

# Biology 1- Principles of Biology

## Course Description

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Lecture Instructor: **R. Elizondo**

Office: LS 5 ( ext. 257)

Office Hours: MW 12:00-1:00

Tu 11:00-12:00

or by appointment

This course is required for the Biological Science Major and is designed to introduce the student to a variety of topics including: The Scientific Method, Care and Use of Microscopes, Biochemistry, Cell Theory, Cell Structure and Function, Cellular Metabolism, Histology, Structure and Function of Selected Systems (Digestive, Circulatory, Lymphatic, Excretory, Reproductive, Respiratory, and Nervous), Plant Tissues, Plant Morphology (root, stem, and leaf), Plant Growth and Development, Plant Reproduction, Taxonomy, Viruses, Kingdoms (Monera, Protista, Fungi, Plant, and Animal), Mendelian Genetics, Molecular Genetics, Population Genetics, Evolution, Animal Development, and Embryology.

Your active participation in all lectures and laboratory sessions is mandatory because of the many oral questions and discussions, demonstrations, exercises, and quizzes, carried out during these periods. Your point totals on weekly quizzes and lab reports will be reduced by your absence from lecture and lab. Excessive unexcused absences will cause you to be dropped from the course.

Microscopes, glassware, and most lab supplies will be made available for each lab exercise but a replacement fee will be charged for lost or broken materials. You will be responsible for obtaining your own textbook, laboratory manual, and syllabus.

### **The final course grade will be determined as follows:**

- a. 45% of your grade (150 points each for a total of 450 points) will be based on 3 lecture exams at the end of each major section.
- b. 15% of your grade will be based on weekly quizzes (16) taken during the lecture period (usually on Fridays or Mondays). Attendance during the entire lecture period is a requirement for taking the quiz. On a number of occasions you will be required to take notes during demonstrations and A/V presentations. **There will be NO makeup quizzes (no early or late quizzes) but** your lowest quiz grade will be dropped giving you a total of 150 points for 15 quizzes.
- c. 40% of your grade (400 points) will be based on your laboratory work and your laboratory instructor will give you the details.
- d. Percentages are: 100-90=A    89-80=B    79-70=C    69-60=D    less than 60=F
- e. Occasionally, a student's grade will fall on the borderline, for example: 89.6%. As your instructor, I reserve the right to place that grade above the line if I think it is warranted. I use the following criteria to make that judgment: performance in lab, a steady increase in test scores, attendance, and your attitude in lecture and lab.

- f. Students can discuss any items related to this course during my office hours or by appointment.
- g. If you decide to drop this course, you should complete the appropriate drop card and return it to admissions. The official drop date is \_\_\_\_\_.

**Required Basic Skills:**

Eligibility for Math 1, Eng 25, and Eng 26. There is a great deal of writing on lab reports and exams that is required in this course, so it is strongly recommended that you complete English 15 and English 26 before you take Biology 1.

**Subject Pre-requisites:**

None, but it is strongly recommended that you continue taking the required Math, English, and Chemistry courses which will prepare you for the Biological Sciences Associate in Science Degree, and which are required for Anatomy, Physiology, Microbiology, Biology 5A,5B and other science courses that you will be taking in the future depending on your major or area of interest.

**Recommended Courses:**

College English, math, computers, chemistry, and biology courses.

**Required Materials:**

Biology- Life On Earth by Audersirk (latest edition)

Biology 1- Lab Manual titled: Biological Explorations by Gunstream (latest edition)

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**Course Outline:**

<u>Week</u>	<u>Chapter</u>	Section 1 Lecture Exam at the end of 6 weeks ( Friday, _____)
1	1	Introduction: What is Life? 1. The Characteristics of Living Things 2. The Scientific Method  Lab 1: Care and Use of Microscopes
2	5,6,9,12	Cell Theory, Structure, and Function 1. The Development of the Cell Theory 2. Types of cells (prokaryotes and eucaryotes) 3. Overview of Cell Structure and Function 4. Cell Division (mitosis and meiosis) 5. Spermatogenesis and Oogenesis  Lab 2 Cell Structure Lab 3 Cell Division (mitosis and meiosis)
4-5	2,3	Molecules of Life 1. Matter and Energy 2. Atoms and Atomic Structure (O,C,H,N,Ca,P,K,S) 3. Chemical Bonds and Chemical Reactions 4. Inorganic Molecules (water, acids, bases, and salts, ph) 5. Organic Biological Molecules (carbohydrates, lipids, proteins, nucleic acids)  Lab 4 Histology (Animal Tissues) and Organization of the Human Body
5-6	7,8	Cellular Respiration and Photosynthesis 1. Carbohydrate Metabolism - An Overview 2. Cellular Respiration Glycolysis-->Krebs Cycle-->Electron Transport Chain, Chemiosmosis 3. Photosynthesis (leaf anatomy, pigments, chloroplasts, light & dark reactions) 4. Transport Across Cell Membranes 5. Hypertonic, Hypotonic, and Isotonic Solutions  Lab 5 Chemistry of Cells
6		Lecture Exam 1 (Friday _____) Lab Exam 1 - during the lab period

