

# Course Outline of Record

Los Medanos College      2700 East Leland Road      Pittsburg CA 94565      (925) 439-2181

**Course Title: GENERAL BIOLOGY      Subject Area/Course Number: BIOSC-010**

**Approval Date: 1/2/08**

**New Course**       **OR**      **Existing Course**

**Instructor(s)/Author(s):** Mark Lewis

**Subject Area/Course No.:** BIOSC-010

**Units: 4**

**Course Name/Title:** GENERAL BIOLOGY

**Discipline(s):** BIOLOGICAL SCIENCE

**Pre-Requisite(s):** None

**Co-Requisite(s):** None

**Advisories, Eligibility for ENGL-090 or higher; MATH-015 or higher**

**Catalog Description:**

An integrated study with laboratory techniques and methods of the biological concepts, principles, and laws pertaining to life processes. An interdisciplinary approach will be used to develop an understanding of living organisms in terms of these processes. The creative process of scientific inquiry, the aesthetics of science, and the implications of scientific knowledge will be emphasized. Throughout the course, critical thinking, problem solving, and effective learning will be emphasized. This course meets the General Education Requirement for Science.

**Schedule Description:**

The student will discover the elegance of nature while examining the basic structural and functional components of living organisms. This course includes both lecture and interactive, hands-on, lab activities provided in a modern science teaching facility. This course meets the General Education Requirement for Science.

<b>Hours/Mode of Instruction:</b>	Lecture	<u>54</u>	<b>Schedule or HBA Lab:</b>	<u>72*</u>	Composition
	Activity	Total Hours		<u>126</u>	
	<i>(Weekly hours)</i>				<i>(Total for course)</i>

**\*This course could have HBA OR scheduled lab hours.** See page 13 for list of activities for HBA hours.

<b>Credit</b> <input checked="" type="checkbox"/>	<b>Credit Degree Applicable (DA)</b>	<b>Grading</b>	<input type="checkbox"/>
Credit/Non-Credit (CR/NC)	<b>Repeatability</b>	<input checked="" type="checkbox"/>	0
<input type="checkbox"/> Credit Non-Degree (NDA)	<input checked="" type="checkbox"/> Letter (LR)		<input type="checkbox"/> 1
(If Non-Credit desired, contact Dean.)	<input type="checkbox"/> Student Choice (SC)		<input type="checkbox"/> 2
			<input type="checkbox"/>

**Please apply for:**

**LMC General Education Requirement and/or Competency & Graduation Requirement(s):**  
**Biological Science**

UC, CSU Gen. Ed. Area B2, B3, IGETC Area 5B

**Transfer to:**  CSU     UC     IGETC    LDTP    **Course is Baccalaureate Level:**  Yes  No

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## Signatures:

Department Chair \_\_\_\_\_ Date \_\_\_\_\_  
Librarian \_\_\_\_\_ Date \_\_\_\_\_  
Dean/Sr. Dean \_\_\_\_\_ Date \_\_\_\_\_  
Curriculum Committee Chair \_\_\_\_\_ Date \_\_\_\_\_  
President/Designee \_\_\_\_\_ Date \_\_\_\_\_  
CCCCD Approval Date (Board or Chancellor's Office) \_\_\_\_\_ Date \_\_\_\_\_

## FOR OFFICE OF INSTRUCTION ONLY. DO NOT WRITE IN THE SECTION BELOW.

Begin in Semester SU09 Class Max: 42 Catalog year 2009      / 2010     

Dept. Code/Name: L5010-BIOSC T.O.P.s Code: \_\_\_\_\_

0401.00 Crossover course 1/ 2: \_\_\_\_\_

ESL Class: Yes / (No) DSPS Class: Yes / (No)

Coop Work Exp: Yes / (No)

