Environmental Science: Biological Diversity and Ecosystems – EVPP 301

Spring 2026

Lecture: Monday / Wednesday 4:30 PM – 6:20 PM, Innovation Hall 134

Lecture Instructor

Dr. Diego Valderrama
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Laboratory Instructor

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Topics of this Course

Together with EVPP 210 and 302, this course is part of a three-semester sequence for environmental science majors, which provides the basic underpinning for major courses. Topics include the human dimensions of the environment, biological diversity, vertebrate organ systems, conservation biology, and general ecology.

Course Learning Outcomes:

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

- demonstrate knowledge of the diversity of life and its organization in major taxonomical categories.
- demonstrate knowledge of basic concepts in ecology at the species, community, ecosystem and biome level.
- demonstrate knowledge of basic concepts in conservation biology and climate science.

Textbooks

Life: The Science of Biology. 2020. Hillis, Heller, Hacker, Hall, Laskowski, Sadava. 12th Edition. (also used in EVPP 210 and 302).

Elements of Ecology (S&S). 2014. T.M. Smith and R.L. Smith. 9th ed. (also used in EVPP 302).

Additional required reading:
(1) Leopold, Aldo: https://www.uky.edu/~rsand1/china2017/library/Leopold1.pdf.
(2) Silent Spring by Rachel Carson. (Bookstore will order, but can get cheap used copies online).

Learning Management System

This course will be hosted on Canvas (https://info.canvas.gmu.edu/). Please ensure you are familiar with accessing and navigating this platform. Resources and support are available at: https://lms.gmu.edu/getting-started-students/ to help you get started.

Grading and Assignments

The course consists of coupled lecture and laboratory sessions; both must be taken concurrently and your grade will depend on your performance in both lecture and lab.

The final grade you earn in the lecture part of the course will be based on your performance in examinations, one student presentation, and attendance quizzes. There will be **four exams** throughout the semester. The Poll Everywhere platform will be used to record attendance through quizzes based on the material covered in each class. Total points for the lecture portion: **400 points** (72.7% of course grade), distributed as follows:

Exam 1:	100 points (18.2% of course grade).
Exam 2:	70 points (12.7% of course grade).
Exam 3:	130 points (23.6% of course grade).
Exam 4:	40 points (7.3% of course grade).
Student Presentation:	30 points (5.45% of course grade).
Attendance Quizzes:	30 points (5.45% of course grade).

Student Presentation: each student will sign up for the presentation of a selected case study (see topics and dates in Class Schedule below – up to three students per topic). Presentations will take place at the end of the class period and should not extend for more than 20 minutes. More details will be provided in class.

Laboratory session: The final grade you earn in the laboratory portion of the course will be based on your performance on worksheets (10 worksheets, 8 points each = 80 points), a full laboratory report on *Daphnia* toxicity (40 points), and an oral presentation on the effects of nutrients on algal growth (30 points). Total points for the laboratory portion: **150 points** (27.3% of course grade).

Final grades will be assigned for undergraduates based on a standard plus/minus scale:

A	(94 - 100 %)	C+	(77 - 79.99 %)
A-	(90 - 93.99 %)	C	(73 - 76.99 %)
B+	(87 - 89.99 %)	C-	(70 - 72.99 %)
B	(83 - 86.99 %)	D	(60 - 69.99 %)
B-	(80 - 82.99 %)	F	(< 60 %)

Practical Matters

It is not possible to master this material without regular class attendance. I will use some different examples than are in the books and incorporate material from other sources. The PowerPoint lectures are ***not*** *a substitute for lecture attendance*. Students should focus on taking detailed notes of lectures and synthesizing the information with the ideas illustrated in the slides. Occasionally videos will be shown. Students are responsible for all the material discussed in lecture, announced changes in the syllabus, and any handouts distributed in class.

Please adhere to the list below during lecture and lab:

Be prepared for class.
Do not be late to class (classes will start on time).
Cell phones are **not** to be used in any way, under *any* circumstances during lecture/lab, and should be turned OFF and stowed out of sight for the duration of every lecture/lab.

Students must use their MasonLive email account to receive important University information, including communications related to this class. I will not respond to messages sent from or send messages to a non-Mason email address.

In certain cases, students will be allowed to take the exam at a unique time - this will usually be held in my office. The only valid reasons for missing an assignment deadline or an examination are those accepted by the University and include death in the immediate family and major illness of the student. Any student missing a graded assignment (including tests) for health reasons or other extenuating circumstances may be required to submit at doctor's statement or other appropriate documentation to avoid a zero for that assignment.

Notice Regarding the Poll Everywhere System:

Poll Everywhere is a web-based student response system. Student e-mails will be registered by the instructor prior to the first day of classes (students can confirm their registration by logging in at https://www.polleverywhere.com/login with their Mason credentials). Normally at a random moment during each class period, the instructor will display a Poll Everywhere quiz on-screen and students will provide their responses through their phone apps or by logging in at the web address **pollev.com/dvalder** using their laptops or tablets. Results will appear live on the screen for the class to discuss. Students are strongly advised to download the phone apps for quick, regular access to Poll Everywhere.

