



CREDIT COURSE OUTLINE

I. COVER PAGE

(1) BIOL 1 _____ (2) PRINCIPLES OF BIOLOGY _____ (3) 4 _____
 Number Title Units

(4) Lecture / Lab Hours: Total Course Hours <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Total Lec hours:</td> <td style="width: 10%;"></td> <td style="width: 30%; text-align: center;">3.00</td> </tr> <tr> <td>Total Lab hours:</td> <td></td> <td style="text-align: center;">2.00</td> </tr> <tr> <td>Total Contact hours:</td> <td></td> <td style="text-align: center;">87.00</td> </tr> </table> Lec will generate <u>0</u> hour(s) outside work. Lab will generate <u>0</u> hour(s) outside work.			Total Lec hours:		3.00	Total Lab hours:		2.00	Total Contact hours:		87.00	(8) Classification: <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;"></td> <td style="width: 30%;">Degree applicable:</td> <td style="width: 40%; text-align: center;">X</td> </tr> <tr> <td></td> <td>Non-degree applicable:</td> <td></td> </tr> <tr> <td></td> <td>Basic skills:</td> <td></td> </tr> </table> (9) RC Fulfills AS/AA degree requirement: (area) General education category: Area A Natural Sciences Major: BIOLOGICAL SCIENCE LIBERAL ARTS & SCIENCES Certificate of: Certificate in:				Degree applicable:	X		Non-degree applicable:			Basic skills:	
Total Lec hours:		3.00																					
Total Lab hours:		2.00																					
Total Contact hours:		87.00																					
	Degree applicable:	X																					
	Non-degree applicable:																						
	Basic skills:																						
(5) Grading Basis: Grading Scale Only X Pass/No Pass option Pass/No Pass only			(10) CSU Baccalaureate: X (11) Repeatable: (A course may be repeated three times) 0																				
(6) Advisories: ENGL 1A - READING AND COMPOSITION			(7) Pre-requisites (requires C grade or better): MATH 103 Corequisites:																				

(12) Catalog Description:
 Topics covered include the cellular and chemical basis of life, organ systems, genetics, evolution and the origin of life, ecology and environmental concerns. This course is recommended for the pre-professional and life science majors.

II. COURSE OUTCOMES:

(Specify the learning skills the student demonstrates through completing the course and link critical thinking skills to specific course content and objectives.)

Upon completion of this course, students will be able to:

- A. evaluate comparative anatomy and physiology in living organisms.
- B. apply the scientific method to situations that need evaluation and recommendations.
- C. use inductive and deductive reasoning in any environmental or ecological issue.

III. COURSE OBJECTIVES:

(Specify major objectives in terms of the observable knowledge and/or skills to be attained.)

In the process of completing this course, students will:

- A. identify life from an evolutionary approach, from basic organic molecules to whole organ systems.
- B. evaluate the biological sciences through references to historical discoveries and contributions which have led to the current use of scientific methods.
- C. use scientific methods in performing experiments and collecting data.
- D. apply the classical principles of Mendelian genetics to understand DNA as hereditary material and the application to evolutionary thought.
- E. understand chemical and energy relationships of the levels of biological organization.
- F. compare and contrast functional systems of living organisms.

- G. identify environmental and ecological issues.
- H. evaluate scientific literature and current biological advances.

IV. COURSE OUTLINE:

Lecture Content:

A. Section 1

1. Introduction: Description of Life
 - a. Darwin and the meaning of Life
 - b. Scientific Method
2. Cell Theory and Cell Morphology
 - a. Prokaryotic vs Eukaryotic Cells
 - b. Cell Nucleus and Cell Division: Mitosis
 - c. Meiosis: Spermatogenesis and Oogenesis
3. Molecules of Life
 - a. Atoms and Atomic Structure
 - b. Molecular Bonding
 - c. Sponch, water, and pH (acids and bases)
4. Plasma Membrane Structure
 - a. Transport Across the membrane: Passive and Active
 - b. The effects of Hypertonic, Hypotonic, and Isotonic solutions.
 - c. Define extracellular fluids.
5. Description of Different Types of Energy
 - a. The Laws of Thermodynamics: How do they affect Life?
 - b. The Application of Energy Principles to the chemistry of Life.
 - c. Biochemical reactions and Enzymes.

