

## **Course: Honors Biology with Lab**

### **Course Length:**

Six weeks (140 hours with lab) equivalent to a full-year course.

### **Course Description:**

The course introduces the study of living systems by progressing from the microscopic level up to ecosystems. Class discussion exposes students to current topics in bioethics, environmental concerns and advances in molecular biology. The laboratory provides hands on learning and encourages students to develop skills in observation, data collection, critical analysis and report writing.

The method of instruction varies. Lecture is used for presentation of new concepts. Students are encouraged to participate frequently in class. Homework is assigned to enhance the daily session. It is designed to take students approximately 1 ½ to 2 hours each day. With the exception of the first and last day, quizzes are given frequently to assess the students' progress on covered material. A Lab Practical test will be given mid-semester that will cover all topics presented up to that point; it represents 10% of the final grade. All major tests are announced and a final exam is given to test student's knowledge of the material taught.

### **Requirement:**

Students must pass with at least A- to receive full credit for this class.

### **Course Content:**

- I. **PRINCIPLES OF CELLULAR LIFE**
  - Life's Chemical Basis
  - Molecules of Life
  - Cell Structure and Function
  - Ground Rules of Metabolism
  - Where It Starts—Photosynthesis
  - How Cells Release Chemical Energy
  
- II. **PRINCIPLES OF INHERITANCE**
  - How Cells Reproduce
  - Meiosis and Sexual Reproduction
  - Observing Patterns in Inherited Traits
  - Chromosomes and Human Inheritance
  - DNA Structure and Function
  - From DNA to Proteins
  - Controls over Genes
  - Studying and Manipulating Genomes
  
- III. **PRINCIPLES OF EVOLUTION**
  - Evidence of Evolution
  - Micro evolutionary Process
  - Life's Origin and Early Evolution

- IV. **EVOLUTION AND BIODIVERSITY**
  - Prokaryotes and Viruses
  - Protists--The Simplest Eukaryotes
  - Plant Evolution
  - Fungi
  - Animal Evolution--The Invertebrates
  - Animal Evolution--The Vertebrates
  - Plants and Animals--Common Challenges
  
- V. **HOW PLANTS WORK**
  - Plant Tissues
  - Plant Nutrition and Transport
  - Plant Reproduction and Development
  
- VI. **HOW ANIMALS WORK**
  - Animal Tissues and Organ Systems
  - Neural Control
  - Sensory Perception
  - Endocrine Control
  - Structural Support and Movement
  - Circulation
  - Immunity
  - Respiration
  - Digestion and Human Nutrition
  - The Internal Environment
  - Animal Reproduction and Development
  
- VII. **PRINCIPLES OF ECOLOGY**
  - Population Ecology
  - Community Structure and Biodiversity
  - Ecosystems
  - The Biosphere
  - Behavioral Ecology

**Text and Materials:**

AP Edition Biology – Campbell & Reece