

Washtenaw Community College Comprehensive Report

BIO 103 General Biology II Proposed Start Semester: Spring/Summer 2011

Course Cover

Division: Math, Natural and Behavioral Sciences

Department: Life Sciences

Discipline: Biology

Course Number: 103

Org Number: 12100

Full Course Title: General Biology II

Transcript Title: General Biology II

Is Consultation with other department(s) required: No

Publish in the Following: College Catalog , Time Schedule , Web Page

Reason for Submission: Three Year Review / Assessment Report

Change Information:

Course description

Outcomes/Assessment

Other: Gen Ed

Rationale: Update information.

Proposed Start Semester: Spring/Summer 2011

Course Description: This course analyzes the processes and mechanisms in biological systems including genetics, ecology, evolution, animal behavior and cell energetics. BIO 103 with BIO 101 provides a comprehensive survey of biological concepts and shows the interrelationship of topics covered from the molecular to the biome level. This course is required for the Biology/Pre-Medicine program. Students who have taken high school chemistry with a grade of C or better may have the chemistry prerequisite waived.

Course Credit Hours

Variable hours: No

Credits: 4

Lecture Hours: Instructor: 45 **Student:** 45

Lab: Instructor: 45 **Student:** 45

Clinical: Instructor: 0 **Student:** 0

Other: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 90 **Student:** 90

Repeatable for Credit: NO

Grading Methods: Letter Grades

Audit

Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

Requisites

Prerequisite

Academic Reading and Writing Levels of 6; one year high school chemistry or CEM 090 and BIO 101; minimum grade "C" all BIO, CEM, and high school requirements

General Education

MACRAO

MACRAO Science & Math

General Education Area 4 - Natural Science

Assoc in Applied Sci - Area 4

Assoc in Science - Area 4

Assoc in Arts - Area 4

Request Course Transfer**Proposed For:****Student Learning Outcomes**

1. Recognize and identify basic concepts relating to the process of evolution; including microevolution, macroevolution, evidence for evolution, allopatric speciation and evolution as science.

Assessment 1**Assessment Tool:** Ten core questions per test will be used.**Assessment Date:** Winter 2011**Assessment Cycle:** Every Three Years**Course section(s)/other population:** all**Number students to be assessed:** 50-100% from each section**How the assessment will be scored:** item analysis of test questions.**Standard of success to be used for this assessment:** 75% answers correct for each outcome.**Who will score and analyze the data:** department faculty.

2. Recognize and identify basic concepts relating to the ecological concepts of symbiosis, community interactions, succession, world biomes and aquatic biomes.

Assessment 1**Assessment Tool:** Ten core questions per test will be used.**Assessment Date:** Winter 2011**Assessment Cycle:** Every Three Years**Course section(s)/other population:** all**Number students to be assessed:** 50-100% from each section**How the assessment will be scored:** item analysis of test questions.**Standard of success to be used for this assessment:** 75% answers correct for each outcome.**Who will score and analyze the data:** department faculty.

3. Recognize and identify basic concepts relating to animal behavior; including instinct, various types of learning, imprinting, behavioral genetics, mating behaviors, imprinting, migration and pheromones.

Assessment 1**Assessment Tool:** Ten core questions per test will be used.**Assessment Date:** Winter 2011**Assessment Cycle:** Every Three Years**Course section(s)/other population:** all**Number students to be assessed:** 50-100% from each section**How the assessment will be scored:** item analysis of test questions.**Standard of success to be used for this assessment:** 75% answers correct for each outcome.**Who will score and analyze the data:** department faculty.

4. Recognize and identify basic concepts relating to cell energetics including ATP, enzymes, oxidation-reduction reactions, kinetic and potential energy, cell respiration and photosynthesis.

Assessment 1

Assessment Tool: Ten core questions per test will be used.

Assessment Date: Winter 2011

Assessment Cycle: Every Three Years

Course section(s)/other population: all

Number students to be assessed: 50-100% from each section

How the assessment will be scored: item analysis of test questions.

Standard of success to be used for this assessment: 75% answers correct for each outcome.

Who will score and analyze the data: department faculty.

5. Recognize and identify basic concepts relating to genetics; including a detailed review and discussion of mitosis and meiosis, DNA and RNA structure, the process of DNA replication, the process of protein synthesis, and the overall ideas of genetic manipulation, including DNA fingerprinting.