B. Section 2

1. Digestion and Nutrition
 - a. Anatomical Structures of Digestion
 - b. Chemistry of Digestion
 - c. Essentials of Nutrition
 - d. Comparative Digestive Systems: Invertebrate, Vertebrate, and Human Digestive Systems
2. Cellular Respiration and Photosynthesis
 - a. Glycolysis, Krebs Cycle, and Electron Transport Chain
 - b. Photosynthesis: Light and Dark Reactions
3. Circulatory System
 - a. Internal and External Blood Vessels
 - b. Physiology and Control of Circulation
 - c. Anatomy of Blood Vessels and the Heart
 - d. Components of the Blood Clotting Mechanism and Blood
 - e. Fetal Circulation
 - f. Lymphatic system
4. Plant Growth and Structure
 - a. Plant tissues: root, stem, and leaf
 - b. Plant transport mechanisms
 - c. Transport of Food
5. Classification and Systematics
 - a. Plant Evolution and Diversity
 - b. Major Plant Divisions
 - c. Plant Regulation and Response
 - d. Plant Hormones

C. Section 3

1. Osmoregulation and Excretion/ and Reproduction
 - a. Kidney Anatomy and Physiology
 - b. Reproduction in Animals
 - c. Human Female and Male Anatomy and Physiology
 - d. Pregnancy and Birth
2. Genetics:
 - a. History

- b. Mendelian Genetics
- c. Mutations
- d. Inheritance of Sickle Cell Anemia
- e. Blood Groups
- f. X-linked Traits
- 3. Genetics II
 - a. Dominance, Multiple Alleles, and Gene Expression
 - b. Sex Determination
 - c. DNA as genetic material
 - d. Replication
 - e. Genetic Engineering
- 4. Animal Development and the Nervous System
 - a. Gastrulation, Organogenesis, and Differentiation
 - b. Neurons, Nerve Impulses, and a Synapse
 - c. Brain and Spinal Cord
 - d. Peripheral and Autonomic Nervous Systems
 - e. Sensory Receptors
 - f. Endocrinology
- 5. Natural Selection and Adaptation
 - a. Examples: Finch Experiments
 - b. Global Changes in Darwinian Evolution

The instructor may reorganize the topics to facilitate pedagogy or include special topics relevant to biology or current topics with biological relevance.

Lab Content:

Lab topics are typical for a GE Biology course.

A. Section 1 will include weekly labs from the topics listed below:

- 1. Scientific Method
- 2. Microscopy
- 3. Cell Structure and Function
- 4. Osmosis and Diffusion
- 5. Animal Cell and Tissue Types
- 6. Enzyme Kinetics
- 7. Biochemistry

B. Section 2 will include weekly labs from the topics listed below:

- 8. Plant Anatomy and Morphology
- 9. Plant Physiology
- 10. Plant Evolution and Diversity
- 11. Animal Anatomy

12. Animal Physiology

13. Animal Evolution

14. Animal Development

C. Section 3 will include weekle labs from the topis listed below:

15. Mendelian Genetics

16. Patterns of Inheritance

17. DNA Structure and Duplication

18. Transcription and Translation

19. Biotechnology

20. Ecology

21. Man's Effect on the Environment

The instructor may select laboratory activities to match the lecture or to introduce a special interest topic relevant to biology or current events with relevance to biology

V. APPROPRIATE READINGS

Reading assignments may include but are not limited to the following:

A. Sample Text Title:

or

1. Recommended - Mader *Biology (Custom Version)*, ed. 10th or newer McGraw-Hill, 2010,

or

2. Recommended - Starr, Taggart, Evers, & Star *Biology: The Unity and Diversity of Life*, ed. 12 Brooks/Cole (Cengage), 2009,

B. Other Readings

Global or international materials or concepts are appropriately included in this course

Multicultural materials and concepts are appropriately included in this course

If either line is checked, write a paragraph indicating specifically how global/international and/or multicultural materials and concepts relate to content outline and/or readings.

