This UNO course has been approved by UNO faculty to be offered for dual credit, and this syllabus meets disciplinary outcomes as reflected in UNO's master syllabus. **Students must submit a dual credit application and meet all registration, academic, and other institutional requirements according to established deadlines in order to receive UNO course credit.** Please visit [dualenroll.unomaha.edu](https://dualenroll.unomaha.edu) for additional information.

**Instructor:** Lee Stover  
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**Office phone:** 402-557-3200  
**Class location/time:** Room 232  
**Plan Period:** Block 2 and Block 4

**Textbook**  
**Title:** Living in the Environment, AP Edition  
**Authors:** G. Tyler Miller and Scott E. Spoolman  
**Publisher:** Brooks and Cole Cengage Learning  
**ISBN-13:** 978-0-538-49383-3

**Course Description:** Learn about how sustainability and quality of life depend on human interactions with environmental phenomena such as Climate, Drought, Energy, Water, and Biodiversity. These interactions influence patterns of Urbanization, Technology, Consumption, and Agriculture that can improve or degrade quality of life and sustainability. Lecture emphasizes concepts for understanding and explaining human-environment interaction. Labs focus on fundamentals of physical earth science and how these offer possibilities for sustainable development.

The goal of the AP Environmental Science course is to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving or preventing them. Environmental science is interdisciplinary; it embraces a wide variety of topics from different areas of study. Yet there are several major unifying constructs, or themes, that cut across the many topics included in the study of environmental science. The AP Environmental Science course is developed to be a rigorous class that is intended to enable students to undertake, as first year college student, a more advanced study of environmental science topics, or to fulfill a basic requirement for a laboratory science, thus free time for taking other courses. The goal of this course is to provide students with the scientific principles, concepts and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems, but natural and human-made, to evaluate risks associated with each of these problems and to examine alternative solutions for resolving and/or preventing said problems.

The following themes provide a foundation for the structure of the AP Environmental Science course:

- Science is a process
- Energy conversions underlie all ecological processes.
- The Earth itself is one interconnected system.
- Humans alter systems.
- Environmental problems have a cultural and a social aspect.
- Human survival depends on developing practices that will achieve sustainable resources. Students are strongly encouraged to take the AP Exam.
**Prerequisites:** Physical Science 1-2 and Biology 1-2 and Honors Chemistry is highly recommended.

**Duration:** 1 year
**Credit:** 1 credit per semester
- UNO dual enrollment earns 4 college credits when students take the AP Exam in the Spring.

**Performance Objectives/Student Learning Outcomes**
This course is aligned with UNO disciplinary outcomes as reflected in UNO’s master syllabi.

Specific UNO course learning objectives include:
- Explain how land and landscapes interact with Earths energy, climate, hydrologic, geologic, ecological and social systems. Complete elementary environmental analyses examining human-environment relationships practiced in lab activities (e.g., solar and wind energy potential, water and energy budgets, flood risk assessments, carbon accounting, land use and land cover change.) Explain how human culture and physical processes both create/exacerbate contemporary environmental problems as well as provide opportunities for solving them. Discuss examples of landscapes as places where culture expresses itself through politics, land use decisions, and consumer choices, with environmental outcomes. Explain how ecosystem services reduce our resource consumption, mitigate environmental problems, and increase quality of life; and how ecosystem services are degraded or maintained by human activity. Discuss examples of how land use decisions, culture, and government policy impact environmental processes such as climate change, drought, flooding, pollution, and food production. Provide examples or explain ways that landscape-scale thinking and human-environment geography can be applied to understand and solve problems of environmental sustainability and resilience.

**UNO General Education Student Learning Outcomes (Natural & Physical Sciences)**
This course also fulfills a UNO General Education requirement and is aligned with the following General Education Student Learning Outcomes (SLOs). After completing the course, successful students shall be able to do the following:
- demonstrate a broad understanding of the fundamental laws and principles of science and interrelationships among science and technology disciplines;
- demonstrate a broad understanding of various natural and/or physical phenomena that surround and influence our lives;
- describe how scientists approach and solve problems including an understanding of the basic components and limitations of the scientific method; and
- solve problems and draw conclusions based on scientific information and models, using critical thinking and qualitative and quantitative analysis of data and concepts in particular to distinguish reality from speculation.

**Instructional Philosophy**
We live in a rapidly changing world in which the human species is both the cause of, and the solution to, many of the global environmental problems younger generations will face. My goals for AP Environmental Science students are to make you an environmentally literate student poised to make informed decisions based on sound science and to appreciate, value and respect the diversity of life on our planet. My philosophy of teaching is based on the idea that learning is not something that can be defined as a procedure; learning is something that occurs in a rather unstructured and ad-hoc way. However, learning can be built into structures and processes. As we make new connections between known concepts, add new strategies, link those new concepts to old concepts, then we begin to learn and our body of knowledge grows. Thus, knowledge is a web of concepts with a whole lot of knowledge between them. (Jambekar, 2000). Learning in the science classroom should be hands-on, inquiry based, incorporating authentic research whenever possible, and supported with mastery of scientific concepts fundamental to Environmental Science.

