**ESSEX COUNTY COLLEGE**

**Biology and Chemistry Division**

**BIO 220 *–* Introduction to Environmental Science**

**Course Outline**

**Course Number & Name:**  BIO 220 Introduction to Environmental Science

**Credit Hours:**  4.0 **Contact Hours:**  6.0 **Lecture:** 3.0 **Lab:**  3.0 **Other:**  N/A

**Prerequisites**:  Grade of “C” or better in BIO 103

**Co-requisites:** BIO 104 **Concurrent Courses:** N/A

**Course Outline Revision Date:**  Fall 2010

**Course Description**: An introduction to an interdisciplinary field that focuses on how different elements of the environment (the biological, chemical and the physical) interact and interrelate. Our study of environmental science will encompass various aspects of biology, chemistry, economics, hydrology, physics, law and other social sciences. Topical environmental issues like climate change, aquatic and terrestrial ecology, air and water pollution, world human population problems, and the unsustainable use of natural resources will be examined. Laboratory sessions include measurements of various environmental pollutants, fundamental lab exercises in ecology, analysis of environmental parameters, and descriptive and practical reinforcement of lecture material.

**Course Goals:** Upon successful completion of this course, students should be able to do the following:

1. describe the physical, chemical, and biological methods which measure the effects of various pollutants on the environment;
2. produce and analyze ecological and environmental data; and
3. explain human population growth concerns as they relate to sustainability issues and discuss how such growth may have potential effects on climate change.

**Measurable Course Performance Objectives (MPOs)**: Upon successful completion of t**h**is course, students should specifically be able to do the following:

1. Describe the physical, chemical and biological methods used to measure the effects of various pollutants on the environment:

1.1 *explain the separate and interrelated working of the hydrosphere, atmosphere, biosphere, and geosphere;*

1.2 *explain the hierarchical catergorization of life processes from the organism level to the viome level;* and

1.3 *use nutrient cycles to propose the effect of pollutants in the geosphere, hydrosphere, biosphere, and atmosphere*

**Measurable Course Performance Objectives (MPOs)** (continued):

2. Produce and analyze ecological and environmental data:

 2.1 *explain the chemistry involved in measuring pH, pO2, and BOD*; and

 2.2 *analyze soil and water samples for pH, pO2, and BOD levels both in the lab and in the field*

3. Explain human population growth concerns as they relate to sustainability issues and discuss how such growth may have potential effects on climate change:

 3.1 *define carrying capacity*;

3.2 *describe the age pyramid as it relates to human population growth and explain how difference in age distribution affects the use of natural resources;* and

3.3 *explain the argument of how human population growth has a causal relationship to climate change*

**Methods of Instruction**: Instruction will consist of lecture, discussion, laboratory procedures, data analysis, field studies, and class discussion.

**Outcomes Assessment:** All grading components are analyzed to determine the level of student performance on these assessment instruments in regards to meeting course objectives.  The results of this data analysis are used to guide necessary pedagogical and/or curricular revisions.

**Course Requirements:**

1. All students are required to attend classes.
2. All students are required to be punctual for class. (Latecomers distract both fellow students and the instructor). Attendance will be taken at the beginning at each class session.
3. All assignments are to be completed and handed in as scheduled. No assignment will be accepted if more than one (1) week late. Late submission must have prior instructor approval.
4. Each student must achieve a minimum grade of “C” (70% – 76% average) in order to pass this course.
5. No eating or drinking allowed in the lecture classroom. In addition, no food or drink can be brought into the laboratory classroom.
6. Children are not to be brought into the classroom. They can be a distraction to other students and any class discussions. Other arrangements are the responsibility of each student.
7. Cheating in any form or on any assignment is unfair to you and robs you on your right to learn through self-discipline, analysis and application of material to which you are exposed. Cheating requires an “F” grade and will be given for that specific assignment or in-class examination.
8. No make-up exams will be allowed without prior arrangements being made. In the rare case when a make-up exam is permitted, it must be taken when scheduled. **No make-up exams are allowed.**

9. Cell phone use is prohibited during lectures and examinations. Taping is permitted only for those students with proper documentation from the Office for Services for Students with Disabilities. Cell phones are strictly prohibited in the laboratory classroom.

