BSC 2010 – Principles of Biology 1 Lecture (3 credits)
Fall 2013-1 Term (August-December 2013)
Reference #755502

Day/Time: Lecture: Tuesdays and Thursdays, 9:50-11:05 AM

Classroom: Room G-215, Building G, MDC-Homestead Campus

Instructor: Professor Mark Chiappone
Building B, Room B-119, Homestead Campus
On Campus: (305) 237-5073
Mobile Phone: (305) 898-5390
E-mail: mchiappo@mdc.edu
Web page URL: http://faculty.mdc.edu/mchiappo

Office and Campus Hours: Tuesdays and Thursdays: 7-8 AM, 1-2 PM, 7:30-9 PM

Course Description: This is the first in a sequence of two courses that deal with the principles of modern biology. The course covers scientific process, the chemistry of life, the basics of metabolism, cell theory, cellular respiration, photosynthesis, and classical and molecular genetics. Pre-requisite: ENC 1101, Pre- or Co-requisites: BSC 2010L and CHM 1045. (3 contact hr. lecture).

General Education Outcomes: (1) Communicate effectively using listening, speaking, reading, and writing skills.
(2) Use quantitative analytical skills to evaluate and process numerical data.
(3) Solve problems using critical and creative thinking and scientific reasoning.
(4) Formulate strategies to locate, evaluate, and apply information.
(7) Demonstrate knowledge of ethical thinking and its application to issues in society.
(8) Use computer and emerging technologies effectively.
(10) Describe how natural systems function and recognize the impact of humans on the environment.

Service Learning: Field trip opportunities may periodically be offered to provide service-learning hours with several environmental organizations. The Institute for Civic Engagement and Democracy (ICED) web site (www.mdc.edu/iced) provides further details.
Resources

Textbook: Campbell Biology, 9th edition by Reece et al. (2011) with access code for registering online at www.masteringbiology.com

Course Web Site: Your professor's web site is available at http://faculty.mdc.edu/mchiappo and provides links to the course syllabus, PowerPoint lectures, and the practice tests for the chapters to be covered during the course. The web site accompanying the textbook is available at www.masteringbiology.com and provides supplemental instruction, as well as your mandatory online quizzes for each chapter to be covered.

Learning Support Lab: You are encouraged to visit the Learning Support Lab or Computer Courtyard if you do not have access to a computer with internet connection off campus. You will need a computer with Internet connection to access the online quizzes on Mastering Biology.

Online Course ID MBCHIAPPONE20131 (used to establish access to course web site at www.masteringbiology.com) provides access to supplementary materials that go along with your textbook, along with online quizzes.

Class Procedures

Attendance: There will be a sign-in sheet for every class to verify attendance. If you cannot attend class, please notify the instructor via email or telephone. Class participation counts as 5% of your grade; therefore, poor attendance will be reflected in the final grade. Poor attendance may result in a student being dropped from the course.

PERSONAL COMMUNICATION DEVICES: Pagers and cellular phones are NOT conducive to the educational process in this class. I will assume that any interruption due to a personal communication device will be justifiable based on a real emergency and that the student being summoned will need to leave immediately to deliver a baby, attend to the dying, retrieve an injured child from daycare, or otherwise take immediate action which necessitates leaving. Such devices used during any exam will result in an automatic zero.

Supplementary Materials: An access code with every new textbook allows students to access course compass at www.masteringbiology.com. This web site is an assessment-driven system that accompanies the main textbook by providing chapter guides, eTutors, MP3 Tutors, and Discovery Channel video clips.

Review Sessions: The lecture notes in PowerPoint and the practice tests are available online on your professor’s faculty web page at http://faculty.mdc.edu/mchiappo. Cumulative exam questions will be partially drawn from questions on the practice tests.
Grading Procedure

Components:

80% Cumulative Exams: four cumulative exams, each 20% of the final grade, covering three (3) to five (5) chapters each. Exams will consist of approximately 50-100 questions partially drawn from sample questions available on your instructor’s web site and the Mastering Biology online questions. Exams will be returned the following class and will not be graded on a curve. Except for unusual circumstances, no make-up exams will be provided. Therefore, if you miss an exam, a zero will be recorded for that particular exam.

