

**Southwestern Indian Polytechnic Institute
Liberal Arts Department**

**Biology for Environmental Science
Syllabus**

1. Course Information:

Course Number: Biology 111

Course Title: Biology for Environmental Science with Lab

Credit Hours: 4

Catalog Description:

An introduction to ecology, current environmental problems and control measures. Emphasis on human impact, modern technology, natural ecosystems, social, political, and economic processes. The student will have the knowledge to become environmentally responsible and contribute to the quality of human life. Appropriate laboratory work and demonstrations to implement the fundamental principles and concepts learned in theory.

Prerequisite(s): English 100 and Math 100 with a C grade or better

2. Course Learning Outcomes:

After a systematic study of course material the student should be able to:

- Unit 1- Explain the study of Environmental Science
- Unit 2- Explain the History of Environmental Science
- Unit 3- Describe Ecosystems
- Unit 4- Explain the Scientific Method
- Unit 5- Describe Life Chemistry
- Unit 6- Describe Life Energy
- Unit 7- Explain Species and Community Dynamics
- Unit 8- Explain Biogeochemical Cycles
- Unit 9- Describe Population Issues
- Unit 10- Describe Energy Sources
- Unit 11- Describe Water and Air Quality

The most important thing you can do while in class is take notes. Make sure that you note page numbers and diagrams that are brought to your attention during lecture.

3. Instructional Units:

1. Introduction to the study of Environmental Science
2. History of Environmental Science
3. Ecosystems
4. Scientific Method
5. Chemistry
6. Energy
7. Species and Community
8. Biogeochemical Cycles
9. Population Issues
10. Energy Sources
11. Water and Air Quality

Biology for Environmental Science Syllabus Fact Sheet

1. Course Information:

Course Number: Biology 111

Course Title: Biology for Environmental Science with Lab

Credit Hours: 4

2. Course Instructor:

Instructor: Harold Kihega

Office Location: Science Technology Building, Room 252

Office Hours: Please check my office door for office schedule

Telephone Number: (505) 346-7729

Email: Hkihega@sipi.bia.edu

3. Course Specifics:

Textbooks: Environmental Science, Enger & Smith; Ninth Edition, McGraw-Hill Publishing, 2004

Lab book: Field & Laboratory Exercises in Environmental Science, Enger and Smith, Seventh Edition, McGraw-Hill publishing, 2004

Evaluations:

Four exams will be given during the semester. Each exam is worth 100 points. All lab work is worth 300 points. Homework assigned **must be completed to receive full course credit**. You are responsible for spelling correctly scientific words covered in lecture and laboratory. Each misspelled word is 1/2 point off your test score.

You must complete all work assigned and **complete** all labs to receive a grade at the end of the semester!!!!

There are no make-up exams in class or laboratory.

Grading Policy:

Method of calculating grade:

A - 90 - 100

B - 80 - 89

C - 70 - 79

D - 60 - 69

F - 59 and under

A grade of "C" or better is required for passing General Biology.

Examination Schedule: A minimum of 3 days notice will be given for exams

Exam #1: Units 1, 2 and 3
Exam #2: Units 4, 5 and 6
Exam #3: Units 7 and 8
Exam #4: Units 9, 10 and 11

Homework is required for this course, your final grade will be lowered one letter grade for each homework or lab assignment that is not completed.

Course Policies:

This course is comprised of textbook information as well as classroom notes. Students are expected to come to class prepared. It is imperative that you do the assigned homework. Attendance is important for success in this course and will be monitored closely. The class attendance system currently in effect at SIPI is used to indicate to students and their advisors of class status due to excessive absences. School sponsored activities will not count against the student if the instructor is notified before the absence. It is the student's responsibility to get assignments completed prior to the absence. If there is a problem, you need to visit with the instructor before or after class. If tardiness or attendance becomes a problem, the instructor reserves the right to drop you from this course. Please turn off your cell phones prior to entering class or lab.

Accommodations for students with special needs:

Southwestern Indian Polytechnic Institute complies with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990. Students with disabilities who need accommodations should make their request by contacting the Disability Service Coordinator.

