

**MERCER COUNTY COMMUNITY COLLEGE
DIVISION OF SCIENCE AND HEALTH PROFESSIONS**

**GENERAL BIOLOGY I (BIO 101) – 4 CREDITS
COURSE SYLLABUS**

Professor of Biology – Bruce R. Chorba

DAY AND EVENING CLASSES:

Lecture and Discussion: 3 hours/week

Laboratory Experiments: 3 hours/week

REQUIRED TEXTBOOK:

Biology, Eighth Edition, 2008

Neil A. Campbell and Jane B. Reece

Pearson Benjamin Cummings

REQUIRED LABORATORY MANUAL:

Explorations in Basic Biology, Eleventh Edition, 2008

Stanley E. Gunstream

Pearson Benjamin Cummings

CATALOG DESCRIPTION:

Fundamental concepts, theoretical principles, and practical applications of modern Biology. An introductory college level biology course with emphasis on chemical biology, cell biology, and plant biology. Laboratory exercises stress the development of skills in basic lab techniques, reinforce lecture topics, and introduce supplemental topics. Experiments involve careful observations, measurements, data collection and analysis.

PREREQUISITES:

High school biology or BIO 100; high school chemistry or CHE 100.

COREQUISITES:

BIO 101 Lab, MAT 141 or equivalent, and ENG 101.

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Office Hours: Posted on the bulletin board adjacent to office

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BIO 101 COURSE SYLLABUS

PHIOLOSOPHY OF THE COURSE:

General Biology I (BIO 101) is intended to provide you with an initial exposure to a broad realm of fundamental concepts in the biological sciences. This course will assist you in attaining a basic understanding of biological principles, and it will help you to develop essential skills in these areas. The lecture presentations and discussions, laboratory experiments and exercises, lab quizzes, lab reports and lab skill tests, textbook reading assignments, detailed focus questions and major tests will provide you with an integrated selection of learning activities which can lead you to success.

I think that it is extremely important to emphasis that you, however, are ultimately responsible for your own level of learning. It is you who will decide and determine how much time and effort will be devoted to this course and consequently how much you will learn from it.

MAJOR TESTS:

All major tests covering the lecture and textbook content will be given in class. You must take these major tests at the times they are normally scheduled as indicated in this course syllabus. It is your responsibility to be present to take and complete all three major tests. Your absence will constitute a zero score on any missed major test. Each major test can be taken one time only and there normally will be no make-ups. If you have an emergency, it is important that someone contact me about your situation as soon as possible. All major tests will follow a 70 question multiple choice format. **The questions will be taken from your textbook reading assignments and lecture presentations with Very Substantial Emphasis placed on the written Focus Questions that will be distributed to you during the Semester.**

GRADING PROCEDURE:

The Final Grades for BIO 101 will be based on the total accumulation of your earned points. All three major tests covering the lecture and textbook material, all laboratory quizzes, lab reports and lab skill tests will contribute to the total number of possible points that are available for you to earn during this semester.

Because the laboratory component is critical towards satisfying the educational requirements of BIO 101, any student missing 3 laboratory sessions will receive an "F" (Failure) final grade for the semester unless the student has already officially withdrawn from the course. There are no exceptions to this policy. Missed laboratory sessions cannot be made up, therefore, any potential concerns should be discussed in advance with your laboratory instructor before they can become an issue. Enjoy the lab as you experience the process of science.

% of Total Points Earned:

93 – 100
90 – 92
87 – 89
83 – 86
80 – 82
77 – 79
70 – 76
60 – 69
0 – 59

Final Course Grade:

A
A-
B+
B
B-
C+
C
D
F

BIO 101 COURSE SYLLABUS

LECTURE TOPICAL OUTLINE AND TEXTBOOK READING ASSIGNMENTS

Chapter 1 Introduction: Themes in the Study of Life p 1 – 27

- I. Themes Connect the Concepts of Biology
- II. The Core Theme: Evolution Accounts for the Unity, Diversity, and Adaptations of Life
- III. Scientists use Two Main Forms of Inquiry in their Study of Nature

Chapter 2 The Chemical Context of Life p 30 – 45

- I. Matter Consists of Chemical Elements in Pure Form and in Combinations Called Compounds
- II. An Element's Properties Depend on the Structure of its Atoms
- III. The Formation and Function of Molecules Depend on Chemical Bonding Between Atoms
- IV. Chemical Reactions Make and Break Chemical Bonds

Chapter 3 Water and The Fitness of The Environment p 46 – 57

- I. The Polarity of Water Molecules Results in Hydrogen Bonding
- II. The Emergent Properties of Water Contribute to Earth's Fitness For Life
- III. Acidic and Basic Conditions Affect Living Organisms

