.
2. Faculty should extend to these students the courtesy of absence without penalty on such occasions, including permission to make up examinations.
3. Faculty who intend to observe a religious holiday should arrange at the beginning of the semester to reschedule missed classes or to make other provisions.

Support for Students Outside the Classroom

Disability Support Services (DSS) - Any student who may need an accommodation based on the potential impact of a disability should contact the Disability Support Services office at 202-994-8250 in the Rome Hall, Suite 102, to establish eligibility and to coordinate reasonable accommodations. For additional information please refer to: <https://disabilitysupport.gwu.edu/>

Mental Health Services 202-994-5300 - The University's Mental Health Services offers 24/7 assistance and referral to address students' personal, social, career, and study skill problems. Services for students include: crisis and emergency mental health consultations, confidential assessment, counseling services, and referrals. counselingcenter.gwu.edu/

Academic Integrity Code

Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own

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work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information. For the remainder of the code, see: studentconduct.gwu.edu/code-academic-integrity

Schedule of topics

Date	Topic	Reading
12-Jan	Scientific and statistical inference	Villarreal 2004 Are viruses alive?; Abrahams and Townsend 1993 Bioluminescence in Dinoflagellates: A Test of the Burgular Alarm Hypothesis
19-Jan	Cellular and molecular biology	Rutherford 2020 Race, eugenics, and the canceling of great scientists
26-Jan	Genetics and Evolution	Pennisi 2013 CRISPR Craze; Swallow 2003 Genetics of lactase persistence
2-Feb	Population biology and speciation	Lerner et al. 2011 Hawaiian honeycreepers; Yi et al. 2010 Human adaptation to high altitude
9-Feb	Species interactions	Lafferty et al 2008 Parasites in food webs; Power et al. 1996 Challenges in the Quest for Keystones
16-Feb	Ecosystems, distribution of biodiversity and ecosystem services	Clements et al 2006 Limestone Karsts of Southeast Asia; Speciation reading TBA
23-Feb	Habitat loss and extinction	Barnosky et al 2011 Sixth mass extinction; 2nd reading TBA
2-Mar	Global changes in biodiversity	Hoekstra et al 2005 biome crisis disparity in habitat loss and protection; Invasive species sampler
9-Mar	Global climate change Mid-term exam	Webster et al. 2017 TREE Who should pick the winners of climate change?
16-Mar	SPRING BREAK - NO CLASS	
23-Mar	Human population biology	Coale 1974 The History of the Human Population: 2nd reading TBA
30-Mar	Epidemiology	Readings TBA (Coronavirus, zoonotics, vaccines)

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6-Apr	Environmental health and toxicology	Underwood 2017 The Polluted Brain; Brooks et al. 2020 Toxicology Advances for 21st Century Chemical Pollution
13-Apr	Wildlife Ecology	Gregory and Beck 2014 Response of male greater sage-grouse lek attendance to energy development; Frazer 1992 Sea turtle conservation and halfway technology
20-Apr	Agriculture	Balter_2007_Science_Agriculture's ancient roots; Rockström et al 2016 Sustainable intensification of agriculture
27-Apr	Conservation biology Last class, term paper due	Soga and Gaston 2016 Extinction of experience: the loss of human–nature interactions; Grenier et al 2007 Rapid Population Growth of a Critically Endangered Carnivore (1 page); Watson et al 2014 The performance and potential of protected areas

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Major assignments

Oral presentation guidelines

With a partner, each student will present a topic and lead a group discussion or activity about it. The suggested time budget is: 15 min of oral presentation and 5 min of class discussion or activity. Each student will present at least two topics during the semester.

Term paper guidelines

Each student will write a review about a relevant environmental topic of their choosing, incorporating at least 10 primary literature references. Students can write about a topic they previously presented during the semester or select a different topic. A title should be submitted for approval by February 11th. I am willing to review and provide feedback on outlines and earlier versions of manuscript upon request. Term papers should not exceed 10 pages (double spaced, 12-point standard font).