**Homework (may include but not be limited to):**
- Reading the textbook and responding to written questions
- Reviewing notes from lecture
- Readings and case studies
- Making and using flashcards and other tools for unit tests and quizzes
- Design, conduct and communicate scientific experiments
- Research and essay writing
- Creating posters, surveys or other similar types of projects

**Tests and Assessments**
Tests will be given approximately as entered on the course calendar and will be composed of a variety of multiple choice and essay questions. The majority of multiple-choice questions will come from lecture notes, text questions and review materials.
- Students must pass a lab safety test at the beginning of the school year.
- Typically one quiz and one test per unit.
- We meet on block schedule, 90-minute periods every other day.
- On average, a minimum of one period per week is spent engaged in lab and/or field work.

**Grading**

**OPS Secondary Grading Practices**
All coursework and assessments are judged based on the level of student learning from “below basic” to “advanced.” This course will provide multiple opportunities to achieve at the “proficient” to “advanced” levels. Students are evaluated based on a proficiency scale or project rubric. Proficiency scales for this course are available upon request (teacher will identify location such as portal, teacher website, attached, etc.)

**Weighting Assignments (Using A Multiplier):**
When entering grades in the grade book, teachers may assign greater weight to some assignments than others. For example, the final exam may impact a student’s summative grade more than a unit test. Teachers will have the option to use the multiplier to weigh both formative and summative assessments to a maximum of 4. If a weight of 2 or more is applied to an assessment, this information will be communicated to students at the time the assessment is announced.

**There are three types of coursework**

- **Practice** – assignments are brief and done at the beginning of learning to gain initial content (e.g., student responses on white boards, a valid sampling of math problems, keyboarding exercises, and diagramming sentences, checking and recording resting heart rate). Practice assignments are not generally graded for accuracy (descriptive feedback will be provided in class) and are not a part of the grade. Teachers may keep track of practice work to check for completion and students could also track their practice work. Practice work is at the student’s instructional level and may only include Basic (2) level questions.

- **Formative (35% of the final grade)** – assessments/assignments occur during learning to inform and improve instruction. They are minor assignments (e.g., a three paragraph essay, written responses to guiding questions over an assigned reading, completion of a comparison contrast matrix). Formative assignments are graded for accuracy and descriptive feedback is provided. Formative work may be at the student’s instructional level or at the level of the content standard. Formative assessments/assignments will have all levels of learning – Basic (2), Proficient (3), and Advanced (4), which means that for every formative assessment/assignment, students will be able to earn an Advanced (4). Teachers will require students to redo work that is not of high quality to ensure rigor and high expectations. The students’ score on a formative assessment that was redone will be their final score. Formative - It is recommended to have three to five formative assessments for every one summative assessment.

- **Summative (65% of the final grade)** – assessments/assignments are major end of learning unit tests or projects used to determine mastery of content or skill (e.g., a research paper, an oral report with a power point, major unit test, and science fair project). Summative assignments are graded for accuracy. Summative assignments assess the student’s progress on grade level standards and may not be written at the student’s instructional level. Summative assessments/assignments will have all levels of learning – Basic (2), Proficient (3), and Advanced (4), which means that for every formative assessment/assignment students, will be able to earn an advanced (4).
To maintain alignment of coursework to content standards, which is a key best practice for standards-based grading, teachers will utilize a standardized naming convention for each of the standards within a course. The content standard will be marked on each assignment entered into Infinite Campus (District Grading Program) using all capital letters followed by a colon. After the colon will be the title of the coursework.

At the end of the grading period, scores are converted to a letter grade using this grading scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3.26 – 4.00</td>
</tr>
<tr>
<td>B</td>
<td>2.51 – 3.25</td>
</tr>
<tr>
<td>C</td>
<td>1.76 – 2.50</td>
</tr>
<tr>
<td>D</td>
<td>1.01 – 1.75</td>
</tr>
<tr>
<td>F</td>
<td>0.00 – 1.00</td>
</tr>
</tbody>
</table>

**Proficiency Scales:**

Proficiency scales for this course are available upon request and may be found on the district website.

**Redoing/Revising Student Coursework***

1. Students are responsible for completing all coursework and assessments as assigned.
2. Students will be allowed redos and revisions of coursework for full credit as long as they are turned in during that unit of study while a student still has an opportunity to benefit from the learning. When time permits, teachers should allow the redoing or revising of summative assessments.
3. Students are expected to complete assessments when given to the class, or if a student was justifiably absent, at a time designated by the teacher.
4. Redoing, retaking or revising will be done at teacher discretion in consultation with the student and parent(s). Teachers may schedule students before, during, or after school to address needed areas of improvement if not convenient during class. The time and location for redoing, retaking or revising will be done at the teacher’s discretion in consultation with the student and parent(s).

**Late Coursework***

Students are expected to complete coursework on time. Late coursework may be accepted for full credit until the end of the unit based on the teacher’s professional judgment and evidence collected throughout the unit. Accepted late work will not result in a reduction in grade and the M (Missing) will be replaced with the score earned by the student. The teacher or school may make exceptions depending upon student circumstances (such as prolonged absences due to illness).