Chapter 4 Carbon and The Molecular Diversity of Life p 58 – 67

- I. Organic Chemistry is the Study of Carbon Compounds
- II. Carbon Atoms Can Form Diverse Molecules by Bonding to Other Atoms
- III. A Small Number of Chemical Groups Are Key to the Functioning of Biological Molecules

Chapter 5 The Structure and Function of Large Biological Molecules p 68 – 91

- I. Macromolecules Are Polymers Built From Monomers
- II. Carbohydrates Serve as Fuel and Building Materials
- III. Lipids Are a Diverse Group of Hydrophobic Molecules
- IV. Proteins Have Many Structures Resulting in a Wide Range of Functions
- V. The Nucleic Acids Store and Transmit Hereditary Information

FIRST MAJOR TEST: Covers the Material in Chapters 1, 2, 3, 4 and 5 with Very Substantial Emphasis Placed on the Focus Questions that Will Be Distributed to You During the Semester for These Specific Chapters. The Test Will Consist of 70 Multiple Choice Questions.

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LECTURE TOPICAL OUTLINE AND TEXTBOOK READING ASSIGNMENTS

Chapter 6 A Tour of the Cell p 94 – 124

- I. To Study Cells, Biologists Use Microscopes and the Tools of Biochemistry
- II. The Eukaryotic Cell's Genetic Instructions Are Housed in the Nucleus and Carried Out By the Ribosomes
- III. The Endomembrane System Regulates Protein Traffic and Performs Metabolic Functions in the Cell
- IV. The Cytoskeleton is a Network of Fibers that Organizes Structures and Activities in the Cell
- V. Extracellular Components and Connections Between Cells Help Coordinate Cellular Activities

Chapter 7 Membrane Structure and Function p 125 – 141

- I. Cellular Membranes Are Fluid Mosaics of Lipids and Proteins
- II. Membrane Structure Results in Selective Permeability
- III. Passive Transport is Diffusion of a Substance With No Energy Investment
- IV. Active Transport Uses Energy to Move Solutes Against Their Gradients
- V. Bulk Transport Across the Plasma Membrane Occurs by Exocytosis and Endocytosis

Chapter 8 An Introduction to Metabolism p 142 – 161

- I. An Organism's Metabolism Transforms Matter and Energy, Subject to the Laws of Thermodynamics
- II. ATP Powers Cellular Work by Coupling Exergonic Reactions to Endergonic Reactions
- III. Enzymes Speed Up Metabolic Reactions by Lowering Activation Energy Barriers
- IV. Regulation of Enzyme Activity Helps Control Metabolism

Chapter 11 Cell Communication p. 206 – 227

- I. External Signals Are Converted to Responses Within the cell
- II. Reception: A Signaling Molecule Binds to a Receptor Protein, Causing It to Change Shape
- III. Transduction: Cascades of Molecular Interactions Relay Signals from Receptors to Target Molecules in the Cell
- IV. Response: Cell Signaling Leads to Regulation of Transcription or Cytoplasmic Activities
- V. Apoptosis or Programmed Cell Death Integrates Multiple Cell Signaling Pathways

Chapter 12 The Cell Cycle p 228 – 245

- I. Cell Division Results in Genetically Identical Daughter Cells
- II. The Mitotic Phase Alternates With Interphase in the Cell Cycle
- III. The Eukaryotic Cell Cycle Is Regulated By a Molecular Control System
- IV. Loss of Cell Cycle Molecular Controls in Cancer Cells Grown in Culture

SECOND MAJOR TEST: Covers the Material in Chapters 6, 7, 8, 11 and 12 with Very Substantial Emphasis Placed on the Focus Questions that Will Be Distributed to You During the Semester for These Specific Chapters. The Test Will Consist of 70 Multiple Choice Questions.

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LECTURE TOPICAL OUTLINE AND TEXTBOOK READING ASSIGNMENTS

Chapter 10 Photosynthesis p 185 – 205

- I. Photosynthesis Converts Light Energy to the Chemical Energy of Food
- II. The Nature of Sunlight and Photosynthetic Pigments
- III. Alternative Mechanisms of Carbon Fixation Have Evolved in Hot, Arid Climates

Chapter 35 Plant Structure, Growth and Development p 738 – 754

- I. The Plant Body Has a Hierarchy of Organs, Tissues, and Cells
- II. Meristems Generate Cells for New Organs
- III. Primary Growth Lengthens Roots and Shoots
- IV. Secondary Growth Adds Girth to Stems and Roots in Woody Plants