Class Code  A Liberal Arts & Sciences SAM Code  A Apprenticeship Remediation

Level  ES Elementary and Secondary Basic Skills

B Developmental Preparatory  B Advanced Occupational  P Pre-

collegiate Basic Skills

C Adult/Secondary Basic Education  C Clearly Occupational  B Basic Skills

D Personal Development/Survival  D Possibly Occupational  NBS Not

Basic Skills

E For Substantially Handicapped  E\* Non-Occupational

F Parenting/Family Support  F Transfer, Non-Occupational

G Community/Civic Development \*Additional criteria needed

H General and Cultural  1 One level below transfer

I Occupational Educational

3 Three levels below transfer

3+ Four levels below transfer

Course approved by Curriculum Committee as Baccalaureate Level: Yes / No

LMC GE or Competency Requirement Approved by the Curriculum Committee: \_\_\_\_\_

Distribution: Original: Office of Instruction

Copies: Admissions Office, Department Chairperson

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## **Institutional Student Learning Outcomes**

### **General Education SLOs (Recommended by GE Committee)**

At the completion of the LMC general education program, a student will:

1. read critically and communicate effectively as a writer and speaker.
2. understand connections among disciplines and apply interdisciplinary approaches to problem solving.
3. think critically and creatively
4. consider the ethical implications inherent in knowledge, decision-making and action.
5. possess a worldview informed by diverse social, multicultural and global perspectives.

### **Occupational Education SLOs (Recommended by Occupational Education Committee)**

At the completion of the LMC occupational certificate or degree, a student will:

1.  Be academically prepared to **obtain an entry-level or a mid-level position** in their industry.
2.  Apply **critical thinking** to research, evaluate, analyze and synthesize information.
3.  Demonstrate strong **communication skills** (written and/or oral) and **interpersonal skills** (customer service and team work).
4.  Appropriately apply **industry materials and technology**.
5.  Demonstrate the skills and knowledge necessary to take and pass **certification exams** for career **advancement** in their industry.

### **Developmental Education SLOs (Recommended by Developmental Education Committee)**

At the completion of the LMC Developmental Education Program, a student will:

1.  Demonstrate the skills necessary for the first transfer level courses in English and Math or for the English and Math competencies for the Certificate of Achievement.
2.  Think critically to construct meaning and solve problems.
3.  Read with comprehension.
4.  Communicate effectively both in writing and orally.
5.  Demonstrate the characteristics, habits, and attitudes of an effective learner.

### **Student Services SLOs**

1. LMC students will demonstrate proficiency in the use of college on-line services.
2. LMC students will demonstrate proficiency in self-advocacy.

### **Library and Learning Support Services SLOs**

LMC students utilizing various Library and Learning Support Services will:

1. access and effectively utilize available campus Library and Learning Support Services.
2. apply knowledge learned and competencies gained from using Library and Learning Support Services to academic coursework and assignments.
3. demonstrate information competency skills needed to meet the research demands of academic course work and life long learning.

### **None of the Above**

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## Program-Level Student Learning Outcomes (PSLOs)

**At the completion of the LMC general education program, a student should be able to:**

- A. Read critically and communicate effectively as a writer and speaker.
- B. Understand connections among disciplines and apply interdisciplinary approaches to problem solving.
- C. Think critically and creatively
- D. Consider the ethical implications inherent in knowledge, decision-making and action.
- E. Possess a worldview informed by diverse social, multicultural and global perspectives.

**By the end of a course of study in the Biology Department, a student should be able to:**

- A. Distinguish a scientific hypothesis from an unscientific idea.
- B. Understand the chemical and physical nature of life and apply chemical and structural principles to everyday concepts such as diet and health.
- C. Assess the relationship between the structure and functions of their own bodies, and find the common ground they share with other life forms on Earth.
- D. Use a microscope to perceive that the world is full of life forms too small to see with the unaided eye, such as cells and bacteria, and appreciate that they themselves are made of living cells.
- E. Describe the basic relationship between DNA, proteins, and the transmission and evolution of hereditary traits.
- F. Describe the physical organization of plant and/or animal structure and relate these structures to how the organism maintains homeostasis.
- G. Describe aspects of the interdependence of all life on Earth, and particularly the dependence of human life on other species and on physical resources in nature.

