

JEFFERSON COLLEGE

COURSE SYLLABUS

PTA100

**Anatomy and Physiology I for Physical Therapist
Assistants**

5 Credit Hours

Revised by:

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September 12, 2014

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PTA100 Anatomy and Physiology I for Physical Therapist Assistants

I. CATALOGUE DESCRIPTION

- A. Prerequisite: Reading Proficiency
- B. Credit hour award: 5
- C. Description: This course begins with an introduction to basic concepts in biology and chemistry, including cellular components and division, genetics and inheritance, molecular transport, tissue types, atom structure, ions, pH, and use of the scientific method, before moving on to organ system level of organization of the human body. While each organ system will be presented, the skeletal, muscular, and integumentary systems will be studied in greatest depth. Laboratory time is required. (F, S, Su)

II. EXPECTED LEARNING OUTCOMES AND ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Define and apply the scientific method to a provided research article.	Summative Written Examinations Quizzes Written Assignments Class Discussion
Demonstrate an introductory knowledge of biological concepts including, but not limited to, the following: The components of an animal cell, protein synthesis, mitosis and meiosis, genetics, inheritance, and molecular transport.	Summative Written Examinations Quizzes Written Assignments Class Discussion Lab Activity or Examination
Demonstrate an introductory knowledge of chemistry concepts including, but not limited to, the following: Atoms, ions, elements, carbohydrates, lipids, and proteins.	Summative Written Examinations Quizzes Written Assignments Classroom Discussion Lab Activity or Examination
Demonstrate an understanding of general Anatomy and Physiology concepts including, but not limited to: The function of each organ system, anatomic planes, axes, body organization, homeostasis, and directional terms.	Classroom Discussion Quizzes Written Assignments Summative Written Examinations Lab Activity or Examination
Contrast the composition of tissues of the organs that make up the skeletal, muscular, reproductive, and integumentary systems.	Summative Written Examinations Quizzes Written Assignment Lab Activity or Examination

Demonstrate the ability to correlate gross skeletal and muscular system structures with surface anatomy landmarks.	Classroom Discussion Lab Activity or Examination
Describe the function of cells and cellular components of the integumentary, muscular, reproductive, and skeletal system structures.	Summative Written Examinations Quizzes Classroom Discussion Lab Activity or Examination
Identify changes in the skeletal, muscular, reproductive, and integumentary systems across the lifespan.	Summative Written Examinations Quizzes Classroom Discussion Written Assignments
Explain how the skeletal and muscular systems function together.	Classroom Discussion Written Assignments Summative Written Examinations Lab Activity or Examination
Describe muscle cell anatomy, physiology, and adaptations to resistance and aerobic training with special focus on muscle fiber size and fiber type.	Summative Written Examinations Quizzes Classroom Discussion Lab Activity or Examination
Contrast the differences among skeletal, muscular, and integumentary system function in a sedentary versus an active individual.	Summative Written Examinations Quizzes Classroom Discussion Written Assignments

III. OUTLINE OF TOPICS

- A. Scientific Method
 - 1. Inductive Reasoning
 - 2. Deductive Reasoning

- B. Introduction to Anatomy and Physiology
 - 1. Levels of Organization
 - 2. Homeostasis
 - 3. Anatomical Terms
 - 4. Body Cavities
 - 5. Overview of Organ Systems

- C. Basic Chemistry
 - 1. Atomic Structure
 - 2. Chemical Bonds
 - 3. Chemical Reactions
 - 4. Properties of Water

5. Physiologic Role of pH
 - a. Acids
 - b. Bases
 - c. Salts
6. Carbohydrates
7. Lipids
8. Proteins
9. Nucleic Acids
10. ATP

D. Cellular Level

1. Plasma Membrane
2. Organelles
3. Citric Acid Cycle
4. Nucleus
5. Protein Synthesis
6. Transport Mechanisms
 - a. Diffusion
 - b. Osmosis
7. Stages of Cell's Life Cycle
8. Mitosis and Meiosis
 - a. Spermatogenesis
 - b. Oogenesis
9. Genes, Chromosomes, and Inheritance
 - a. Patterns of Inheritance
 - b. Variations, Mutations
 - c. Sex Linked Inheritance
10. The Reproductive System
 - a. The Male Reproductive Tract
 - b. The Accessory Glands
 - c. Male Hormones
 - d. Female Reproductive Organs
 - e. The Mammary Glands
 - f. Female Hormones

E. Tissue Level of Organization and Integument

1. Epithelial Tissue
2. Connective Tissue
 - a. Cartilage
 - b. Bone
3. Tissue Membranes
 - a. Mucous Membranes
 - b. Serous Membranes
 - c. The Cutaneous Membrane
 - d. Synovial Membranes

