

PHED 7620

SCIENTIFIC FOUNDATIONS OF EXERCISE

Semester Hours: 3

Semester/Year:

Instructor:

Office Location:

Office Hours:

Telephone:

E-mail:

COURSE DESCRIPTION

Prerequisite: PHED 2603 or PHED 2604 or equivalent

The course focuses on the physiological factors affecting human performance and the physiological modifications that occur as individuals engage in exercise. Primary focus is on how the body produces energy during exercise and the modifications within the cardiovascular and respiratory systems throughout exercise bouts.

CONCEPTUAL FRAMEWORK

The conceptual framework of the College of Education at UWG forms the basis on which programs, courses, experiences, and outcomes are created. By incorporating the theme “Developing Educators for School Improvement”, the College assumes responsibility for preparing educators who can positively influence school improvement through altering classrooms, schools, and school systems (transformational systemic change). Ten descriptors (decision makers, leaders, lifelong learners, adaptive, collaborative, culturally sensitive, empathetic, knowledgeable, proactive, and reflective) are integral components of the conceptual framework and provide the basis for developing educators who are prepared to improve schools through strategic change. National principles (INTASC), propositions (NBPTS), and standards (Learned Societies) also are incorporated as criteria against which candidates are measured.

The mission of the College of Education is to develop educators who are prepared to function effectively in diverse educational settings with competencies that are instrumental to planning, implementing, assessing, and re-evaluating existing or proposed practices. This course’s objectives are related directly to the conceptual framework and appropriate descriptors, principles or propositions, and Learned Society standards are identified for each objective. Class activities and assessments that align with course objectives, course content, and the conceptual framework are identified in a separate section of the course syllabus.

COURSE OBJECTIVES

Students will:

1. describe the adaptations of the respiratory and cardiovascular systems throughout exercise bouts
(*Decision Makers, Leaders, Lifelong Learners, Knowledgeable*)
(Brooks & Fahey, 2005; Tipton, Sawka, Tate, & Terjung, 2006; Wilmore, Costill, & Kenney, 2008);
2. discuss the interaction between the nervous system and the muscular system with regard to producing a skeletal muscular contraction and describe how the muscle adapts to exercise over time
(*Decision Makers, Leaders, Lifelong Learners, Knowledgeable*)
(Brooks & Fahey, 2005; Tipton, Sawka, Tate, & Terjung, 2006; Wilmore, Costill, & Kenney, 2008);
3. discuss how the body converts food into ATP to provide energy, and describe the three metabolic systems that generate ATP
(*Decision Makers, Leaders, Lifelong Learners, Knowledgeable*)
(Fox, Bowers & Foss, 1988; McArdle, Katch & Katch, 1991; Wilmore, Costill, & Kenney, 2008);
4. discuss metabolism and the three main components of caloric expenditure and how these factors are affected by exercise
(*Decision Makers, Leaders, Lifelong Learners, Knowledgeable*)
(American College of Sports Medicine, 2006; Brooks & Fahey, 2005; Tipton, Sawka, Tate, & Terjung, 2006; Wilmore, Costill, & Kenney, 2008);
5. compare and contrast the different types of training associated with aerobic and anaerobic exercise
(*Decision Makers, Leaders, Lifelong Learners, Knowledgeable*)
(Brooks & Fahey, 2005; Nieman, 2008; Tipton, Sawka, Tate, & Terjung, 2006; Wilmore, Costill, & Kenney, 2008);
6. discuss the body's adaptations to training in hot and cold environments, at high altitudes, and in humid climates
(*Decision Makers, Leaders, Lifelong Learners, Knowledgeable*)
(Brooks & Fahey, 2005; Tipton, Sawka, Tate, & Terjung, 2006; Wilmore, Costill, & Kenney, 2008); and

7. discuss the major factors of a successful training program, including intensity, duration, frequency, etc.
(*Decision Makers, Leaders, Lifelong Learners, Knowledgeable*)
(Brooks & Fahey, 2005; Tipton, Sawka, Tate, & Terjung, 2006; Wilmore, Costill, & Kenney, 2008).

