BIOL 3404 ENVIRONMENTAL SCIENCE
Fall Semester, 2013
Biology Department, Dr. Jacqueline Horn, Department Chair

COURSE DESCRIPTION

This course is a study of the interrelationships of the natural world and the interactions of organisms with their environment. Analysis of populations, both natural and human, in their communities and the impact of the physical factors will be explored. Current environmental issues will also be discussed. Sampling techniques and field studies will be emphasized. This course includes one semester hour credit for laboratory sessions. This course cannot be counted for credit toward the biology major.

COURSE SEQUENCE IN CURRICULUM

Environmental Science is an upper division course offered by the Biology Department. It is required for those seeking teaching certification in life sciences. This course is an elective that meets the Smith College requirement for a laboratory science course. It does not count toward the biology major.

PRE-REQUISITE INFORMATION

None

INSTRUCTOR INFORMATION

Name:	Dr. Betty Thompson
E-mail:	bthompson@hbu.edu
Office Phone:	281-649-3453
Office Location:	S225
Office Hours:	Monday 1:30 to 2:30, Thursday 12:30 to 2:30 Office hours are posted on my office door in case there are any changes. I am also available by appointment.
Web Page Address, Web Board, ListServ:	Blackboard

LEARNING RESOURCES

Course Text:	Environmental Science for a changing world with entended coverage, 1st edition by Karr, Houtman and Interlandi Publisher WH Freeeman and Scientific American ISBN 13: 978146412938-4
Laboratory Text:	None
Supplementary Text:	None
Other Required Materials:	None

COURSE OBJECTIVES

Purpose of the course:

This course is devoted to the study of how matter and energy flow through ecological systems and the impact humans have on the environment. Environmental Science addresses the goal of the College of Science and Mathematics to provide courses needed by other colleges on campus to meet their accreditation requirements as this course is required for students seeking elementary or secondary teacher certification. This gives the student knowledge that prepares them for the Texes exam for certification and familiarizes them with certain Texas Essential Knowledge and Skills (TEKS) topics. The

1-hour credit laboratory component of the course focuses on the use of ecological and field techniques to study natural populations and communities.

Aims for the course:

The course content in Environmental Science addresses the University's purpose to endow students with a sense of community and promote responsibility in its study of the impact humans have on the environment.

During this course we will be focusing on this introduction as we learn about Environmental Science and the role of Christians to help preserve God's creation.

On completion of this course, students should be able to:

1. Appreciate why all living things are interdependent on one another in the ecosystem.
2. Compare and contrast all of the components in an ecosystem and the energy and nutrient flow in the community.
3. Understand the cause and effects of alterations in the global biosphere.
4. Understand the relationship between economic systems and sustainability and the impact on environmental quality.

RELATION TO DEPARTMENTAL GOALS AND PURPOSES

"The Biology Department will:"

"…prepare students for their careers by offering biology courses with an academically rigorous, contemporary curriculum to support their major requirements or liberal arts education and to encourage a lifetime of learning."

"…offer experiences for undergraduate research in the biological sciences that provide the opportunity to develop professionalism and skills in experimentation and data analysis, interpretation, and presentation."

"…provide mentoring and experiences that enable students to graduate in an appropriate time with the appropriate qualifications and professional attitudes required for success and service."

"…provide a Christian environment in which students, faculty and staff integrate the principles of the biological sciences with their faith."

RELATION TO COLLEGE GOALS AND PURPOSES

"…to prepare students for careers and further education in the natural sciences and mathematics in a nurturing Christian environment. The College will also serve the HBU community by providing science and mathematics classes that empower HBU students to meet the goals and requirements of their field of study and enrich their liberal arts education."

RELATION TO THE PURPOSE STATEMENT OF THE UNIVERSITY

University mission and purpose statement from the Houston Baptist University Catalog, 2009-2010: "…to provide a learning experience that instills in students a passion for academic, spiritual, and professional excellence as a result of our central confession, "Jesus Christ is Lord"

"…Committed to providing a responsible and intellectually stimulating environment that:

- fosters spiritual maturity, strength of character, and moral virtue as the foundation for successful living

- develops professional behaviors and personal characteristics for life-long learning and service to God and to the community

- meets the changing needs of the community and society

- remains faithful to the **'Nature of the Institution'** statement"

"…Promotes learning, scholarship, creative endeavor, and service".

ATTENDANCE

Please see the official Attendance Policy in the HBU Classroom Policy on Blackboard. Students missing more than 25% of the class will be given a failing grade.

All unexcused absences after 3 absences will be counted. Each of these unexcused absences will be counted as 1% and subtracted from the final grade.

ACADEMIC ACCOMODATIONS

Students needing learning accommodations should inform the professor immediately and consult the Academic Accommodations section of the HBU Classroom Policy posted on Blackboard.

COURSE REQUIREMENTS & GRADE SCALE

Course requirements:

The students will be given four exams including the final exam during the course. The average grade of these exams will count 75% of the course grade. The laboratory grade will count 25% of the course grade. The laboratory grade will be determined by laboratory participation, formal lab reports, research project and one laboratory exam. A Comprehensive make-up exam will be given near the end of the quarter for students who miss one of the first three lecture exams. (A medical or other appropriate excuse is required.)