4. Muscle Tissue
 - a. Skeletal Muscle Tissue
 - b. Cardiac Muscle Tissue
 - c. Smooth Muscle Tissue
5. Integumentary Layers
 - a. Epidermis
 - b. Dermis
 - c. Hypodermis
6. Glands
 - a. Sebaceous Glands
 - b. Sweat Glands
7. Integument Repair after Injury

F. Skeletal System

1. Bones
 - a. Bone Matrix
 - b. Bone Cells
 - c. Compact Bone Structure
 - d. Spongy Bone Structure
 - e. Ossification
2. Bone Development
 - a. Effects of Exercise
 - b. Hormonal and Nutritional Effects
 - c. Calcium
3. Bone Pathology
 - a. Fracture
 - b. Osteopenia
 - c. Osteoporosis
4. Axial Skeleton
 - a. The Skull
 - b. The Vertebral Column
 - c. The Thoracic Cage
5. Appendicular Skeleton
 - a. The Pectoral Girdle
 - b. The Upper Extremities
 - c. The Pelvic Girdle
 - d. The Lower Extremities
6. Joints
 - a. Synovial Joints
 - b. Intervertebral Discs and Ligaments
 - c. Ball-and-Socket Joint
 - d. Hinge Joint
 - e. Arthritis and Other Degenerative Changes

G. Muscular System

1. Skeletal Muscle Tissue
 - a. Neuromuscular Junction

- b. Muscle Contraction
- c. Muscle Fiber Type and Physical Conditioning
- 2. Cardiac Muscle Tissue
- 3. Smooth Muscle
- 4. Muscular System
 - a. Fascicle Arrangement
 - b. Classes of Levers
 - c. Muscle Origins and Insertions
 - d. Axial Muscles
 - e. Appendicular Muscles
 - f. Effects of Age
 - g. Effects of Exercise

IV. METHODS OF INSTRUCTION

- A. Lecture
- B. Online Readings
- C. Supplemental Handouts
- D. Active Learning in the classroom setting
- E. Case Studies
- F. Lab Activities

V. REQUIRED TEXTBOOKS

- A. One year subscription to Anatomy and Physiology Online through Acrobatiq
- B. Marieb, E., and Mitchell, S. *Human Anatomy & Physiology Laboratory Manual* (current edition). Boston, MA: Pearson Education, Inc.

VI. REQUIRED MATERIALS

- A. Computer with internet access and basic software
- B. Course homepage available through Blackboard

VII. SUPPLEMENTAL REFERENCES

- A. Class Handouts

- B. Library Resources
 - 1. Supplemental texts
 - a. Seiger, C. *Fundamentals of Anatomy & Physiology Study Guide* (current edition). San Francisco, CA: Pearson Education, Inc.
 - b. Netter, F. H. *Atlas of Human Anatomy* (current edition). Philadelphia, PA: Saunders-Elsevier.
 - c. Martini, F., Ober, W., and Nath, J. *Visual Anatomy and Physiology* (current edition). San Francisco, CA: Pearson Education, Inc.
 - 2. Databases
 - 3. Periodicals
 - 4. Videos
- C. Internet Resources
 - 1. On-line references
 - a. anatomyarcade.com
 - b. bbc.co.uk/science/humanbody/body

VIII. METHODS OF EVALUATION

- A. Summative Written Examinations and Quizzes: 40%
- B. Lab Activity or Examination: 30%
- C. Written Assignments: 25%
- D. Attendance and Classroom Discussion: 5%
- E. Grading Scale:
 - A=90-100%
 - B=80-89.9%
 - C=70-79.9%
 - D=60-69.9%
 - F=under 60%

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library: phone 636-797-3000, ext. 3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook. (See College website <http://www.jeffco.edu>).

XI. ATTENDANCE STATEMENT

Regular and punctual attendance is expected of all students. Any one of these four

options may result in the student being removed from the class and an administrative withdrawal being processed: (1) Student fails to begin class; (2) Student ceases participation for at least two consecutive weeks; (3) Student misses 15 percent or more of the coursework; and/or (4) Student misses 15 percent or more of the course as defined by the instructor. Students earn their financial aid by regularly attending and actively participating in their coursework. If a student does not actively participate, he/she may have to return financial aid funds. Consult the College Catalog or a Student Financial Services representative for more details.

XII. OUTSIDE OF CLASS ACADEMICALLY RELATED ACTIVITIES

The U.S. Department of Education mandates that students be made aware of expectations regarding coursework to be completed outside the classroom. Students are expected to spend substantial time outside of class meetings engaging in academically related activities such as reading, studying, and completing assignments. Specifically, time spent on academically related activities outside of class combined with time spent in class meetings is expected to be a minimum of 37.5 hours over the duration of the term for each credit hour.