Biol-1 is a GE biology course and as such ecology is included in the curriculum. Ecology is the study of the interaction between the living and their environment which requires a global view point to understand. Therefore, a global view is interwoven throughout the course.

VI. METHODS TO MEASURE STUDENT ACHIEVEMENT AND DETERMINE GRADES:

Students in this course will be graded in at least one of the following four categories. Please check those appropriate. A degree applicable course must have a minimum of one response in category A, B, or C.

A. Writing			
Check either 1 or 2 below			
X	1. Substantial writing assignments are required. Check the appropriate boxes below and provide a written description in the space provided.		
	2. Substantial writing assignments are NOT required. If this box is checked leave this section blank. For degree applicable courses you must complete category B and/or C.		
X	a) essay exam(s)	X	d) written homework
X	b) term or other paper(s)	X	e) reading reports
X	c) laboratory report(s)	X	f) other (specify)

Required assignments may include but are not limited to the following:

Examples:

1. diagram meiosis and mitosis giving the specific arrangement of DNA.
2. read an article about Photosynthesis and summarize in one page.
3. answer questions on the digestive tract and discuss normal vs abnormal function.
4. after completing the chemistry lab, please discuss the importance of the four macromolecules of life.

B. Problem Solving			
Computational or non-computational problem-solving demonstrations, including:			
X	a) exam(s)	X	d) laboratory reports
X	b) quizzes	X	e) field work
X	c) homework problems		f) other (specify):

Required assignments may include but are not limited to the following:

1. convert a 160 pounds into metric units.
2. given the function of smooth ER, what is its role in lipid metabolism.
3. what is the longhand form of a dilution is 1×10^{-6} ?
4. in our chemistry lab, what is the meaning of an orange color in the Benedicts Test?

C. Skill demonstrations, including:			
X	a) class performance(s)	X	c) performance exams(s)
	b) field work		d) other (specify)

Required assignments may include but are not limited to the following:

1. fetal Pig Dissection and identification of the digestive system.
2. use of a microscope: optics, field of vision, and measurement.
3. microscopic examination of plants slides and the identification of roots, stems, and leaves.
4. an experiment involving feeding congo red –stained yeast cells to unicellular Paramecium so students may observe, discuss, and write about the processes involved including phagocytosis, pH changes during digestion, and osmoregulation as the Paramecium undergoes the digestive process.

D. Objective examinations including:			
X	a) multiple choice	X	d) completion
X	b) true/false	X	e) other (specify):
X	c) matching items		

COURSE GRADE DETERMINATION:

Description/Explanation: Based on the categories checked in A-D, it is the recommendation of the department that the instructor's grading methods fall within the following departmental guidelines; however, the final method of grading is still at the discretion of the individual instructor. The instructor's syllabus must reflect the criteria by which the student's grade has been determined. (A minimum of five (5) grades must be recorded on the final roster.)

If several methods to measure student achievement are used, indicate here the approximate weight or percentage each has in determining student final grades.

The ranges listed is a suggestion that may/should be adjusted by each instructor. 30% - 50% Lecture Exams 20% - 40% Lab Exams 5% - 15% Term Paper 45% - 60% Homework, Lab Reports, Quizzes, etc.

VII. EDUCATIONAL MATERIALS

For degree applicable courses, the adopted texts, as listed in the college bookstore, or instructor-prepared materials have been certified to contain college-level materials.

Validation Language Level (check where applicable):	College-Level Criteria Met	
	YES	NO
Textbook	<u>X</u>	_____
Reference materials	<u>X</u>	_____
Instructor-prepared materials	<u>X</u>	_____
Audio-visual materials	<u>X</u>	_____

Indicate Method of evaluation:

Used readability formulae (grade level 10 or higher)	_____
Text is used in a college-level course	<u>X</u>
Used grading provided by publisher	_____
Other: (please explain; relate to Skills Levels)	_____

