



Date		Credits	3
Course Title	Environmental Science	Course Number	EVR 1009
Pre-requisite (s)	None	Co-requisite (s)	None
Lecture Hours	45		
Out of Classwork Assignment Hours	90		

Place and Time of Class Meeting

San Ignacio University
3905 NW 107 Avenue, Suite 301
Miami, FL 33178

Name and Contact Information of Instructor

Book required

(San Ignacio University recognizes the use of the textbook in the classroom as part of the educational methodology and strategy applied in diverse materials. The textbook is part of the curriculum and is used to reach the student in an effective manner in the classroom. Every student is expected to acquire and use the textbook.)

Visualizing Environmental Science

Author(s): Linda R. Berg, David M. Hassenzahl, Mary Catherine Hager

Publisher: Wiley Edition: 4th, 2013

Print ISBN: 9781118169834, 1118169832

eText ISBN: 9781118801819

<https://www.vitalsource.com/referral?term=9781118801819>

Classroom expectations for students

Attendance Policy

Students are expected to attend all scheduled university classes for the courses that they are registered for and to achieve the goals set forth by each class instructor. Attendance is taken daily. Enrolled students are permitted no more than 2 “free” absences in one semester. Students missing 3-5 classes over the course of the semester will receive a one-letter grade deduction from their final course grade; missing more than 6 classes will result in failure of the course regardless of grade average. It is the student's responsibility to arrange to make up work missed because of an absence.

Student Tardiness Policy

A student is considered tardy/late if he/she comes to class 15 minutes late. With three tardies the student accumulates one full absence. If the student misses half of the class period, it is a full absence. When a student has more than 6 tardies, the instructor will contact the San Ignacio University Coordinator of Student Affairs and Academic Department and request an intervention session with the student. The goal of the intervention session is to develop and implement an intervention program to help students learn new ways to save and manage time.

NOTE: Plagiarism is defined as the use, without proper acknowledgment, of the ideas, phrases, sentences, or larger units of discourse from another writer or speaker. Plagiarism includes the unauthorized copying of software and the violation of copyright laws. Students who commit plagiarism will obtain a grade of “Failure” on their exam or assignment.

Course Description (must correspond exactly to Catalog description)

The purpose of this course is to provide students with the scientific principles, concepts, and methodologies to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, and to evaluate the risks associated with these problems and examine alternative solutions for resolving and/or preventing them.

Learning Objectives

At the end of this course student will be able to:

- Measure environmental variables and interpret result
- Evaluate local, regional and global environmental topics related to resource use and management
- Propose solutions to environmental problems related to resource use and management
- Interpret the results of scientific studies of environmental problems
- Describe threats to global biodiversity, review their implications and potential solutions

Topical Outline and Schedule

DATE	WEEK 1
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Describe the course. • Define Environmental Science • Distinguish among highly developed countries, moderately developed countries, and less developed countries • Relate human population size to natural resources and resource

	<p>consumption</p> <ul style="list-style-type: none"> Describe the three factors that are most important in determining human impact on the environment
TOPIC (S)	<p>Syllabus</p> <p>Discuss Library Orientation Course, Instructor to verify completion</p> <ul style="list-style-type: none"> Define environmental science The Gap Between Rich and Poor countries Population, resources, and environment
LEARNING ACTIVITIES	<p>Discussion of Syllabus</p> <p>Analysis of examples brought up in class(page 23)</p> <p>Group discussion</p>
OUT OF CLASSWORK ASSIGNMENT, & ASSIGNED READINGS	<p>Review the Syllabus</p> <p>Complete the Library Orientation Course. Instructor to verify completion.</p> <p>Homework: Read Chapter 1 pp.1-25</p> <p>Critical Thinking pg. 25</p>
DATE	WEEK 2
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> Define Sustainable development Outline some of the complexities associated with the concept of sustainable consumption Contrast voluntary simplicity and technological progress Define environmental justice
TOPIC (S)	<ul style="list-style-type: none"> Sustainable consumption Human values and environmental problems Environmental justice and ethical issues A plan for sustainable living
LEARNING ACTIVITIES	<p>Analysis of examples brought up in class pg. 44</p> <p>Group discussion</p>
OUT OF CLASSWORK ASSIGNMENT, & ASSIGNED READINGS	<p>Homework: Read Chapter 2 pp. 28-47</p> <p>Critical Thinking p. 46-47</p>
DATE	WEEK 3
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> Define conservation and preservation, and distinguish between them Briefly outline the environmental history of US Describe the contributions of important people to our perspective on the environment Distinguish between utilitarian conservationists and biocentric preservationists Explain how a system perspective helps us understand human impacts on the environment Explain why the natural environmental policy Act is the cornerstone