TEXTS, READINGS, AND INSTRUCTIONAL RESOURCES

Required Text

Wilmore, J. H., Costill, D. L., & Kenney, W. L. (2008). *Physiology of sport and exercise* (4th ed.). Champaign, IL: Human Kinetics.

References

- Adams, J. M., & Beam, W. C. (2008) *Exercise physiology laboratory manual* (5th ed.). Boston: McGraw-Hill.
- American College of Sports Medicine. (2006a). *Guidelines for exercise testing and prescription* (7th ed.). Philadelphia: Lippincott Williams & Wilkins.
- American College of Sports Medicine. (2006b). *Resource manual for guidelines for exercise testing and prescription*. Philadelphia: Lippincott Williams & Wilkins.
- Baechle, T. R., & Earle, R. W. (Eds.) (2008). *Essentials of strength training and conditioning* (3rd ed.). Champaign, IL: Human Kinetics.
- Bowers, R. W., & Fox, E. L. (1988). *Sports physiology* (3rd ed.). Dubuque, IA: Wm. C. Brown.
- Brooks, G. A., Fahey, T. D., & Baldwin, K. M. (2005). *Exercise physiology: Human bioenergetics and its application* (4th ed.). Boston: McGraw-Hill.
- Fox, E. L., Bowers, R. W. & Foss, M. L. (1993). *The physiological basis of physical education and athletics* (5th ed.). Dubuque, IA: Wm. C. Brown.
- Guyton, A. C. (1991). *Textbook of medical physiology* (8th ed.). Philadelphia: W. B. Saunders.
- Nieman, D. C. (2008). *Exercise testing and prescription* (6th ed.). Boston: McGraw-Hill.
- Powers, S. K., & Howley, E. T. (2009) *Exercise physiology* (5th ed.). Boston: McGraw-Hill.
- Roberts, R. A., & Keteyian, S. J. (2003). *Fundamentals of exercise physiology for fitness, performance, and health*. Boston: McGraw-Hill.

Roberts, S. O., Robergs, R. A., & Hanson, P. (1997). *Clinical exercise testing and prescription: Theory and application*. Boca Raton, FL: CRC Press.

Shangold, M. M. & Mirkin, G. (1999). *Women and exercise: Physiology and sports medicine* (2nd ed.). Philadelphia: F.A. Davis.

Tipton, C. M., Sawka, M. N., Tate, C. A., & Terjung, R. L. (Eds.). (2006). *ACSM's advanced exercise physiology*. Philadelphia: Lippincott, Williams, & Wilkins.

ASSIGNMENTS, EVALUATION PROCEDURES, AND GRADING POLICY

Link to Conceptual Framework

The primary goal of this course is for students to demonstrate an understanding of the advanced terminology and practice of the discipline and how the content is related to physical education and physical activity.

At the completion of this course, students will have demonstrated achievement in the following areas: a) *decision making*: choosing solutions to performance scenarios (**All Assignments**); b) *leadership*: taking responsibility for ongoing inquiry and serving as a leader during in-class assignments and presentations (**All Assignments**); c) *lifelong learning*: studying the various components and applications of exercise science (**All Assignments**); d) *knowledge*: drawing on acquired knowledge and demonstrating understanding (**All Assignments**); e) *adaptive*: implementing exercise science principles to learning situations and modifying these principles when necessary (**Assignment: 4**); f) *proactive*: implementing new strategies and presentation topics (**Assignments: 3, 4**); g) *reflection*: Engaging in ongoing, continuous reflection of the primary principles and research in the field of exercise science (**All Assignments**); and h) *collaborative*: demonstrating skills during group presentations and group problem solving (**Assignments: 3, 4**).

Assignments

1. Exam (100 points)

One cumulative final exam will be given at the end of the semester. The exam will consist of multiple choice, matching, fill-in-the-blank, short answer, and essay items.

Course Objectives: 1, 2, 3, 4, 5, 6, 7

2. Quizzes (100 points: 10 points each)

Ten quizzes will be given throughout the semester. All quizzes consist of multiple choice, true/false, and short answer items.

