

COURSE OUTLINE

Biology 121
Introduction to Physiology

I. Catalog Statement

Biology 121 studies the functions of the systems of the human body. The systems studied are nervous, muscle, sensory, endocrine, cardiovascular, blood and immune, respiratory, urinary, gastrointestinal, and reproductive.

Units - 4.0

Lecture Hours - 3.0

Laboratory Hours - 3.0

(Faculty Lab Hours 3.0 + Student Lab Hours 0.0 = Total Laboratory Hours 3.0)

Prerequisite: Biology 120 and Chemistry 101,110, or 120

II. Course Entry Expectations

Skill Level Ranges: Reading 5; Writing 5; Listening/Speaking 5; Math 4.

Prior to enrolling in the course, the student should be able to:

1. possess a basic understanding of the structure of the human body;
2. identify the basic features of cells and their organization as tissues;
3. describe the general structure-function relationship of each organ, because structure determines function;
4. operate a microscope and employ dissection techniques;
5. evaluate current atomic theories;
6. analyze experimental data;
7. predict chemical properties;
8. demonstrate proper use of laboratory equipment and chemicals.

III. Course Exit Standards

Upon successful completion of the required course work, the student will be able to:

1. explain homeostasis and cellular mechanisms responsible for its maintenance;
2. describe the physiology of the cell including such processes as cell respiration, molecular genetics, protein synthesis, and cellular transport;
3. describe the physiology of the major systems of the body and how they are responsible for maintaining homeostasis;

4. explain immunology including specific and non-specific mechanisms of immunity;
5. analyze current issues in physiology as deemed appropriate by the instructor.

IV. Course Content

Total Contact Hours = 96

A. The Chemical and Physical Basis of Physiology	4.5 hours
1. The elements	
2. Chemical reactions – molecules	
3. Organic molecules	
4. Acids, bases and salts	
5. Solutions	
6. Brownian movements	
7. Absorption	
B. The Cellular Metabolism	18 hours
1. Cell division	
2. Molecular genetics	
3. Protein synthesis	
4. Cell respiration	
5. Cellular transport	
C. The Tissues	0.5 hours
D. The Cardiovascular System	6 hours
1. Pumping action of heart and its regulation	
2. Blood flow and regulation in systemic circulation	
3. Special areas of the circulatory system	
4. Systemic arterial pressure and hypertension	
5. Cardiac output, venous pressure, cardiac failure, and shock	
E. The Urinary System	6 hours
1. Formation of urine by kidneys	
2. Micturition	
3. Regulation of body fluid volume and composition	
F. Blood and Immunity	12 hours
1. Blood cells and their functions	
2. Immunity and allergy	
3. Blood coagulation and transfusion	
G. Respiration	6 hours
1. Mechanics of respiration and transport of oxygen and carbon dioxide	
2. Regulation of respiration	
3. Aviation and deep sea physiology	
H. The Nervous System and Muscle	15 hours
1. The nerve and the membrane potentials	
2. Muscle physiology	
3. The ganglion cell and basic neuronal circuits	
4. Somesthetic sensations and interpretation of sensations by the brain	
5. Thought processes and control of motor activities	

6. Reflex functions of spinal cord and brain stem and cerebro-spinal fluid system
7. The autonomic nervous system
- I. Special Sensory Systems 6 hours
 1. The eye
 2. The ear
 3. Taste
 4. Olfaction
- J. Gastrointestinal and Metabolic Systems 10 hours
 1. Gastrointestinal movements and their regulation
 2. Digestion of carbohydrates, fats, and proteins
 3. Release of energy from foods and nutrition
 4. Body heat and temperature regulation
- K. Endocrinology and Reproduction 12 hours
 1. Introduction to endocrinology
 2. Pituitary hormones
 3. Thyroxine
 4. Adrenocortical hormones and insulin
 5. Calcium metabolism and bone
 6. Parathyroid hormone and teeth
 7. Sexual functions of male and female
 8. Sex hormones
 9. Reproduction

V. **Methods of Presentation**

The following instructional methodologies may be used in the course:

1. lecture;
2. laboratory experiments;
3. multi-media.

VI. **Assignments and Methods of Evaluation**

1. Quizzes.
2. Midterm examinations.
3. Final examination.

VII. **Textbook**

Fox, S., Human Physiology. Current Edition.
New York: McGraw-Hill, 2010.
13th Grade Textbook Reading Level. ISBN: 0-07726587-4.

VIII. Student Learning Outcomes

1. Students will be able to define and/or describe the cellular organelles of the human body and relate the significance of the mechanisms used by these organelles to the acquisition and use of food as an energy source.
2. Students will be able to explain the biochemical mechanisms of molecular genetics, protein synthesis, and cellular transport and combine this knowledge in order to understand the functions of the systems of the human body.
3. Students will be able to explain the normal physiology of the major human body systems, demonstrate how these systems are able to maintain homeostasis and critique selected current issues about abnormal physiology.
4. Students will be able to explain the specific and non-specific mechanisms of human immunity and integrate the significance of these mechanisms to the homeostasis of the human body.
5. Students will be able to demonstrate the proper techniques of the various physiological aspects of the human body including: blood typing, cardiovascular analysis, respiratory analysis, urinary analysis, normal muscle function, analysis of digestive enzyme activity on selected macromolecules, and analysis of sensory function.