	<p>of US Environmental Law</p> <ul style="list-style-type: none"> • Describe how environmental impact statements provide powerful protection of the environment • Explain the environmental protection Agency's role in Environmental policy
TOPIC (S)	<ul style="list-style-type: none"> • Conservation and preservation of resources • Environmental history • Environmental Legislation • Environmental Economics
LEARNING ACTIVITIES	<p>Analysis of examples brought up in class pg. 68 Small group discussion/comparisons</p>
OUT OF CLASSWORK ASSIGNMENT, & ASSIGNED READINGS	<p>Homework: Read Chapter 3 pp.49-69 Critical Thinking questions pg. 71</p>
DATE	WEEK 4
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Define risk and risk assessment • Explain how risk assessment helps us manage potential health threats • Explain why public water supplies are monitored for fecal coliform bacteria despite the fact that most cause disease • Describe the link between environmental changes and emerging diseases, such as swine flu • Distinguish among persistence, bioaccumulation, and biological magnification of toxicants • Discuss the mobility of persistence toxicants in the environment • Describe the purpose of the Stockholm Convention on persistent organic pollutants • Describe how a dose-response curve is used to determine the health effects of environmental pollutants • Describe the most common method of determining whether a chemical causes cancer • Distinguish among additive, synergistic, and antagonistic interactions in chemical mixtures • Explain why children are particularly susceptible to toxicants • Discuss the precautionary principle as it relates to the introduction of new technologies or products
TOPIC (S)	<ul style="list-style-type: none"> • Conservation and preservation of resources • Environmental history • Environmental history • Environmental legislation • Environmental economics



LEARNING ACTIVITIES	Discussion Analysis of examples brought up in class pg. 92 Think-pair-share
OUT OF CLASSWORK ASSIGNMENT, & ASSIGNED READINGS	Homework: Read Chapter 4 pp. 73-94 Critical Thinking p. 95
DATE	WEEK 5
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Define ecology • Distinguish between the following ecological levels: population, community, ecosystem, landscape, and biosphere • Define energy, and state the first and second laws of thermodynamics • Distinguish among producers, consumers, and decomposers • Diagram and explain the carbon, hydrologic, nitrogen, sulfur, and phosphorus cycles • Describe the factors that contribute to an organism's ecological niche • Explain the concept of resource partitioning • Distinguish among mutualism, commensalism and parasitism • Define competition and distinguish between intraspecific and interspecific competition • Discuss an example of a Keystone species • Define biome and discuss how biomes are relative to climate • Briefly describe the nine major terrestrial biomes • Summarize the important environmental factors that affect aquatic ecosystems • Define evolution • Describe various types of evidence that support evolution • Define ecological succession, distinguish between primary and secondary succession
TOPIC (S)	<ul style="list-style-type: none"> • EXAM 1 & Homework #1 Due • What is ecology? • The flow of energy through ecosystems • The cycling of matter in ecosystems • Ecological niches • Interaction between organisms
LEARNING ACTIVITIES	Analysis of examples brought up in class pg 122 & 154 Think-pair-share activity
OUT OF CLASSWORK ASSIGNMENT, & ASSIGNED READINGS	Homework: Read Chapter 5 pp.97-155 Critical thinking questions pp 124-125 & 157



DATE		WEEK 6
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Define population ecology • Explain four factor that produce changes in population size • Summarize the history of human population growth • Explain why Thomas Malthus ideas about human population growth are wrong • Explain why it is impossible to precisely determine ow many people Earth can support • Define demographics and describe demographic transition • Relate total fertility rates to each of the following: cultural values, social and economic status of women, availability of family planning services, and government policies • Define urbanization and describe in the distribution of people in rural and urban areas 	
TOPIC (S)	<ul style="list-style-type: none"> • Population ecology • Human population patterns • Demographics of countries • Stabilizing world population • Population and urbanization 	
LEARNING ACTIVITIES	Analysis of examples brought up in class pg 186 Small group discussion	
OUT OF CLASSWORK ASSIGNMENT, & ASSIGNED READINGS	Homework: Read Chapter 7 pp. 159-186 Critical Thinking p.189	
DATE		WEEK 7
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Define atmosphere and list the major gases comprising the atmosphere • Briefly describe the four major concentric layers of the atmosphere • Explain the causes of wind, including the Coriolis effect • Define air pollution and distinguish between primary and secondary pollutants • Relate in general terms, the adverse health effects of air pollutants • Describe industrial smog, photochemical smog, temperature inversions, urban heat islands, and dust domes • Distinguish between weather and climate, and explain what determines Earth’s climate • Summarize the effects of solar energy on Earth’s temperature • Provide several reasons for regional precipitation differences 	

