

**BIO 121**  
**Concepts of Biology**

**Course Description:** Four semester hours, three hours lecture per week, 2 hours laboratory per week. Concepts oriented course for the non-science major. Study of the origin of life, the cell, growth and reproduction, genetics and evolution. May not be used to meet graduation requirements by students majoring in the College of Sciences and Mathematics or for certification of high school teachers in biology.

**Number of Credit Hours:** 4

**Course Prerequisites and Corequisites:** Prerequisite none; Corequisite BIO 121L.

**Program Learning Outcomes:**

This is a general education core curriculum course and no specific program learning outcomes for this major are addressed in this course.

**General Education Core Curriculum Objectives/Outcomes:**

1. **Critical Thinking:** Students will develop this ability by learning to use the scientific method to draw conclusions based on observations of some aspect of nature. Students will be exposed to the scientific method in lecture and will gain the ability to identify the components (hypothesis, experimental groups, conclusions, etc.). This skill will be further developed in lab when the students will utilize the scientific method to set up and conduct their own experiments, gather data and draw conclusions based on that data.
2. **Communication Skills:** Students will develop both written and visual communication skills in this course. Written skills will be developed in the laboratory as they make written descriptions of their experimental methods and outcomes. Visual communication will be developed through the process of converting experimental data into a meaningful graphical representation of that data.
3. **Empirical and Quantitative Skills:** Students will develop their empirical and quantitative skills through many aspects of this course. Specifically, they will learn to calculate probabilities when tracing flow of genetic information from parents to offspring in lecture and will also use quantitative skills to estimate animal populations based on sampling in lab.
4. **Teamwork:** Students will be instructed on good teamwork practices and will develop teamwork skills by working in groups to complete each lab exercise. This will require the students to divide tasks, communicate results with one another and discuss the results to reach a conclusion. They will complete peer evaluations using a multiple choice Likert Scale Questionnaire, and the teamwork experience as a whole by responding to short answer questions.

**Student Learning Outcomes:**

Students who complete Concepts of Biology will be able to understand:

1. How the scientific method is used to critically evaluate scientific information (CO: 1, 4)
2. What characteristics distinguish living things from inanimate matter (CO: 1)
3. How chemical interactions are the basis for life (CO: 2, 3, 4)
4. How genetic information is passed from parents to offspring and how this genetic information is expressed by cells and how humans are utilizing this information for the benefit of society (CO: 1, 3, 4)
5. Classification systems used for of the diversity of life forms from the species to kingdom level (CO: 1)
6. Analysis of the biological interactions that occur from the sub-cellular to the ecosystem level of organization (CO: 1, 2, 3, 4)
7. The Theory of Evolution and the history of life on Earth (CO: 1)

**Text and Materials:**

Campbell Essential Biology with Physiology 4<sup>th</sup> Edition  
Concepts of Biology Laboratory Manual, 3<sup>rd</sup> ed.

**Course Requirements:**

Students must enroll in both lecture and lab and final grades will reflect both components. The lecture portion of the grade is based on student performance on examinations, quizzes, participation, and homework. Lab includes both a daily quiz and in-lab assignments. Students will complete a teamwork-based assignment in which they will be required to follow an experimental procedure, gather and analyze data, and prepare a final report of their results.

**Lecture Calendar**

<b>Week</b>	<b>Topic</b>	<b>CO</b>	<b>Activity</b>
1	Introduction to Biology, Chemistry in Biology	1	<i>Scientific method:</i> Critical Instruction of the Components and Uses; <i>Critical reading:</i> Are Trans Fats Bad for You?
2	Chemistry in Biology	3	<i>Calculation:</i> Quantities of Subatomic Particles in Atoms of Various Elements.
3	Cell Structure	1	<i>Critical reading:</i> The Evolution of Antibiotic Resistance
4	Cell Structure; Cell Division	1	<i>Compare and contrast:</i> Mitosis and Meiosis
5	Cell Division	3	<i>Calculation:</i> Chromosome Numbers During Cell Division
6	Principles of Genetics	1	<i>Compare and contrast:</i> Modes of Inheritance
7	Principles of Genetics; DNA Structure and Function	3	<i>Calculation:</i> Punnett square
8	DNA Structure and Function	1	<i>Critical reading:</i> Mix-and-Match Viruses
9	Plant Structure	1	<i>Critical reading:</i> The Problem of the Disappearing Bees
10	Cellular Metabolism	1	<i>Critical reading:</i> What Causes Muscle Burn?
11	Cellular Metabolism; Biodiversity	3	<i>Calculation:</i> Byproducts of Respiration and Photosynthesis.
12	Biodiversity	1	<i>Critical reading:</i> The Sixth Mass Extinction
13	Principles of Ecology	1	<i>Critical reading:</i> How Does Climate Change Affect Species Distribution
14	Principles of Ecology; Principles of Evolution	1	<i>Critical reading:</i> Climate Change as an Agent of Natural Selection
15	Principles of Evolution	1	<i>Critical reading:</i> An Evolutionary Response to Malaria

