



School of Humanities and Social Sciences
ENS 201-AIX 1
Principles of Environmental Systems Science
202425 Fall

Course Details

Credit Hours: 3

Days: Monday/Wednesday

Time: 14:00-15:25

Prerequisites: None

Instructor Information

Mohammad Hassouna

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Course Description

The Principles of Environmental Systems Science course is designed to introduce the fundamental concepts of environmental science to undergraduate students. It includes topics from different areas of study such as earth science, hydrology, atmospheric science and life science. The course focuses on key areas such as climate, global oceans, water quality and biodiversity, and aims at raising environmental awareness among students by providing them with the scientific knowledge and skills to identify and understand the functioning of environmental systems..

The course accommodates all students and is tailored to be manageable without any particular prerequisite.

Course Objectives

- Develop a holistic understanding of the Environment
- Recognize the four global spheres: the geosphere, the hydrosphere, the atmosphere and the biosphere
- Understand the principles of geochemical and biogeochemical cycles
- Recognize the impact of human activity on the global environment
- Understand the principles of the global water cycle
- Distinguish between the different scales of biodiversity and the threats each of them is facing

Learning Outcomes

The class provides the fundamental elements that undergraduate students need to know about the global environment and to understand the intertwined relations between them.

Instructional Methods and Activities

- In-class lectures and discussions
- Field-trips and students' observations
- Oral presentations based on selected scientific readings

Primary/Required Textbooks and Materials

Environmental Science

ISBN: 9780810886100

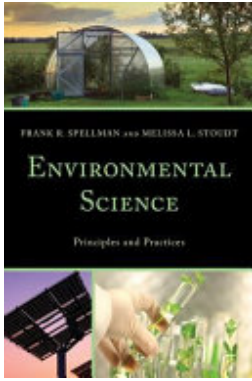
Authors: Frank R. Spellman, Melissa L. Stoudt

Publisher: Rowman & Littlefield

Publication Date: 2013-01-01

Additional Information:

Selected Readings



Assessment, Evaluation, and Grading

- 30% Attendance, Quizzes and homework
- 10% Oral presentations
- 30% Midterm exam
- 30% Final exam

Grading System/Grade Distribution

Grading System/Grade
Distribution

U.S	ACM	French Equivalent
95-100%	A	17-20
90-94%	A -	16
88-89%	B+	15
84-87%	B	14
80-83%	B-	13
78-79%	C+	12
74-77%	C	11
70-73%	C-	10
68-69%	D+	9
64-67%	D	8
60-63%	D-	7

U.S	ACM	French Equivalent
0-59%	F	0-6

Attendance

One of the primary requirements this semester is that you attend class. This is not a lecture class; it's essential that you come to class on time, be prepared for the lesson, and be ready to participate in discussions and activities. Attendance will be part of your final grade. Any absences can harm your final grade. It will be up to the student to manage and communicate with professors about their absences. For every absence, your final grade may be lowered by one half-letter grade (B+ to become a B, B to become B-, and so on). ACM-IAU professors are empowered to impose academic sanctions (including a lowered grade or even failure) upon students for unexcused absences, frequent tardiness, work submitted late, or any other actions or behaviors that violate ACM's academic standards and policies.

Academic Policies

All students are responsible for reading, knowing, and understanding the information pertinent to their areas of study available in the ACM Catalog. The catalog contains requirements for all degree programs, course descriptions, academic policies, and regulations that govern ACM. All parts of the catalog are subject to annual changes as university rules, policies, and curricula change. It is your responsibility to keep informed of such changes; failure to do so will not exempt you from whatever penalties you may incur. Catalogs are published from August through July.

Review the latest catalog at: <https://www.acmfrance.org/academics/catalog>

Schedule of Classes and Assignments

W1 Introduction of the class and of the syllabus

- Humans meeting humans!
- The class, the syllabus and working together!
- Fieldwork, oral presentations and other duties

W2 Principles of Environmental Science

- Introduction
- The scientific method
- Ecology vs. Environmental science
- Scope and objectives of Environmental Science

W2 Environmental Systems

- Introduction
- The Systems Theory
- The Four (Five) Spheres of the Earth
 - The Atmosphere
 - The Hydrosphere
 - The Geosphere
 - The Biosphere
 - The Anthroposphere
- Interrelation between Spheres
 - Endogenic and Exogenic Cycles
 - Pools and Fluxes

W3 Matter and its cycling

- Introduction
 - Matter & its hierarchal organization
 - Geochemistry & Biogeochemistry
 - The Goldschmidt classification of elements
- The Carbon Cycle
 - An overview
 - The Major Carbon poles

- The inorganic (Silicate-Carbonate) Cycle
- The Biological Cycle
- The Anthropogenic deregulation of the Global Carbon Cycle

W4 & W5 The Geosphere

□ Introduction

- The Earth and the Solar system
- The physical structure of the Earth
- The Chemical Structure of the Earth

□ Minerals

- Primary Minerals
- Secondary Minerals
- Evaporites
- Volcanic Sublimates

□ Rocks types & the Rock Cycle

- Sedimentary Rocks
- Metamorphic Rocks
- Igneous Rocks

□ The Rock Cycle

W6 & W7 The Hydrosphere

□ Introduction

□ The properties of Water

□ Salt vs. Fresh Water: occurrence and distribution

□ The Global Water Cycle

- Overview

- Global water reservoirs and Fluxes

- The World's Oceans

- Physical Features of the Oceans

- Chemical Properties of the oceans & the Impact of Human Activities

- Temperature

- Salinity

- Acidity

W8 & W9 The Atmosphere

- Introduction

- Chemical composition of the atmosphere

- Background

- Major gases

- Trace gases

- Structure of the atmosphere

- The troposphere

- The Stratosphere

- The Mesosphere

- The Thermosphere

- The Ionosphere

- Atmospheric Circulation

- Overview

- The Hadley Circulation Model: Single Cell Model

- The Ferrel Circulation Model: Three Cells Model

- Global Climate Change & Global Warming

□ Ozone Layer Depletion

W10 & W12 The Biosphere

□ Introduction

□ The origin of life: Living vs. non-living

□ The tree of life

□ Biodiversity

- Definition

- Ranks of biodiversity

- Challenges

□ Major Terrestrial Biomes

□ Major Marine biomes