**ESSEX COUNTY COLLEGE**

**Biology & Chemistry Division**

**BIO 104 – General Biology II**

**Course Outline**

**Course Number & Name:** BIO 104 General Biology II

**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 or placement

**Co-requisites:** None **Concurrent Courses:** None

**Course Outline Revision Date:**  Fall 2010

**Course Description:** A continuation of BIO 103, this course covers evolution, organization of cells intotissues and organs, organ systems, comparative physiological studies among plants and among animals, structure and function relationships.

**General Education Goals:** BIO 104 is affirmed in the following General Education Foundation Category: **Scientific Knowledge and Reasoning.** The corresponding General Education Goal is as follows: Students will use the scientific method of inquiry through the acquisition of scientific knowledge.

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

1. demonstrate knowledge of the fundamental concepts and theories that are the basis of the fields of genetics, biotechnology, evolution, ecology, plant and animal form and function;
2. utilize various qualitative and quantitative problem solving and critical thinking techniques to perform experimental procedures and analyze experimental data related to the fields listed above; and
3. utilize microscopes, UV/Vis spectrophotometer, basic laboratory glassware and other laboratory equipment effectively as tools in carrying out experiments related to areas described above.

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

1. Demonstrate knowledge of the fundamental concepts and theories that are the basis of the fields of genetics, biotechnology, evolution, ecology, plant and animal form and function:

* 1. *define and discuss the themes that connect the concepts of biology;*
  2. *describe how recombinant DNA technology is being used today in the treatment of disease, in agriculture and in animal husbandry;*
  3. *explain how evolution accounts for the diversity of life ;* and

1.4 *explain the form/function relationships that exist among plants and animals*

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

2. Utilize various qualitative and quantitative problem solving and critical thinking techniques to perform experimental procedures and analyze experimental data related to the fields listed above:

2.1 *construct and perform experiments investigating biological phenomena utilizing qualitative and quantitative lab equipment;* and

* 1. *collect and analyze the data generated from these experiments*

3. Utilize microscopes, UV/Vis spectrophotometer, basic laboratory glassware and other laboratory equipment effectively as tools in carrying out experiments related to areas described above:

3.1 s*afely use lab equipment listed in the production and analysis of data*

**Methods of Instruction**: Instruction will consist of a combination of lecture, class discussion, class activities, PowerPoint presentations, laboratory exercises, and data analysis.

**Outcomes Assessment:** Exam and laboratory exam questions are blueprinted to course objectives. A checklist rubric is used to score student application of lab skills relative to course objectives. Data are collected and 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:** All students are required to:

1. Attend class. Excessive absences or late arrivals negatively affect student understanding of material and, therefore, performance in the course.

2. Complete assigned reading and homework in a timely manner and regularly contribute to class discussions. It is important to note that science cannot be understood without doing a significant amount of outside study.

3. Take all exams and deliver presentations when scheduled. Note: Policies regarding make-up exams depend on the individual instructor of the class.

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

**% of**

**Grading Components final course grade**

* **3 or more Hourly Exams** (dates specified by the instructor)  **40 – 60%**

Exams will show evidence of the extent to which students meet course objectives, including but not limited to, identifying and applying concepts, analyzing and solving problems, estimating and interpreting results, and stating appropriate conclusions using correct terminology.

* 1 or more Cumulative Lab Exam & 1 or more Presentations 15 – 25%

The lab exams and presentations will assess the extent to which students meet course objectives, including, but not limited to, identifying and applying concepts of the scientific method, following correct laboratory procedure and performing accurate data analysis.

* **Final Exam** **25 – 35%**

The final exam will examine the extent to which students meet course objectives, synthesize course content and retain fundamental concepts.

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. Please refer to the Essex County College student handbook, *Lifeline*, for more specific information about the College’s Code of Conduct and attendance requirements.

**Course Content Outline:** The lecture component is based on the text **Biology**, 9th edition, by Campbell, Reece et al.; published by Pearson Benjamin Cummings; San Francisco, CA, 2010; ISBN-10 #: 0-558-33604-3. The laboratory component of the course is based on the manual **Biology in the** **Laboratory**, 3rd edition – customized for Essex County College, by Helms, Helms, Kosinski and Cummings; published by W H Freeman and Company; USA, 2002; ISBN #: 0-7167-5597-1.

**Week Chapter/Topics/Lab Exercises**

1 CHAPTER 16 The Molecular Basis of Inheritance

CHAPTER 17 From Gene to Protein

2 CHAPTER 20 Biotechnology

CHAPTER 21 Genomes and Their Evolution

3 CHAPTER 22 Descent With Modification: A Darwinian View

Lab 1: Mendelian Inheritance in Humans

4 **HOURLY EXAM I**

CHAPTER 23 The Evolution of Populations

Lab 2: DNA Isolation

5CHAPTER 24 The Origin of Species

Lab 3: DNA Analysis

6 CHAPTER 25 The History of Life on Earth

Lab 4: Bioinformatics

7 CHAPTER 40 Basic Principles of Animal Form and Function

Lab 5: Directional Selection

8 CHAPTER 42 Circulation and Gas Exchange

Lab 6: Fossil Taxonomy

9 **HOURLY EXAM II**

CHAPTER 43 The Immune System

Lab 7: Human Population Changes

10 CHAPTER 50 Sensory and Motor Mechanisms

Lab 8: Sheep Brain Dissection

11 CHAPTER 26 Phylogeny and the Tree of Life

Lab 9: Fetal Pig Dissection

12 **HOURLY EXAM III**

CHAPTER 35 Plant Structure, Growth, and Development

Lab 10: Electrocardiograph

**Week Chapter/Topics/Lab Exercises**

13 CHAPTER 53 Population Ecology

Lab 11: Blood Pressure

14 CHAPTER 54 Community Ecology

Lab 12: Histology

15 Continue unfinished chapters

**CUMULATIVE LAB EXAM**

Review for Final Exam

16 **FINAL EXAM**