10% Mastering Biology Online Quizzes: There are online quizzes for each chapter we will cover that are available at www.masteringbiology.com. Online quizzes must be taken by the due dates specified on your course web site. Quizzes consist of multiple-choice questions for each chapter.

10% In-class Quizzes: There is an in-class quiz for each chapter that may or may not be given to test your learning progress of key concepts. Quizzes will consist of 5-10 questions that may be multiple-choice, true-false, or short answer at the beginning or end of class. There are no make-ups for any missed quizzes.

Participation: a sign-in sheet will be available to verify attendance. You are expected to have read the material that will be covered before lecture and to participate in class discussions.

Weighted grade formula: Overall average = 0.10 * (online quiz average) + 0.10 * (in-class quiz average) + 0.80 * (exam average).

Grading Scale: A = 90-100, B = 80-89, C = 70-79, D = 60-69, F = 0-59

No pluses or minuses will be given. It is the responsibility of the student to withdraw from the course by the appropriate deadline if the student wishes to receive a grade of W.

Important Dates for the Fall 2013-1 Term

Friday, August 30: Last Day to Change Courses without Penalty; Withdraw from classes with 100% refund; Register, add, drop, or change sections of credit courses with instructor or department approval

Wednesday, November 6: Last Day to Withdraw with a Grade of W

Friday, December 13: Last Day of Classes for the Fall 2013-1 Term

Sunday, December 22: Final course grades available on MyMDC
## BSC 2010 – Principles of Biology 1 Lecture (3 credits)

**Fall 2013-1 Tentative Course Schedule**

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<tr>
<th>Class #</th>
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<tr>
<td>1</td>
<td>T  8/27</td>
<td>Introduction Chapter 1</td>
<td>18</td>
<td>R  10/24</td>
<td>Chapter 12</td>
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BSC 2010 – Principles of Biology 1 Lecture (3 credits)
Chapter Reading Assignments from Biology, 9th edition

Exam #1 Material

Chapter 1: Introduction: Themes in the Study of Life

Unit 1: The Chemistry of Life
Chapter 2: The Chemical Context of Life
Chapter 3: Water and Life
Chapter 4: Carbon and the Molecular Diversity of Life
Chapter 5: The Structure and Function of Large Biological Molecules

Exam #2 Material

Unit 2: The Cell
Chapter 6: A Tour of the Cell
Chapter 7: Membrane Structure and Function
Chapter 8: An Introduction to Metabolism
Chapter 9: Cellular Respiration and Fermentation
Chapter 10: Photosynthesis

Exam #3 Material

Unit 3: Genetics
Chapter 12: The Cell Cycle
Chapter 13: Meiosis and Sexual Life Cycles
Chapter 14: Mendel and the Gene Idea
Chapter 15: The Chromosomal Basis of Inheritance

Exam #4 Material

Unit 3: Genetics
Chapter 16: The Molecular Basis of Inheritance
Chapter 17: From Gene to Protein
Chapter 18: Regulation of Gene Expression
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Course Competencies

Competency 1: Upon successful completion of this course, the student will demonstrate knowledge of the scientific process and the nature of biology by:

a. Identifying the components of the scientific process and recognizing that testable hypotheses for the basis of all scientific inquiry.
b. Describing the hierarchical nature of life, from atoms to ecosystems and explaining the idea that each level of life has emergent properties.
c. Recognizing the cell as the basic unit of all life and that DNA is the molecule responsible for the continuity of life.
d. Explaining the idea that structure and function are correlated at all levels of biological organization.
e. Explaining that all living things interact with both the living and the non-living components of their environment.
f. Recognizing that dynamic balance is maintained in living systems through regulatory mechanisms.

