

# OCES 1010 Principles and Applications of Environmental Science (Fall 2022-23)

## Learning Outcomes

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

- 1) demonstrate fundamental understanding of environmental concepts such as Earth's life-supporting systems and biodiversity, natural resources, pollution and mitigation, and their inter-relationships;
- 2) address challenges in environmental science by integrating scientific knowledge, technical applications, and innovative technology;
- 3) identify and describe different scientific methods to critically evaluate complex, emerging environmental problems at global and local scales;
- 4) recognize the importance of harmony between humans and nature in a sustainable living society;
- 5) develop a broad interest in the environment and connect the knowledge to their major study;
- 6) communicate effectively in written format to convey scientific knowledge and the application of modern technologies;
- 7) apply the knowledge in daily life to live more sustainably and to contribute to environmental protection.

## Course Format

Two lectures (1.5-hour each) per week.

## Course Assessment (**TENTATIVE**)

- In-class Tests (10%)
- Midterm Exam (40%)
- Final Exam (50%)

## Major Reference

Cunningham, W.P. and Cunningham, M.A. (2020) *Principles of Environmental Science: Inquiry and Application*. 9<sup>th</sup> Edition. McGraw-Hill Companies, Inc.

## Lecture Outline and Schedule (TENTATIVE)

Lecture Topic	Instructor
<b>Part 1: Matter &amp; Energy (Chapters 2 &amp; 13)</b>	
1) Elements of Life	
2) Non-renewable Energy Resources	
3) Renewable Energy Resources	
<b>Part 2: Human Population &amp; Dynamics (Chapter 4)</b>	
4) Human Population Dynamics	
5) Can we Live Sustainably? Ecological Footprint and Biocapacity	
6) Controlling Population Growth	
<b>Part 3: Food Security and Nutrition (Chapter 7)</b>	
7) Food Security and Famines	
8) Role of Aquaculture in Improving Food Security	
9) Green Revolution to Increase Food Supply	
<b>Part 4: Biomes and Biodiversity (Chapter 5)</b>	
10) Earth's Major Biomes	
11) What is Biodiversity and Why is It Important?	
12) Threats to Biodiversity	
13) <b>Midterm Exam</b>	
<b>Part 5: Environmental Health &amp; Toxicology (Chapter 8)</b>	
14) Environmental Health	
15) Toxicology and Environmental Toxins	
<b>Part 6: Atmosphere and Pollution (Chapter 10)</b>	
16) Atmospheric Circulation and Climate	
17) Global Climate Change	
18) Air Pollution: Acid Rain, Ozone Depletion, Ocean Acidification	
<b>Part 7: Water Resources and Pollution (Chapter 11)</b>	
19) Water Supply, Usage and the Hydrological Cycle	
20) Water Conservation and Water-Saving Technologies	
21) Aquatic Hypoxia and Eutrophication	
22) Water Pollution and Remediation	
<b>Part 8: Ocean Plastics</b>	
23) Microplastics: Global and Local Impacts	
24) Microplastics: Detection and Removal Technology	
<b>Part 9: Solid Wastes Management (Chapter 14)</b>	
25) Solid Wastes Treatment	
26) Solid Wastes Remediation	
<b>Final Exam</b>	

Chapter numbers refer to those in the major reference by Cunningham and Cunningham (2020).