## Course-Level Student Learning Outcomes (CSLOs):

**At the conclusion of the Biology 10 course, a student should be able to:**

- 1. Distinguish a scientific hypothesis from an unscientific or religious idea. (GESLO B, C, D and E; PSLO A)
- 2. Work in groups to collect, analyze, or present biological data or observations. (GESLO A, B, and C; PSLO C and D)
- 3. Describe the chemical and physical nature of life, and be able to apply chemical principles to everyday concepts such as diet and exercise (GESLO B and C; PSLO B)

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4. Compare and contrast the internal structures and metabolic processes that allow diverse living organisms to exhibit the same characteristics of life. (GESLO C and E; PSLO B,C, E and F)
5. Use a microscope to observe life forms (such as cells and bacteria) too small to see with the unaided eye, and recognize that all organisms are made of living cells. (GESLO B; PSLO D)
6. Describe the basic relationship between DNA, proteins, and the transmission of evolutionary traits. (GESLO C; PSLO E)
7. Evaluate some of the ethical implications of important Biological discoveries and techniques, including genetic engineering. (GESLO A and D; PSLO E and G)
8. Evaluate some aspects of the interdependence of the various life forms on Earth, including the possible global effects of various human economic and cultural practices on the Earth's natural resources. (GESLO D and E; PSLO G)

## **CSLO Assessment Criteria:**

### **General assessment criteria:**

For lab quizzes:

Demonstrate understanding of lab purposes and procedures

Appropriately apply the scientific method and recognize ideas that do not follow the method

Demonstrate understanding of the scientific principles and concepts that inform each lab exercise

For lab exercises:

Ability to work together cooperatively and share information

Ability to draw conclusions and develop hypotheses from experimental data

Ability to analyze experimental data (quantitative ability and reasoning)

Ability to carefully observe nature and report these observations

Lab reports are also assessed for clarity, accuracy, and logical reasoning

For lecture exams (essay sections):

Ability to read scientific articles or books critically and for understanding

Ability to write cogently

Ability to apply scientific concepts and theories to real world examples (critical thinking)

For lecture exams (multiple choice sections)

Memorization of the definitions of scientific terms

Understanding of scientific concepts and theories

Ability to demonstrate critical thinking by correctly identifying connections between, or practical applications of, scientific concepts and theories.

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## Specific assessment criteria, by CSLO:

CSLO 1: Distinguish a scientific hypothesis from an unscientific or religious idea.

- a. Assignment And Assessment Criteria: When presented with several different explanations for the same natural phenomena, the student correctly identifies which are scientific and which are not, and the student is able to clearly explain their reasoning based on proper application of the principles underlying the scientific method.

CSLO 2: Work in groups to collect, analyze, or present biological data or observations.

- a. Assignment And Assessment Criteria: The student will be asked to complete charts and graphs that require the data collected from other group members (and other lab groups) during the lab period. This assignment will be assessed for completeness and accuracy of data collection.
- b. Assignment And Assessment Criteria: The student will be asked to perform basic quantitative analysis of lab data to determine whether the data supports or disproves an existing hypothesis. This assignment will be assessed for quantitative reasoning and logical inference.
- c. Assignment And Assessment Criteria: When confronted by an unexpected result during a lab experiment, the student demonstrates creative and critical thinking by developing and writing or orally presenting a new logical scientific hypothesis (and a predictive test based on that hypothesis) to explain the unexpected result.

CSLO 3: Describe the chemical and physical nature of life, and be able to apply chemical principles to everyday concepts such as diet and exercise.

- a. Assignment And Assessment Criteria: The student will be asked to describe some of the chemical changes that occur in their own bodies during everyday activities, such as eating or exercising, and to explain the metabolic purpose for each of these reactions. This assignment will be assessed for clarity, completeness, and accuracy.

CSLO 4: Compare and contrast the internal structures and metabolic processes that allow diverse forms of life to exhibit the same characteristics of life.

