

JEFFERSON COLLEGE

COURSE SYLLABUS

BIO212

ANATOMY AND PHYSIOLOGY II

4 Credit Hours

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**Revised Date: November 18, 2005
by
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**Arts & Science Education
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BIO212 ANATOMY AND PHYSIOLOGY II

I. CATALOGUE DESCRIPTION

Prerequisite: BIO211 with a minimum grade of C, or special permission of the Associate Dean

4 semester hours credit

A continuation of BIO211 with integration and focus on systems associated with fluids/electrolytes, circulation, respiration, digestion, excretion and reproduction. Three lecture and two laboratory hours per week. (S)

II. GENERAL COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- A. Understand the basic composition of body fluids associated with the interstitium, blood and urine and relate the diagnostic significance of clinical tests regarding these fluids.
- B. Describe basic histology associated with fluid/electrolytes, circulatory, respiratory, digestive, excretory and reproductive systems.
- C. Explain the general functions of these organ systems.
- D. Identify major organs that make-up these systems and tell how these organs function.
- E. Explain how other organ systems regulate fluid/electrolytes, circulation, breathing, digestion of food, excretion of metabolic waste and reproduction.
- F. Describe key pathophysiology related to these systems.
- G. Describe common clinical tests for determining normal function of the organs and systems of fluid/electrolyte, circulation, respiration, digestion, excretion and reproduction.
- H. Understand the complex integration between all of the organ systems.

III. COURSE OUTLINE (COURSE CONTENT WILL BE DRAWN FROM THIS)

- A. Circulatory System
- B. Lymphatic/Immune System
- C. Respiratory System
- D. Digestive System

- E. Metabolism
- F. Urinary System
- G. Fluid and Electrolytes
- H. Reproductive System
- I. Development and Inheritance

IV. UNIT OBJECTIVES

A. Circulatory System

1. Describe the important components and major functions of blood.
2. Discuss the composition and functions of plasma.
3. List the characteristics and functions of red blood cells.
4. Identify the locations where the components of blood are produced and discuss the factors that regulate their production.
5. Explain what determines a person's blood type and why blood types are important.
6. Categorize the various white blood cells on the basis of their structures and functions.
7. Describe how white blood cells fight infection. disadvantages.
8. Explain the mechanisms that control blood loss after an injury.
9. Relate the anatomy of the heart to its functions.
10. Identify important differences between cardiac and skeletal muscle.
11. Trace the path of blood flow through the heart.
12. Identify the major arteries and veins of the pulmonary and systemic circuits.
13. Explain what can be learned by listening to the heart or analyzing an ECG.
14. Describe the mechanisms that regulate heart rate and cardiac output.
15. Relate the structural characteristics of blood vessels to their functions.
16. Describe how blood pressure is measured.
17. Explain the factors that influence blood pressure.

B. Lymphatic/Immune System

1. Identify the major components of the lymphatic system and explain their functions.
2. Discuss the importance of lymphocytes and describe where they are found in the body.
3. List the body's nonspecific defenses and explain how each functions.
4. Describe the characteristics of the body's specific defenses.
5. Compare the different types of immunity and their origins.
6. Explain how lymphocytes are activated and how they distinguish between foreign cells and cells of the body.

7. Discuss the roles of the various types of lymphocytes in an immune response.
8. Describe the structure of antibody molecules and explain how they function.
9. Relate allergic reactions and autoimmune disorders to immune mechanisms.
10. Specify the factors that can enhance or reduce one's resistance to disease.
11. Describe the changes in the immune system that occur with aging.

C. Respiratory System

1. Describe the primary functions of the respiratory system.
2. Relate these functions to the anatomical and histological specializations of the tissues and organs in the system.
3. Describe the physical principles governing the movement of air into the lungs and the diffusion of gases into and out of the blood.
4. Describe how oxygen and carbon dioxide are transported in the blood.
5. Identify the reflexes that regulate respiration.
6. Explain how respiratory activities change to keep pace with metabolic needs.
7. Explain how the centers of respiratory control interact.