USE OF AI TOOLS: The four exams in this course will be paper-based and administered in the classroom. Other than that, students may use generative AI tools (e.g., ChatGPT) whenever they believe it would be useful to their learning of course material. Student work will not be submitted through originality detection software focused on AI tools because the utilization of these types of tools is acceptable in assignments such as the preparation of presentations. Students will nevertheless be responsible for any incorrect, biased, or unethical information that is submitted. Students are also expected to be transparent with the use of these tools.

CLASS SCHEDULE:

Week	Lecture Topic / Student Presentation	Laboratory Topic and Assignment
Jan 20 - 23	(2) Population Dynamics See Lecture notes; S&S, Ch. 9 AND Hillis et al.: Ch. 53	Population Pyramids as Indicators of Human Population Growth Lab manual, Lab 1
Jan 26 - 30	(1) Humans and Nature-History (3) Environmental Ethics Leopold: https://www.uky.edu/~rsand1/china2017/library/Leopold1.pdf	Human Survivorship Curves Derived from Gravestones Lab manual, Lab 2
Feb 2 - 6	(4) Biological Diversity: Bacteria and Archaea Hillis et al.: Ch. 24 **Student Presentation: The Discovery of Hydrothermal Vents in the Pacific Ocean** (5) Biological Diversity: Eukaryotes Hillis et al.: Ch. 25	Environmental Ethics Discussion – "The Land Ethic" by Aldo Leopold
Feb 9 -13	(6) Biological Diversity: Fungi, Protists, Plants I **Student Presentation:** **The K-Pg Extinction Event and the Modern Rain Forest** (7) Biological Diversity: Plants II: Plant Structure and Function Hillis et al.: Ch. 26-28, 32-37	Using Dichotomous Keys to Identify Organisms Lab manual, Lab 3
Feb 16 - 20	**Exam 1 – Monday, Feb 16** (8) Biological Diversity: Animal Diversity I Hillis et al.: Ch. 29-31 **Student Presentation:** **The Immortal Jellyfish**	Biological Diversity: The Protists Lab manual, Lab 4
Feb 23 - 27	(9) Biological Diversity: Animal Diversity II **Student Presentation:** **The Indestructible Tardigrades** (10) Biological Diversity: Animal Diversity III Hillis et al.: Ch. 31, 38-42 **Student Presentation: The Platypus Puzzle**	Biological Diversity: The Plants Lab manual, Lab 5
March 2 - 6	(11) Vertebrate Organ Systems Hillis et al.: Ch.43-50 (12) Toxicology **Student Presentation:** **The Volkswagen Case**	Biological Diversity: The Animals I Lab manual, Lab 6

Week	Lecture Topic and Reading Assignment	Laboratory Topic and Assignment
March 9 – 13	**SPRING BREAK – CLASSES DO NOT MEET**	
March 16 - 20	**<u>Exam 2 – Monday, March 16</u>** (13) Conservation Biology Hillis et al.: Ch. 57 AND S&S: Ch. 26 **Student Presentation:** **The Invasive Asian Carp**	Biological Diversity: The Animals II Effect of Nutrients on Primary Production: Set Up Lab manual, Lab 7
March 23 - 27	(14) Population Ecology Hillis et al.: Ch. 53 AND S&S: Ch.8-9 **Student Presentation:** **New Zealand's Predator Free 2050** (15) Population Regulation Hillis et al.: Ch. 53 AND S&S: Ch.8-9 **Student Presentation: Do Lemmings Really Commit Mass Suicide?**	Impact of Pesticides Discussion – "Silent Spring" by Rachel Carson Lab manual, Lab 8
March 30 – April 3	(16) Adaptation and Evolution S&S: Ch. 5 AND Hillis et al: Ch. 55 **Student Presentation:** **The Return of the Dire Wolf** (17) Life Histories S&S: Ch. 10, 11 AND Hillis et al: Ch. 55	Lab Report Writing Lab manual, Lab 9
April 6 – 10	(18) Species Interactions S&S: Ch. 12-15 AND Hillis et al.: Ch. 54 **Student Presentation:** **Mutualism in the Animal Kingdom** (19) Communities S&S: Ch. 16-18 AND Hillis et al.: Ch. 55 **Student Presentation: Pleistocene Park**	Effect of Nutrients on Primary Production – Data Collection
April 13 - 17	(20) Ecosystems; Decomposers and Local Nutrients S&S: Ch. 20-21 AND Hillis et al.: Ch. 56 (21) Biogeochemical Cycling S&S: Ch. 22 AND Hillis et al.: Ch. 56 **Student Presentation:** **Iron Fertilization of the Ocean**	Toxicity Test on a Small Aquatic Organism (Formal Write-up)
April 20 - 24	**<u>Exam 3 – Monday, April 20</u>** (22) Climate Basics S&S: Ch. 2	Oral Presentations: Effects of Nutrients on Primary Production Draft of 'Toxicity Test Lab Report' due for peer review

Week	Lecture Topic and Reading Assignment	Laboratory Topic and Assignment
April 27 – May 1	(22) Climate Basics - Continued S&S: Ch. 2 **Student Presentation:** **Direct Air Capture of CO_2** (23) Terrestrial Ecosystems S&S: Ch. 4 **Student Presentation:** **The C4 Rice Project**	Toxicity Test - Final Paper Due
May 4	(24) Biomes S&S: Ch. 23 - 27	

EXAM 4 – WEDNESDAY MAY 6, 2026!