- a. Assignment And Assessment Criteria: The student will be asked to use lecture and text-based information to identify and describe the characteristics of life and provide specific examples of how different organisms manifest these characteristics. These essay answers will be assessed for clarity, depth, and accuracy.
- b. Assignment And Assessment Criteria: The student will be asked to provide examples of the characteristics of life exhibited by organisms they observe in the lab or outside. These lab reports will be assessed for clarity, evidence of careful observation, and creativity.
- c. Assignment And Assessment Criteria: The student will be asked to synthesize information from their text or lectures and internet/library resources to compare and contrast the methods different organisms use to carry out the same vital function, such as breathing or generating energy from food. These answers will be assessed for clarity, ability to access and effectively use available information resources, logic, and critical reasoning.

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CSLO 5: Use a microscope to observe life forms (such as cells and bacteria) too small to see with the unaided eye, and recognize that all organisms are made of living cells.

- a. Assignment And Assessment Criteria: When provided with appropriate materials and direction, the student is able to prepare their own stained slides of cells and microorganisms and focus on those slides using a compound microscope. This activity will be assessed for competency by direct instructor observation during the lab period.
- b. Assignment And Assessment Criteria: The student will be asked to identify the kingdom to which an unknown organism belongs from a picture or description of its cellular structure. This assignment will be assessed for accuracy.

CSLO 6: Describe the basic relationship between DNA, proteins, and the transmission of evolutionary traits.

- a. Assignment And Assessment Criteria: The student will be asked to describe and recognize the basic structure and function of a DNA molecule. These questions will be assessed for depth and accuracy.
- b. Assignment And Assessment Criteria: The student will be asked to summarize the steps and recognize the molecules necessary to form a new protein in a cell. These questions will be assessed for clarity, depth, and accuracy.
- c. Assignment And Assessment Criteria: The student will be asked to critically evaluate the asexual and the sexual forms of reproduction, describing some of the advantages and disadvantages of each in a written essay. This assignment will be assessed for clarity, logic, depth, and evidence of cogent critical reasoning.
- d. Assignment And Assessment Criteria: The student will be asked to solve simple genetics problems using Punnett squares. This assignment will be assessed for accuracy, as well as evidence of the ability to apply appropriate mathematical operations.

CSLO 7: Evaluate some of the ethical implications of important Biological discoveries and techniques, including genetic engineering.

- a. Assignment And Assessment Criteria: The student will be asked to read a semi-technical article about a controversial biological technique, and use this information to develop logical arguments for or against the expanded use of this technique. This assignment will be assessed for evidence of reading comprehension, clarity, logic, and applied critical or creative reasoning.

CSLO 8: Evaluate some aspects of the interdependence of the various life forms on Earth, including the possible global effects of various human economic and cultural practices on the Earth's natural resources.

Assignment And Assessment Criteria: The student will be asked to observe and identify various organisms interacting in nature, and then look up the feeding habits of some of these organisms on the internet. The student will then be asked to illustrate the trophic levels of this ecosystem. This assignment will be evaluated for originality, logic, accuracy, and the ability to find and use internet-based information sources.

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Assignment And Assessment Criteria: The student will be asked to synthesize lecture and reading material to describe some of the possible effects of human economies on the Earth's climate, natural resources, and on the viability of other species, as well as some of the ways humans depend on other species for their survival. This assignment will be assessed for clarity, logical inference, and evidence of critical thinking.

## Assessments:

### Bio 10 Course Assignments:

CSLO #1: Lab assignments (i.e. lab reports) and midterm exam questions

CSLO #2: Lab assignments and presentations

CSLO #3: Midterm exam questions and lab quizzes

CSLO #4: Midterm and final exam questions

CSLO #5: Lab assignments (i.e. lab practical) and lab quizzes

CSLO #6: Midterm and final exam questions and lab quizzes

CSLO #7: Midterm and final exam questions

CSLO #8: Midterm and final exam questions

### Sample Assignments by CSLO:

For CSLO 1: Possible Essay Assignment:

Students may be asked to write one scientific hypothesis that might explain some common observation, such as WHY plants need water to grow. They will then be asked to develop and write one predictive test that could be used to scientifically evaluate their hypothesis. Finally, they must explain WHY an hypothesis such as "plants need water to grow because that is how God made them" is NOT a scientific hypothesis. This assignment gives students the opportunity to demonstrate understanding of the scientific method by developing their own scientific hypothesis and tests.