**Missing Coursework***

Work not turned in at all will be recorded in Infinite Campus (district grade book) as an M for missing, which calculates to a score of zero.

**Independent Practice***

The role of independent practice is to develop knowledge and skills effectively and efficiently during the unit of study. Independent practice helps guide the learning process by providing accurate, timely and helpful feedback to students without penalty.

**Tentative Schedule**

**Unit 1**

- Introduction to Environmental Science
- Earth Science concepts (geologic time, plate tectonics, earthquakes, volcanoes, season, solar intensity and latitude)
- The Atmosphere (composition, structure, weather and climate, atmospheric circulation and the Coriolis effect, atmosphere-ocean interactions, ENSO)
• Global water resources and use (freshwater/saltwater, ocean circulation, agricultural, industrial and domestic use, surface and groundwater issues, global problems, conservation)
• Soil and Soil Dynamics (rock cycle, formation, composition, physical and chemical properties, main soil types, erosion and other soil problems, soil conservation)

Unit 2
• Ecosystem structure (biological populations and communities, ecological niches, interactions among species, keystone species, species diversity and edge effect, major terrestrial and aquatic biomes)
• Energy Flow (photosynthesis and cellular respiration, food webs, trophic levels, ecological pyramids)
• Ecosystem Diversity (biodiversity, natural selections, evolutions, ecosystem services)
• Natural Ecosystem Change (climate shifts, species movement, ecological succession)
• Natural Biogeochemical Cycles (carbon, nitrogen, phosphorous, sulfur, water)

Unit 3
• Population Biology (population ecology, carrying capacity, reproductive strategies, survivorship)
• Human Populations
• Human Population Dynamics (historical population size, distribution, fertility rates, growth rates and doubling time, demographic transition)
• Population size (sustainability, case studies, national policies)
• Impacts of population growth (hunger, disease, economic effects, resource use, habitat destruction)

Unit 4
• Agriculture
• Feeding a growing population (human nutrition, types of agriculture, green revolution, sustainability)
• Pest Control (pesticides, cost and benefits, integrated pest management, relevant laws)
• Forestry (tree plantations, old growth forests, forest fires, forest management)
• Rangelands (overgrazing, deforestation, desertification, federal rangelands)
• Mining (mineral formation, extraction, global reserves, relevant laws and treaties)
• Global Economics (globalizations, world bank, tragedy of the commons, relative laws and treaties)

Unit 5
• Energy concepts (energy forms, power, units, conversions, laws of thermodynamics)
• Energy consumption (industrial revolution, exponential growth, energy crisis)
• Present global energy use and future energy needs
• Fossil fuels (formation of coal, oil and natural gas, extraction)
• Nuclear Energy (fission process, nuclear fuel, electricity production)
• Energy Conservation (energy efficiency, hybrid cars, mass transit)
• Renewable Energy (solar, hydrogen, biomass, wind, oceans and tidal energy)

Unit 6
• Pollution types
  o Air Pollution (sources, primary and secondary, major air pollutants, measurement units, smog, acid deposition, heat islands, temperature inversion, indoor air pollution, remediation and reduction strategies, Clean Air Act)
  o Noise Pollution (sources, effects, control measures)
  o Water Pollution (types, sources, cause and effects, cultural eutrophication, groundwater pollution)

Unit 7
• Impacts on the Environment and Human Health
• Economic Impact (cost-benefit analysis, externalities, marginal costs, sustainability)

Unit 8
• Stratospheric Ozone (formation, UV radiation, cause of ozone depletion, strategies for reducing depletion, laws and treaties)
• Global warming (greenhouse gases, greenhouse effect, impacts/consequences of global warming, reducing climate change, relevant laws and treaties)
• Loss of Biodiversity (habitat loss, overuse, pollution, introduced species, endangered and extinct species, maintenance through conservation, laws, regulations, treaties)
Class Rules and Expectations

✓ Be to class on time and attend regularly.
✓ Treat yourself and others with kindness and respect.
✓ Cell phones and other electronics are a nuisance in the classroom and interfere with learning. During direct instruction, group work, lab activities and testing all electronic devices and accessories must be out of sight and not in use. Students will have the option of placing their device in a charging station where it will remain for the duration of instructional time. Violation of this expectation will result in one warning. If the behavior continues, referrals will be written to the appropriate administrator.
✓ No food or drink in the science classroom without express consent of the teacher.

Safety Expectations
All students are expected to review for and pass a district required lab safety quiz. Students and parents are also required to sign and return a safety contract agreement, indicating you understand the expectations for safety in the science classroom. Food and drink are not permitted in the science classroom unless the teacher has given explicit permission. During labs and other inquiry activities, food and drink are expressly forbidden. Safety of our students is of utmost importance.

Academic Integrity: “The maintenance of academic honesty and integrity is a vital concern of the University community. Any student found responsible for violating the policy on Academic Integrity shall be subject to both academic and disciplinary sanctions.” Via studentlife.unomaha.edu/integrity