

COURSE SYLLABUS

Course Title:	General Biology I (lecture/lab)	Date submitted:	November 2017 (AAC: 17-61)	
Department:	Mathematics and Science			
Curriculum:	Biology			
Course Descriptors: Make certain that the course descriptors are consistent with college and Board of Trustees policies, and the current course numbering system.	Course Code: (eg. ACC 101)	BIO*121	Prerequisites:	
	Course Type:	X		C- or better in Composition (ENG*101)
	A: Clinical B: Lab D: Distance Learning I: Individual/Independent L: Lecture N: M: Seminar Internship P: Practicum U: Studio X: Combined Lecture/Lab Y: Combined Lecture/ Clinical/Lab Z: Combined Lecture/Studio			
	Elective Type:	G/LA/S		
	E: English FA: Fine Arts HI: History HU: Humanities LA: Liberal Arts FL: Foreign Language M: Math S: Science SS: Social Science G: General			
	Credit Hours:	4	Corequisites:	
	Developmental: (yes/no)	NO		None
	Lecture:	3		
	Clinical:	0		
	Lab:	3		
Studio	0			
Other:	0			
Contact Hours:	TOTAL: 6			
Class Maximum:	36	Other Requirements:		
Semesters Offered:	F/Sp/ Su		Computer Literacy Safety Glasses	
Catalog Course Description:	Study of the physical and chemical nature of the cell, including biochemistry, photosynthesis, and cellular respiration. Additional focus on topics of cell division, genetics, and understanding of DNA and RNA processes. NOTE: It is recommended that the student take Concepts of Chemistry prior to or concurrently with this course.			

Topical Outline:

List course content in outline format.

1. Introduction
 - a. Life's Levels of Organization
 - b. Diversity of Life
 - c. Scientific Method
2. Basic Chemistry
 - a. Atomic Structure
 - b. Molecules and Compounds
 - c. Chemical Bonds
 - d. Structure of Water
 - e. Dehydration Synthesis and Hydrolysis Reactions
 - f. Measurement of pH
 - g. Inorganic Molecules
3. Organic Compounds
 - a. Carbohydrates
 - b. Lipids
 - c. Proteins
 - d. Nucleic Acids
4. Tour of the Cell
 - a. Microscope
 - b. Prokaryotic versus Eukaryotic Cells
 - c. Location and Function of Organelles
5. The Working Cell
 - a. Energy
 - b. Laws of Thermodynamics
 - c. Structure and Function of ATP
 - d. Structure of Enzymes and Role in Metabolism
 - e. Fluid Mosaic Model of Cell Membrane Structure
 - f. Methods of Cellular Transport
 1. Simple Diffusion
 2. Facilitated Diffusion
 3. Filtration
 4. Active Transport
 5. Exocytosis
 6. Endocytosis
6. Cellular Energy Processes
 - a. Cellular Respiration
 1. Glycolysis
 2. Citric Acid Cycle (Kreb's Cycle)
 3. Electron Transport
 4. Chemiosmosis
 - b. Products of Anaerobic Respiration
7. Photosynthesis
 - a. Light Dependent Reactions
 - b. Light Independent Reactions (Calvin Cycle)
 - c. C4 and CAM Plants
8. Cellular Reproduction

- a. Binary Fission
 - b. Cell Cycle
 - c. Mitosis
 - d. Cytokinesis
 - e. Meiosis
 - f. Cancer
9. Patterns of Inheritance
- a. Mendel's Laws
 - b. Punnett Squares
 - 1. Monohybrid Cross
 - 2. Dihybrid Cross
 - a. Family Pedigree
 - b. Testcross
 - c. Incomplete Dominance
 - d. Codominance
 - e. Pleiotropy
 - f. Epistasis
 - g. Environmental Effects on Genes
 - h. Continuous Variation
 - i. Genetic Diseases
10. Molecular Biology
- a. Structure of DNA and RNA
 - b. DNA Replication
 - c. DNA Repair
 - d. Transcription Process
 - e. Translation Process
11. Control of Gene Expression
- a. Cloning
 - b. Lactose Operon Model
 - c. Cancer: Oncogenes and Tumor-Suppressing Genes
12. DNA Technology
- a. Plasmids and Restriction Enzymes
 - b. Recombinant DNA Methodology and Gene Products
- Laboratory:
- 1. Measurement
 - 2. Scientific Method
 - 3. Chemistry
 - 4. Microscopy
 - 5. Diffusion and Osmosis
 - 6. Photosynthesis
 - 7. Cellular Respiration
 - 8. Mitosis and Meiosis
 - 9. Genetic Problems
 - 10. Heredity
 - 11. Blood Typing
 - 12. DNA Extraction

<p>Outcomes: Describe measurable skills or knowledge that students should be able to demonstrate as evidence that they have mastered the course content.</p>	<p>Upon successful completion of this course, the student will be able to do the following:</p> <ol style="list-style-type: none"> 1. identify the steps in the scientific method 2. recognize the differences in chemical bonding 3. describe characteristics of inorganic compounds 4. differentiate between molecular structure of carbohydrates, lipids, proteins and nucleic acids 5. describe the structure of an enzyme and the enzyme's role in metabolism 6. explain dehydration synthesis versus hydrolysis reactions 7. distinguish between prokaryotic and eukaryotic cells 8. describe the cellular membrane and the methods of cellular transport 9. identify function of cellular organelles 10. demonstrate an understanding of the pathways that constitute cellular respiration and photosynthesis 11. describe the phases of mitosis and relate the cellular problems that occur with cancer 12. explain the process of meiosis 13. describe the structure of a chromosome including being able to distinguish between chromatin, chromatids, and centromere 14. define the following terms: gene, allele, locus, dominant, recessive, phenotype, genotype, homozygous and heterozygous 15. apply the proper mathematical methodology to Punnett Squares 16. recognize the differences in the following processes: DNA replication, transcription and translation 17. explain the lactose operon model 18. explain techniques used in DNA technology, such as cloning and use of plasmids <p>PROGRAM: <i>(Numbering reflects Program Outcomes as they appear in the college catalog)</i> N/A</p> <p>COMPETENCY FULFILLED: Scientific Knowledge & Understanding (SCKX) OR Scientific Reasoning (SCRX)</p>
<p>Evaluation: List how the above outcomes will be assessed.</p>	<p>Assessment will be based on the following criteria:</p> <ul style="list-style-type: none"> lecture examinations lecture and laboratory quizzes written assignments standardized laboratory practicals
<p>Instructional Resources: List library (e.g. books, journals, on-line resources), technological (e.g. Smartboard, software), and other resources (e.g. equipment, supplies, facilities) required and desired to teach this course.</p>	<p>Required:</p> <ul style="list-style-type: none"> slides experiment materials specimens software <p>Desired: None</p>
<p>Textbook(s)</p>	<p><i>Biology: Concepts and Connections</i>; Campbell, Reece, Taylor, and Simon; Latest edition</p>