Piedmont Technical College

Course Information Sheet

Course Title: Biological Sciences I
Course Prefix/Number: BIO 101

COURSE-SPECIFIC GRADE CALCULATION
Advanced notification of any changes will be provided to the student.

Letter grades are assigned according to the numerical average achieved using the following scale: A = 90-100; B = 80-89; C = 70-79; D = 60-69; F = 59 and below; W = Withdrew.

The Numerical Average will be determined by the following:

60% - Lecture Exams 1-5: (12% each): The single lowest exam from Exams 1 - 4 can be replaced by the mandatory cumulative final Exam 5*

* The lowest exam grade from lecture exams 1-4 will be replaced with exam 5 grade. Exam 5 will be cumulative. (Questions will come from Unit 1-4 content).*

Participation: 10% (This can include graded homework, online projects, pop quizzes, class participation, discussion postings and/or oral presentations)

Lab: 30% Average of all laboratory assignments.

* Under extenuating circumstances, if a second lecture exam or if lecture exam 5 is missed, make-ups for the respective exam will be administered as fill in the blank / short answer questions with no associated word bank and spelling will count.

* For all other work (homework, classwork, labwork, and lab quizzes) there will be no makeup work allowed for missed assignments and assignments will not be accepted late.

* Any Lecture exam grade(s) assigned a zero as a result of academic misconduct will not be replaced with the Lecture Exam 5 grade.

August 18, 2021
EXPLANATION OF SPECIFIC PROCTORED EXAM INFORMATION
Instructor may use exam proctoring software, such as Honorlock or Respondus, to proctor lecture and lab exams. A computer containing a working Web Camera, microphone and stable internet connection will be required for completion of exams requiring proctoring. Fully online sections will include at least one proctored exam.

LAB/CLASSROOM SAFETY STATEMENT
Piedmont Technical College Laboratory Safety Statement: Lab Safety Statement (www.ptc.edu/courseinfo/safety.pdf)

Classroom Safety Statement:
For laboratory sessions, students must wear garments that extend at least to the knee and must wear closed-toe shoes.

COURSE CONTENT OUTLINE
Advanced notification of any changes will be provided to the student.

Modules/Units
Module/Unit 1

Competencies:

Unit 1: Upon completion of this unit the student should be able to:

- Identify and describe the properties of life
- Describe the levels of organization among living things
- List example of different sub disciplines in biology
- Identify the shared characteristics of the natural sciences
- Understand the process of scientific inquiry
- Describe the goals of basic science and applied science
- Describe matter and elements
- Describe the interrelationship between protons, neutrons, and electrons, and the ways in which electrons can be donated or shared between atoms
- Describe the properties of water that are critical to maintaining life
- Describe the ways in which carbon is critical to life
- Explain the impact of slight changes in amino acids on organisms
- Describe the four major types of biological molecules
- Understand the functions of the four major types of molecules

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Module/Unit 2

Competencies:

- Describe the fundamental aspects of enzymes and their importance to metabolic processes.
- Describe the complete degradation of glucose to release ATP
- Describe the fundamental energy and wavelength characteristics of the electromagnetic spectrum.
- Describe the formation of energy rich components by plants, including the light and dark reaction (C3, C4, and CAM pathways).

Module/Unit 3

Competencies:

Unit 3: Upon completion of this unit the student should be able to:

- Describe the fundamental aspects of DNA structure, function and production.
- Identify the components of the cell cycle including the stages of mitosis.
- Identify the component of meiosis, with particular attention the processes in human males and females.
- List and explain Mendel’s principles of inheritance.
- Escribe non-Mendelian patterns of inheritance.
- Explain fundamental gen regulation at the molecular level for prokaryotes and eukaryotes.

Module/Unit 4

Competencies:

Unit 4: Upon completion of this unit, the student should be able to:

- Describe the currently accepted theories for the origin of life on earth.
- Identify and list examples of major evolutionary patterns and mechanisms
- List and describe currently accepted theories concerning animal behavior of individuals, groups and species.
• Identify and describe the ecology of populations. Communities and ecosystems.
• Identify and describe the major ecosystems of the biosphere.

**Module/Unit 5**

Competencies:

Upon completion of the following exercises, the student should be able to describe the procedures done, to collect the data from the exercises, to analyze the collected data, and to discuss the results.

• Lab 1: Measuring, Conversions, and Scientific Data
• Lab 2: The Scientific Method and Scientific Journals
• Lab 3: Biological Molecules
• Lab 4: Using the Spectrophotometer
• Lab 5: Functions of Enzymes
• Lab 6: The Microscope and Cell Structure
• Lab 7: Diffusion, Osmosis and Surface Area to Volume of a Cell
• Lab 8: Cell Division in Plant and Animal Cells
• Lab 9: Photosynthesis and Cellular Respiration
• Lab 10: DNA, RNA, and Protein Synthesis
• Lab 11: Patterns of Inheritance
• Lab 12: Natural Selection
• Lab 13: Ecology
• Lab 14: Taxonomy

For online courses the laboratory exercises require the use of the eSciences kit and will include the following topics listed for a typical 15 week semester (terms of other durations will have their own unique sequencing). Indicated lab numbers (e.g. Lab 1, Lab 3, etc.) reference the titles within eScience. Upon completion of the following exercises, the student should be able to
describe the procedures done, to collect the data from the exercises, to analyze the collected data, and to discuss the results.

- Lab 1: Introduction to Science; Personal Safety
- Lab 2: Measurements
- Lab 3: Introduction to the Microscope
- Lab 4: Scientific Method
- Lab 5: How Enzymes Work
- Lab 6: Osmosis
- Lab 7: Diffusion
- Lab 8: Photosynthesis
- Lab 9: Cellular Respiration
- Lab 10: Biotechnology
- Lab 11/12: Genetics
- Lab 13: Human Genetics
- Lab 14: Evolution