<i>Computation Level</i> (Eligible for MATH 101 level or higher where applicable)	<u>X</u>	_____
Content		
Breadth of ideas covered clearly meets college-level learning objectives of this course	<u>X</u>	_____
Presentation of content and/or exercises/projects:		
Requires a variety of problem-solving strategies including inductive and deductive reasoning.	<u>X</u>	_____
Requires independent thought and study	<u>X</u>	_____
Applies transferring knowledge and skills appropriately and efficiently to new situations or problems.	<u>X</u>	_____

List of Reading/Educational Materials

Recommended - Mader *Biology (Custom Version)*, ed. 10th or newer McGraw-Hill, 2010,

Recommended - Starr, Taggart, Evers, & Star *Biology: The Unity and Diversity of Life*, ed. 12 Brooks/Cole (Cengage), 2009,

The library must subscribe to sufficient periodicals and subscription data bases pertinent to biology that students will be able to obtain general information and original research article relevant to their term paper topics.

Comments:

- This course requires special or additional library materials (list attached).
- The library must subscribe to sufficient periodicals and subscription data bases pertinent to biology that students will be able to obtain general information and original research article relevant to their term paper topics.
- This course requires special facilities:
- Biology Teaching Lab Standard Lecture room, possibly LGI for double or triple lecture sections.

Attached Files:

<p><u>BASIC SKILLS ADVISORIES PAGE</u> The skills listed are those needed for eligibility for English 125, 126, and Math 101. These skills are listed as the outcomes from English 252, 262, and Math 250. In the right hand column, list at least <u>three</u> major basic skills needed at the beginning of the target course and check off the corresponding basic skills listed at the left.</p> <p><u>Check the appropriate spaces.</u></p> <p><input type="checkbox"/> Eligibility for Math 101 is advisory for the target course.</p> <p><input type="checkbox"/> Eligibility for English 126 is advisory for the target course.</p>
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____ Eligibility for English 125 is advisory for the target course.
If the reviewers determine that an advisory or advisories in Basic Skills are all that are necessary for success in the target course, stop here, provide the required signatures, and forward this form to the department chair, the appropriate associate dean, and the curriculum committee.

CONTENT REVIEW	
MATH 103 INTERMEDIATE ALGEBRA	
Simplify and/or factor mathematical expressions into forms more conducive to analysis.	
Solve equations introduced in Intermediate Algebra.	
Graph functions and relations introduced in Intermediate Algebra.	
Apply Intermediate Algebra topics to solve real-life problems.	

REQUISITES	
Subject Prerequisite -- MATH 103 INTERMEDIATE ALGEBRA	
<ul style="list-style-type: none"> • Simplify and/or factor mathematical expressions into forms more conducive to analysis. • Solve equations introduced in Intermediate Algebra. • Graph functions and relations introduced in Intermediate Algebra. • Apply Intermediate Algebra topics to solve real-life problems. 	<ul style="list-style-type: none"> • understand chemical and energy relationships of the levels of biological organization. • use scientific methods in performing experiments and collecting data. • evaluate scientific literature and current biological advances.

ESTABLISHING PREREQUISITES OR COREQUISITES

Every prerequisite or corequisite requires content review plus justification of at least one of the seven kinds below. Prerequisite courses in communication and math outside of their disciplines require justification through statistical evidence. Kinds of justification that may establish a prerequisite are listed below.

Check one of the following that apply. Documentation may be attached.

1. ____ The prerequisite/corequisite is required by law or government regulations.
 Explain or cite regulation numbers:
2. ____ The health or safety of the students in this course requires the prerequisite.
 Justification: Indicate how this is so.
3. ____ The safety or equipment operation skills learned in the prerequisite course are required for the successful or safe completion of this course.
 Justification: Indicate how this is so.
4. X The prerequisite is required in order for the course to be accepted for transfer to the UC or CSU systems.
 Justification: Indicate how this is so.
 The UC system mandated the Math 103 course as a prerequisite for Biol-1 to transfer.
5. ____ Significant statistical evidence indicates that the absence of the prerequisite course is related to unsatisfactory performance in the target course.
 Justification: Cite the statistical evidence from the research.
6. ____ The prerequisite course is part of a sequence of courses within or across a discipline.
7. ____ Three CSU/UC campuses require an equivalent prerequisite or corequisite for a course equivalent to the target course: