暨南大學 JINAN UNIVERSITY

2025

0810E101
Introduction to Environmental Science

Instructor: TBA

Time: December 15, 2025 - January 16, 2026

Office Hours: by appointment

Contact Hours: 60 (50 minutes each)

Credits: 4

E-mail: TBA

Course Description

Introduction to Environmental Science, will focus on the science-based physical, geological, ecological, marine, and atmospheric aspects of environmental sciences. The most important topics that will be covered include trends in energy use and generation (fossil fuels and alternatives), water and air pollution, weather, and climate (and the biosphere's response to climate).

The homework will emphasize calculations assisting in a better understanding of quantitative models and the manipulation environmental data.

Goals for Students

One of the goals for this course is to help students to grow to be environmentally conscious and knowledgeable. Another is to empower students to be conversant in environmental topics and issues and to apply their knowledge as critical thinkers to national and regional environmental policies and regulations.

Specific skills that students should acquire and refine during this course include:

- Critical thinking regarding environmental issues
- Environmental science comprehension and communication
    - critical thinking papers, activities, and assignments

- Ability to think about the effects of individual choices and develop alternative environmentally conscious options
- Knowledge of core environmental issues (listed above)

Course Learning Outcomes

Upon successful completion of this course, you should be able to:

- Define Environmental Science and identify the shared characteristics of the natural sciences.
- Understand the process of scientific inquiry.
- Explain the concept of sustainability and its social, political, and cultural challenges.
- Interpret environmental issues as systems problems by identifying the inter-relationships (context and connections), perspectives (each actor has their own unique perception of the situation) and boundaries (agreeing on scope, scale and what might constitute an improvement) of ecosystems, agriculture, and land-use.
- Evaluate how human population and human activities affect the Earth's natural systems and vice versa.
- Apply quantitative methods to identify, evaluate, and solve environmental problems.
- Describe the major biogeochemical cycles and their relationship to life on Earth.
- Evaluate and design strategies for optimizing biodiversity, ecological restoration, and conservation within our environment.
- Gain a working knowledge of the role of fossil fuels and alternatives for generating power and economic growth in the future.
- Understand the wide-ranging causes, impacts and possible adaptations to climate change. Create your own strategy to advocate for an environmental issue important to you.

Required Textbook

Reading materials will be provided by the instructor.

Grading Policy

Exams	5 lecture exams (equal weight, lowest grade dropped)	40%
Exercises (homework)	**Section 1:** Carbon storage in forests 5% Carbon storage in suburban development 10% **Section 2:** Corn and population model 5% **Section 3:** Sustainable fishery report 10% **Section 4:** Productivity and precip + temp 10% **Section 5:** Natural Gas Evaluation 5% Hydropower Calculations 5%	50%
Class participation	/	10%

Evaluation Format:

Your final grade is based on <u>four (or five)</u> class exams (you can take 5 and drop the lowest), a series of <u>class assignments</u> and <u>class participation</u>.

<u>I. There will be five lecture exams</u> (final is a 5th lecture exam and is not cumulative). Exams will be based on what we cover in the class (<u>only</u>) and are open book but not open internet. Please use course materials only for the exams. Obviously do not use AI tools. Those will not draw on the appropriate material and wouldn't be your work anyway (see Academic Integrity policy). You will not be tested on any material not covered in lecture. Together, exams are worth 40% of your grade. Only your 4 best exam grades will be used to calculate the overall exam grade (you may choose to skip one of the exams if you wish). Exam format will be short answer questions where you will explain a phenomenon or process, an essay. or quantitative questions where you show your deductive reasoning skills.

<u>II. Class participation</u> is worth 10% of your grade (see criteria below for participation evaluation below).

- *Participation Grades:*

Show that you are thinking about the course material and trying to apply it. Students do this by responding to discussion posts related to questions the professor poses to the class.

- *Participation Grade Scale:*

There will be questions posted for discussion each week. Students are expected to contribute to the discussion at least 4 times with some substantiative comment around whatever is being discussed. Students are also expected to attend the in person online meetings where we will review assignments, discuss news, and other activities.