4:30 PM – 7:15 PM

Common Policies Affecting All Courses at George Mason University

Updated August 2025

These four policies affect students in all courses at George Mason University. This Course Policy Addendum must be made available to students in all courses (see Catalog Policy AP.2.5).

Additional policies affecting this course, and additional resources or guidance regarding these policies, may be provided to students by the instructor.

Academic Standards

Academic Standards exist to promote authentic scholarship, support the institution's goal of maintaining high standards of academic excellence, and encourage continued ethical behavior of faculty and students to cultivate an educational community which values integrity and produces graduates who carry this commitment forward into professional practice.

As members of the George Mason University community, we are committed to fostering an environment of trust, respect, and scholarly excellence. Our academic standards are the foundation of this commitment, guiding our behavior and interactions within this academic community. The practices for implementing these standards adapt to modern practices, disciplinary contexts, and technological advancements. Our standards are embodied in our courses, policies, and scholarship, and are upheld in the following principles:

- **Honesty:** Providing accurate information in all academic endeavors, including communications, assignments, and examinations.
- **Acknowledgement:** Giving proper credit for all contributions to one's work. This involves the use of accurate citations and references for any ideas, words, or materials created by others in the style appropriate to the discipline. It also includes acknowledging shared authorship in group projects, co-authored pieces, and project reports.
- **Uniqueness of Work:** Ensuring that all submitted work is the result of one's own effort and is original, including free from self-plagiarism. This principle extends to written assignments, code, presentations, exams, and all other forms of academic work.

Violations of these standards—including but not limited to plagiarism, fabrication, and cheating—are taken seriously and will be addressed in accordance with university policies. The process for reporting, investigating, and adjudicating violations is outlined in the university's academic standards procedures. Consequences of violations may include academic sanctions, disciplinary actions, and other measures necessary to uphold the integrity of our academic community.

The principles outlined in these academic standards reflect our collective commitment to upholding the highest standards of honesty, acknowledgement, and uniqueness of work. By adhering to these principles, we ensure the continued excellence and integrity of George Mason University's academic community.

Student responsibility: Students are responsible for understanding how these general expectations regarding academic standards apply to each course, assignment, or exam they participate in; students should ask their instructor for clarification on any aspect that is not clear to them.

Accommodations for Students with Disabilities

Disability Services at George Mason University is committed to upholding the letter and spirit of the laws that ensure equal treatment of people with disabilities. Under the administration of University Life, Disability Services implements and coordinates reasonable accommodations and disability-related services that afford equal access to university programs and activities. Students can begin the registration process with Disability Services at any time during their enrollment at George Mason University. If you are seeking accommodations, please visit the Disability Services website for detailed information about the Disability Services registration process. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email: ods@gmu.edu. Phone: (703) 993-2474.

Student responsibility: Students are responsible for registering with Disability Services and communicating about their approved accommodations with their instructor *in advance* of any relevant class meeting, assignment, or exam.

FERPA and Use of GMU Email Addresses for Course Communication

The Family Educational Rights and Privacy Act (FERPA) governs the disclosure of education records for eligible students and is an essential aspect of any course. **Students must use their GMU email account** to receive important University information, including communications related to this class. Instructors will not respond to messages sent from or send messages regarding course content to a non-GMU email address.

Student responsibility: Students are responsible for checking their GMU email regularly for course-related information, and/or ensuring that GMU email messages are forwarded to an account they do check.

Title IX Resources and Required Reporting

As a part of George Mason University's commitment to providing a safe and non-discriminatory learning, living, and working environment for all members of the University community, the University does not discriminate on the basis of sex or gender in any of its education or employment programs and activities. Accordingly, **all non-confidential employees, including your faculty member, have a legal requirement to report to the Title IX Coordinator, all relevant details obtained directly or indirectly about any incident of Prohibited Conduct** (such as sexual harassment, sexual assault, gender-based stalking, dating/domestic violence). Upon notifying the Title IX Coordinator of possible Prohibited Conduct, the Title IX Coordinator will assess the report and determine if outreach is required. If outreach is required, the individual the report is about (the "Complainant") will receive a communication, likely in the form of an email, offering that person the option to meet with a representative of the Title IX office.

For more information about non-confidential employees, resources, and Prohibited Conduct, please see University Policy 1202: Sexual and Gender-Based Misconduct and Other Forms of Interpersonal Violence. Questions regarding Title IX can be directed to the Title IX Coordinator via email to TitleIX@gmu.edu, by phone at 703-993-8730, or in person on the Fairfax campus in Aquia 373.

Student opportunity: If you prefer to speak to someone ***confidentially***, please contact one of Mason's confidential employees in Student Support and Advocacy (SSAC), Counseling and Psychological Services (CAPS), Student Health Services (SHS), and/or the Office of the University Ombudsperson.