EXERCISE AND THE CARDIOVASCULAR SYSTEM - FMT 209

COURSE LEARNING OUTCOMES (CLOs)

1. Discuss the processes involved with developing aerobic fitness.
2. Examine the anatomy of the cardio-respiratory and cardiovascular systems.
3. Discover how the body adapts to CV exercise training.
4. List the specific biochemical and cellular adaptations that are made by the body in response to training.
5. Describe and trace the route taken by oxygen molecules as they work through the CV system and are delivered to the working cells.
6. Review the current methods of testing cardiovascular condition.
7. Perform an exercise test using one of the current exercise testing protocols.
8. Discuss the potential for developing Coronary Heart Disease.
9. Perform a CHD risk evaluation.
10. Examine the methods used for rehabilitation of CHD patients.
11. Develop beginning, moderate and advanced CV exercise programs.

COURSE OUTLINE

I. Course Orientation
- A. Explanation of syllabus and learning outcomes
- B. Overview of class, including grading format and expectations
- C. Explanation of textbooks

II. Structure of the Heart and Respiratory System
- A. Heart anatomy
  1. Valves
  2. Chambers
  3. Other Structures
- B. Respiratory structures
  1. Respiratory tract
  2. Respiratory zone

III. Cardiovascular Physiology
- A. Gas exchange
  1. Gas laws
  2. Partial pressures
  3. Factors that affect gas exchange
- B. Cardiac Output
  1. Components of cardiac output
  2. Effect of exercise on cardiac output
  3. Factors that affect cardiac output
- C. Structure of Blood and Formed Elements
  1. Role of each of the components of blood
  2. Erythropoiesis
- D. Electrical Control of the Heart
  1. Intrinsic conduction system
  2. ECG

IV. Group Presentations
- A. Trace the O_2/CO_2 molecule
- B. Electrical control of the heart cycle
- C. Structure of blood and formed elements
- D. Gas exchange

V. Physiological Adaptations to Aerobic Endurance Training
    A. Adaptations to the heart
        1. Stroke volume
        2. Cardiac output
    B. Systemic Adaptations
        1. Cellular
        2. Vascular
        3. Biochemical
    C. Pulmonary Adaptations
        1. Pulmonary ventilation
        2. Respiratory exchange ratio
VI. Cardiovascular Testing
    A. Current exercise testing protocols
        1. Cycle ergometer tests maximal/submaximal
        2. Treadmill test maximal/submaximal
        3. Step tests
    B. Student Led Cardiovascular Testing

VII. Cardiovascular disease
    A. Types of cardiovascular disease
        1. Diseases of the heart
        2. Diseases of the vascular system
    B.Cardiac rehabilitation
        1. Types
        2. Stages of rehabilitation
        3. Therapeutic modalities
    C. CHD risk assesment
        1. Risk factors
        2. Risk stratification

VIII. Cardiovascular exercise programming
    A. Exercise programming variables
        1. Application
        2. Essential formulas for calculating intensity
        3. Processes involved with developing aerobic fitness
    B. Periodization for cardiovascular training
        1. Cycles
        2. Periods
        3. Seasons
        4. Strategies
    C. Applying exercise prescription principles
        1. Develop an individual beginning CV exercise program
        2. Develop a moderate and advanced CV exercise programs (as a group)