Assessment 1

Assessment Tool: Ten core questions per test will be used.

Assessment Date: Winter 2011

Assessment Cycle: Every Three Years

Course section(s)/other population: all

Number students to be assessed: 50-100% from each section

How the assessment will be scored: item analysis of test questions.

Standard of success to be used for this assessment: 75% answers correct for each outcome.

Who will score and analyze the data: department faculty.

6. Perform laboratory procedures related to lecture topics.

Assessment 1

Assessment Tool: Written lab reports and instructor observation of these skills in lab.

Assessment Date: Winter 2011

Assessment Cycle: Every Three Years

Course section(s)/other population: all sections.

Number students to be assessed: 50-100% of students per section.

How the assessment will be scored: departmentally developed rubric.

Standard of success to be used for this assessment: 75% of students rated as Good or better.

Who will score and analyze the data: department faculty.

Course Objectives

1. Evolution - Recognize the definition of evolution. Recognize the questions concerning replicating molecules (RNA and DNA) and their influence on evolution. Identify how the first cells and multicelled organisms may have formed. Recognize the contributions Charles Darwin and Richard Dawkins made to evolution. Recognize and identify ideas regarding the Hardy-Weinberg theorem. Identify and recognize the five agents of evolutionary change. Recognize the concepts of sexual selection. Recognize how the term "fitness" is used regarding evolution. Recognize the three basic forms of evolution (stabilizing, directional, disruptive). Identify and recognize the evidence which supports evolution. Recognize and identify the "biological species" concept and its inherent problems. Recognize other

definitions of the term "species." Recognize allopatric speciation.

Methods of Evaluation

Exams/Tests

Lab Activity, Report or Test

Matched Outcomes

1. Recognize and identify basic concepts relating to the process of evolution; including microevolution, macroevolution, evidence for evolution, allopatric speciation and evolution as science.

6. Perform laboratory procedures related to lecture topics.

2. Ecology - Recognize the concept of a "biological community." Identify various biological communities in Michigan. Distinguish between the individualistic and holistic concept of communities. Recognize the concept of a habitat. Recognize the concept of a niche. Identify interspecific competition. Recognize how interspecific competition can lead to competitive exclusion. Identify resource partitioning. Recognize how predation affects prey populations. Recognize the various ways that predation affects evolution. Recognize various plant and animal defenses against predators. Identify the process of coevolution and its effects on both participants. Recognize the examples of the three basic forms of symbiosis. Identify definitions of and recognize examples of keystone species. Differentiate between primary and secondary succession and recognize various examples. Recognize the definition of ecosystem. Recognize the definition of a biome. Identify what influences biome productivity.

Methods of Evaluation

Exams/Tests

Lab Activity, Report or Test

Matched Outcomes

2. Recognize and identify basic concepts relating to the ecological concepts of symbiosis, community interactions, succession, world biomes and aquatic biomes.

6. Perform laboratory procedures related to lecture topics.

3. Ecology continued - Recognize the names and features of the eight major biomes of the world. Identify the characteristics of freshwater habitats (ponds and lakes). Identify and recognize the characteristics of the three major biotic zones in a pond or lake. Recognize the difference between aquatic and terrestrial ecosystems.

Methods of Evaluation

Exams/Tests

Lab Activity, Report or Test

Matched Outcomes

2. Recognize and identify basic concepts relating to the ecological concepts of symbiosis, community interactions, succession, world biomes and aquatic biomes.

6. Perform laboratory procedures related to lecture topics.

4. Behavioral Biology - Identify the definition of behavior. Identify the definition of ethology. Recognize Fixed Action patterns. Recognize the various aspects of behavioral genetics. Identify the definition of learning. Recognize the definition and examples of nonassociative learning. Recognize the definition and examples of associative learning. Recognize parent-offspring interactions. Identify examples of imprinting. Recognize interactions between instinct and learning. Recognize the characteristics of animal cognition. Identify the definition and examples of migration behavior. Recognize various aspects of communication between animals. Identify the various types of communication in social groups. Recognize various reproductive strategies found in the animal kingdom.

Methods of Evaluation

Exams/Tests

Lab Activity, Report or Test

Matched Outcomes

3. Recognize and identify basic concepts relating to animal behavior; including instinct, various types of learning, imprinting, behavioral genetics, mating behaviors, imprinting, migration and pheromones.

