

RESP-120: RESPIRATORY CARE THEORY I

Effective Term

Fall 2026

CC Approval

12/05/2025

AS Approval

12/11/2025

BOT Approval

12/18/2025

SECTION A - Course Data Elements

CB04 Credit Status

Credit - Degree Applicable

Discipline

Minimum Qualifications	And/Or
Respiratory Technologies (Any Degree and Professional Experience)	

Subject Code

RESP - Respiratory Care

Course Number

120

Department

Respiratory Therapy

Division

Health Occupations (HEOC)

Full Course Title

Respiratory Care Theory I

Short Title

Respiratory Care Theory I

CB03 TOP Code

1210.00 - *Respiratory Care/Therapy

CIP Code

51.0908

CB08 Basic Skills Status

NBS - Not Basic Skills

CB09 SAM Code

C - Clearly Occupational

Rationale

Course has been reviewed and updated.

SECTION B - Course Description

Catalog Course Description

Students will receive instruction in the theoretical foundations of respiratory care. The course will cover the anatomy and physiology of the respiratory system, the mechanics of breathing, and acid-base balance.

SECTION C - Conditions on Enrollment

Open Entry/Open Exit

No

Repeatability

Not Repeatable

Grading Options

Letter Grade Only

Allow Audit

Yes

Requisites

Prerequisite(s)

Completion of CHEM-110, BIOL-218, BIOL-219, BIOL-220, and MATH-106 or STAT-C1000 with a minimum grade of C.

Advisory Prerequisite(s)

Completion of PHYS-110 with a minimum grade of C.

Requisite Justification

Requisite Description

Course Not in a Sequence

Subject

CHEM

Course

110

Level of Scrutiny

Content Review

Upon entering this course, students should be able to:

Unit 1: Measurement and Calculations. Metric-metric conversions; metric-English conversions; using units; the dimensional analysis method; the proportion method; density; temperature conversions (Fahrenheit, Celsius, Kelvin); Charles' and Boyle's Gas Laws; the barometer. Exponential notation.

Unit 2: Atoms and Bonding. The atom and its parts; isotopes; atomic number, mass number, atomic mass; energy and the electron shells; the

Periodic Table; Elements, compounds, mixtures; solutions; molecules and formula units; atomic, molecular and formula masses.

Unit 3: Redox, Chemical Equations, and Solutions. Electronegativity; oxidation and reduction; oxidizing and reducing agents.

Hydrogen bonding; dissolving; salts, strong and weak bases, strong and weak acids; hydronium ion; the modern definition of a base.

Types of chemical equations. Predicting what the products will be. Writing complete, balanced chemical equations.

Unit 4: The Mole. The mole defined-molar number, molar mass, molar volume of a gas and of a solid or liquid. The mole and gas density. Concentrations of solutions; molarity and normality. pH-what it is and what influences it.

Lab: Basic safety rules and techniques. A variety of experiments including the making and testing of gases.

Requisite Description

Course Not in a Sequence

Subject

BIOL

Course

218

Level of Scrutiny

Content Review

Upon entering this course, students should be able to:

Upon completion of this course, the student will be able to:

1. Identify microscopic and macroscopic structures of human anatomy at several levels of organization, including the organelle, cellular, tissue, organ, and organ system levels.
2. Categorize anatomical structures according to their level of organization and in relation to larger physiological systems.
3. Locate gross anatomical structures on a model of the human body and on a human subject, where appropriate.
4. Relate anatomical structures to function by describing normal functions for each structure.

Requisite Description

Course Not in a Sequence

Subject

BIOL

Course #

219

Level of Scrutiny

Content Review

Upon entering this course, students should be able to:

Upon completion of this course, the student will be able to:

1. Identify microscopic and macroscopic structures of human anatomy at several levels of organization, including the organelle, cellular, tissue, organ, and organ system levels.
2. Categorize anatomical structures according to their level of organization and in relation to larger physiological systems.
3. Locate gross anatomical structures on a model of the human body and on a human subject, where appropriate.
4. Relate anatomical structures to function by describing normal functions for each structure.

Requisite Description

Course Not in a Sequence

Subject

BIOL

Course #

220

Level of Scrutiny

Content Review

Upon entering this course, students should be able to:

Upon completion of this course, the student will be able to:

1. Identify microscopic and macroscopic structures of human anatomy at several levels of organization, including the organelle, cellular, tissue, organ, and organ system levels.
2. Categorize anatomical structures according to their level of organization and in relation to larger physiological systems.
3. Locate gross anatomical structures on a model of the human body and on a human subject, where appropriate.
4. Relate anatomical structures to function by describing normal functions for each structure.

Requisite Description

Course Not in a Sequence

Subject

MATH

Course #

106

Level of Scrutiny

Content Review

Upon entering this course, students should be able to:

Math requirement to ensure safety of drug calculations. Other transferable math with a minimum grade of C

Requisite Description

Course Not in a Sequence

Subject

STAT

Course #

C1000

Level of Scrutiny

Content Review

Upon entering this course, students should be able to:

Math requirement to ensure safety of drug calculations. Other transferable math with a minimum grade of C

SECTION D - Course Standards

Is this course variable unit?

No

Units

6

Lecture Hours

108

Outside of Class Hours

216

Total Contact Hours

108

Total Student Hours

324

Distance Education Approval

Is this course offered through Distance Education?