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**Week**      **Chapter**      Section 2 - Lecture Exam at end of 12 weeks(Friday \_\_\_\_\_)

- 7      32      Digestion and Nutrition
1. Types of Digestive Systems (invertebrate, vertebrate, and human)
  2. Structure and Function of the Human Digestive System
  3. Chemistry of Digestion
  4. Essentials of Digestion

Lab 7 Fetal Pig (General Features and Digestive System)

- 8      30      Circulatory System
1. Types of Circulatory Systems
  2. The Vertebrate Circulatory System - An Overview
  3. Chambers of the Heart and Major Blood Vessels
  4. Anatomical Comparison of Arteries, Capillaries, and Veins
  5. Cardiac Physiology and Control of Circulation
  6. Blood Clotting Mechanism
  7. Fetal Circulation
  8. Lymphatic System

Lab 8 Circulatory System

- 9      25-26      Plant Growth and Structure
1. An Overview of Plant Structure and Growth
  2. Plant Tissues (dermal, ground, and vascular tissues)
  3. Plant Organs (roots, stems, and leaves)
  4. A Comparison of Plant and Animal Nutrition
  5. Plant Transport Mechanisms (water, minerals, & sugars)

Lab 9 Plant Morphology (root, stems, and leaves)

- 10      20-24      Classification and Systematics
1. Five Kingdoms of Life
  2. An Introduction to Animal and Plant Diversity
  3. Major Plant Divisions
  4. Plant Regulation and Response
  5. Plant Hormones

Lab 10 Plant Topics including plant reproduction, monocot vs dicot, flowers and seeds, moss and fern cycles

- 11-12      33,39      Osmoregulation - Excretion and Reproduction
1. Some Simple Urinary Systems
  2. Structure and Function of the Human Urinary System
  3. Asexual versus Sexual Reproduction

4. Human Female and Male Reproductive Systems
5. Pregnancy and Birth'

Lab 11 Urogenital Systems

- 12                      Lecture Exam 2 (Friday, \_\_\_\_\_)  
                                    Lab Exam 2 during lab period

- 13      13-15      Genetics
1. Introduction to Mendelian Genetics (dominance, mutations, inheritance of sickle cell anemia, multiple alleles and blood groups, x-linked traits)
  2. Inheritance of Single and Multiple Traits, Sex-linked Genes, and Multiple Alleles
  3. DNA as Genetic Material
  4. Replication
  5. Genetic Engineering / Ethics of Biotechnology

Lab 13 Human Genetics

- 14      31              Respiratory System
1. Comparative Anatomy of Respiratory Systems
  2. The Human Respiratory System

Lab 14 Human Respiration (Vital Capacity)

- 15      35-37      Nervous System
1. Neurons, Nerve Impulse, Synapse
  2. Brain and Spinal Cord (CNS)
  3. Cranial Nerves and Spinal Nerves (PNS)
  4. Autonomic Nervous System (ANS)
  5. Sensory Receptors
  6. Endocrinology

Lab 15 Central Nervous System (Brain and Spinal Cord)

- 16      40              Animal Development
1. Differentiation
  2. Stages of Animal Development
  3. Human Development

Lab 16 Fertilization and Development

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<u>Week</u>	<u>Chapter (s)</u>	
17	16-19	Evolution 1. The History of Evolutionary Thought 2. The Evidence of Evolution 3. The Mechanisms of Evolution Including 4. Speciation 5. The First Life
		Lecture Exam 3 during Finals Week (_____)
		Lab Exam 3 during the lab period.