**Methods of Evaluation:** Final course grades will be computed as follows:

 **% of**

**Grading Components final course grade**

* **3 or more Lecture Exams** (dates specified by the instructor)  **50** – **60%**

Lecture exams will show evidence of the extent to which students meet lecture-based course objectives.

* **3 or more Lab Exams** (dates specified by the instructor) **20 – 30%**

Lab exams will show evidence of the extent to which students meet laboratory-based course objectives.

* **Final Exam** **20 – 30%**

The **comprehensive** final exam will examine the extent to which students have synthesized all course material and have achieved both lecture and laboratory course objectives.

Note: The instructor will provide specific weights, which lie in the above-given ranges, for each of the grading components at the beginning of the semester.

**Academic Integrity:** Dishonesty disrupts the search for truth that is inherent in the learning process and so devalues the purpose and the mission of the College. Academic dishonesty includes, but is not limited to, the following:

* plagiarism – the failure to acknowledge another writer’s words or ideas or to give proper credit to sources of information;
* cheating – knowingly obtaining or giving unauthorized information on any test/exam or any other academic assignment;
* interference – any interruption of the academic process that prevents others from the proper engagement in learning or teaching; and
* fraud – any act or instance of willful deceit or trickery.

Violations of academic integrity will be dealt with by imposing appropriate sanctions. Sanctions for acts of academic dishonesty could include the resubmission of an assignment, failure of the test/exam, failure in the course, probation, suspension from the College, and even expulsion from the College.

**Student Code of Conduct:** All students are expected to conduct themselves as responsible and considerate adults who respect the rights of others. Disruptive behavior will not be tolerated. All students are also expected to attend and be on time for all class meetings. No cell phones or similar electronic devices are permitted in class and are not to be handled at all during laboratory. Please refer to the Essex County College student handbook, *Lifeline*, for more specific information about the College’s Code of Conduct and attendance requirements.

**Lecture Content Outline:** based on the text **Living in the Environment**, 17th edition, by Miller and Spoolman;published by Cengage, 2012; and the **Ecology Laboratory Manual**, by Darrell S Vodopich; published by McGraw-Hill, 2010.

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| **Week** | **Lecture Topics** | **Lab Activity** |
| 1 | Environmental Problems; Matter, Energy & Systems  | The Nature of Data |
| 2 | Ecosystems, Biodiversity and Evolution  | The Process of Science |
| 3 | Species Interactions and Population Control  | Soil Analysis**Lab Exam #1** |
| 4 | Climate and Aquatic Biodiversity **Lecture Exam #1** | O2/CO2 cycling |
| 5 | Sustaining Biodiversity: Species and Ecosystem Approaches  | Population Growth |
| 6 | Sustaining Aquatic Biodiversity; Pest Management  | Age Distribution & Survivorship |
| 7 | Water and Mineral Resources  | Terrestrial Plant Community Assessment**Lab Exam #2** |
| 8 | Nonrenewable and Renewable Energy Sources **Lecture Exam #2** | Stream Ecosystem Assessment |
| 9 | Environmental Hazards and Human Health  | Microcommunity Assessment |
| 10 | Climate Disruption and Water Pollution  | Plant and Animal Community Sampling |
| 11 | Hazardous Waste and Urban Sustainability   | Species Diversity**Lab Exam #3** |
| 12 | Economics and Environmental Sustainability **Lecture Exam #3** | Primary Productivity in an Aquatic Community |
| **Week** | **Lecture Topics** | **Lab Activity** |
| 13 | Politics and Environmental Sustainability  | Competition and Natural Selection |
| 14 | Ethics and Environmental Sustainability | Plant and Vertebrate Adaptations |
| 15 | Review and **Final Exam** on all course material covered in lectures and labs |  |

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Note: Lab Activities are subject to change.