### Laboratory Calendar

Week	Topic	CO	Activity
1	Introduction & The Microscope	2, 3, 4	Discussion of Basic Elements of Teamwork; <i>Microscope observations</i> : Proper Microscope Use
2	Organic Molecules of the Cell	1, 2, 4	<i>Scientific method</i> : Identification of an Unknown Organic Substance
3	Cells	1, 2, 4	<i>Compare and contrast</i> : Cell Types; <i>Microscope observations</i> : Cells
4	Molecular Movement and the Cell Membrane	1, 2, 3, 4	<i>Scientific method</i> : Experimental Design to Observe Diffusion; <i>Compare and contrast</i> : Diffusion Rates of Different Solutions; <i>Calculation</i> : Diffusion Rates
5	Mitosis and Cytokinesis	2, 3, 4	<i>Microscope observations</i> : Dividing Cells; <i>Calculation</i> : Lengths of Cell Cycle Stages based on student data
6	Meiosis and Gametogenesis	1, 2, 4	<i>Microscope observations</i> : Dividing cells; <i>Compare and contrast</i> : mitosis and meiosis
7	Inheritance	1, 2, 4	<i>Scientific method</i> : Determining Genotype and Phenotype of Inherited Traits Based on Observations
8	Organization of the Flowering Plant Body	1, 2, 4	<i>Compare and contrast</i> : Microscopically Observed Plant Tissues; <i>Microscope observations</i> : Plant Tissues
9	Enzymes	1, 2, 4	<i>Scientific method</i> : Experimentally testing of enzyme activity in different environmental conditions
10	Photosynthesis	1, 2, 4	<i>Scientific method</i> : Experimental observations of the effects of light and carbon dioxide on photosynthesis
11	Biological Diversity	1, 2, 4	<i>Scientific method</i> : Experimental Sample Collection; <i>Compare and contrast</i> : Organisms from Different Taxa
12	Ecology	1, 2, 3, 4	<i>Scientific method</i> : Experimental Sample Collection; <i>Calculation</i> : Determining the amounts of compounds present in a water sample
13	Estimating Animal Population Sizes	2, 3, 4	<i>Scientific method</i> : Experimental Sample Collection; <i>Calculation</i> : Population Size Estimates

#### Grading Policy:

The grading for this course will be a result of your efforts in both lecture and laboratory. Your grades from lecture and lab will be computed into a single grade; the same grade is reported for both lecture and lab. The lab portion counts 1/4 (25%) while the lecture portion counts 3/4 (75%) of your final grade.

PERCENTAGE OF POINTS	LETTER GRADE
90 – 100%	A
80 – 89%	B
70 – 79%	C
60 – 69%	D
0 – 59%	F

#### Attendance Policy:

Students will be allowed up to 6 absences (excused or unexcused). Make-up work will only be given to students with University excused absences. Students that exceed this maximum will no longer be eligible to make-up missed work.

**Academic Integrity (A-9.1)**

Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

**Definition of Academic Dishonesty**

Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at [http://www.sfasu.edu/policies/academic\\_integrity.asp](http://www.sfasu.edu/policies/academic_integrity.asp)

**Withheld Grades Semester Grades Policy (A-54)**

Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

**Students with Disabilities**

To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to <http://www.sfasu.edu/disabilityservices/>.