I. **OVERVIEW**

_The following information will appear in the 2016 - 2017 catalog_

**BIO 111—GENERAL BIOLOGY**

4 UNITS

*54.00 Lecture Hours, 54.00 Lab Hours*

Introduction to principles of life, including reproduction, heredity, development, evolution, historical development of biology, molecular biology, and ecology. Not open to students who have completed BIO 101. Not a substitute for BIO 101. Field trips might be required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) (CC: BIOL 17) **General Education:** (MJC-GE: A ) (CSU-GE: B2, B3 ) (IGETC: 5B, 5C )

II. **LEARNING CONTEXT**

_Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:_

A. **COURSE CONTENT**

1. **Required Content:**

   A. Science of life
      1. Characteristics of living organisms
      2. Origins of life
      3. History of biology

   B. Cellular biology
      1. Types of cells: prokaryote and eukaryote
      2. Structure and function of cells
      3. Tissues and organs

   C. Chemistry and life processes
      1. Introduction to basic chemistry
      2. Organic compounds
      3. Diffusion, osmosis, active transport
      4. Photosynthesis
      5. Respiration: anaerobic and aerobic

   D. Reproduction and development
      1. Asexual vs. sexual reproduction

   Field trips might be required.

   Not repeatable.
2. Alternation of generation
3. Human reproduction and development
4. Plant reproduction and development
5. Aging processes

E. Genetics
   1. Mendel's laws
   2. Various types of inheritance
   3. Human genetics
   4. Mutation and cancer

F. Ecology
   1. Principles of ecology
   2. Population ecology
   3. Ecosystems and biomes
   4. Environmental issues

G. Evolution and taxonomy
   1. Principles of classification
   2. Phylogeny and taxonomy

H. Current topics in biology
   I. Scientific method, involving hypotheses and theories

2. **Required Lab Content:**

A. Composition of lab reports
B. Scientific Method
C. Metric System
D. Biological molecules
E. Microscopy
F. Cellular biology
G. Osmosis and Diffusion
H. Enzymes
I. Photosynthesis
J. DNA replication
K. Mitosis and meiosis
L. Genetics
M. Evolution
N. Microbes and protista
O. Fungi and plants
P. Animal diversity
Q. Human reproduction

B. HOURS AND UNITS

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<tr>
<th>INST METHOD</th>
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<td>Lect</td>
<td>54</td>
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C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture
2. Use of photographic slides, microscope slides, videos, living and preserved specimens
3. Instructor facilitated classroom discussion
4. Demonstrations
5. Field trips

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS
   Time spent on coursework in addition to hours of instruction (lecture hours)
   A. Complete weekly laboratory reports
   B. Compose discussion based on findings from experiments
   C. Weekly chapter readings or online searches to support course content
   D. Weekly pre-laboratory reading to prepare students for lab work

2. EVIDENCE OF CRITICAL THINKING
   Assignments require the appropriate level of critical thinking
   A. Laboratory clinics given at the end of laboratory activities to confirm that students can progress to the next activity.
   B. Laboratory will require students to answer questions from lecture exams, homework, and laboratory that require multistep processing of information (such as applying the results of a lab on fermentation to course content regarding anaerobic fermentation).
C. Actual question (sample) of critical thinking: Compare and contrast eukaryote and prokaryote types of cells.

D. Critical thinking example: Describe the germ theory of disease, adding to this description current beliefs prior to the work of Pasteur and Koch.

E. Critical thinking question: How can we use our understanding of the immune system to fight cancer?

F. Critical thinking example: Compare DNA translation with DNA transcription.

E. TEXTS AND OTHER READINGS (TYPICAL)


III. DESIRED LEARNING

A. OBJECTIVES

1. **Required Objectives**

   Upon satisfactory completion of this course, the student will be able to:

   a. describe biology and its role in society and culture.

   b. explain the fundamental principles and generalizations of biology.

   c. use the scientific method in problem solving.

   d. interpret data from a scientific experiment and formulate conclusions.

   e. review the historical background and relate this to modern biology.

   f. describe chemical and physical reactions as they relate to biology and life’s processes.

   g. use appropriate tools to study biological principles.

   h. analyze and propose solutions for current topics, such as bioethics in biology.

   i. use the laboratory to formulate ideas relating to a scientific experiment.

   j. describe adaptation and natural selection as evidenced in various aspects of biology.

   k. cite the interactions of organisms with the biotic and abiotic environment in an ecosystem.

   l. review the hierarchical structure and function as it relates to the organization of life from the atom to the biosphere.

   m. cite the various types of reproduction and development in plants and animals.

   n. diagram the principles of genetics and the various common types of inheritance.

   o. describe the important energy forming and releasing processes of organisms.

   p. compare and contrast eukaryotic and prokaryotic cells and life forms.
q. describe the principles of classification and phylogenetic systems.

2. Lab Objectives
   Upon satisfactory completion of the lab portion of this course, the student will be able to:
   
a. describe and use the scientific method to solve problems.
b. use the laboratory to formulate ideas relating to a scientific experiment.
c. analyze data from a scientific experiment and formulate conclusions.
d. use appropriate tools to study biological principles.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION
   1. Lab write ups
   2. Quizzes and problem-solving activities
   3. Homework
   4. Mid-term exams
   5. Lab exams

B. SUMMATIVE EVALUATION
   1. Comprehensive final exam
BIO - 111: General Biology

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Investigate historical and current scientific theories in chemistry, general biology, ecology and molecular science.
2. Proficiently use scientific laboratory equipment and protocols.
3. Conduct, record, and report on the results of scientific experiments.
4. Compare and contrast animal and plant cell structures as demonstrated in student prepared laboratory drawings and responses to exam questions.
5. Use a compound light microscope to locate, focus, and estimate the size of specimens on microscope slides.
DE Addendum

PREPARED BY: Elizabeth McInnes
COURSE PREFIX AND NUMBER: BIO 111
COURSE TITLE: General Biology
EFFECTIVE DATE: 05/02/2016

DISTANCE EDUCATION: MIXED MODALITIES/HYBRID COURSE Some, but not all, class time is replaced by distance education. Students must have access to a computer and the Internet. Course has one or more on-campus meetings.

Describe this hybrid option. Typically, what parts of the course are done face-to-face? Typically, what parts are done online?
Lecture materials and discussion questions will be held online using such programs as camtasia or screencast-o-matic. Weekly discussion and activities will be done face to face.

METHOD OF INSTRUCTION:
- E-mail
- Viewing Text-based Materials
- Web or Computer-based Activities
- Written Assignments
- Reading Course Materials
- Quizzes, Exams, and Surveys

CHECK BELOW THE METHODS THAT WILL ENSURE APPROPRIATE INSTRUCTOR/STUDENT CONTACT AS REQUIRED BY TITLE 5:

DESCRIBE HOW THE METHODS SELECTED WILL ALLOW STUDENTS TO MEET THE COURSE LEARNING OUTCOMES OF THE COURSE:
These methods will support an active learning environment. Discussions are interactive and encourage active learning, they also encourage students to analyze the ways that other students think; this can assist students in becoming better critical thinkers while meeting the learning goals of the course.

ARE THE METHODS OF EVALUATION DIFFERENT FROM THOSE LISTED ON THE APPROVED COURSE OUTLINE? IF SO, IN WHAT WAYS DO THEY DIFFER?
No