Competency 2: Upon successful completion of this course, the student will demonstrate knowledge of the chemistry of life by:

a. Identifying the components of matter (such as atoms, elements, compounds, and molecules), recognizing that atoms are the fundamental unit of matter, and describing basic atomic structure.
b. Comparing and contrasting the basic types of bonds that occur within and between molecules and describing how bonds are made and broken in chemical reactions.
c. Describing the polar nature of water and explaining how water’s properties play a role in the evolution and continuity of life on Earth.
d. Explaining the nature of organic compounds, including the basic functional groups and the relationship between monomers and polymers.
e. Analyzing the component structure of carbohydrates, lipids, proteins, and nucleic acids and understanding how these molecules function in living systems.

Competency 3: Upon successful completion of this course, the student will demonstrate knowledge of cell structure and function by:

a. Differentiating between the two basic cell types, describing their differences and similarities, and explaining their evolutionary relationship.
b. Analyzing the importance of sub-cellular compartmentalization and multi-cellularity in the evolution of life on Earth.
c. Identifying the sub-cellular organelles and describing their structure and functions.
d. Explaining the fluid mosaic nature of membrane structure and the basic processes responsible for transport across membranes.
e. Explaining the function of cell division, and identifying and describing the major steps in the cell cycle, including the processes of mitosis and cytokinesis.
f. Describing how cell cycles are regulated at the molecular level.

Competency 4: Upon successful completion of this course, the student will demonstrate knowledge of the nature of metabolism, photosynthesis, and cellular respiration by:

a. Describing the nature of metabolism, the types of energy available to living systems, and the basic laws that govern the transformations of energy.
b. Analyzing the relationship between entropy and free energy, and explaining how life affects both.
c. Illustrating the structure of ATP and explaining how it functions in cells to link exergonic and endergonic pathways.
d. Explaining the structure and function of enzymes, as well as how they are regulated.
e. Discussing the significance of cellular respiration and explaining how it relocates electrons to yield ATP.
f. Identifying the steps of cellular respiration and describing its component processes including glycolysis, the Krebs cycle, the electron transport chain, and chemiosmosis.
g. Comparing and contrasting the component chemical processes and efficiencies of cellular respiration and fermentation.
h. Explaining the function of photosynthesis, its evolutionary significance, and its importance to the continuation of life on our planet.
i. Describing the structure and function of the cellular components required for the process of photosynthesis.
j. Analyzing the steps of photosynthesis, including the light-dependent reactions and the Calvin cycle, in order to understand how organic molecules are assembled from inorganic ones.
Competency 5: Upon successful completion of this course, the student will demonstrate knowledge of genetics by:

a. Summarizing the nature of heredity and explaining how it is governed by the structure and function of chromosomes.
b. Comparing and contrasting sexual and asexual reproduction, and describing the advantages and disadvantages of both.
c. Identifying and describing the steps of meiosis and explaining how meiosis increases genetic variation, the raw material for evolution.
d. Describing the work of Gregor Mendel and explaining how he derived the basic principles of heredity.
e. Paraphrasing the basic rules of probability and illustrating how they can be used to predict the outcome of genetic crosses.
f. Distinguishing between Mendelian and non-Mendelian inheritance and describing patterns resulting from both.
g. Describing the work of T.H. Morgan and how it relates to the phenomenon of gene linkage and sex linkage.

Competency 6: Upon successful completion of this course, the student will demonstrate knowledge of the structure and function of DNA by:

a. Describing the structure of DNA and the processes of replication, transcription, and translation.
b. Explaining the semi-conservative nature of DNA replication and how nitrogen base pairing and the participation of various enzymes ensure the adequacy of this process.
c. Listing and describing the steps in the process of transcription, as well as the structure and function of the molecules involved.
d. Discussing the nature of the genetic code and explaining how it governs the process of translation.
e. Listing and describing the steps in the process of translation, as well as the structure and function of the molecules involved.
f. Describing the nature and consequences of point and chromosomal mutations.
g. Comparing and contrasting the structure and function of viral and bacterial genomes.
h. Comparing and contrasting gene expression in prokaryotes and eukaryotes and analyzing the evolutionary significance of these differences and similarities.