

Date Revised: 1980  
Date Revised: 1985  
Date Revised: 1985, 1998, 2002

|                |  |                |
|----------------|--|----------------|
| <u>BIO 202</u> | <u>HUMAN ANATOMY AND PHYSIOLOGY II</u> | <u>BIO 201</u> |
| Prefix No.     | Course Title                           | Prerequisite   |

Credit Hours: 4      Contact Hours: Lecture 3 Lab 2

## I. COURSE DESCRIPTION

This course is the second in a two-semester sequence that examines the structure (anatomy) and function (physiology) of the human body. Topics in BIO 202 include the endocrine, cardiovascular, lymphatic, immune, respiratory, digestive, urinary, and reproductive systems. Dissection, histological studies, physiology experiments, and computer-simulated activities are featured in the required lab.

## II. GENERAL COURSE COMPETENCIES

- A. The student will demonstrate knowledge of the detailed anatomy of each system studied.
- B. The student will demonstrate knowledge of the physiological concepts related to each system studied.
- C. The student will acquire an understanding of the principle of complementarity, as well as, an understanding of the concept of a holistic organism functioning to maintain homeostasis.

## III. COURSE OBJECTIVES

The student will be required to demonstrate that he has attained each general course competency for the systems studied in this course by performing the objectives listed under each body system.

- A. Endocrine System
  - 1. Define the functions of the endocrine system.
  - 2. Compare the endocrine system to the nervous system as a control for body functions by identifying the targets, messengers, and response time of each.
  - 3. Understand the difference between an endocrine gland and an exocrine gland.

4. Describe the four general types of regulation for hormonal secretion.
5. Discuss the negative feedback mechanism as it relates to the control of hormonal activity.
6. Describe the difference in the structure of amino acid-based hormones and steroid hormones.
7. Explain the mechanisms of hormone action.
8. Identify the location and structure of each gland.
9. List the hormones secreted by each gland.
10. Know the structure, target, action and control of each major hormone.
11. Give examples of homeostatic interrelationships between the endocrine system and other body systems.

## B. Cardiovascular System

1. List the functions of the blood.
2. Identify the components of plasma.
3. Identify the major plasma proteins and the function of each.
4. Describe the structural and functional characteristics of the formed elements of the blood.
5. Know the chemical composition of hemoglobin.
6. Describe the regulation and requirements for erythropoiesis.
7. Discuss ABO blood typing and transfusion incompatibilities.
8. Explain hemolytic disease of newborns and its relationship to the Rh factor.
9. Describe the steps in hemostasis.
10. Use a flow chart to diagram the blood clotting mechanism.
11. Describe the size, location, and orientation of the heart.
12. Identify the structures of the heart, including valves, chambers and associated great vessels.
13. Diagram the route of blood flow through the heart, including the pulmonary and systemic circuit.
14. Compare the structural and functional differences of cardiac and skeletal muscle.
15. Describe the mechanism and events of cardiac muscle contraction.
16. Name the components of the conduction system of the heart and trace the conduction pathway.
17. Draw a normal electrocardiogram tracing and label the individual waves and line segments.
18. Describe the sequence of events of the cardiac cycle.
19. Discuss the effects of various factors on cardiac output.
20. Explain the role of the autonomic nervous system in regulating cardiac output.
21. Compare and contrast the structure and function of arteries and veins.
22. Describe the structure and function of a capillary bed.
23. Define vasodilation and vasoconstriction.

24. Explain the relationship between blood flow, blood pressure and resistance.
25. Describe the mechanisms of blood pressure regulation.
26. Discuss neural, hormonal, and chemical factors that affect blood pressure.
27. Name and give the location of the major arteries and veins in systemic circulation.
28. Classify the different types of circulatory shock.
29. Give examples of homeostatic interrelationships between the cardiovascular system and other body systems.

#### C. Lymphatic System

1. Identify the functions of the lymphatic system.
2. Describe the structure and distribution of lymphatic vessels.
3. Identify the source of lymph and trace its route of transport.
4. Describe the location and function of lymph nodes, tonsils, lymphoid organs and other lymphoid structures.
5. Give examples of homeostatic interrelationships between the lymphatic system and other body systems.

#### D. Immune System

1. Explain the difference between a structural body system and a functional body system.
2. Describe the membrane surface barriers and their protective functions.
3. List the cells involved in non-specific resistance and state the functions of each.
4. Describe in detail the inflammatory process and its role in non-specific resistance.
5. Describe in detail the development and stages of fever.
6. Describe the antimicrobial proteins that are produced during non-specific resistance.
7. Distinguish between non-specific resistance and the immune response.
8. Compare cell mediated immunity and humoral immunity.
9. Define immunocompetence.
10. Understand the role of HLA's in self-tolerance.
11. Compare and contrast the origin, site of immunocompetence, and function of B and T lymphocytes.
12. List the sequence of steps in the immune response.
13. Classify the types of antibodies as to location, size and action.
14. Describe the types of immunity and the method for development of the immunity.
15. Identify the types of hypersensitivity reactions.
16. Know the major autoimmune disorders and the target of the self-antibody.

