

Syllabus

Environmental Science I (ENVR 1101)



Credit: 1 Semester Credit Hours (lab)

Prerequisite/Co-requisite: Pass the reading and writing portion of TSI or other accepted testing instrument.
ENVR 1301 Environmental Science I (lecture).

Course Description

A survey of the forces, including humans, that shape our physical and biologic environment, and how they affect life on Earth. Introduction to the science and policy of global and regional environmental issues, including pollution, climate change, and sustainability of land, water, and energy resources. Laboratory and field investigation activities in the course should be diverse. As examples, students can acquire skills in specific techniques and procedures (such as collecting and analyzing water samples), conduct a long-term study of some local system or environmental problem (such as the pollution of a nearby stream), analyze a real data set (such as mean global temperatures over the past 100 years), and visit a local public facility (such as a water-treatment plant). Although there is a great diversity in the laboratory and field activities that would be appropriate for the course, activities should:

- always be linked to a major concept in science and to one or more areas of the course outline
- allow students to have direct experience with an organism or system in the environment
- involve observation of phenomena or systems, the collection and analysis of data and/or other information, and the communication of observations and/or results

The relative magnitudes of these elements may vary from activity to activity. As a whole, the course's laboratory and field investigation component should encompass all of the elements

Required Textbook and Materials

Environmental Science Systems and Solutions, 6th Edition
Michael L. McKinney
ISBN: 9781284091700

Course Objectives

The laboratory and field investigation component of the Environmental Science course should challenge the students' abilities to:

1. critically observe environmental systems.

2. develop and conduct well-designed experiments.
 3. utilize appropriate techniques and instrumentation.
 4. analyze and interpret data, including appropriate statistical and graphical presentations.
 5. think analytically and apply concepts to the solution of environmental problems.
 6. make conclusions and evaluate their quality and validity.
 7. propose further questions for study.
 8. communicate accurately and meaningfully about observations and conclusions.
- It is expected that students will perform as many labs/field investigations as possible.

Core Objectives

1. **Critical Thinking Skills:** To include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.
2. **Communication Skills:** To include effective development, interpretation and expression of ideas through written, oral, and visual communication
3. **Empirical & Quantitative Skills:** To include the manipulation and analysis of numerical data or observable facts resulting in informed conclusion
4. **Teamwork:** To include the ability to connect choices, actions, and consequences to ethical decision-making
5. **Personal Responsibility:** To include the ability to connect choices, actions and consequences to ethical decision-making

Course Outline: (lecture)

UNIT I

A. Introduction to environmental health science

Chapter 1

1. History of environmental impact and environmental movements
2. Why people pollute
3. The role of the individual
4. Towards a sustainable world

B. The environment as an integrated system

Chapter 3

1. Biogeochemical cycles
2. Energy flows

3. The environment as a system

C. The biosphere

Chapter 4

1. The evolution of the biosphere
2. Biosphere interactions: populations
3. Biosphere interactions: communities and ecosystems

D. Conserving biological resources

Chap. 6 & 11

1. Biodiversity measurement
2. Biodiversity loss
3. Prevention of extinctions
4. Public land issues

E. Environmental Ethics

Reading TBA

1. Major traditions in Western ethical thought
2. Ecocentric Ethics
3. Animal rights and deep ecology

UNIT II

A. Demography

Chapter 2

1. World population changes
2. Distribution of the earth's human population
3. Age structures
4. The consequences of over population
5. Solving the worlds' population problem

B. Feeding the world

Chapter 13

1. Food as a biological resource
2. Hunger
3. Feeding the world
4. Eating animal products
5. Food for the future
6. Food production and supplies
7. Biotechnology and transgenic crops
8. Aquaculture
9. Soil degradation

C. Fundamentals of energy, fossil fuels, and hydroelectric power

Chapter 7

1. Fundamentals of energy, work, power, and thermodynamics
2. Modern society's dependence upon energy
3. Fossil fuels: origins and human use
4. Hydropower

D. Nuclear energy

Chapter 7

1. Principles of nuclear power
2. Nuclear fuel production process
3. Uranium resources
4. Advantages and disadvantages of nuclear power
5. Safer nuclear reactors
6. Disposal of nuclear wastes
7. Decommissioning nuclear reactors
8. Global nuclear power today and in the future

E. Alternative energy sources and energy conservation

Chapter 8

1. Biomass energy, fuels, technologies, and environmental advantages and disadvantages
2. Solar energy
3. Wind power
4. Geothermal energy
5. Ocean energy
6. Energy storage and conservation

UNIT III

A. Water resources

Chapter 9

1. Water and the hydrologic cycle
2. Water demand
3. Water supply
4. Social solution to water scarcity
5. Economic and legal solutions

B. Water pollution

Chapter 15

1. Water purification in nature
2. Pollution overwhelming natural purification
3. Reduction, treatment, and remediation of water pollution
4. Legal and social solutions to pollution

C. Principles of pollution control

Chapter 14

1. Pollution defined
2. Myths of pollution control

D. Toxicology, pesticides and risk

Chapter 14

1. Toxicology: the science of poisons
2. Pesticides: pollutants made to kill
3. Legal aspects of toxic substance and pesticide control