Possible Multiple Choice Questions:

Why wouldn't the hypothesis "The grass is green because that is God's will" be considered a valid scientific hypothesis?

- Scientists don't believe in God
- God doesn't believe in science
- God's will is not testable
- All of these answers are correct

Which of the following is NOT true of a valid scientific hypothesis?

- The hypothesis relies on divine or supernatural explanations
- The hypothesis explains some observable or measurable aspect of nature
- The hypothesis can be used to make verifiable predictions
- The hypothesis is wrong



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For CSLO 2: Possible Lab Assignments:

Students may be asked to perform a photosynthesis experiment in lab groups to determine the best "color" of light for plant growth. Each group will examine just one or two different colors of light, but every group will then be asked to draw conclusions based on the collective data generated by ALL groups in the class. This assignment forces students to work together cooperatively to answer a scientific question, modeling the actual process of research and data-sharing common in most scientific fields.

Students may be asked to work in groups to observe and record observations of various flora and fauna on the LMC campus, and then report their observations back to class. Different groups may be assigned different areas or forms of life to help complete a campus "nature survey".

Students may be asked to form groups to answer questions posed by students or by the teacher in class. Students may then present their answers in various forms (written, visual, or oral) to benefit other students in the class.

For CSLO's 3, 4 and 8: Possible Essay Assignments:

Students may be asked to write a short essay describing the metabolic process that provides the energy they need to walk to class. Their essay should include the location, substrates, and products of this process, as well as an appropriate definition of the term "energy". The essay will indicate understanding of a practical application of metabolic theory.

Students may be asked to describe how the products of plant cell photosynthesis can be used in animal cells. Answers will indicate the ability to think critically about the relationships between the metabolic functions performed by different forms of life on Earth.

Possible Multiple Choice Questions:

What two compounds created during photosynthesis are required to begin aerobic cellular respiration?

- a. Sugar and O<sub>2</sub> gas
- b. Water and CO<sub>2</sub> gas
- c. NADPH and ATP
- d. Proteins and DNA

Which statement accurately describes how a cell lacking mitochondria could still make ATP?

- a. Cells can undergo anaerobic metabolism which requires no O<sub>2</sub> or mitochondria
- b. Cells can substitute lipids for energy which do not need O<sub>2</sub> or mitochondria to make ATP
- c. ATP is made during photosynthesis and any organism could choose to photosynthesize
- d. DNA codes for ATP production and DNA is in the nucleus not the mitochondria
- e. It is impossible to make ATP without mitochondria

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FOR CSLO's 4 and 6: Possible Lab/Homework Assignment:

The students may be asked to do a field observation/ecology lab assignment that requires speculation about the survival value and evolutionary trade-offs of observed animal/plant traits, adaptations, or behaviors. For example: Students could be asked to write a report describing in detail the physical characteristics of the leaves, stems, bark, and flowers/fruit of two different trees on campus that have obvious differences in an homologous structure such as their leaves. Students must then explain HOW they believe this physical difference could represent different survival strategies for the two trees. This assignment integrates observational skills and critical thinking skills applied to fundamental principles of Biology.

For CSLO 5: Lab Assignment:

Students will be asked to demonstrate their ability to prepare slides and focus a compound microscope. Students will have to prepare slides of cells from sample organisms belonging to each of the major kingdoms of life, and they will demonstrate understanding by drawing a picture of a cell from each organism and contrasting the organisms by cellular morphology and organelles structure.

Students may be asked to identify the microorganisms such as protists and bacteria by their morphology using field guides and keys available in the laboratory.

