

## KIN 373 PHYSIOLOGY OF EXERCISE

*KIN 373 is a required course for the Bachelor's Degree in Kinesiology and All-Level Certification.*

**College of Education and Applied Science**

**Department of Health and Kinesiology**

Summer 2008

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Center 211

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**Text/Readings:** Robergs and Keteyian (2003). Fundamentals of Exercise Physiology, (2<sup>nd</sup> edition) Boston: WCB/McGraw Hill

**Course Description:** This class is designed to provide the student with the knowledge necessary to understand the physiological basis upon which exercise is prescribed. Understanding these processes will allow kinesiologists to more effectively plan exercise programs and evaluate current practices used in the field.

### Standards Matrix:

<b>Objectives/Learning Outcomes</b>	<b>Activities (* indicates field-based activity)</b>	<b>Performance Assessment</b>	<b>Standards: • State Standards • Specialty Organization Standards</b>
Identify and select the appropriate training method for team and individual sport participants.	Lecture, class discussion	Written exam	1,2
Demonstrate how to condition players in selected sports.	Lecture, class discussion	Written exam, Written conditioning plan	1,2,6
Develop programs designed to increase cardiovascular endurance.	Lecture, class discussion	Written exam, written exercise prescription	1,2,6
Develop programs designed to increase muscular strength and endurance.	Lecture, class discussion	Written exam, written exercise prescription	1,2,6
Understand various techniques used to access body composition.	Lecture, class discussion, lab experience	Observation of body composition measurements	1,2,6,7
Understand physiological changes which occur as a result of	Lecture, class discussion	Written exam	1,2

exercise.			
Understand heat related illness, training in the heat and how to prevent heat related illness.	Lecture, class discussion	Written exam	1,2,6
Understand nutrition as it related to health and athletic performance.	Lecture, class discussion	Written exam	1,2
Understand the use of ergogenic aids to enhance performance.	Lecture, class discussion, lab	Written exam	1,2

Web address for specialty organization standards: [www.aahperd/naspe.org](http://www.aahperd/naspe.org)

### Course Format:

This lecture course will present and highlight underlying concepts which are integral to understanding the physiological basis upon which exercise is founded.

### Course Content:

#### I. Energy

- A. Introduction
- B. Definitions
- C. The Energy Systems
- D. 02 Consumption and Energy Production

#### II. Sports Activities and the Energy Continuum

- A. The Energy Continuum Concept
- B. The Energy Continuum and Running & Swimming
- C. The Energy Continuum and Other Sports
- D. Setting Up Continuum Guidelines

#### III. The Fuel for Exercise

- A. Carbohydrates
- B. Fats
- C. Proteins

#### IV. Recover from Exercise

- A. Restoration of Muscle, ATP and PC stores
- B. Replenishment of Myoglobin
- C. Restoration of Muscle Glycogen
- D. Removal of Lactic Acid from Muscle and Blood

#### V. Measurement of Energy, Work, and Power

##### A. Definitions

- 1. Energy
- 2. Work
- 3. Power

##### B. Measurement of Energy

- 1. Direct
- 2. Indirect (carbo, fat, protein)

C. Measurement of Energy; Cost of Exercise

1 Aerobic

2

Anaerobic

VI. Physiological Changes Associated with Exercise

A. Aerobic Programs and Anaerobic Programs

1. Blood Pressure

systolic

diastolic

hypertension

measurement techniques

changes during exercise

long term effects

2. Cardiac Output

stroke volume

heart rate

changes during exercise

long term effects

3. Max V<sub>O2</sub>

VII. Exercise Testing and Prescription

A. Cardiovascular Disease

1 History

2 Risk Factors

3 Treatment

B. Medical Screening and Evaluation Procedures

1 Preliminary Considerations

2 Physical Fitness Evaluation

3 Diagnostic Aspects of Graded Exercise Testing

C. Prescribing Exercise for the Apparently Healthy

VIII. Neuromuscular Concepts Applied to Sports

A. Structure of Nerves

B. Function of Nerves

C. Structure of Skeletal Muscle

D. Function of Skeletal Muscle

IX. Weight Resistance Training: Methods & Effects

A.