17. Discuss the etiology, pathogenesis and pathophysiology of AIDS.
18. Give examples of homeostatic interrelationships between the immune system and other body systems.

#### E. Respiratory System

1. List the functions of the respiratory system.
2. Review the structure of the red blood cell and hemoglobin.
3. Identify the location and structure of the organs of respiration.
4. Trace the bronchial tree from the trachea to the alveolus.
5. Compare type I and type II alveoli as to structure, function and numbers.
6. Define “dust” cells.
7. Describe the mechanics of breathing.
8. Explain and compare the respiratory volumes and capacities.
9. Describe the various pulmonary function tests.
10. Define dead space air.
11. Understand the different pressures involved in the mechanics of breathing.
12. Define atelectasis.
13. State Boyle’s Law, Dalton’s Law, and Henry’s Law and relate each to their involvement in respiration.
14. Know the partial pressures of oxygen and carbon dioxide in systemic and pulmonary circulation, as well as at the alveolar and tissue level.
15. Discuss ventilation-perfusion coupling.
16. Describe the effects of pH, temperature, and pCO<sub>2</sub> on oxygen unloading.
17. Describe carbon dioxide transport in the blood.
18. Discuss the neural controls of respiration.
19. Define hyperventilation and hypoventilation.
20. Understand the types of hypoxia and the causes of each.
21. Give examples of homeostatic interrelationships between the respiratory system and other body systems.

#### F. Digestive System

1. Describe the functions of the digestive system.
2. Describe the location and function of all organs of digestion.
3. Identify the accessory organs of digestion and their function.
4. Explain the dental formula and differentiate between deciduous and permanent teeth.
5. Describe the composition, function and regulation of saliva.
6. Understand the mechanisms of chewing and swallowing.
7. Discuss structural modifications of the wall of the stomach and small intestine that enhance the digestive process.
8. Describe the composition of gastric juice.

9. Name the cell types responsible for secreting the various components of gastric juice.
10. Discuss the function of hormones produced by the small intestine.
11. State the roles of bile and pancreatic juice in digestion and the regulation of each.
12. List the enzymes involved in chemical digestion and name the food on which they act.
13. Name the end products of the digestion of protein, fat, carbohydrates and nucleic acids.
14. Describe the process of absorption.
15. List the six major nutrient categories.
16. Distinguish between fat and water-soluble vitamins and list vitamins belonging to each group.
17. List minerals essential for health and know important dietary sources of each.
18. Describe deamination and B-oxidation as they relate to energy production.
19. Differentiate between LDL and HDL relative to their structures and roles in the body.
20. Give examples of homeostatic interrelationships between the digestive system and other body systems.

#### G. Urinary System

1. Identify the location and structure of the accessory organs of the urinary system.
2. Describe the functions of the kidney.
3. Trace blood flow through the kidney.
4. Develop a flow chart to show the flow of urine.
5. Describe the anatomy of a nephron.
6. Distinguish between the vascular portion of a nephron and the tubular portion.
7. Describe the mechanisms of filtration, reabsorption and secretion.
8. Define glomerular filtration rate.
9. Explain the roles of aldosterone and ADH in regulating sodium and water reabsorption.
10. Describe in detail the autoregulatory mechanism of the kidney.
11. Discuss the effects of renin-angiotensin on systemic blood pressure.
12. Calculate the renal clearance of various substances.
13. Explain the formation of dilute and concentrated urine.
14. List abnormal urine components and name the condition associated with each.
15. Describe the fluid compartments and indicate the electrolyte concentration in each.
16. List the consequences of abnormal levels of major electrolytes and know terms associated with excess or deficit of each electrolyte.

17. Discuss the three major buffer systems of the body.
18. Describe the influence of the respiratory system on acid-base balance.
19. Describe the influence of the kidney on acid-base balance.
20. Identify acid-base imbalances, determine cause and the possibility of compensation.
21. Give examples of homeostatic interrelationships between the urinary system and other body systems.

#### H. Reproductive System

1. Describe the common function of the male and female reproductive systems.
2. Describe the location structure and function of the male reproductive organs and accessory structures.
3. Know the secondary sex characteristics of the male.
4. Discuss the source and function of semen.
5. Review the process of spermatogenesis.
6. Review the target, action, and regulation of testosterone.
7. Describe the location, structure and function of the female reproductive organs.
8. Describe the anatomy of the female external genitalia.
9. Discuss the structure of the mammary glands.
10. Review the process of oogenesis.
11. Describe the regulation of the menstrual cycle.
12. Discuss the physiological effects of estrogen and progesterone.
13. Indicate the infectious agents that cause the sexually transmitted diseases.
14. Describe the significant events of puberty and menopause.
15. Give examples of homeostatic interrelationships between the reproductive system and other body systems.

### IV. CLASS ACTIVITIES

- A. Lecture
- B. Laboratory
- C. Multimedia supported exercises and activities
- D. Parallel readings

## **V. CRITERIA FOR EVALUATION**

A student will have demonstrated competency in the course if he/she accumulated a total of 70% of the possible points from the following methods of evaluation; the student may pass the course with 60% accuracy in these same evaluations.

- A. Scheduled lecture examinations.
- B. Laboratory examinations
- C. Semester final examination