5. Cell Energetics - Recognize the difference between kinetic and potential energy. Identify the definitions and examples of oxidation and reduction. Recognize the energy requirements of exergonic and endergonic reactions. Recognize the importance of activation energy and how it can be altered. Recognize the basic structure of enzymes, how they function and can be affected. Recognize the structure of ATP and how it is able to "drive" biological reactions. Recognize the function and importance of ATP synthase. Recognize the two ways in which cells generate energy and indicate which is a more efficient process. Recognize and identify information regarding photons and the visible light spectrum involved in the process of photosynthesis. Recognize and identify components and their function briefly, and then in detail, the four stages of harvesting energy: glycolysis, pyruvate oxidation, the Krebs cycle (citric acid cycle) and the electron transport chain.

Methods of Evaluation

Exams/Tests

Lab Activity, Report or Test

Matched Outcomes

4. Recognize and identify basic concepts relating to cell energetics including ATP, enzymes, oxidation-reduction reactions, kinetic and potential energy, cell respiration and photosynthesis.

6. Cell Energetics continued - Recognize how a cell processes organic molecules other than glucose. Identify the molecules and processes of fermentation. Identify the levels of

organization in a typical leaf. Recognize the equation that summarizes the overall process of photosynthesis. Recognize the accessory pigments involved in photosynthesis (other than chlorophyll a and b). Identify and recognize the details of the stages of the light reactions of C3 photosynthesis. Identify and recognize the details of the Calvin cycle. Recognize the relationship between a chloroplast and a mitochondrion.

Methods of Evaluation

Exams/Tests

Lab Activity, Report or Test

Matched Outcomes

4. Recognize and identify basic concepts relating to cell energetics including ATP, enzymes, oxidation-reduction reactions, kinetic and potential energy, cell respiration and photosynthesis.

7. Genetics - Review (in detail) the processes of mitosis and meiosis. Recognize the structure of the nucleotide subunits of DNA and RNA. Recognize the structure of the DNA double helix and be able to answer questions regarding the concept of antiparallel strands. Recognize and identify the steps and molecules associated with DNA replication, first in overview and then in detail. Recognize the three kinds of RNA in terms of structure and function. Recognize the "central dogma." Recognize and identify the steps and molecules associated with DNA transcription and translation, first in overview and then in detail. Recognize and be able to answer questions regarding the genetic code. Identify the definition of genetic engineering. Recognize the importance and function of restriction endonucleases.

Methods of Evaluation

Exams/Tests

Lab Activity, Report or Test

Matched Outcomes

5. Recognize and identify basic concepts relating to genetics; including a detailed review and discussion of mitosis and meiosis, DNA and RNA structure, the process of DNA replication, the process of protein synthesis, and the overall ideas of genetic manipulation, including DNA fingerprinting.

8. Genetics - Recognize and be able to answer questions regarding the five stages of a basic genetic engineering experiment: DNA cleavage and separation, production of recombinant DNA, cloning, screening and finding the gene of interest. Recognize and describe cDNA. Recognize the importance of the Polymerase chain reaction. Recognize the steps in Southern blotting. Recognize and identify questions relating to restriction fragment length polymorphisms (RFLPS). Recognize and be able to interpret a "genetic fingerprint."

Methods of Evaluation

Exams/Tests

Lab Activity, Report or Test

Matched Outcomes

5. Recognize and identify basic concepts relating to genetics; including a detailed review and discussion of mitosis and meiosis, DNA and RNA structure, the process of DNA replication, the process of protein synthesis, and the overall ideas of genetic manipulation, including DNA fingerprinting.
6. Perform laboratory procedures related to lecture topics.

New Resources for Course

Course Textbooks/Resources

Textbooks

Johnson, G., Losos, J.. *Living World*, 6 ed. McGraw Hill, 2010

Manuals

Periodicals

Software

Other

Equipment/Facilities

Reviewer	Action	Date
Originator:	<i>Originator</i>	
Department Chair/Area Director: <i>Anne Heise</i>	<i>Recommend Approval</i>	<i>Nov 05, 2010</i>
Dean: <i>Martha Showalter</i>	<i>Recommend Approval</i>	<i>Nov 05, 2010</i>
Vice President for Instruction: <i>Stuart Blacklaw</i>	<i>Approve</i>	<i>Dec 02, 2010</i>
President:		