Introduction  
Basic Principles Associated with Weight  
Training Programs

C. Construction of Weight Resistance Programs for  
Various Sports

D. Effects of Weight Resistance Training

X. Dehydration, Heat Problems, and Prevention of Heat Illness

A. Introduction (Heat Loss and Gain)

B. Dehydration

C. Environmental Heat Problems in Athletics

D. Prevention of Heat Disorders

XI. Body Composition, Nutrition, and Performance

A. Introduction

B. Body Composition

C. Nutrition

- D. Diet and Performance
- E. Fad Diets and Weight Loss Products

## XII. Flexibility

- A. Types
  - 1. ~~Passive~~
- B. ~~Programs~~ **Dynamic** for Development
  - 1. Ballistic
  - 2. Stretch and Hold
  - 3. Comparison of Programs
    - results
    - myotactic

## XIII. Ergonomic Aids

- A. Legal
  - 1. Physiological Effects
  - 2. Psychological
- B. ~~Legal~~ **Illegal**
  - 1. Physiological Effects
  - 2. Psychological Effects

### Evaluation (\* indicates field-based activity):

1. Tests: 3 tests, 100 pts. each (tests will be a combination of objective and subjective questions)
2. Final: 100 points (cumulative) 75 to 100 objective questions
3. Exercise Prescription: (10 points) Each student will write on exercise prescription based on the fitness level and physiology needs of a given individual.
4. Internet Assignments & Articles Review: (30 pts) Each student will respond to a set of questions over topics presented online. In addition, students will review a minimum of 2 research articles.

SUMMATIVE EVALUATION 306 -340 points  
 = A 272 -305 points = B 238 -271 points = C 204  
 -237 points = D 203 pts or below = F

ON ANY ONE EXAM 90 - 100points = A 80  
 -89 " = B 70 -79 " = C 60 -69 " = D 59 or  
 fewer = F

NOTE: Regarding the Final - If you maintain a passing grade in this class, you will not be required to complete the final. If you do decide to take the final, it can't hurt your grade. If your grade on the final is higher than any one of your 3 test scores, I will substitute the grade on the final for your lowest test score.

NOTE: Regarding all Tests – Students are expected to be on time for tests. Students will not be allowed to start a test after the first student has completed the test.

### Expectations:

Upon completion of the course, students will be able to:

1. Understand the ATP-PC, lactic acid and O<sub>2</sub> energy systems of the body as they relate to ATP production, maintenance of ATP by fuel utilization and restoration;
2. Understand the sliding filament theory of muscle contraction;
3. Understand the importance of cardiovascular adaptations which occur as a result of exercise;
4. Evaluate and develop programs designed to increase cardiovascular endurance;
5. Evaluate and plan programs designed to improve muscular strength and muscular endurance;
6. Understand physiological changes which occur as a result of various training programs;
7. Understand how the circulatory, respiratory, and digestive systems affect the human body during exercise;
8. Understand the role and techniques of exercise testing and prescription;
9. Understand and evaluate nutrition as it relates to health and athletic performance; and
10. Understand ergogenic aids and how they may enhance performance.

**Disability Statement:**

Students with a disability that affects their academic performance are expected to arrange for a conference with the instructor in order that appropriate strategies can be considered to ensure that participation and achievement opportunities are not impaired. The physically impaired may contact the Director of the Counseling Center as chair of the Committee for Continuing Assistance for Disabled Students by telephone (extension 1720).

***STUDENT ABSENCES ON RELIGIOUS HOLY DAYS POLICY***

Section 51.911(b) of the Texas Education Code requires that an institution of higher education excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. A student whose absence is excused under this subsection may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence.

University policy 861001 provides the procedures to be followed by the student and instructor. A student desiring to absent himself/herself from a scheduled class in order to observe (a) religious holy day(s) shall present to each instructor involved a written statement concerning the religious holy day(s). This request must be made in the first fifteen days of the semester or the first seven days of a summer session in which the absence(s) will occur. The instructor will complete a form notifying the student of a reasonable timeframe in which the missed assignments and/or examinations are to be completed.