	<ul style="list-style-type: none"> List the five main greenhouse gases and describe the enhanced greenhouse effect Give examples to mitigate or adapt to global climate change Define acid deposition and explain how acid deposition develops Relate examples of the effects of acid deposition
TOPIC (S)	<ul style="list-style-type: none"> The atmosphere Types of sources of air pollution Effects of air pollution Controlling air pollutants Indoor air pollution The atmosphere and climate Global climate change Ozone depletion in the stratosphere Acid deposition
LEARNING ACTIVITIES	<p>Discussion Small group activity Analysis of examples brought up in class pg. 212 % 238</p>
OUT OF CLASSWORK ASSIGNMENT, & ASSIGNED READINGS	<p>Continue research and work on final project Homework: Read Chapter 8 & 9 pp. 191 – 237 Critical Thinking p. 212 & 240-241</p>
DATE WEEK 8	
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> Describe the structure of water molecule and explain how hydrogen bonds form between adjacent water molecules List the unique properties of water Explain how the processes of the hydrologic cycle allow water to circulate through the abiotic environment Define water sustainable water use Contrast the benefits and drawbacks of dams and reservoirs Give examples of water conservation in agriculture, industry, and individuals homes and buildings Define water pollution Distinguish between the two types of pollution sources and give examples Describe how most drinking water is purified in the United States Describe the global ocean and its significance to life in Earth Define El Niño-Southern Oscillation (ENSO) and La Niña and describe some of their effects Describe the four ocean life zones Identify the human activities that contribute to marine pollution and



	<p>describe their effects</p> <ul style="list-style-type: none"> • Explain strategies proposed to correct ocean problems in the future
TOPIC (S)	<ul style="list-style-type: none"> • The importance of water • Water resource problems • Water management • Water pollution • Improving water quality • The global ocean • Major ocean life zones • Humans impact on oceans • Addressing ocean problems
LEARNING ACTIVITIES	Analysis of examples brought up in class pg. 268 & 292
OUT OF CLASSWORK ASSIGNMENT, & ASSIGNED READINGS	Homework: Read Chapter 10 pp.243-269 & Chapter 11 pp 271 - 293 Critical Thinking p.244 & 295
DATE	WEEK 9
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Define plate tectonics and explain its relationship to earthquakes and volcanic eruptions • Contrast the consumption of minerals by developing and highly developed countries • Distinguish between surface mining and subsurface mining using the terms overburden and spoil bank in your answer • Relate the environmental impacts of mining and refining minerals • Explain how mining lands can be restored • Define sustainable use of soils • Explain the impacts of soil erosion on plant growth and on other resources, such as water • Summarize current land ownership in US • Define sustainable forestry and explain how monocultures and wildlife corridors are related to it • Describe national forests and state which government agencies administer them and current issues of concern • Describe rangelands and their general uses • Define desertification and explain its relationship to overgrazing • Describe how conservation easements help to protect privately owned rangelands • State which government agency administers US National parks and describe current issues of concern • Define wilderness and discuss the administration of the National

