SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

# ACADEMIC AFFAIRS

Course Number: BIOL 113 Department: Biological Sciences

Course Title: Fund. Environmental Biology Semester: Spring Year: 1997

## Objectives/Competencies

| Course Objective | Competencies |
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| 1. Provide an overview of environmental problems. | 1. Define Environmental Biology.<br>2. Describe the biosphere and summarize the current state of the biosphere.<br>3. Identify the root causes of environmental problems.<br>4. Define sustainable society/resources.<br>5. Discuss 5 major environmental problems of the 20th Century.<br>6. Distinguish between an anthropocentric and a biocentric worldview. |
| 2. Understand basic concepts of ecosystem structure and function. | 1. Define ecosystem and list the 2 major components of any ecosystem.<br>2. Describe the basic processes that keep humans and all other organisms alive.<br>3. Identify and define the levels of ecological study.<br>4. Know the roles played by producers, consumers, and decomposers in the ecosystem and the interactions among them. |

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| | 5. List examples of producers, consumers, and decomposers.<br>6. Understand structure and workings of a food chain and food web.<br>7. Learn the carbon and water cycles.<br>8. Understand predator-prey cycles and interactions.<br>9. Other key terms and ideas: Symbiosis, carrying capacity, keystone resources, keystone species, limiting factors, primary and secondary succession. |
| 3. Learn world biomes. | 1. Define biome.<br>2. List 8 major world biomes, their geographic distribution and 5 characteristics of each type. |
| 4. Understand concepts regarding human population growth and dynamics. | 1. Explain exponential growth characteristics.<br>2. Discuss how population size is affected by birth, death, fertility, and migration rates.<br>3. Define demography.<br>4. Understand age structure diagrams and describe population momentum.<br>5. Argue each side of the Great Population Debate.<br>6. Explain differences in growth rates in More Developed Countries vs. Less Developed Countries.<br>7. Discuss ways that human population growth can be slowed. |
| 5. Discussion of air resources. | 1. List the layers that compose the atmosphere.<br>2. Define and discuss 6 major classes of air pollutants and |

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| | their sources.<br>3. Distinguish between primary and secondary pollutants.<br>4. Describe the effects of air pollutants on environmental and human health.<br>5. Understand the phenomenon of acid deposition.<br>6. Discuss ways to prevent and control air pollution.<br>7. Learn about important federal legislation controlling air pollutants.<br>8. Explain the phenomenon of global climate change (global warming).<br>9. Understand the potential long-term effects of global temperature increase on humans and biological diversity. |
| 6. Discussion of energy resources. | 1. Identify the three major types of fossil fuels and explain briefly how fossil fuels are formed.<br>2. Explain how energy consumption has changed in the United States over the past 200 years.<br>3. Learn the environmental effects of obtaining and burning fossil fuels.<br>4. Compare and contrast the various major and minor fossil fuels available worldwide.<br>5. Discuss challenges for the future regarding fossil fuel consumption. |
| 7. Discussion of water resources. | 1. List properties of water that enable it to support life.<br>2. Identify how water resources are classified and describe each classification.<br>3. Describe worldwide water availability and consumption |

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| | patterns.<br>4. Know eight categories of water pollution.<br>5. Summarize how both drinking water and wastewater are treated.<br>6. List current threats to groundwater, lakes, rivers, and marine waters. |
| 8. Understand the various threats to biological diversity. | 1. Explain habitat destruction, degradation, and fragmentation.<br>2. List examples of all three types of habitat alteration.<br>3. Know how changes in habitat affect biological diversity.<br>4. Understand the dangers posed by exotic species on native organisms.<br>5. Discuss the pros and cons of hunting. |
| 9. Discussion of government conservation policy and the Endangered Species Act. | 1. Understand early history of wildlife management in the United States.<br>2. Know key ideas regarding the following pieces of Environmental legislation: The Lacey Act (1900); The Migratory Bird Treaty Act (1916); Migratory Bird Conservation Act (1929); Migratory Bird Hunting Stamp Act (1934); Pittman-Robertson Act (1937); Dingell-Johnson Act (1939); National Environmental Policy Act (1976); CITES (1975).<br>3. Understand early history of the Endangered Species Act.<br>4. Summarize the objectives of the Endangered Species Act, categories of listed species, and enforcement of the Act. |
| 10. Conservation strategies and reserve design. | |

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| 11. Discuss future goal in Environmental Biology. | 1. Explain the difference between in situ and ex situ conservation strategies.<br>2. Learn the role of zoos, aquaria, and botanical gardens in the conservation effort.<br>3. Learn fundamentals of reserve design, including corridors, buffer zones, core areas, and sustainable reserves.<br>4. Differentiate between coarse-filter and fine-filter approaches to species conservation.<br><br>1. Class discussion on future direction of, and priorities in, Environmental Biology. |