Chapter 37 Soil and Plant Nutrition p 785 – 800

- I. Soil Is a Living, Finite Resource
- II. Plants Require Essential Elements to Complete Their Life Cycle
- III. Plant Nutrition Often Involves Relationships with Other Organisms

Chapter 38 Angiosperm Reproduction and Biotechnology p 801 – 820

- I. Flowers, Double Fertilization, and Fruits are Unique Features of the Angiosperm Life Cycle
- II. Flowering Plants Reproduce Sexually, Asexually, or Both
- III. Humans Modify Crops by Breeding and Genetic Engineering

THIRD MAJOR TEST: Covers the Material in Chapters 10, 35, 37 and 38 with Very Substantial Emphasis Placed on the Focus Questions that Will Be Distributed to You During the Semester for These Specific Chapters. The Test Will Consist of 70 Multiple Choice Questions.

BIO 101 COURSE SYLLABUS

LABORATORY GUIDELINES AND SAFETY PROCEDURES

During the first laboratory class your lab instructor will call your attention to the safety procedures to be followed in the General Biology Laboratory. Be sure you become familiar with the location and proper use of each of the following basic safety equipment:

Eyewash	Fire Extinguishers
Fire blanket	Emergency Electric Power Shut Off Switch
Faucets and Sinks	Soap and Paper Towels
Electrical Outlets	Natural Gas Connections
Room Exits	Trash Cans
Biohazards Container	Broken Glass Container

The following are the general guidelines and procedures which should be followed during each of your laboratory classes:

- Please use the Amphyll (disinfectant) solution on the lab work-tables both before you begin and after you have completed your lab class.
- Please be certain to wear latex, plastic, or rubber gloves as well as safety glasses when appropriate. Please stay alert and attentive during the entire lab class.
- Please be careful not to cut yourself or your partner with any instruments. **Never Cut Toward Yourself** and put the instruments down when not in use. Your lab instructor will demonstrate the proper handling and use of any appropriate laboratory equipment.
- In the event of a cut or injury of any kind, please notify your laboratory instructor immediately.
- Please be certain to **Wash Your Hands Well** with soap and water prior to leaving the lab for any reason. Also, please do not smoke, eat, drink or bite your nails while in the laboratory.
- Please be certain that you read and understand the details in those sections on preparing for the laboratory, working in the laboratory, and laboratory safety and housekeeping that are included in the required lab manual for the course.
- Please note that although dangerous chemicals may occasionally have to be utilized in our laboratory, always read the labels on the containers and follow all of the instructions carefully.
- Please turn off your cell phone before entering the lab.

BIO 101 COURSE SYLLABUS

SCHEDULE OF LAB EXPERIMENTS AND EXERCISES

Week of Semester	Title of Laboratory and Type of Evaluation	Lab Manual Exercise Number	Lab Manual Page Numbers
1	<u>Orientation</u>	1	3 – 14
2	<u>The Microscope</u> Lab Quiz or Lab Report # 1 on Orientation	2	15 – 28
3	<u>Chemical Aspects</u> Lab Quiz or Lab Report # 2 on the Microscope	4	47 – 58
4	<u>Enzymes</u> Lab Quiz or Lab Report # 3 on Chemical Aspects	6	71 – 78
5	<u>Cellular Respiration and Fermentation</u> Lab Quiz or Lab Report # 4 on Enzymes	8	93 – 105
6	<u>Diffusion and Osmosis</u> Lab Quiz or Lab Report # 5 on Cellular Respiration	5	59 – 69
7	<u>The Cell</u> Lab Quiz or Lab Report # 6 on Diffusion and Osmosis AND Review of Previous Lab Experiments and Exercises For the First Lab Skills Test	3	31 – 46
8	<u>FIRST LAB SKILLS TEST</u> : Covers the Material on the Labs Conducted from Weeks # 1 to 7		

BIO 101 COURSE SYLLABUS

SCHEDULE OF LAB EXPERIMENTS AND EXERCISES

Week of Semester	Title of Laboratory and Type of Evaluation	Lab Manual Exercise Number	Lab Manual Page Numbers
9	<u>Prokaryotes and Protists</u>	10	121 – 134
10	<u>Green, Brown and Red Algae</u>	11	135 – 146
	Lab Quiz or Lab Report # 7 on Prokaryotes and Protists		
11	<u>Fungi</u>	12	147 - 158
	Lab Quiz or Lab Report # 8 on Algae		
12	<u>Photosynthesis</u>	7	79 – 91
	Lab Quiz or Lab Report # 9 on Fungi		
13	<u>Terrestrial Plants</u>	13	159 - 172
	Lab Quiz or Lab Report # 10 on Photosynthesis		
14	<u>Structure of Flowering Plants</u>	31	391 – 402
	Lab Quiz or Lab Report # 11 on Terrestrial Plants		
	AND		
	Review of Previous Lab Experiments and Exercises		
	For the Second Lab Skills Test		
15	<u>SECOND LAB SKILLS TEST: Covers the Material on the Labs Conducted from Weeks # 9 to 14</u>		