	<p>Preservation System and the problems faced by wilderness areas.</p> <ul style="list-style-type: none"> • Name at least three of the most endangered ecosystems in US
TOPIC (S)	<ul style="list-style-type: none"> • Plate tectonics and the Rock cycle • Economic geology: useful minerals • Environmental implications of mineral use • Soil properties and processes • Soil problems and conservation • Forest management • Rangelands • National parks and wilderness areas • Conservation of land resources
LEARNING ACTIVITIES	<p>Analysis of the examples raised in class.pg. 317 & 344 Group discussion</p>
OUT OF CLASSWORK ASSIGNMENT, & ASSIGNED READINGS	<p>Homework: Read Chapter 12 & 13 pp. 297-318 & 321 – 343</p>
DATE WEEK 10	
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Test 2 & Homework 2 Due • Discuss recent trends in loss of US agricultural land, global declines in domesticated plant and animal varieties, and efforts to increase crop and livestock yields • Relate the benefits and problems associated with the green revolution • Describe the environmental impacts of industrialized agriculture, including land degradation and habitat fragmentation • Define sustainable agriculture and contrast it with industrialized agriculture • Identify the potential benefits and problems of genetic engineering • Distinguish between narrow spectrum and broad spectrum pesticides • Relate the benefits of pesticides in disease control and crop protection • Summarize problems associated with pesticide use, including genetic resistance, ecosystem imbalances, bioaccumulation and biological magnification, and mobility in environment • Describe alternative ways to control pests
TOPIC (S)	<ul style="list-style-type: none"> • Challenges of agriculture: loss of agriculture land, global decline in domesticated plant and animal varieties. Increasing crop yields, increasing livestock yields. • Environmental impacts of industrialized agriculture • Moving to sustainable agriculture • Genetic engineering: a solution or a problem? • Benefits of pesticides



	<ul style="list-style-type: none"> • Problems with pesticides • Benefits of pesticides • Problems with pesticides • Pesticide use and new pest species • Alternative to pesticides
LEARNING ACTIVITIES	<p>Discussion Analysis of examples brought up in class Group discussion</p>
OUT OF CLASSWORK ASSIGNMENT, & ASSIGNED READINGS	<p>Explanation about research and work on final project Homework: Read Chapter 14 pp.349-367 Critical Thinking Questions pg. 371</p>
DATE	WEEK 11
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Describe factors associated with species richness • Define biological diversity and distinguish among species richness, genetic diversity, and ecosystem diversity • Relate several important ecosystem services provided by biological diversity • Define extinction and distinguish between background and mass extinction • Contrast threatened and endangered species • Describe four human causes of species endangerment and extinction • Define conservation biology and compare in situ and ex situ conservation • Describe restoration ecology • Describe the benefits and shortcomings of the US endangered species act • Relate the purpose of the world conservation strategy
TOPIC (S)	<ul style="list-style-type: none"> • How many species are there? • Why we need biodiversity • Importance of genetic biodiversity • Endangered and threatened species • Areas declining biological diversity • Earth's biodiversity hotspots • Where is declining biological biodiversity the most serious? • Human causes of species endangerment • Protecting habitats • Restoring damaged or destroyed habitats • Conserving species • The endangered species act • International conservation policies and laws

	<ul style="list-style-type: none"> • The endangered species act • International conservation policies and laws
LEARNING ACTIVITIES	<p>Discussion Analysis of examples brought up in class pg. 392 Think-pair-share</p>
OUT OF CLASSWORK ASSIGNMENT, & ASSIGNED READINGS	<p>Due: First Draft of Final Project Homework: Read Chapter 15 pp.373-392 Critical Thinking p. 395</p>
DATE	WEEK 12
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Distinguish between municipal and non-municipal solid waste • Describe the features of a modern sanitary landfill and relate some of the problems associated with sanitary landfills • Describe the features of a mass burn incinerator and relate some of the problems associated with the incinerators • Explain the composting process • Define source reduction • Summarize how source reduction, reuse, and recycling help reduce the volume of solid waste • Define integrated waste management • Define hazardous waste • Briefly hazardous waste • Briefly characterize two types of hazardous waste: dioxins and PCBs • Compare the resource conservation and recovery Act and the comprehensive environmental response, compensation, and liability Act (The superfund Act) • Explain how green chemistry is related to source reduction
TOPIC (S)	<ul style="list-style-type: none"> • Solid waste • Reducing solid waste • Hazardous waste • Managing hazardous waste
LEARNING ACTIVITIES	<p>Analysis of examples brought up in class pg. 415 Visual aids and/or view video</p>
OUT OF CLASSWORK ASSIGNMENT, & ASSIGNED READINGS	<p>Homework: Read Chapter 16 pp. 397-414 Critical thinking Questions pg. 417</p>
DATE	WEEK 13
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Compare per person and total energy consumption in highly developed countries and developing countries



