NorthWest Arkansas Community College
Division of Allied Health

Course Number and Title

RESP 2104 Respiratory Care Science

Catalog Description

Focuses on basic math principles and the metric system; basic chemical principles and a general knowledge of organic and biochemistry; basic physics principles, including gas laws, flow dynamics, and the relationship between flow, time, pressure, and volume

Prerequisites

- Anatomy and Physiology I
- Anatomy and Physiology II
- Introduction to Computer Information
- College Algebra **OR** Math for AAS
- English Composition I
- English Composition II **OR** Technical Writing
- Medical Terminology
- Microbiology
- General Psychology

Admission into the Respiratory Therapy Program.

Credit hours/Contact hours/Load hours

4 credit hours
64 contact hours
4 load hours

Target Audience and Transfer

Students admitted into the Respiratory Therapy Program.
May transfer to other respiratory therapy programs.

Student Learning Outcomes

- Define key terms those assigned by instructor
- State the Kinetic Theory of Matter
- Convert atmospheric pressure to mmHg, cmH_2O or psi
- Describe the gas laws described in text and those assigned by instructor:
- Calculate Dalton's Law for any given gas or pressure
- Describe how a hyperbaric chamber works
- Calculate the PAO_2 using the Alveolar Air Equation
- State the Law of Continuity
- Apply the Law of Continuity to respiratory therapy and cardiology
- Describe the Bernoulli Principle
- Apply the Bernoulli Principle to respiratory therapy
- Describe the Venturi Principle
- Apply the Venturi Principle to respiratory therapy equipment
- Calculate the air to oxygen ratio by using the "Magic Box".
- State what respiratory therapy equipment uses the Venturi Principle
- State where tracheobronchial flow is found in the tracheobronchial tree
- Calculate alveolar ventilation
- Describe the five different modes of oxygen transport
- Describe the three types of airway resistance
- Calculate pulmonary airlow resistance
- Describe the factors that influence the flow of fluids according to Poiseuille's Law of Laminar Flow
- Calculate Reynold's Number
- Apply Reynold's Number to respiratory therapy
- Describe Hooke's Law as it relates to elastic recoil and elastic limit
- Describe, physiologically, how we use Hooke's Law
- Calculate lung compliance
- Relate the pressure-volume curve to disease states
- Define *time constants*
- Calculate time constants when given Raw and CL
- List the percentage of inspiration for each time constant
- Explain the importance of LaPlace's Law as it relates to respiratory therapy
- Explain the importance of pulmonary surfactant
- Explain the four pressures that influence capilllary dynamics
- List the major anions and cations
- Describe what occurs in systemic edema and in pulmonary edema
- Describe how a paramagnetic susceptibility analyzer operates
- Describe how a thermal conductivity analyzer operates

Topics

- Anatomic structure and electron configuration
- Chemical bonding
- Henry's Law
- Graham's Law
- Molarity
- Henderson-Hasselbach Equation
- Chemical equilibrium
- Electrolytes
- Temperature scales
- Electrochemistry
- Oxygen analyzers
- Organic chemistry
- Cellular anatomy
- Carbohydrates, proteins, amino acids, and lipids
- Surfactant
- Nucleic acids
- Hemoglobin
- Oxygen toxicity
- Inhaled nitric oxide
- Adult respiratory distress syndrome
- Mechanisms of bronchospasm
- Mast cells
- Work, enery, and pressure
- Kinetic energy
- Gas laws
    - Boyle's
    - Charles'
    - Gay-Lussac's
    - Combined
    - Dalton's
    - Avagadro's
    - Ideal
- Fluid dynamics
- Bernoulli's Principle
- Venturi Principle
- Oxygen transport
- Airway resistance
- Viscosity
- Mechanics of ventilation
- Hooke's Law

- Compliance
- Time constants
- LaPlace's Law
- Starling's Law of the Capillaries
- Anions and cations
- Physical and electrical oxygen analyzers

Forms of Assessment

- Written examinations
- Homework
- Group projects