Virginia Western Community College
BIO 271
Introduction to Ecological Systems

Prerequisites

BIO 101

Course Description

Examines the basic biological, meteorological and geologic/geographic factors at play in determining various critical ecosystems. Emphasis on wetlands and wetlands reconstruction, and endangered and threatened species habitats, and aquatic systems. Remote sensing technology and use of GIS in ecological management will be examined.

Semester Credits: 4 **Lecture Hours: 3** **Laboratory/Recitation Hours: 3**

Required Materials

Textbooks:

The State of the Nation's Ecosystems. Heinz Center for Science, Economics, and the Environment. 2008 edition. Cambridge University Press. ISBN: 9781597264716

Wetland Sourcebook & Field Guide. Tiner. 2nd edition. Rutgers University Press. ISBN: 9780813536811 A Guide to Common Freshwater Invertebrates of North America. Voshell, Jr. 2002 edition. McDonald & Woodward. ISBN: 9780939923878

Course Outcomes

At the completion of this course, the student should be able to:

- Describe how large scale patterns of climatic variation in conjunction with geology and soils produce the diversity of ecosystems found on Earth.
- Explain patterns of species abundance and diversity, succession and the interactions among species and how these ecological concepts relate to biodiversity.
- Describe the trophic structure of communities, particular wetlands and aquatic systems.
- Demonstrate an understanding of the basic patterns of energy flow in ecosystems and be able to discuss differences in nutrient cycling between terrestrial and wetland ecosystems.
- Discuss how island biogeography concepts relate to endangered and threatened species habitat.
- Conduct preliminary wetland investigations, stream assessments and natural resources inventories using a combination of field observations and GIS data.
- Explain how remote sensing and GIS data are used to assess the state of various ecosystems in the United States and manage natural resources.

Topical Description

Week	Topic	Chapter(s)
1	Orientation/Introduction to Course State of Nation's Ecosystems	Syllabus Heinz – Chapter 1
2	Core National Indicators	Heinz – Chapter 2
3	Farmlands	Heinz – Chapter 4
4	Farmlands (continued) Forests	Heinz – Chapter 4 Heinz – Chapter 5
5	Forests (continued)	Heinz – Chapter 5
6	Fresh Waters	Heinz – Chapter 6
7	Grasslands and Shrublands Urban & Suburban Lands	Heinz – Chapter 7 Heinz – Chapter 8
8	Wetlands – Definition and Formation	Tiner – Chapters 1 & 3
9	Wetlands Hydrology Hydric Soils	Tiner – Chapter 2 Tiner – Chapter 4
10	Hydrophytic Vegetation Wetland Functions and Values	Tiner – Chapter 5 Tiner – Chapters 6 & 7
11	Wetland Types Wetlands: Wastelands and Watery Wealth	Tiner – Chapters 13 & 14 Tiner – Chapters 8 & 9
12	Freshwater Invertebrates	Voshell – pp. 1-55
13	Stream Monitoring Field Trip	Voshell – for ID and ecology
14	Water Quality Monitoring Stream Monitoring Field Trip	Assigned Readings
15	Stream Monitoring (Rain Date)	Assigned Readings
Exam Week	Final Comprehensive Exam	

Notes to Instructors

1. Departmental policy dictates that instructors do not allow students to keep tests.
2. A comprehensive final exam counting 15%-20% of the total grade will be given at the end of the semester.
3. The syllabus should state what the course grade will be based on, such as tests, quizzes, a comprehensive final exam, and any other assignments made by the instructor.
4. The VWCC Biology Department uses a 10-point grading scale.