	<ul style="list-style-type: none"> • Distinguish between surface mining and subsurface mining • Summarize the environmental problems associated with using coal • Describe two technologies that can be used to make coal a cleaner fuel • Describe reserves of oil and natural gas • Discuss the environmental problems caused by using oil and natural gas • Define nuclear energy and describe a typical nuclear power reactor • Discuss the pros and cons of electric power produced by nuclear energy versus coal • Describe safety issues associated with nuclear power plants and risks associated with the storage of radioactive wastes • Distinguish between active and passive solar heating and describe how each is used • Contrast the advantages and disadvantages of photovoltaic solar cells and solar thermal electric generation in converting solar energy into electricity • Explain how fuel cells work • Define biomass and outline its use as a source of energy • Compare the potential of wind energy and hydropower • Describe geothermal energy-effect heat pumps, and tidal energy • Distinguish between energy conservation and energy efficiency and give examples of each • Summarize options to conserve energy at home
TOPIC (S)	<ul style="list-style-type: none"> • Energy consumption • Non-renewable energy: coal, oil and natural gas, and nuclear energy • Renewable energy: Direct solar energy, indirect solar energy, other renewable energy sources • Energy solutions: conservation and efficiency
LEARNING ACTIVITIES	Textbook Case Study pg. 439 & 463 Small group activity Group discussion
OUT OF CLASSWORK ASSIGNMENT, & ASSIGNED READINGS	Editing & Revision of Final Project Homework: Read Chapter 17 & 18 pp.419 - 439 & 443-464 Review Questions 441 and 465

DATE		WEEK 14
SPECIFIC OBJECTIVES		<ul style="list-style-type: none"> • Discuss projects during the presentation
TOPIC (S)		<ul style="list-style-type: none"> • Presentation of the projects
LEARNING ACTIVITIES		Analysis and discussion of the projects in class
OUT OF CLASSWORK ASSIGNMENT, & ASSIGNED READINGS		Study of the corresponding concept check to chapters 14-18
DATE		WEEK 15
SPECIFIC OBJECTIVES		Final Exam Evaluation of the corresponding objectives from Chapters 14-18
TOPIC (S)		<ul style="list-style-type: none"> • Agriculture and food resources • Biodiversity and conservation • Solid and hazardous waste • Renewable and non-renewable energy resources
LEARNING ACTIVITIES		No learning activities
OUT OF CLASSWORK ASSIGNMENT, & ASSIGNED READINGS		Final test

Instructional Methods

Instruction consists mostly of lectures, discussions, demonstrations, and written assignments—including research projects, in-class assignments, and homework. Approximately one block per week is devoted to hands-on laboratory experiences or fieldwork. All lab and fieldwork requires a written report.

The following strategies may be used in this class:

1. A review of the questions at the end of each chapter.
2. Check of the reading.
3. Analysis of assigned readings.
4. Group discussions.
5. Individual and group discussions.
6. Preparation of reports.
7. Preparation of a didactic plan.
8. Carrying out a micro-class.

Additional Instructional Materials and References

Environmental Science
by Daniel D. Chiras
Jones & Bartlett Learning, 2014

Environmental Science
by Daniel B. Botkin and Edward A. Keller
Wiley, 2014

Environmental Science
by Eldon D. Enger and Bradley F. Smith
McGraw-Hill, 2015

Assessment Criteria and Methods of Evaluating Students

96 – 100%	→ A
90 – 95%	→ A-
87 – 89%	→ B+
83 – 86%	→ B
80 – 82%	→ B-
77 – 79%	→ C+
73 – 76%	→ C
70 – 72%	→ C-
67 – 69%	→ D+
63 – 66%	→ D
60 – 62 %	→ D-
< 59%	→ F

Do not count on a curve!

Generally, the grades “A” through “C-” are considered passing grades. Grades “W” and “I” indicate that no grades were earned for the course. A “W” grade indicates that the student withdrew from the course. An “I” grade indicates that the student was passing the course, but failed to complete all the required course work. The instructor, in his/her discretion may grant an “I” grade instead of an “F”, pending completion of the course work by the student within a specified time arranged by the instructor and told to the student. It is the student's responsibility to follow-up with the instructor to complete the course work. If the course work is not completed by the arranged time, the “I” grade becomes an “F”.

Distribution of Grade Elements

Homework:	20% (10% each)
Exams I, II, III:	30% (10% each)



Final Presentation: 25%

Final Research Project 25%

Total: 100 %

Date Syllabus Was Last Reviewed: Date: 04-18-2016