

Course Objectives/Course Outline
Spokane Community College

Course Title: Cardiopulmonary Anatomy and Physiology
Prefix and Course Number: RT 244

Course Learning Outcomes:

By the end of this course, a student should be able to:

- Identify the structures of the cardiopulmonary system
- Explain the physiology of ventilation
- Explain the physiology of gas diffusion from the atmosphere to the blood
- Describe the physiology of cardiopulmonary circulation
- Describe or define the hemodynamic measurements obtained using a pulmonary artery catheter
- Explain the physiology of ventilation/perfusion relationships
- Describe the control of ventilation
- Analyze how the cardiopulmonary system responds to the challenge of exercise

Course Outline:

- I. Anatomy
 - A. Upper and lower airways
 - B. Sites of gas exchange
 - C. Pulmonary vascular system
 - D. Pulmonary lymphatic system
 - E. Neural control of the lungs
 - F. The lungs
 - G. The mediastinum
 - H. The pleura
 - I. The thorax
 - J. Muscles of ventilation
- II. Ventilation
 - A. Mechanics of ventilation
 - B. Elastic and dynamic properties of the lungs
 - C. Ventilatory patterns
 - D. Pressure gradients
 - E. Airway resistance, compliance and time constants
- III. Diffusion of pulmonary gases
 - A. Gas laws
 - B. Partial pressures of gases in the pulmonary system
 - C. Alveolar air equation
 - D. Diffusion of oxygen and carbon dioxide
 - E. Diffusion and perfusion limited gases
- IV. Anatomy and physiology of the pulmonary circulation
 - A. Comparison of pulmonary with system circulation
 - B. Blood pressure

- C. Distribution of pulmonary blood flow
- D. West's zone system model of pulmonary blood flow
- V. Oxygen and carbon dioxide transport
 - A. Oxygen transport
 - 1. Oxyhemoglobin dissociation curve
 - 2. Oxygen transport calculations
 - 3. Hypoxia, hypoxemia and cyanosis
 - B. Carbon dioxide transport
 - 1. Carbon dioxide dissociation curve
 - 2. Six mechanisms of carbon dioxide transport
 - 3. Role of the lungs and the renal system
- VI. Acid-Base Balance
 - A. Chemical buffer systems
 - B. Henderson-Hasselbach equation
 - C. Role of the respiratory system in acid-base balance
 - D. Role of the renal system in acid-base balance
 - E. Application of nomograms
- VII. Ventilation / Perfusion relationships
 - A. V/Q ratio
 - B. West's zone system and V/Q ratio
 - C. Effects of V/Q ratio on alveolar PAO₂ and PACO₂
 - D. Effects of V/Q ratio on arterial PO₂ and PCO₂
- VIII. Control of ventilation
 - A. Central and peripheral chemoreceptors
 - B. Factors that influence rate and depth of breathing
- IX. Adaptation to exercise
 - A. Ventilation adaptation
 - B. Circulation adaptation
 - C. Relationship between work, O₂ consumption and CO₂ production
 - D. Anaerobic threshold and anaerobiosis
 - E. Effect of training on the cardiovascular system
 - F. Pulmonary rehabilitation