SOUTHWESTERN COLLEGE
COURSE OUTLINE

School of: Mathematics, Science, and Engineering
Department: Life Sciences
Discipline: Biology
Course Designator and Number: BIOL 140
Title: Environmental Biology

Origination Date: 02/01/1985
Effective Date: 2014 Fall
Effective Catalog Year: 2014–2015
Units 3 **Lec** 3 **Lab** 0
Total Contact Hours: 54

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Total Contact Hours will be automatically entered by the CurricUNET based on lecture and lab hours entered.

4
Same as other course(s) designator(s),

5
Grading Basis: Grade or Pass/No Pass option available

6
This should always be zero. Students will need to petition if they want/need to repeat.
Repeatable: 0

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8
The Entry Skills section MUST be filled out before a course will populate in the drop-down menu in the Prerequisites/ Corequisite/Advisories section.
Corequisite:
Limitation on Enrollment:
Prerequisite:
Recommended Concurrent Enrollment:
Recommended Preparation:
ENGL 115 or equivalent;
RDG 158 or the equivalent skill level as determined by the Southwestern College Reading Assessment or equivalent

9
Use fragmented sentences and start each sentence with an action verb.
Course Description & Scope: (50 words or less)
Provides environmental biology with a global emphasis. Investigates environmental interrelationships and impacts of human activities on ecosystems and on global quality of life. Focuses on population dynamics, biological diversity, global environmental change, pollution, natural resources, impacts of agriculture, industrialization, technology, and energy use. Field trips may be required. [D; CSU; UC]

10
Must be one sentence only. Use Bloom's Taxonomy using 1-2 verbs.
Measurable Course Objectives and Minimum Standards, as Determined by Standards set by the instructor, at 70% Proficiency for a Grade of "C":

1. Student will apply the scientific thought process to the study of environmental biology by analyzing

current environmental issues.

2. Student will describe and analyze the nature of Earth's physical environment (atmosphere, lithosphere, and hydrosphere), including geologic processes and biogeochemical cycles.
3. Student will describe and analyze the nature of Earth's biosphere and ecosystems.
4. Student will describe and analyze characteristics of populations (growth curves, keystone species, density, abundance, carrying capacity, ecological stability, and community structure.)
5. Student will describe and explain processes of evolution and speciation.
6. Student will evaluate the importance of biological diversity, and assess current rates and causes of species extinction and habitat destruction.
7. Student will diagram energy flow through trophic pyramids, food chains and food webs, contrast types of producers and consumers, as well as analyze and describe global differences in biomass and productivity.
8. Student will compare and contrast international differences in ways humans impact their environments.
9. Student will survey and describe types of environmental pollution, as well as categorize and explain their sources, causes, and impacts on organisms and ecosystems.
10. Student will analyze and explain the principles of environmental sustainability, as well as describe and discuss changes individuals can make to improve local and global environmental health.

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Create topics based on objectives using at least two (2) bulleted sub-topics to demonstrate additional information for each topic.

Core Content to be covered in all sections:

1. Approximately 15% of course
   Environmental sciences
   - Scientific thought process, critical thinking and analysis of current issues
   - Changing environmental ethics and perspectives
   - Environmental and social justice
2. Approximately 4% of course
   Environmental economics and policies
   - U.S. and international economies and environmental policies
   - Economic value of natural resources, ecosystems, and biodiversity
   - Role and power of consumers
3. Approximately 4% of course
   Chemistry and the environment
   - Basic chemistry
   - Environmental sources of energy
   - Global biogeochemical cycles
4. Approximately 4% of course
   Biosphere
   - Ecosystems (communities and habitats)
   - Energy transfer through trophic levels, food chains, and food webs
   - Community structure, succession and biomes
5. Approximately 5% of course
   Biodiversity
   - Speciation, evolution, natural selection, and extinction of species
   - Role of species in ecosystems and the importance of biodiversity

- Factors that increase or decrease biodiversity
- Conservation biology

6. Approximately 5% of course

   Population structure and dynamics

   - Population ecology (size, abundance, distribution, reproductive strategies, growth patterns, and carrying capacity)
   - Competition for limited resources

7. Approximately 10% of course

   Human population biology

   - Age pyramids and regional demographics
   - Environmental impact
   - Ecologic footprint

8. Approximately 4% of course

   Lithosphere

   - Anatomy of the lithosphere
   - Reasons for declining percent of arable land available for agriculture or livestock
   - Soil degradation and conservation, erosion, and desertification
   - Use of fertilizers, persistent pesticides, and biological pest control

9. Approximately 4% of course

   Agriculture

   - Sustainable agriculture and food production
   - Preservation of pollinator species and use of non-native predator species
   - Impact of agriculture on ecosystems
   - Agricultural use of biotechnologies

10. Approximately 4% of course

    Urban growth

    - Urban growth, sprawl, and “smart” or “green” cities
    - Environmental impact
    - Vulnerability of coastal urban areas to catastrophic events