Possible Multiple Choice Question:

You observe a new organism under the microscope. The organism appears to be unicellular and its cytoplasm contains chloroplasts. To which Kingdom (or phylum) does this organism belong?

- a. Animalia    b. Protozoan    c. Algae    d. Fungi    e. Bacteria

For CSLO 6: Possible Multiple Choice Questions.

Why does DNA have a coding strand?

- a. The DNA coding strand has the instructions for making cellular proteins  
b. The DNA coding strand has the instructions for making cellular transfer RNA molecules  
c. The DNA coding strand has the instructions for making a new DNA template strand  
d. The DNA coding strand has the instructions for making messenger RNA molecules  
e. The DNA coding strand never mutates

What is the function of transfer RNA (tRNA) in protein synthesis?

- a. Transfer RNA brings the instructions for making a protein from the DNA to the ribosome  
b. Transfer RNA has the instructions for making all the proteins an organism needs to survive  
c. Transfer RNA has the instructions for making all of the amino acids from sugar  
d. Transfer RNA brings amino acids to the ribosome in the order specified by messenger RNA

Which statement best describes how some insects have evolved a resistance to some pesticides?

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- a. Some insects create new genes that give them pesticide resistance after they have been exposed to the pesticide
- b. Every exposed insect suddenly develops a protective coat that blocks the pesticide
- c. Some insects already had genes that made them resistant to the pesticide before they were exposed to it
- d. Insects observe the behavior of other insects that survive the pesticide & mimic their behavior

For CSLO 7: Possible Essay Assignment:

Students may be asked to read a section in their textbook that describes the methods and practical applications of some genetic engineering techniques, such as human cloning, or human stem cell research, or embryonic DNA "repair", or DNA sequence screening for potential health problems. They will then be asked to write a short argument describing whether they believe the possible benefits of this technique will, in the future, outweigh the risks and why. This assignment allows students to demonstrate their ability to read critically and reason logically about a controversial topic in the field of Biology.

For CSLO 8: Possible Essay Assignments:

Students may be asked to analyze a change in one human economic or culinary practice in terms of its possible effects on local and global natural resources or the global climate. This assignment will assess student's critical thinking and global/cultural perspectives.

Students may be asked to research and speculate on the possible effects global industrialization and "Americanization" may have on the Earth's natural resources and climate.

Students may be asked to pick and research one possible method our society could reduce its utilization of a natural resource or its production of unreclaimed waste, and speculate on the effect of this change on other human societies.

Possible Multiple Choice Questions:

Which of the following describes one way flowering plants may depend on humans and other animals for THEIR survival?

- a. Humans and animals provide O<sub>2</sub> gas for plant photosynthesis
- b. Humans and animals provide sugar so flowering plants can grow
- c. Humans and animals can help flowering plants reproduce
- d. All of the above

The over-bite clam and the delta smelt fish both live in the San Joaquin river delta, although the clam is a recent addition to this environment. Both the clam and the smelt feed on the same deep river organisms, and recently the smelt population has been dropping due to lack of food. Which of the following terms best describes the interaction between the introduced over-bite clam and the native Delta smelt?

- a. Predation    b. Competition    c. Parasitism    d. Commensalism    e. Mimicry

Suppose, several years from now, Biologists discover that the local delta smelt population is increasing even though the over-bite clam population is still high. Careful investigation reveals that the new smelt

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fish can eat a wider variety of organisms than before. Which of the following ideas could both PREDICT and EXPLAIN this scenario?

- The smelt fish population evolved by natural selection
- A new species of fish that look just like smelt wandered into the delta
- Smelt fish decided that they aren't get to let clams take over their turf
- Some humans taught the smelt fish how to eat new types of food

## Method of Evaluation/Grading:

Since we have not offered this class in this precise format before, it is not yet possible for us to assign a completely accurate weighting of the assignments to particular CSLO's. However, we anticipate that more than half the points on lecture exams will focus on CLSO's 3 and 6, since these topics encompass nearly all of the information provided in the course. Lab assignments and reports will focus more on CSLO's 1, 2 and 5. Reading and critical thinking assignments will focus on CSLO's 7 and 8.