Course Objectives: 1, 2, 3, 4, 5, 6, 7

3. Research Paper and Presentation (Paper: 100 points; Presentation: 50 points)

Each student is responsible for completing a research paper on an assigned topic. An in-class presentation must accompany the paper and cover the major content of the assigned paper.

Course Objectives: 1, 2, 3, 4, 5, 6, 7

4. Exercise Testing (50 points)

Each student will participate in physical activities related to the content discussed throughout the course. The activities will be practical and relevant for future use in K-12 physical education programs. Specific grading rubrics will be provided based on the completion of the physical activities.

Course Objectives: 7

Grading Policy

A = 360 - 400 points (90 - 100%)

B = 320 - 359 points (80 - 89%)

C = 280 - 319 points (70 - 79%)

F = < 280 points (69% or less)

CLASS POLICIES**E-mail**

University of West Georgia students are provided a MyUWG e-mail account. The University considers this account to be an official means of communication between the University and the student. The purpose of the official use of the student e-mail account is to provide an effective means of communicating important University related information to UWG students in a timely manner. It is the student's responsibility to check his or her email.

Work Credit

No material prepared to meet requirements in one course may be used to fulfill the requirements in another course without prior permission of the instructor.

Electronic Portfolio

This course will require students to save course assignments. The course assignments will be uploaded to the student's electronic portfolio. This is a requirement for teaching certification/graduation.

Americans with Disabilities Statement (ADA)

The ADA is a federal anti-discrimination statute that provides comprehensive civil rights for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of his/her disabilities. If you believe you have a disability requiring an accommodation, please contact the Disability Services Office in Room 272 of the Student Development Center located in Parker Hall. The phone number is (678) 839-6428, and the fax number is (678) 839-6429.

Academic Integrity and Honor Code Pledge

At the University of West Georgia we believe that academic and personal integrity are based upon honesty, trust, fairness, respect, and responsibility. Students at West Georgia assume responsibility for upholding the honor code. West Georgia students pledge to refrain from engaging in acts that do not maintain academic and personal integrity. These include, but are not limited to, plagiarism, cheating, fabrication, aid of academic dishonesty, lying, bribery, or threats, and stealing.

Pledge:

Having read the Honor Code for UWG, I understand and accept my responsibility to uphold the values and beliefs described and to conduct myself in a manner that will reflect the values of the institution in such a way as to respect the rights of all UWG community members. As a West Georgia student, I will represent myself truthfully and complete all academic assignments honestly. I understand that if I violate this code, I will accept the penalties imposed, should I be found guilty of violations through processes due me as a university community member. These penalties may include expulsion from the University. I also recognize that my responsibility includes willingness to confront members of the University community if I feel there has been a violation of the Honor Code.

** If plagiarism or another act of academic dishonesty occurs, a grade of zero will be given for the course assignment and, if further actions are warranted, the misconduct will be dealt with in accordance with the academic misconduct policy as stated in *The Student Handbook*, the *Undergraduate Catalog* and *Graduate Catalog*.

CLASS OUTLINE

Week	Topic
1	An Introduction to Exercise and Sport Physiology
2	Structure and Function of Skeletal Muscle
3	Fuel for Exercising Muscle
4	Metabolism and Hormonal Control
5	Energy Expenditure and Fatigue
6	The Cardiovascular System and Its Control
7	The Respiratory System and Its Regulation
8	Principles of Exercise Training and Program Design
9	Training for Sport; Exercise Prescription
10	Adaptations to Resistance Exercise, Aerobic, and Anaerobic Training
11	Exercise in Hot and Cold Environments; Thermoregulation; Exercise at Altitude
12	Body Composition and Nutrition for Sport
13	Children and Adolescents in Sport and Exercise
14	Aging in Sport and Exercise; Sex Differences in Sport and Exercise
15	Cardiovascular Disease and Physical Activity; Obesity, Diabetes, and Physical Activity
16	Final Exam