A = 100-90%; superior work, participates in class and discussion posts, almost flawless work,

B = 90-80%; very good work, participates in class and discussion posts, solid fulfillment of course requirements

C = 80-70% effort demonstrated toward satisfactory fulfillment of course requirements

D = 69-60%; below satisfactory work, Attends less than 60% of in person meetings

E = <60%; failure to meet minimum course requirements.

III. Exercises: There are 7 of these and they will be "homework". One is the calculating the value of a natural gas deposit. The second is calculating power output from hydroelectric stations. The third is figuring out how the productivity of trees change with environmental factors. The last one is modeling how carbon storage in the biosphere and soils change with both rising CO2 and warmer temperatures (globally). We will review each of these assignments in class to get you started (at the appropriate time). The due dates are on the top of the assignments. Lates are docked 10% per day (see late policy and missed assignment policy on page 3 above), so please get them turned in on time.

Grading Scale

The instructor will use the grading system as applied by JNU:

Definition	Letter Grade	Score
Excellent	A	90~100

Good	B	80~89
Satisfactory	C	70~79
Poor	D	60~69
Failed	E	Below 60

Class Schedule

Dates	Topics	Readings, Assignments, & Lectures
Section 1 Week 1	Course Intro & Overview. Science as a way of knowing. Systems. Diversity. Evolution. Scientific Method	Lecture 1) Professor Introduction and Welcome. Lecture 2) Introduction to Environmental Science Lecture 3) Environmental Systems: Energy flow and Ecosystems Lecture 4) Diversity Lecture 5) Evolution and Biogeography Lecture 6) The Scientific Method **Carbon storage in forests.** **Carbon storage in suburban development.** **Exam 1**
Section 2 Week 2	Populations, Community Ecology. Conservation biology (populations). Minerals and Mining	Lecture 1) Populations Lecture 2) Communities Lecture 3) Conservation of Populations Lecture 4) Heterozygosity and Effective Population Lecture 5) Minerals Lecture 6) Mining **Corn and Population Model** **Exam 2**
Section 3 Week 3	Water, Oceans, Marine Conservation, Atmospheric Processes, Coastal Zones and Processes	Lecture 1) Properties of water Lecture 2) Oceans Lecture 3) Urban Water Pollution Lecture 4) Atmospheric Circulation Lecture 5) Coastal zones (tides, currents, cyclones, sea level) **Sustainable fishery report.** **Exam 3**

Section 4 Week 4	Nitrogen Cycle, Carbon cycling, Climate Change	Lecture 1) Origins of Elements and Cycles Lecture 2) Rise of Biological Complexity Lecture 3) Geological Cycling Lecture 4) Nitrogen and Phosphorus Cycles Lecture 5) Natural Drivers of Climate Change Lecture 6) Human Caused Climate Change and Consequences **Productivity and precip + temp.** **Exam 4**
Section 5 Week 5	Energy Basics, Fossil Fuels, Alternative and Renewable Energy	Lecture 1) Energy Overview of current sources and trends Lecture 2) Energy Basics Lecture 3) Fossil Fuels general Lecture 4) Fossil Fuels: Petroleum Lecture 5) Fossil Fuels: Fracking and Natural Gas Lecture 6) Fossil Fuels: Coal Lecture 7) Alternatives: Overview and Concentrated Solar Lecture 8) Alternatives: Solar PV Lecture 9) Alternatives: Hydroelectric Power Lecture 10) Alternatives: Wind Power **Natural Gas Evaluation.** **Hydropower exercises.** **Exam 5**

Academic Integrity

As members of the Jinan University academic community, students are expected to be honest in all of their academic coursework and activities Academic dishonesty, includes (but is not limited to) cheating on assignments or examinations; plagiarizing, i.e., misrepresenting as one's own work any work done by another; submitting the same paper, or a substantially similar paper, to meet the requirements of more than one course without the approval and consent of the instructors concerned; or sabotaging other students ' work within these general definitions. Instructors, however, determine what constitutes academic misconduct in the courses they teach. Students found guilty of academic misconduct in any

portion of the academic work face penalties that range from the lowering of their course grade to receiving a failing grade (E) in the course.