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:

Lecture exam average: 60%

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

Lab: 30% Traditional class: Average of all laboratory assignments.

Extra Credit (required): Term papers for up to 10 points on the final course grade. Please see the term paper guidelines posted in D2L for more information. This is a required component of the course.

EXPLANATION OF SPECIFIC PROCTORED EXAM INFORMATION
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 includes chapters 1 through 5 of the text. Upon completion of this unit the student should be able to:

- Describe the relationships between matter, atoms, and molecules, and discuss various aspects of atomic and molecular structure, as they relate to living things.
- Name the four classes of biomolecules and how they are used in living things.
- Describe the components of typical animal and plant cells. Explain how substances move into and out of cells.
- List and discuss the various characteristics of living things.
- Define and describe the scientific method and means of hypothesis formation and testing.

Module/Unit 2

Competencies:

Unit 2 includes chapters 6, 7, and 8 of the text. Upon completion of this unit the student should be able to:

- Describe the fundamental aspects of enzymes and their importance to metabolic processes.
- Describe the complete degradation of glucose to release ATP energy, including glycolysis, anaerobic respiration, the Krebs' cycle, and oxidative phosphorylation.
- Describe the fundamental energy and wavelength characteristics of the electromagnetic spectrum.
- Describe the formation of energy rich compounds by plants, including the light reaction and the dark reactions (C3, C4, and CAM pathways).

Module/Unit 3

Competencies:

Unit 3 includes chapters 23 through 26 of the text. 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 components of meiosis, with particular attention to the processes in human males and females.

• List and explain Mendel's principles of inheritance.

• Describe non-Mendelian patterns of inheritance.

• Explain fundamental gene regulation at the molecular level for prokaryotes and eukaryotes

**Module/Unit 4**

Competencies:

Unit 4 includes chapters 27 and 33 through 37 of the text. 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

• Identify and describe the ecology of populations, communities, and ecosystems

• List and describe currently accepted theories concerning animal behavior of individuals, groups, and species

**Module/Unit 5**

Competencies:

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.

• Week 1 Lab 1 Introduction to Science; Lab 2 General Lab Safety; Appendix: Good Lab Techniques
- Week 2 Lab 3 Chemical Bonding Fundamentals; Lab 5 The Chemistry of Life
- Week 3 Lab 4 Introduction to the Microscope Lab 10 Cell Structure and Function Biology Video: Introduction to the Microscope Biology Video: Cells
- Week 4 Lab 6 Diffusion; Lab 7 Osmosis
- Week 5 Lab 8 Enzymes
- Week 6 Lab 9 Cellular Respiration Biology Video: Cellular Respiration
- Week 7 Lab 20 Energy and Photosynthesis; Biology Video: Photosynthesis
- Week 8 Midterm Laboratory Period
- Week 9 Lab 11 Mitosis; Biology Video: Stop-Motion Mitosis Lab 12 Meiosis; Biology Video: Stop-Motion Meiosis
- Week 10 Lab 13 DNA and RNA; Biology Video: DNA and RNA
- Week 11 Lab 14 Mendelian Genetics; Biology Video: Stop-Motion Mendelian Genetics
- Week 12 Lab 15 Population Genetics
- Week 13 Lab 27 Ecology of Organisms; Biology Video: Environmental Biology
- Week 14 Lab 28 Ecological Interactions
- Week 15 Final Laboratory Period