D. Digestive System

1. Identify the components of the digestive tract and discuss the functions of each.
2. Describe the histological characteristics of each segment of the digestive tract in relation to its function.
3. Discuss how food is processed in the mouth and describe the key events of the swallowing process.
4. Describe the characteristics of smooth muscle and explain how ingested materials are propelled through the digestive tract.
5. Identify the enzymes produced by the digestive system and what they accomplish.
6. Summarize the stages involved in the regulation of gastric function.
7. Discuss the homeostatic mechanisms that regulate the activities of the digestive system.
8. Discuss the roles played by the accessory organs in digestion.
9. Explain how various compounds in food are broken down and absorbed by the body.

E. Metabolism

1. Compare the mechanisms of carbohydrate, lipid, protein, and nucleic acid metabolism.
2. Explain how the metabolic activities of tissues, organs, and organ systems are coordinated.
3. Describe the energy reserves of an average person.
4. Describe how we utilize our energy reserves to maintain homeostasis.

5. Explain what constitutes a balanced diet, and why it is important.
6. Discuss the functions of vitamins, minerals, and other important nutrients.
7. Discuss the homeostatic mechanisms that maintain a constant body temperature.

F. Urinary System

1. Identify the components of the urinary system and their functions.
2. Describe the structure and functions of the kidneys.
3. Describe the processes involved in the formation of urine and the changes that occur in the filtrate as it moves through the nephron.
4. Discuss the factors that regulate the composition of the urine.
5. Describe the structures and function of the ureters, urinary bladder, and urethra.
6. Discuss the process of urination and how it is controlled.
7. Describe the effects of aging on the urinary system.
8. Explain how the urinary system interacts with other body systems to maintain homeostasis in body fluids.

G. Fluid and Electrolytes

1. Describe how water and electrolytes are distributed within the body.
2. Explain the homeostatic mechanisms involved in the control of the fluid and electrolyte composition of body fluids.
3. Discuss the ways in which the body compensates for sudden losses or gains of water and/or electrolytes.
4. Explain the homeostatic mechanisms that stabilize the pH of intracellular and extracellular fluids.
5. Identify the most frequent threats to acid-base balance, and explain how the body responds when the pH varies outside normal limits.

H. Reproductive System

1. Summarize the functions of the human male and female reproductive systems and their principal components.
2. Describe the components of the male and female reproductive systems.
3. Detail the physiological processes involved in the ovarian and menstrual cycles.
4. Describe the hormonal mechanisms that regulate reproductive activities.
5. Discuss the production, storage, and transport of sex cells.
6. Describe the anatomical, physiological, and hormonal changes that accompany pregnancy.
7. Discuss the changes in the reproductive system that occur at puberty and with aging.
8. Explain how the reproductive system interacts with other body systems.

I. Development and Inheritance

1. Explain the differences between ordinary cells and gametes and relate the specializations of gametes to their functions.

2. Describe how gametes are formed.
3. Relate basic principles of genetics to the inheritance of human traits.
4. Describe the process of fertilization.
5. Discuss the stages of embryonic and fetal development.
6. Explain how pregnancy affects the mother's body systems and describe the processes of labor and delivery.
7. Explain how developmental processes are regulated.
8. Discuss the major stages of life after delivery.

V. METHOD(S) OF INSTRUCTION

- A. Lectures
- B. Case Studies
- C. Classroom Discussion
- D. Group Work
- E. Textbook Reading
- F. Laboratory Exercises
- G. Classroom and Laboratory Identification Drill Exercises
- H. Tutorial Computer Laboratory
- I. Course Website

VI. REQUIRED TEXTBOOK(S) WITH PUBLICATION INFORMATION

Martini, F., Fundamentals of Anatomy and Physiology, 7th ed., Englewood Cliffs: Prentice Hall, 2001.

Laboratory Manual, Jefferson College

VII. REQUIRED MATERIALS (STUDENT)

None.

VIII. SUPPLEMENTAL REFERENCES

- A. Applications Manual, CD Atlas Physiology CD (packaged with textbook)
- B. Online Supplemental textbook (access with text)
- C. Anatomy & Physiology Coloring Book (available in bookstore)

D. Course Website (STARS)

VIII. METHOD OF EVALUATION (STUDENT)

A. Written Exams

B. Classroom Quizzes

C. Written Case Studies (some group work)

D. Laboratory Exams

E. Laboratory Quizzes and Worksheets

F. Comprehensive Written Exam