

KINS 8A: THEORY & CONCEPTS OF EXERCISE PHYSIOLOGY I

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2022
Units:	5
Hours:	5 lecture per week (60 total per quarter)
Advisory:	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.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	CSU/UC
Grade Type:	Letter Grade Only
Repeatability:	Not Repeatable

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:

1. Identify the basic anatomy and exercise physiology terminology.
2. Describe the theories of exercise physiology as they relate to the body and its ability to perform exercise.
3. Explain the structure and function of exercising muscle.
4. Describe the three energy systems.
5. Explore current concepts of bioenergetics, muscle metabolism and causes of fatigue.
6. Understand the neural and hormonal systems and their responses to exercise.
7. Understand the cardiorespiratory systems and their responses to exercise.
8. Apply the basic concepts of exercise physiology to training programs.

9. Explain the adaptations to resistance, aerobic, and anaerobic training.
10. Analyze body composition and nutrition for sport.

Course Content

1. Structure and function of exercising muscle
 - a. Anatomy of skeletal muscle
 - b. Muscle fiber contraction
 - c. Muscle fiber types
 - d. Skeletal muscle and exercise
2. Fuel for exercise: bioenergetics and muscle metabolism
 - a. Energy substrates
 - b. Controlling the rate of energy production
 - c. Storing energy: high-energy phosphates
 - d. The basic energy systems
 - i. The ATP-PCr system
 - ii. The glycolytic system
 - iii. The oxidative system
 - e. Interaction of the energy systems
 - f. The oxidative capacity of muscle
3. Neural control of exercising muscle
 - a. Structure and function of the nervous system
 - b. Central nervous system
 - c. Peripheral nervous system
 - d. Sensory-motor integration
4. Hormonal control during exercise
 - a. The endocrine system
 - b. Endocrine glands and their hormones
 - c. Hormonal regulation of metabolism during exercise
 - d. Hormonal regulation of fluid and electrolytes during exercise
 - e. Hormonal regulation of caloric intake
5. Energy expenditure and fatigue
 - a. Measuring energy expenditure
 - b. Energy expenditure at rest and during exercise
 - c. Fatigue and its causes
 - d. Muscle soreness and muscle cramps
6. The cardiovascular system and its control
 - a. Heart
 - b. Vascular system
 - c. Blood
7. The respiratory system and its regulation
 - a. Pulmonary ventilation
 - b. Pulmonary volumes
 - c. Pulmonary diffusion
 - d. Transport of oxygen and carbon dioxide in the blood
 - e. Gas exchange at the muscles
 - f. Regulation of pulmonary ventilation
8. Cardiorespiratory responses to acute exercise
 - a. Cardiovascular responses to acute exercise
 - b. Respiratory responses to acute exercise
9. Principles of exercise training
 - a. Terminology
 - b. General principles of training
 - c. Resistance training programs
 - d. Anaerobic and aerobic power training programs

10. Adaptations to resistance training
 - a. Resistance training and gains in muscular fitness
 - b. Mechanisms of gains in muscle strength
 - c. Interaction between resistance training and diet
 - d. Resistance training for special populations
11. Adaptations to aerobic and anaerobic training
 - a. Adaptations to aerobic training
 - b. Adaptations to anaerobic training
 - c. Adaptations to high-intensity interval training
 - d. Specificity of training and cross-training
12. Body composition and nutrition for sport
 - a. Assessing body composition
 - b. Body composition, weight, and sport performance
 - c. Classification of nutrients
 - d. Water and electrolyte balance
 - e. The athlete's diet
13. Training for sport
 - a. Optimizing training
 - b. Periodization of training
 - c. Overtraining
 - d. Tapering for peak performance
 - e. 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

Wilmore, Jack H., and David I. Costill. *Physiology of Sport and Exercise*. 7th ed. 2020.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

1. Weekly reading assignments from text, online curriculum, and outside sources
2. Homework assignments including terminology and responses to discussion questions
3. Responses to essay questions on mid-term and final exam
4. Research paper on topic from scientific peer reviewed journal
5. Weekly discussion posts on topics relevant to course material

Discipline(s)

Kinesiology