Grading standards:

Lecture – 75% of the grade. There will be four lecture exams including the final exam.
Laboratory – 25%
Lab exam and quizzes– 15%
Lab reports ,homework and research presentations - 10%

Students need to turn in five (5) scantrons, # 882-ES at the beginning of the quarter for their lecture exams. (If a student does not take the makeup exam then they will only use 4 scantrons.) Students will be asked to arrive on exam day on time. All books, purses, pagers, and cell phones will be placed on the side of the testing room. Pagers and cell phones must be turned off during class and exams. Students are not allowed to have any electronic device at their testing location. Any student having or using an electronic device during an exam will be given a 0 on the exam for cheating. The only materials allowed at the desk will be pencils, pens and erasers. All other materials will be provided. Students are not allowed to leave and exam until finished. Use the restroom before starting your exams. On the scantron portions of exams all answers must be correctly entered on the scantron for credit.

The grading scale is as follows:

A = 89.5 – 100; B = 79.5 – 89; C = 69.5 – 79; D = 59.5 – 69; F = below 59.5

PROFICIENCIES:

Technology component:

Students will perform laboratory experiments in lab using hand held calculators and computers. They will use the internet for research on current topics in environmental science.

Designated essay/writing component:

Each lecture test contains essay questions. Students will write a project report on an assigned research topic.

Reading component:

Students will be expected to read both the textbook and other scientific articles to prepare for the lectures and tests.

Oral communication component:

Students will be expected to present their findings in the field and discuss options with their peers. Each group will present their independent research project to the class.

Mathematics component:

Students must graph data obtained in the laboratory component. They must learn to solve mathematical problems concerning preparation of solutions for their research projects.

Critical thinking component:

The laboratory includes experiments and exercises which require students to make observations, formulate hypotheses, perform well-designed experiments, evaluate the experimental data, and reach scientifically sound conclusions based on the data and observations obtained.

LATE WORK & TEST POLICY

Late work:

Attendance for laboratory is mandatory. Roll will be taken at the end of the period. One lab may be missed with a written excuse for illness or death in the family, but the student is still responsible for the missed material. **You must be on time for the lab.** Important safety information will be discussed. Lab work cannot be made up. Late work will not be accepted.

Missed tests:

A comprehensive make-up exam will be given near the end of the semester for students who miss one of the first three lecture exams. (A medical or other appropriate excuse is required.) One comprehensive makeup exam will be given during finals week on the scheduled period during finals. All graduating seniors must take their final exam during the last week of class. Please inform me if you are a graduating senior.

EVALUATION

Method of student appraisal of faculty:

Students will be given an opportunity to appraise the professor by completing the IDEA Faculty Evaluation Questionnaire, and/or the COSM course evaluation at the end of the semester. The instructor, the department chairman and dean will review the responses of the students after the completion of the course.

Method of evaluating student response to course:

Students will be given an opportunity to describe their response to the course by completing the IDEA Faculty Evaluation Questionnaire and/or the COSM course Evaluation at the end of the course. The instructor, the department chairman and dean will review the responses of the students after the completion of the course.

LABORATORY DRESS CODE

Students may be asked in advance to wear closed-toed shoes and long pants during certain experimental procedures. Student must come prepared for field trips with appropriate materials and clothing.

LABORATORY CONDUCT AND SAFETY

IMPORTANT INFORMATION FOR THIS COURSE: IF A STUDENT IS PREGNANT OR NURSING, SHE WILL NOT BE ALLOWED TO ATTEND THE LABORATORY SESSIONS BECAUSE SOME OF THE CHEMICALS, WHICH ARE NORMALLY INNOCUOUS, USED IN THESE LABORATORY EXPERIMENTS, MAY BE HARMFUL TO A DEVELOPING FETUS. IF A STUDENT BECOMES PREGNANT DURING THE COURSE, SHE MUST STOP ATTENDING THE LABORATORY SESSIONS IMMEDIATELY AND SHE IS TO NOTIFY HER PROFESSOR. THE PROFESSOR WILL DISCUSS OPTIONS THAT THE STUDENT WILL HAVE TO ENABLE HER TO COMPLETE THE COURSE REQUIREMENTS.

You must be on time to lab.
Important laboratory safety is discussed in the laboratory introduction.
Any student that does not following the safety rules in lab or on field trips will be asked to leave. This will count as an unexcused absence.
Attention all students: Review and sign lab safety policy on the first day of lab. *Students must pass a safety quiz of 70 or above to continue attending lab.*

TOPICAL OUTLINE - ***include table, calendar, or topical outline with dates***

Topics Covered:

Lecture:

Week 1		Ecology Summary Notes UNIT 1 Chapters 1 -3	Review of Biology FOUNDATIONS AND TOOLS OF THE TRADE Environmental Literacy Science Literacy and the Process of Science Information Literacy
Week 2		Chapters 4-6	Environmental Economics and Consumption Human Populations Environmental Health
	Labor Day		