BIO 101 COURSE SYLLABUS

INDIVIDUAL EFFORT:

Please keep in mind that General Biology I (BIO 101) is a college level course for those students who are willing to work diligently to improve their level of biological knowledge. We can accomplish a great deal together, but only if you make a personal commitment to the course and plan on giving it your best efforts for the entire semester.

ACADEMIC INTEGRITY STATEMENT:

Any student who (a) knowingly represents the work of others as his/her own; (b) uses or obtains unauthorized assistance in the execution of any academic work; or (c) gives fraudulent assistance to another student is guilty of cheating. Violators will be penalized in accordance with established college regulations, policies, and procedures. You are encouraged to obtain a copy of the college's "Student Calendar/Handbook Rights & Responsibilities" and read this document carefully.

CLASSROOM CONDUCT:

It is your responsibility to attend all class sessions. If you miss a class for any reason, you are responsible for all of the content that was covered, for any announcements that may have been made and for acquiring any materials or documents that may have been distributed. It is expected that you will be punctual for all the classes. If occasionally you enter the class after it has begun, it is courteous to select a seat close to where you entered the room so that you do not disrupt the class.

COMMON COURTESY:

You are expected to follow what are considered ordinary rules of common courtesy during all class sessions. For example, engaging in private conversations during class time is distracting to other students as well as to your instructor. Leaving class early without having informed your instructor prior to the beginning of the class is inappropriate. Leaving class and then returning while the class is in session is not acceptable behavior either. Disruptive behavior of any type will not be tolerated. **Also, please turn off any cell phones, beepers, pagers, or similar electronic devices at the beginning of each class session.** This will prevent other students as well as your instructor from being distracted by these devices.

PERSONAL NOTE:

With these understandings I welcome you into a college environment in which a sense of community, pride, and mutual respect will be sustained. We are here to collaborate and to work cooperatively and learn together. Good luck in your study of Biology during its golden age. I sincerely hope that you enjoy your overall classroom experiences in General Biology I.

Lastly, I reserve the right to modify and alter this course syllabus at any time during the semester as may be professionally necessary and appropriate.

BIO 101 COURSE SYLLABUS

DETERMINING YOUR GRADE: When you receive your results of each graded major test, laboratory quiz, lab skills test, or lab report, please write these points below on the line under the appropriate heading. **In this way you will be able to objectively determine your Grade at any time during the semester including your Final Grade.**

THREE MAJOR TESTS:

- (1) First Major Test: Maximum of 70 points available – Your earned points = _____
(2) Second Major Test: Maximum of 70 points available – Your earned points = _____
(3) Third Major Test: Maximum of 70 points available – Your earned points = _____

210 Total Major Test Points available - Your Total Earned Test Points = _____

Lecture Classes Attended:

- (1) 90-100% of Classes: Maximum of 15 Points- Your Earned Points=_____
(2) 80-89% of Classes: Maximum of 10 Points- Your Earned Points=_____
(3) 70-79% of Classes: Maximum of 5 Points- Your Earned Points= _____

ELEVEN LABORATORY QUIZZES OR LAB REPORTS: VALUE 15 POINTS EACH

Your Earned Points For Each Quiz or Lab Report:

- | | | |
|----------|----------|-----------|
| 1. _____ | 5. _____ | 9. _____ |
| 2. _____ | 6. _____ | 10. _____ |
| 3. _____ | 7. _____ | 11. _____ |
| 4. _____ | 8. _____ | |

165 Total Lab Quiz and Lab Report Points available – Your Total Earned Points = _____

TWO LABORATORY SKILLS TESTS: VALUE 30 POINTS EACH

Your Earned Points For Each Lab Skills Test:

1. _____ 2. _____

60 Total Lab Skills Test Points available - Your Total Earned Points = _____

Your Total Earned Points in the Lecture Component (225) = _____.

Your Total Earned Points in the Lab Component (225) = _____.

Your Total Earned Points in the Course = _____, Divided by the Total Points Available in the Course: 450. Then Multiplied by 100 = _____%.

YOUR GRADE OR FINAL GRADE IN BIO 101 = _____.

Revised May 2008