The weighting of each type of assessment instrument will be approximately:

Lab Assignments	25%
Group Project/Presentation	15%
3 Midterm Exams	45%
Final Exam:	15%

The assigned grade will be based on the percent of correctly solved problems as follows:

- 'A': 90% or better.
- 'B': from 80% to 89%.
- 'C': from 70% to 79%.
- 'D': from 60% to 69%.
- 'F': below 60%.

"A" level work is characterized by demonstration of thorough comprehension of a great majority of the concepts and terminology presented during the course, as well as clear evidence of ability to apply the knowledge in unexpected or real world situations. Evidence for the above includes 90% or higher correct responses on the multiple choice sections of exams, as well as clear, logical, and accurate answers to essay questions and clear, logical, thoughtful, and original lab reports.

"C" level work is characterized by demonstration of comprehension of more than half of the concepts and terminology presented during the course, as well as intermittent evidence of ability to apply the knowledge in unexpected or real world situations. Evidence for the above includes 70% or higher correct responses on the multiple choice sections of most exams, as well as at least partially accurate answers to most essay questions. Lab reports and essay answers will show a tendency toward glib or rote responses, without much originality. Ability to apply concepts to unexpected or real world situations will be intermittent and inconsistent.

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## Course Content:

### Lab hours by arrangement activities include:

For sections with lab hours by arrangement, these activities occur during the hours by arrangement: Students perform hands-on experiments, take graded quizzes, fill in the lab workbook and view additional instructional material under the supervision of an instructor. These are required hours and lab work counts for a significant portion of the student's final grade.

## BIO 10 COURSE CONTENT (LECTURE AND LAB COMPONENTS)

Characteristics of life

The Scientific Method of Inquiry

Microscope Use and Practice

Metric Measurements

Basic chemistry: The Atomic theory of Matter

Basic chemistry: Chemical bonds and molecules

Biochemistry: Large and small molecules in living organisms

Biochemistry: Chemical reactions, metabolism, and energy

Cell theory and cell structure

Physical characteristics of water

Molecular Motion, Diffusion, and osmosis

Photosynthesis

Cellular Respiration

Comparative Anatomy:

Gas exchange, digestion, and circulation in animals and plants

Hormones In Animals And Plants

Animal Nervous Systems And Senses

Protein Structure And Functions

DNA Structure And Function

Genetic Engineering

Protein Synthesis: Transcription and Translation

Asexual reproduction: The Cell Cycle, Mitosis, And Cloning

Sexual reproduction: Meiosis

Sexual reproduction: Sexual Anatomy, Fertilization, And Pollination

Mendelian Genetics

Modern Genetics

Sexual Reproduction Of Plants And Animals

Embryonic Development

Evolution And Adaptation

Ecology (ecosystems, food webs, symbiosis, and nutrient cycles)

Environmental Issues (possible contributions of human societies to global warming, pollution, and natural resource depletion)

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**Instructional Methods:** *Check all the instructional methods that will be used in teaching this course. Keep in mind that the method of instruction and activities should relate to the CSLOs.*

- Lecture
- Lab
- Activity
- Problem-based Learning/Case Studies
- Collaborative Learning/Peer Review
- Demonstration/Modeling
- Role-Playing
- Discussion
- Computer Assisted Instruction
- Other (explain) \_\_\_\_\_

**Textbooks:** Indicate name of text (or list of text choices), author, publisher and date of publication. Date of publication has to be within 5 years of authoring course outline. For degree applicable courses, text should be **College Level**. Include sample pages and the contents page of the instructor designed module if it is the only text.

1. ESSENTIAL BIOLOGY WITH PHYSIOLOGY 2nd Ed by Campbell, Reece,& Simon  
ISBN # 0-8053-6841-8

2. BIOLOGY 10 LAB SYLLABUS