

El Paso Community College

Syllabus

Part II

Official Course Description

SUBJECT AREA	<u>Respiratory Care Technology</u>
COURSE RUBRIC AND NUMBER	<u>RSPT 1307</u>
COURSE TITLE	<u>Cardiopulmonary Anatomy and Physiology</u>
COURSE CREDIT HOURS	<u>3 1 5</u>
	Credits Lec Lab

I. Catalog Description

Discusses the anatomy and physiology of the cardiovascular, and pulmonary systems. A grade of "C" or better is required in this course to take the next course. **Corequisites: RSPT 1260 and RSPT 1429. (1:5). Lab fee.**

II. Course Objectives

A. Unit I. Anatomy and Physiology of the Lungs and Thorax

1. Identify the main structures of the thorax, i.e., vertebrae, sternum, ribs, and muscles, and describe their function.
2. Name the four groups of accessory muscles for breathing and explain their function at various levels of activity.
3. Describe the diaphragm and its function.
4. Explain the anatomical structure of the lungs.
5. Define hilum, lobe, fissure, segment, and lobule.
6. Explain the structure and function of the two pleural layers.
7. Explain how somatic and autonomic innervation of the lungs and thoracic musculature relates to loss of function as occurs with disease.
8. Compare and contrast the pulmonary and bronchial circulations.

B. Unit II. Anatomy and Physiology of the Respiratory Tract

1. Identify the major anatomical structures of the **upper** respiratory tract and how they function.
 - A. The nose
 - B. Paranasal sinuses
 - C. Oral cavity
 - D. Pharynx
 - E. Larynx
2. Identify and discuss details of the anatomy and physiology associated with the **lower** respiratory tract.
 - A. The trachea
 - B. Main stem bronchi
 - C. Lobar bronchi
 - D. Segmental bronchi
 - E. Subsegmental bronchi
 - F. Bronchioles (small airways)
 - G. Terminal bronchioles
 - H. Respiratory bronchioles
 - I. Terminal respiratory bronchioles
 - J. Terminal respiratory unit.
 - K. Alveolar ducts
 - L. Alveoli

3. Define pores of Kohn, pulmonary surfactant, alveolar macrophage, alveolar capillary membrane, and canals of Lambert.
4. Explain how gas is conducted through the lower respiratory tract during spontaneous breathing.
5. Identify distinguishing anatomical and physiological features associated with the alveolar-capillary membrane.
6. Discuss the role and significance of cilia.
7. Contrast physiological aspects associated with the gel/sol layer of the mucociliary escalator.
8. Contrast the mechanisms responsible for mucous clearance of the tracheobronchial tree and of the alveolar lining.

C. Unit III. The Cardiovascular System

1. Describe the anatomy of the heart.
2. Explain how the anatomy of the heart relates to its function.
3. Explain how the anatomy of the vascular system relates to its function.
4. Trace blood flow through the circulatory system and identify pulmonary and circulatory pressures.
5. Explain the role of the coronary circulation.
6. Identify and explain the four key properties of myocardial tissue.
7. Explain Starling's law of the heart.
8. Identify the three major components of the systemic vasculature and explain their function.
9. Compare and contrast systemic vascular resistance with pulmonary vascular resistance.
10. Identify the determinants of blood pressure.
11. Compare and contrast the local and central control mechanisms of the cardiovascular system.

D. Unit IV. Ventilation

1. Define atmospheric, intrapleural, intrapulmonary, transthoracic, transpulmonary, and transairway pressures.
2. Identify and explain pressure gradients between areas of the pulmonary system.
3. Identify and describe lung volumes, capacities, and parameters.
4. Describe the concepts of anatomical, alveolar, and physiological dead space.
5. Explain the various classifications of ventilation.
6. Explain factors involved in lung resistance and compliance and identify normal values.
7. Describe the relationship of Poiseuille's Law and Reynold's number to airway resistance.
8. Differentiate between dynamic and static compliance.
9. Measure and calculate dynamic and static compliance from given data.

E. Unit V. Gas Exchange and Transport

1. Explain how oxygen and carbon dioxide are transported in the blood.
2. Describe the variables associated with the transport of oxygen and carbon
3. Explain how arterial oxygen and carbon dioxide tension may be measured.
4. Discuss details of the affect of shifts of the oxygen hemoglobin dissociation curve associated with specific factors, including pH, CO₂, 2,3-DPG, temperature, and HbF.
5. Describe the consequences associated with:
 - a. A shift of the oxygen hemoglobin curve to the right.
 - b. A shift of the oxygen hemoglobin curve to the left.
6. Explain details associated with the P₅₀ concept in terms of:
 - a. Relevance
 - b. Normal acceptable value
 - c. Factors which effect an increased P₅₀
 - d. Factors which effect a decreased P₅₀

F. Unit VI. Fluids and Electrolytes

1. Describe the characteristics of solutions.
2. Explain where fluid compartments are located in the body.
3. Explain the mechanisms of water loss and replacement.
4. Explain what roles are played by osmotic and hydrostatic pressure in edema.
5. Discuss the clinical findings associated with excess or deficiency of the seven basic electrolytes.

G. Unit VII. Regulation of Breathing

1. Explain where the structures regulating breathing are located.
2. Explain how the central and peripheral chemoreceptors differ in (1) the way they respond to oxygen, carbon dioxide, and hydrogen ions, and (2) the way they influence breathing in healthy individuals.
3. Explain why the blood-brain barrier causes the central chemoreceptors to respond differently to respiratory and non-respiratory acid-base conditions.
4. Explain how the regulation of breathing in individuals with chronic hypercapnia differs from the regulation of breathing in healthy persons.
5. Explain why administering oxygen to patients with chronic hypercapnea poses a special risk that is not present in healthy individuals.
6. Characterize abnormal breathing patterns.
7. Explain why artificially altering the pattern of breathing in patients with head injuries may affect cerebral blood flow beneficially.

III. THECB Learning Outcomes (WECM)

1. Explain normal pulmonary anatomy and physiology.
2. Explain cardiovascular anatomy and physiology.

IV. Evaluation

The following percentages reflect weight assignment toward the final grade for the course.

A.	Unit Exams	60%
B.	Quizzes, assignments	10%
C.	Final Exam	<u>30%</u>
	Total	100%

Letter Grade Scale

93%	100%	= A
86%	92%	= B
78%	85%	= C
70%	77%	= D
≤ 69%		= F

V. Disability Statement (American with/Disabilities Act [ADA])

EPCC offers a variety of services to persons with documented sensory, mental, physical, or temporary disabling conditions to promote success in classes. If you have a disability and believe you may need services, you are encouraged to contact the Center for Students with Disabilities to discuss your needs with a counselor. All discussions and documentation are kept confidential. Offices located: VV Rm C-112 (831-2426); TM Rm 1400 (831-5808); RG Rm B-201 (831-4198); NWC Rm M-54 (831-8815); and MDP Rm A-125 (831-7024).

VI. 6 Drop Rule

Students who began attending Texas public institutions of higher education for the first time during the Fall 2007 semester or later are subject to a 6-Drop limit for all undergraduate classes. Developmental, ESL, Dual Credit and Early College High School classes are exempt from this rule. All students should consult with their instructor before dropping a class. Academic assistance is available. Students are encouraged to see Counseling Services if dropping because exemptions may apply. Refer to the EPCC catalog and website for additional information.