E. Air pollution: local and regional

Chapter 16

1. The atmosphere
2. Review of particulates, sulfur oxides, nitrogen oxides, volatile organic compounds, carbon monoxide, and lead
3. International trends
4. Weather and air pollution
5. Indoor air pollution
6. Noise pollution
7. Electromagnetic fields

F. Global air pollution and global warming

Chapter 17

1. Nature of ozone pollution
2. Effects of increased ultraviolet radiation
3. Controlling CFC releases
4. The greenhouse effect

G. Municipal solid waste and hazardous wastes

Chapter 18

1. Defining wastes

2. Alternative paradigms for waste management
3. Hazardous wastes

Grade Scale

- A = 90 - 100
- B = 80 - 89
- C = 70 - 79
- D = 60 - 69
- F = less than 60

Course Evaluation

1. Class Attendance and Participation 50%
2. Midterm Exam 20%
3. Class Presentation of Selected Topic 10%
4. Final Exam 20%

Course Policies

1. No food, drinks, or use of tobacco products in class.
2. Do not bring children to class.
3. If you wish to drop a course, the student is responsible for initiating and completing the drop process. If you stop coming to class and fail to drop the course, you will earn an 'F' in the course.
4. Additional class policies as defined by the individual course instructor are in the addendum.
5. It shall be considered a breach of academic integrity (cheating) to use or possess on your body any of the following devices during any examination unless it is required for that examination and approved by the instructor: Cell phone, smart watch/watch phone, laptop, tablet, electronic communication devices (including optical), and earphones connected to or used as electronic communication devices.
6. Students with special needs and/or medical emergencies or situations should communicate with their instructor regarding individual exceptions/provisions. It is the student's responsibility to communicate such needs to the instructor.

Disabilities Statement

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973

are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409) 880-1737 or visit

the online resource: <http://www.lit.edu/depts/stuserv/special/defaults.aspx>

Student Code of Conduct Statement

It is the responsibility of all registered Lamar Institute of Technology students to access, read, understand and abide by all published policies, regulations, and procedures listed in the *LIT Catalog and Student Handbook*. The *LIT Catalog and Student Handbook* may be accessed at www.lit.edu or obtained in print upon request at the Student Services Office.

Supplemental Instruction

Supplemental Instruction (SI) consists of group tutoring sessions conducted once a week for 50 minutes for selected subjects. The SI Leader is a peer who helps students learn difficult content in those specific courses. The SI Leader attends the class with the students to keep up with the course content and engage students in interactive learning strategies at the 50 minute sessions. For this course, the supplemental instruction session will be held on – Currently not available.

Starfish

LIT utilizes an early alert system called Starfish. Throughout the semester, you may receive emails from Starfish regarding your course grades, attendance, or academic performance. Faculty members record student attendance, raise flags and kudos to express concern or give praise, and you can make an appointment with faculty and staff all through the Starfish home page. You can also login to Blackboard or MyLIT and click on the Starfish link to view academic alerts and detailed information. It is the responsibility of the student to pay attention to these emails and information in Starfish and consider taking the recommended actions. Starfish is used to help you be a successful student at LIT.





Environmental Science I (ENVR 1101)
Section 5A1 – Fall 2018
4:30-5:25pm Thurs. MPC 127

Course Syllabus Class Addendum

Instructor Contact Information

Instructor: H. Morgan

Email: holmorgan@lit.edu

Office Phone: 409-880-8845

Office Location: MPC 204

Instructor: Harry L. Morgan

Office: MPC 127

Office Phone: 409 880-8845

Cell Phone: 409 656-5618

Office Hours: Monday: 11:00 AM – 2:00 PM

Tuesday: 11:00 AM - 1:00 PM

Wednesday: 2:00 PM- 4:00 PM

Thursday: 11:00 AM – 1:00 PM

Friday: By appointment only (after class)

Course Requirements

1. Homework/revision of material is a course requirement.
2. Participation in classroom discussions/activities is also required.

Course Schedule – Week 1 – 16

Week 1: Laboratory Safety

Population Growth and Shelford's Law

Tool Use, Energy and Environmental Consequences

Week 2: Chemical and Physical Properties

Energy Flow Through a Food Chain:

Week 3: Classification of Organisms

Plant Anatomy

Flower Anatomy

Week 4: Cattail Marsh and Wetlands Ecology

Week 5: Plant Collection

Pollination Ecology

Seed Dispersal and Evolution

Week 6: Hardy-Weinberg Equilibrium

Plot Transect for Grassland Plants: Assessing Exotic Plant Influence

Week 7: Two Species' Interactions

Week 8: Midterm exam

Week 9: Bird Identification and Ecological Niches

Animal Specializations: Zoo Observations

Week 10: Benthic Ecosystems: Macroinvertebrates in Saltwater Bays

Mark and Recapture Population Estimates

Endangered Species

Week 11: Rocks and Minerals

The Physical and Chemical Nature of Soils

Week 13: Physical Environmental Measurements

Acid Rain

Week 14: Alkalinity of Freshwater Streams

Water Quality: Determining the Water Quality Index
Dissolved Oxygen Sag Simulation and Sewage Treatment

Week 15: Measuring Air Quality

Alternatives to Pesticides: Parasitic Jewel Wasp Control of Blowflies
Bioassays Using *Daphnia magna* and *Lactuca sativa* Test Organisms

Week 16: Final exam