11. Approximately 4% of course

    Management of wild lands

    - Forests (resource management, fire policy, and sustainable forestry)
    - Public parks, wildlife refuges, and sanctuaries (size and design)
    - Invasive species

12. Approximately 5% of course

    Environmental pollution

    - Toxicology
    - Chemical pollutants
    - Mutagens, carcinogens, teratogens, and endocrine disrupters
    - Path of toxins through food chain (biological accumulation and magnification)
    - Risk assessment and management

13. Approximately 4% of course

    Hydrosphere

    - Hydrologic cycle and global water resources
    - Decline and degradation of water resources

- Unequal distribution of water

14. Approximately 10% of course

    Oceans
    - Ecosystems
    - Patterns of productivity
    - Conservation and human impact
    - Relationship with climate

15. Approximately 9% of course

    Atmosphere
    - Characteristics and relationship with climate
    - Pollution and greenhouse gases
    - Normal cycles of climate change
    - Estimates, predictions, and causes of abnormal climate change

16. Approximately 6% of course

    Energy
    - First law of thermodynamics
    - Second law of thermodynamics
    - Nonrenewable and renewable energy sources and their environmental impacts

17. Approximately 3% of course

    Waste management
    - Management of solid wastes, sewage, and water treatment
    - Disposal and recycling of industrial wastes
    - Pollution controls
    - Global impacts

NOTE: For specific details, see instructor's syllabus.

12 Click on all boxes that apply to the course.

Method of evaluation to determine if objectives have been met by students:

1. Quizzes
2. Service learning
3. Computer assignments
4. Oral presentations
5. Report notebooks
6. Role-playing participation in class activities
7. Essay
8. Problem solving
9. Class activities
10. Written assignments
11. Objective test
12. Student knowledge
13. Competency-based written and practical tests
14. Individual activity

15. Case studies

13 Use if additional methods of evaluation are identified.

Other Methods of evaluation:

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14 Use full sentences. Write as if you are speaking to the students. Provide length and delivery mode for each assignment. Do not write like objectives. Reading, Writing, and Critical Thinking assignments are mandatory for **ALL** courses.

Example of Assignments:

Reading

As preparation for next week's discussion, read Chapter 9, "Global Atmospheric Changes" in "Visualizing Environmental Science." Write a two-page (single-spaced, typed) analytical essay explaining an actual example or area of evidence used in current climatology models measuring the rate of global warming.

Writing

Write a three-page (single-spaced, type) analysis on the environmental ramifications of Japan's 2011 tsunami. Focus on one example or area of evidence and show its immediate and long-term environmental ramifications or implications. You will present your example or evidence to your peer team next week in class. Use a minimum of five resources, include in-text citations, as well as a "Literature Cited" section at the end of your paper.

Critical Thinking

After watching the Nova documentary "Earth from Space", present a logical, evidence-based argument to defend or oppose continued monitoring of Earth from space. Include and explain, in depth, actual examples and evidence to support your position. Include in-text citations and a "Literature Cited" section at the end of your paper. Your essay will help form the basis for our class discussion at the beginning of our next meeting.

15 Click on all boxes that apply to the course.

Instructional Methodology:

Requires a minimum of three (3) hours of work per unit, including class time.

1. Audiovisual
2. Discussion
3. Group activity
4. Individual assistance
5. Lecture
6. Other Methods
    1. Field trip activities

16 If textbooks are used, there must be at least one with a five year recency. MLA format must be used. Author's last name comes first for the first author only.

Required and major optional reading(s), including textbook(s) and software: (Author: Last name, First name. Title. 2nd ed. (or higher edition) Location: Publisher, Year)

Required:

- Berg, Linda, R., Hassenzahl, David M., and Mary Catherine Hager. Visualizing Environmental Science. 3rd ed. Hoboken, New Jersey: Wiley, 2011.ISBN: 978-0-470-569184

- Cunningham, William P., and Mary Ann Cunningham. Environment Science: A Global Concern. 12th ed. San Francisco, CA: McGraw-Hill Higher Education, 2012.ISBN: 978-0073383255
- Eathorne, Richard. Annual Editions Environment 13/14. 32nd ed. Dubuque, IA: McGraw Hill Professional, 2013.ISBN: 978-0073515625
- Withgott, Jay H. and Matthew Laposata. Essential Environment: The Science Behind the Stories. 4th ed. San Francisco, CA: Pearson Benjamin Cummings Publishing Co., 2012.ISBN: 978-0321752901
- Wright, Richard T., and Dorothy Boorse. Environmental Science: Toward a Sustainable Future. 12th ed. Upper Saddle River, New Jersey: Pearson Higher Education, 2013.ISBN: 978-0321811530

Optional:

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Codes

Is this an approved special class for students with disabilities? No Answer

Is this course a part of a cooperative work experience program? No Answer

Funding Agency Category: Y Not Applicable

Is this a basic skills course? No Answer

Course Offered: Variable

18 Please spell check your entries.