No

SECTION E - Course Content

Student Learning Outcomes

Upon satisfactory completion of the course, students will be able to:

1. Analyze and describe cardiopulmonary structures, lung mechanics and gas exchange.

Course Objectives

Upon satisfactory completion of the course, students will be able to:

1. Describe the gas exchange unit of the lung.
2. Discuss the indications and hazards of oxygen therapy.
3. Calculate blood oxygen content given the necessary data.
4. Explain how oxygen and carbon dioxide are transported in the blood.
5. Describe how pulmonary diseases affect lung volumes and capacities.
6. Perform and interpret basic pulmonary function tests.
7. Explain the ways that oxygen and carbon dioxide diffuse across the alveolar-capillary membrane.
8. Perform calculations using Boyle's, Charles's, and Gay-Lussac's laws.

9. Discuss the pressure changes that occur during inspiration and expiration.
10. Analyze arterial blood gas values, including oxygenation and acid-base status.
11. Evaluate respiratory and metabolic acid-base disturbances.

Course Content

1. Anatomy of the Respiratory System
 - a. Common causes of respiratory system derangements
 - b. Implications for respiratory care techniques
2. Oxygen Therapy
 - a. Indications for oxygen therapy
 - b. Hazards of oxygen therapy
3. Oxygen Transport
 - a. Oxygen dissolved in plasma
 - b. Oxygen bound to hemoglobin
 - c. Oxy-hemoglobin dissociation curve
 - d. Oxygen content calculation
4. Carbon Dioxide Transport
 - a. Six ways in which carbon dioxide is carried in the blood
 - b. Bohr and Haldane effects
5. Lung Volumes and Capacities
 - a. Four lung volumes and four lung capacities
 - b. Pulmonary diseases' effects on lung volumes and capacities
6. Introduction to Pulmonary Function Testing
 - a. Basic pulmonary spirometry
 - b. Interpretation of basic pulmonary function results
7. Behavior and Diffusion of Gases
 - a. Diffusion of gases across the alveolar-capillary membrane
 - b. Gas law calculations
8. Mechanics of Breathing
 - a. Pressure changes during inspiration and expiration
 - b. Effect of common pulmonary diseases on mechanics of breathing
9. Chemical Concepts/Acid Base
 - a. Henderson-Hasselbalch equation
 - b. Interpretation of arterial blood gases

Methods of Instruction

Methods of Instruction

Types	Examples of learning activities
Activity	Students collaborate to solve simulated patient problems.
Lecture	Instructor relays information on a given subject.
Observation and Demonstration	Instructor displays respiratory care equipment and techniques.

Methods of Evaluation

Methods of Evaluation

Types	Examples of classroom assessments
Exams/Tests	A midterm and a final will be given. Midterm exam to include both multiple choice and essay questions. Example of a mid-term question: As the patient/s lung compliance improved, would the pressure needed to ventilate them change? Explain. Final exam, to include both multiple choice and essay questions. Quizzes, midterm, and final exams constitute 90% of final grade.
Quizzes	A minimum of 5 Quizzes will be given. Example of a quiz question: Given the required data, calculate the oxygen content of the blood in grams/deciliter. Determine whether or not it falls within the normal range.
Other	Completion of computer programs, internet research assignments, and other homework assignments (10% of final grade).

Assignments

Reading Assignments

Assigned readings from textbooks and medical journals.

Examples:

1. Read pages 236-244 in Egan's Fundamentals of Respiratory Care on the ways that oxygen is transported in the blood.
2. Read pages 391-425 in Egan's Fundamentals of Respiratory Care covering the eight lung volumes and capacities and basic pulmonary function testing.

Writing Assignments

Examples of homework/class work assignments:

1. Perform spirometry on a partner and have your partner perform spirometry on you. Submit the results with interpretations.
2. Complete the worksheet on arterial blood gas interpretations. Determine whether each of the ten patients has a problem with oxygenation, ventilation, or both, and develop a care plan.

SECTION F - Textbooks and Instructional Materials

Material Type

Textbook

Author

Beachey

Title

Respiratory Care Anatomy and Physiology

Edition/Version

5th

Publisher

Elsevier

Year

2023

Material Type

Textbook

Author

Kacmarek, et al.

Title

Egan's Fundamentals of Respiratory Care

Edition/Version

13th

Publisher

Elsevier

Year

2025

Material Type

Textbook

Author

Wilkins, Robert

Title

Mosby's Respiratory Care Online for Egan's Fundamentals of Respiratory Care

Edition/Version

2nd

Publisher

Mosby Elsevier

Year

2012

SECTION G - Diversity, Equity and Inclusivity**How does your course and/or course outline of record reflect strategies for accommodating and engaging diverse student populations, advancing equitable outcomes, and fostering inclusion for all students?**

The course outline of record reflects inclusive practices by detailing flexible instruction, diverse course materials, equitable assessments, and supportive policies that ensure accessibility and engagement for all students.

Course Codes (Admin Only)**CB00 State ID**

CCC000310650

CB10 Cooperative Work Experience Status

N - Is Not Part of a Cooperative Work Experience Education Program

CB11 Course Classification Status

Y - Credit Course

CB13 Special Class Status

N - The Course is Not an Approved Special Class

CB23 Funding Agency Category

Y - Not Applicable (Funding Not Used)

CB24 Program Course Status

Program Applicable

Allow Pass/No Pass

No

Only Pass/No Pass

No