	9/2		
Week 3		Unit 2 Chapters 7-9	ECOLOGY, PATTERNS, AND PROCESSES Ecosystems and Nutrient Cycling Population Ecology Community Ecology
	9/11	Census date/Last date to drop without a "W"	
Week 4		Chapters 10-11	Biodiversity
	9/20	**Test 1**	
Week 5		Unit 3 Chapter 13 - 14	EARTH'S RESOURCES, CURRENT CHALLENGES, AND SUSTAINABLE OPTIONS Forest and Grasslands
Week 6		Chapters 15 - 17	Marine Ecosystems Fisheries & Aquaculture
Week 7			
Week 8		Chapters 17 - 18	Freshwater Resources Water pollution
	10/18	**Test 2**	
Week 9		Chapters 19-20	Mineral Resources Feeding the World
Week 10		Chapters 21-22	Agriculture: Raising Livestock Agriculture: Raising Crops
	11/11	**Last date to drop with a "W"**	
Week 11		Unit 4 – Energy Chapters 23-25	Coal Petroleum Air Pollution
Week 12		Chapters 26 - 27	Climate Disruption Nuclear Energy
	11/15	**Test 3**	
Week 13		Chapter 28-30	UNIT 5: TOWARD A SUSTAINABLE FUTURE Sun, Wind, and Water Energy Biofuels Managing Solid Waste
Week 14	Thanksgiving 11/27-11/29	Chapter 31	Environmental Policy and Law
Week 15		Chapters 32 Review for Final Exam	Urbanization and Sustainable Communities
	12/6/13	**Makeup Exam**	Last Day of Class
Week 16		Final exam	Comprehensive Final Exam

Laboratory:

		Objectives
Week 1	Introduction to Field Ecology Start with field collections on abiotic components of soil. Start compost experiments	1. Understand the nature of environmental studies and laboratory techniques. 2. Apply scientific methods to experimentation in this course. 3. How to write a scientific laboratory report.
Week 2 - 3	Continue Compost	1. Understand the ecological concept of

	experiments. Community Structure Lab Scientific methodology assignment. Start air collection for air pollution studies. Start Air quality experiment.	community structure and the relevance of this concept to a sustainable environmental policy. 2. Use the quadrant method for studying communities. 3. Determine the density and relative density of species in the community. 4. Determine the frequency and relative frequency of each species in the community. 5. Recognize the importance of community structure in the function of an ecosystem.
9/11	Port of Houston Field Trip. (9/11- Rain Date 9/18) Start water collection for stream ecology field studies. Start water quality.	1. Understand the difference between species richness and evenness. 2. Be able to calculate species richness and evenness. 3. Understand how natural and human disturbance can affect species diversity.
Week 4 - 5	Writing Lab Reports Abstracts, introductions and hypothesis On campus field collection of water. Analysis of water.	Understand the implications of water pollution. Perform a basic experiment to determine the water quality of a given system based on biochemical tests. Gain an awareness of water pollution problems in your own community.
Week 6 - 7	Research projects continued Research topics due. Conclude research on Air Quality	Air pollution, Particulate matter in the air and carbon dioxide levels
Week 8	Field Trip Arboretum Depending on weather (10/16)	Sampling in the field
Week 9	Soil Management Conclude research on Water Quality	1. Understand characteristics of soil, its formation, and importance. 2. Classify a given soil sample based on its texture, water-holding capacity, color, and amount of organic matter. 3. Conduct chemical analysis of soil horizons using commercially available soil testing kits. 4. Discuss critically the suitability of a given soil for agricultural cultivation or landfill location, etc. 5. Continue Research Projects
Week 10 10/16	Field trip Pitman park	Air and water sampling in the field
Week 11 10/30	**Lab Exam**	
Week 13	Conclude research projects and final lab reports Conclude Compost Research projects	
11/22-23 Week 14	Thanksgiving	No Lab

Week 15 12/4	Final Research lab reports due. Presentations.	

All field trip dates are subject to change depending on weather conditions.

Test Dates

9/20	**Test 1**
10/18	**Test 2**
10/30	**Lab Exam**
11/15	**Test 3**
12/6/13	**Makeup Exam**

Attendance for lab:

Attendance is mandatory. Roll will be taken at the end of the period. One lab may be missed with a written excuse for illness or death in the family, but the student is still responsible for the missed material. **You must be on time for the lab. There are no makeup labs. Students may not leave lab or field trips early 5 points off lab average for every missed lab.**

Reading Assignments:

Students will be responsible for current events.

Lab Content:

Lab will consist of an experiment, field studies, lecture and videos. Notes should be taken on the videos and lab lectures. Each person will conduct an independent research project on a topic in Environmental Science. Formal lab write-up and a presentation will be required.

The content of this outline and the attached schedule are subject to change at the discretion of the professor.

Student Signature – I have read and understand the syllabus for this class. I understand that the content of this syllabus and the topical outline are subject to change at the discretion of the professor. I have read and understand the HBU Classroom Policy posted on Black Board. **I promise to uphold the Code of Academic Integrity at Houston Baptist University and will not tolerate its violation by others**.