KINS 8A: THEORY & CONCEPTS OF EXERCISE PHYSIOLOGY I

Foothill College Course Outline of Record

<table>
<thead>
<tr>
<th>Heading</th>
<th>Value</th>
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<tr>
<td>Effective Term:</td>
<td>Summer 2022</td>
</tr>
<tr>
<td>Units:</td>
<td>5</td>
</tr>
<tr>
<td>Hours:</td>
<td>5 lecture per week (60 total per quarter)</td>
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<tr>
<td>Advisory:</td>
<td>Maximum UC credit awarded for any or all of the following courses combined is 12 units: KINS 2, 3, 8A, 8B; not open to students with credit in PHED 8.</td>
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<tr>
<td>Degree &amp; Credit Status:</td>
<td>Degree-Applicable Credit Course</td>
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<tr>
<td>Foothill GE:</td>
<td>Non-GE</td>
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<tr>
<td>Transferable:</td>
<td>CSU/UC</td>
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<tr>
<td>Grade Type:</td>
<td>Letter Grade Only</td>
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<tr>
<td>Repeatability:</td>
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Student Learning Outcomes

- A successful student will be able to explain the theories of exercise physiology as they relate to the body and its ability to perform exercise.
- A successful student will be able to acquire and interpret the basic anatomy and exercise physiology terminology.

Description

Basic concepts and principles of exercise physiology and how the human body responds to the demands of physical activity. Emphasis on anatomy and physiology of human organ systems; cardiorespiratory function; neural and hormonal control; energy systems, expenditure, and fatigue; adaptations to resistance, aerobic, and anaerobic training; body composition and nutrition; and principles of training for sport.

Course Objectives

The student will be able to:

a. Identify the basic anatomy and exercise physiology terminology.

b. Describe the theories of exercise physiology as they relate to the body and its ability to perform exercise.

c. Explain the structure and function of exercising muscle.

d. Describe the three energy systems.

e. Explore current concepts of bioenergetics, muscle metabolism and causes of fatigue.

f. Understand the neural and hormonal systems and their responses to exercise.

g. Understand the cardiorespiratory systems and their responses to exercise.

h. Apply the basic concepts of exercise physiology to training programs.

i. Explain the adaptations to resistance, aerobic, and anaerobic training.

j. Analyze body composition and nutrition for sport.

Course Content

a. Structure and function of exercising muscle
   i. Anatomy of skeletal muscle
   ii. Muscle fiber contraction
   iii. Muscle fiber types
   iv. Skeletal muscle and exercise

b. Fuel for exercise: bioenergetics and muscle metabolism
   i. Energy substrates
   ii. Controlling the rate of energy production
   iii. Storing energy: high-energy phosphates
   iv. The basic energy systems
      1. The ATP-PCr system
      2. The glycolytic system
      3. The oxidative system
   v. Interaction of the energy systems
   vi. The oxidative capacity of muscle

c. Neural control of exercising muscle
   i. Structure and function of the nervous system
   ii. Central nervous system
   iii. Peripheral nervous system
   iv. Sensory-motor integration

d. Hormonal control during exercise
   i. The endocrine system
   ii. Endocrine glands and their hormones
   iii. Hormonal regulation of metabolism during exercise
   iv. Hormonal regulation of fluid and electrolytes during exercise
   v. Hormonal regulation of caloric intake

e. Energy expenditure and fatigue
   i. Measuring energy expenditure
   ii. Energy expenditure at rest and during exercise
   iii. Fatigue and its causes
   iv. Muscle soreness and muscle cramps

f. The cardiovascular system and its control
   i. Heart
   ii. Vascular system
   iii. Blood

g. The respiratory system and its regulation
   i. Pulmonary ventilation
   ii. Pulmonary volumes
   iii. Pulmonary diffusion
   iv. Transport of oxygen and carbon dioxide in the blood
   v. Gas exchange at the muscles
   vi. Regulation of pulmonary ventilation

h. Cardiorespiratory responses to acute exercise
   i. Cardiovascular responses to acute exercise
   ii. Respiratory responses to acute exercise

i. Principles of exercise training
   i. Terminology
   ii. General principles of training
   iii. Resistance training programs
   iv. Anaerobic and aerobic power training programs
j. Adaptations to resistance training  
   i. Resistance training and gains in muscular fitness  
   ii. Mechanisms of gains in muscle strength  
   iii. Interaction between resistance training and diet  
   iv. Resistance training for special populations  

k. Adaptations to aerobic and anaerobic training  
   i. Adaptations to aerobic training  
   ii. Adaptations to anaerobic training  
   iii. Adaptations to high-intensity interval training  
   iv. Specificity of training and cross-training  

l. Body composition and nutrition for sport  
   i. Assessing body composition  
   ii. Body composition, weight, and sport performance  
   iii. Classification of nutrients  
   iv. Water and electrolyte balance  
   v. The athlete’s diet  

m. Training for sport  
   i. Optimizing training  
   ii. Periodization of training  
   iii. Overtraining  
   iv. Tapering for peak performance  
   v. Detraining  

Lab Content
Not applicable.

Special Facilities and/or Equipment
When taught as an online distance learning or hybrid section, students and faculty need ongoing and continuous internet and email access.

Method(s) of Evaluation
Methods of Evaluation may include but are not limited to the following:

Exams and quizzes: multiple choice, matching and essay questions to assess student learning outcomes  
Analysis of selected case studies using various training scenarios  
Research paper on current exercise physiology issue from a scientific, peer reviewed journal  
Weekly homework assignments to emphasize course topics  
Participation in classroom discussions

Method(s) of Instruction
Methods of Instruction may include but are not limited to the following:

Lecture presentations and classroom discussion using the language of exercise physiology  
Reading of textbook, use of multi-media, and related material to promote discussion and synthesis of objectives  
Presentation of research projects followed by in-class discussion and evaluation  
Problem solving exercises and discussion emphasizing objective analysis and critical thinking

Representative Text(s) and Other Materials

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments
a. Weekly reading assignments from text, online curriculum, and outside sources  
b. Homework assignments including terminology and responses to discussion questions  
c. Responses to essay questions on mid-term and final exam  
d. Research paper on topic from scientific peer reviewed journal  
e. Weekly discussion posts on topics relevant to course material

Discipline(s)
Kinesiology