Course Outline:

History of Environmental Science

1864 George Perkins Marsh

Pinchot

Rachel Carson

Environmental Geography

Brandt Line

First World

Second World

Third World

Fourth World

Regions of North America

Wilderness Northern

Agricultural Middle

Dry West

Forested West

Great Lakes and Industrial Northeast

Diverse South

Species to Ecosystem

Species

Population

Community

Ecosystem

Scientific Method

Observation

Hypothesis

Predict consequences of hypothesis

Collect Data

Experiment

Interpret

Draw Conclusion

Chemistry

Elements

Atoms

Atomic Number

Isotope

Organic Compounds

Cells

Matter Energy

Thermodynamics

First Law of Thermodynamics

Second Law of Thermodynamics

Life Energy

Photosynthesis

Cellular Respiration

Ecological Niche

Habitat

Niche

Natural Selection, Adaptation, and Evolution

Adaptation

Theory of Evolution

Natural Selection

Artificial Selection

Divergence

Convergence

Species Interactions and Community Dynamics

Predator Keystone Species

Competition

 Intraspecific

 Interspecific

Symbiosis

 Commensalism

 Mutualism

 Parasitism

Batesian Mimicry

Mullerian Mimicry

Cryptic Coloration

Food Chains

Food Webs

Trophic Levels

Biogeochemical Cycles

Carbon Cycle

Nitrogen Cycle

Phosphorous Cycle

Sulfur Cycle

Hydrologic Cycle

Community Structure

Edge Effects

Econtones

Community Transition

 Ecological Succession

 Primary Succession

 Pioneer Community

 Climax Community

 Secondary Succession

Introduced Species

Populations

 Regulations of Populations

 K and r strategist

 Population growth curves

Population continued

Human Populations

Energy

History of Energy production

Energy Sources

Renewable

Nonrenewable

Water and Air Quality

Water Use

Freshwater

Marine Water

Water Pollutants

The Atmosphere

Air Pollutants

Environmental Policies

Laws and Enforcement

Government Agencies

LAB SCHEDULE

The first labs 1-5 are done using the Nardoo CD, you will have the instructions printed out as part of your course handouts.

Lab 1- Parts 1,2,3 and 4 This lab teaches the student how to use the Nardoo CD.

Lab 2- Parts 1 & 2 Nardoo diversity and food webs

Lab 3- Effects of Blue Green Algae, Water Quality, Water Quality Index and Human Impact on Rivers.

Lab 4- Parts 1 & 2 Dissolved Oxygen and Temperature Changes on the Nardoo

Lab 5- Hazardous wastes along the Nardoo

The second half of the labs is done from your workbook. Please note that the titles are matched to the lab, lab numbers does not match the numbers in the workbook, i.e. Lab 6 is not Lab 6 in the workbook.

Lab 6

Exercise 1 INTRODUCTION TO LAB FORMAT

Answer questions at the end of the exercise. This is the only page that you need to send for credit.

Lab 7

Exercise 7 IS YOUR CAMPUS FRIENDLY TO WILDLIFE?

Answer data sheet 7.1 and questions. You may use a local college if you can't make it to NOC, last resort use a local park.

Lab 8

Exercise 9 HUMAN POPULATIONS - CHANGE IN SURVIVAL

Answer data sheet 9.1, 9.2 and 9.3 and answer questions at the end of the exercise. Make sure you follow the example given in the Lab Manual!!!

For pre-1900 obituaries use this website:

<http://www.rootsweb.com/~iadubuqu/obits/obits.html>

For the last 5 years you can use this website:

<http://obits.abqjournal.com/>

Make sure you research what a survivorship curve actually looks like, there are Type I, Type II and Type III curves. You will see that the pre-1900 is close to a Type III and the last 5 yrs resemble a Type I. You will recognize this when you graph your numbers. Make sure you scan your graph and send it in with this lab.

Lab 9 and 10

Exercise 17 ECONOMICS OF ENERGY CONSUMPTION

Part 1 answer data sheet 17.1

Part 2 answer data sheet 17.2 and answer the questions at the end of the exercise. You will need to type in current gas prices on the Gas Mileage section.