COURSE OUTLINE

Health 117 Applied Exercise Physiology

I. Catalog Statement

Health 117 examines how physiological functions of the human body change during exercise. Topics of discussion include cardiorespiratory changes, training effect of the musculoskeletal system, energy production, fitness assessment, and the effect of ergogenic aids on exercise performance. All topics are discussed as they relate to practical exercise training. Hands-on laboratory exercises and assessments demonstrate how aspects of exercise physiology should be integrated into practical trainer/client work.

Units -4.0Lecture Hours -3.0Total Laboratory Hours -3.0(Faculty Laboratory Hours 1.5 + Student Laboratory Hours 0 = 3.0 Total Laboratory Hours)

Recommended preparation: Biology 115 or equivalent

II. Course Entry Expectations

Skill Level Ranges: Reading 5; Writing 5; Listening/Speaking 5; Math 2

III. Course Exit Standards

Upon successful completion of the required coursework, the student will be able to:

explain the immediate and long-term physiological adaptations that occur with regular cardiorespiratory exercise training;

relate physiological adaptations of musculoskeletal tissue to observable and nonobservable training effects;

execute practical assessments which help determine nutrient consumption, nutrient expenditure, and body composition;

distinguish between anaerobic and aerobic metabolism and how each applies to exercise:

examine and explain the effects of regular exercise training on metabolism, weight control, and body composition;

analyze the physiological relationship of disease and the untrained condition as impetus for engaging in regular exercise;

explain to the client the physiological basis for performing a variety of cardiovascular and muscular training exercises;

explain to the client appropriate information regarding the impact of exercise on weight control and body composition;

analyze the impact of environmental conditions on exercise performance; evaluate the purpose, efficacy, and side-effects of commonly used ergogenic aids as they relate to exercise performance;

anaylze, explain, and execute fitness assessments associated with exercise prescription.

IV. Course Content

A. Introduction and overview of course

2 hours

- 1. Importance of physical activity as part of health maintenance
- 2. Benefits and risks associated with exercise
- 3. History of exercise physiology
- B. Behavior modification

6 hours (3 lab)

- 1. Significance and application to exercise prescription
- 2. Foundation for permanent adoption of exercise
- 3. Lab: Psychosocial assessment and analysis
- C. Cardiorespiratory Physiology

18 hours (9 lab)

- 1. Cardiorespiratory system overview
- 2. Cardiorespiratory responses to exercise
 - 1. Pre-exercise physiological preparation
 - 2. Heart rate response/stroke volume
 - 3. Blood pressure responses
 - 4. Breathing rate
 - 5. Post-exercise oxygen and energy repayment
 - 6. Lab: Assessment of cardiorespiratory health at rest & exercise
- 3. Oxygen/carbon dioxide delivery
 - 1. Oxygen utilization
 - 2. Using practical or submaximal lab testing + calculations to predict maximal oxygen utilization (lab)
 - 3. Relationship of maximal oxygen utilization to cardiac output as a practical exercise prescription tool
 - 4. Practical application of cardiovascular loading to observe normal, immediate cardiorespiratory responses to exercise (lab)
 - 5. Writing the cardiorespiratory exercise prescription
 - 6. Practical consultation with the client regarding the physiological basis for performing a variety of cardiorespiratory training exercises (lab)
- D. Musculoskeletal physiology

18 hours (9 lab)

1. Musculoskeletal system overview

- 2. Musculoskeletal (and other tissue) responses to exercise
- 3. Balance, coordination, and core stability enhancements
- 4. Assessment of strength, endurance, and flexibility capacities (lecture + lab)
- 5. Lab: Practical application of muscle contraction and effectiveness of various overload methods on strength and endurance progression
- 6. Writing the musculoskeletal exercise prescription
- 7. Lab: Practical consultation with clients regarding the physiological basis for performing a variety of muscular training exercises

E. Energy Sources

9 hours (4.5 lab)

- 1. Anaerobic and aerobic energy production during rest
- 2. Anaerobic and aerobic energy production during exercise
- 3. Interactions of anaerobic and aerobic systems during exercise of varying intensity on persons of varying fitness levels
- 4. Lab: Practical application of energy use during physical performance
- F. Body Composition, Body Weight, Body Image

9 hours (4.5 lab)

- 1. Physiological aspects of body composition
 - 2. Psychological aspects of body composition
 - 3. Relationship of body fatness, weight, and health
 - 4. Expected adaptations and changes to body composition related to exercise
 - 5. Practical application of body composition assessments, including calculations (lecture + lab)
 - 6. Lab: Practical consultation with clients regarding the relationship of body composition, weight control, exercise, and health
- G. Environmental impact on exercise performance 2 hours
 - 1. Heat stress
 - 2. Cold stress
 - 3. Altitude
- H. Ergogenic aids related to exercise performance 8 hours (4 lab)
 - 1. Stimulants
 - 2. Herbal remedies
 - 3. Other "trendy remedies"
 - 4. Safety, efficacy, and legality issues related to the use of ergogenic aids
 - 5. Lab: Practical application of utility and efficacy of ergogenic aids
- I. Exercise as a preventive mechanism

10 hours

- 1. Against cardiovascular disease
- 2. Against metabolic diseases
- 3. Against musculoskeletal disorders
- 4. Against psychological stress
- 5. Against synergistic effect of multiple risk factors for disease
- J. Exercise prescription practical (lab)

14 hours (14 lab)

- 1. Consultation with clients to assess current health conditions including behavioral data
- 2. Interpretation and integration of data on CV health (including lipid analysis and medications)
- 3. Impact of health conditions and medications and psychosocial issues on exercise prescription and goals
- 4. Information delivery
 - 1. Explain data analysis to client
 - 2. Explain expected impact of exercise training related to goals
 - 3. Implement an appropriate personalized exercise prescription
 - 4. Adjust prescription based on client needs

V. Methods of Presentation

The following instructional methodologies may be used in the course:

lecture:

multimedia;

demonstrations:

field site visits.

VI. Assignments and Methods of Evaluation

Written exams

Quizzes

Exercise prescription project (ex: Student works one-on-one with client to assess baseline physiology and health status, then writes an exercise prescription appropriate to client need)

Final exam

VII. <u>Textbook(s)</u>

McArdle, William, Frank Katch, Victor Katch. <u>Essentials of Exercise Physiology</u>, 2nd Ed.

Baltimore: Lippencott, Williams & Wilkins, 2000.

11th grade textbook reading level. ISBN: 0683305077

Clark, Michael A., Scott Lucett, Rodney Corn. <u>NASM Essentials of Personal Fitness Training</u>, 3rd ed.

Philidelphia: Wolters Kluwer/Lippencott, Williams & Wilkins, 2008.

10th grade textbook reading level. ISBN: 9780781782913