Course Information Form (CIF)

Course Code: RTT 134

Course Title: Respiratory Therapy III

Department: Allied Health
PCS Code: 1.2 - Occupational/Technical Instruction
CIP Code: 51.0908
Repeatability: 0

Effective Date: Summer 2026

Credit Hours

Catalog Notation: 3-3-4
Credit Hour Distribution:

Lecture: 3	Lab: 3	Clinical: 0	**Total: 4**

General Course Information

Catalog Description

Introduction to mechanical ventilation, including establishing the need for mechanical ventilation, positive pressure theory, invasive and non-invasive mechanical ventilation, intubation, airway management, airway clearance techniques, ventilator operation, modes of ventilation, ventilator settings, troubleshooting issues, extubation.

General Course Objectives

Upon completion of this course the student will be able to: identify, discuss, analyze, and apply concepts of ventilation including establishing the need of ventilation, mechanics of ventilation, positive pressure theories, airway management, airway clearance, ventilator operation, breath delivery, modes of ventilation, and troubleshooting clinical issues related to mechanical ventilation.

Minimum Placement Levels

English	Reading	Math
Placement out of ENG 099	Placement out of CCS 099	Placement out of MAT 072

Prerequisites

Credit in RTT 117, RTT 130, RTT 131, RTT 132, and BIO 121
Concurrent enrollment in RTT 133, RTT 135, RTT 151, BIO 122, and ENG 101
Admission into the Respiratory Care program

Methods of Evaluation

1 final exam, 1 lab exam, 3-5 objective exams, 8-10 weekly quizzes, 13-15 homework assignments, and 1 investigation paper and poster project with verbal presentation.

Instructional Materials and Additional Supplies

Egan's Fundamentals of Respiratory Care, 13th Edition, Kacmarek, R. Et.al. Elsevier, 2025. Students may choose to purchase electronic version of textbook. 9780323931991
Egan's Fundamentals of Respiratory Care Workbook, 13th Edition, Kacmarek, R. Et.al. Elsevier, 2025. Students may choose to purchase electronic version of the workbook. 9780323933698
Pilbeam's Mechanical Ventilation, 8th ed. Cairo. Students may choose to purchase electronic version of textbook. 9780323871648
Pilbeam's Mechanical Ventilation Workbook, 8th ed. Cairo. Students may choose to purchase electronic version of workbook. 9780323871716
Internet for hybrid class.

Course Content

General Learning Outcomes (GLOs)

- Critical Thinking and Information Literacy: Students will demonstrate the ability to evaluate perspectives, evidence, and implications, and to locate, assess, and use information effectively.
- Technology: Students will demonstrate the ability to evaluate, select, and appropriately use current and emerging tools.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Establishing the Need for Mechanical Ventilation	1. Identify and explain the clinical manifestations of acute respiratory failure. 2. Identify and explain the clinical objectives of mechanical ventilation. 3. Identify and explain the indications for mechanical ventilation. 4. Identify, describe, and explain pulmonary mechanics and oxygenation equations used to assess the need for mechanical ventilation. 5. Compare normal values. 6. Examine patient case scenarios; identify the appropriate level of ventilatory support for patient needs. 7. Demonstrate previously learned Level I skills. 8. Demonstrate application of physical restraints used for patients receiving critical care therapies, following demonstration.	3	3	0
Mechanics of Ventilation	1. Define and explain ventilation, external respiration, and internal respiration. 2. Identify the muscles of breathing. 3. Identify, describe, and explain pressure gradients influencing gas flow through the conductive airways. 4. Identify, describe, and explain the mechanics of the spontaneous breath. 5. Identify, describe, and explain the waveform of the spontaneous breath. 6. Identify, describe, and explain the waveform of a positive pressure breath. 7. Identify, explain, and analyze arterial blood gas values in situations of hypoxemic and hypercapnic respiratory failure. 8. Identify and explain terminology and theory of positive pressure and negative pressure ventilation. 9. Identify, explain, and discuss physiologic and physical variables related to ventilatory mechanics and laws that influence lung compliance, airway resistance, and time constants. 10. Compute calculations for lung compliance, resistance, and time constants. 11. Examine patient case scenarios, applying concepts of compliance, resistance, and time constants. 12. Independently measure lung compliance and resistance values for patient case scenarios in the laboratory, using instructor feedback and simulated patient responses to guide adjustments.	3	3	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Positive Pressure Theories	1. Identify and discuss the etiology, risk factors, clinical manifestations, diagnostic findings, and treatments for atelectasis. 2. Identify and describe terminology associated with expansion therapies. 3. Identify, discuss, and describe the theory, indications, contraindications, complications, operation, application, and monitoring of positive airway pressure therapy. 4. Discuss the effects of positive pressure application on venous return. 5. Identify, discuss, and describe the theory, indications, contraindications, complications, operation, application, function, monitoring, and troubleshooting of Intermittent Positive Pressure Ventilation (IPPV). 6. Describe, identify, and explain open and closed loop control systems. 7. Independently perform an arterial blood gas procedure in the laboratory setting, including gathering of supplies; completion of Allen's Test; patient positioning for procedure; proper labeling of sample; and appropriate handling, transport, and disposal of hazardous waste following demonstration.	3	3	0
Non-Invasive Positive Pressure Ventilation	1. Define and discuss non-invasive positive pressure ventilation. 2. Identify, describe, and apply terminology associated with non-invasive ventilation. 3. Identify, describe, and discuss the clinical benefits of non-invasive ventilation. 4. Identify and discuss indications and goals for non-invasive ventilation in acute and chronic care settings. 5. Identify, describe, and discuss patient selection and exclusion criteria for non-invasive ventilation. 6. Identify, describe, and discuss the function of equipment utilized in the application of non-invasive ventilation. 7. Discuss the importance and application of optimal humidity during non-invasive positive pressure ventilation. 8. Describe and demonstrate the selection, fitting, application, and complications of the patient interface. 9. Identify, explain, and discuss the advantages and disadvantages of various interfaces utilized for the application of non-invasive positive pressure ventilation. 10. Describe and discuss the operational characteristics of the modes and setting of the non-invasive positive pressure ventilator. 11. Discuss and demonstrate the assembly, application, monitoring, and management of non-invasive ventilation. 12. Discuss and demonstrate the application of aerosol delivery during non-invasive ventilation. 13. Discuss key components of patient assessment during non-invasive ventilation administration, including predictors of success and criteria for termination, weaning, and discontinuation. 14. Discuss complications and common troubleshooting techniques for non-invasive ventilation. 15. Evaluate patient case scenarios and select appropriate treatment interventions for patients requiring non-invasive ventilation. 16. Independently demonstrate the assembly and application of non-invasive ventilation equipment in a laboratory setting, accurately adjusting settings and patient interface based on instructor and simulated patient responses.	6	6	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Airway Management	1. Identify and discuss the structures and protective reflexes of the anatomical airway. 2. Identify and discuss methods to relieve partial and complete airway obstructions. 3. Identify and describe the major features of pharyngeal, endotracheal, and tracheal airways. 4. Identify and discuss the indications for pharyngeal, endotracheal, and tracheal airways. 5. Discuss the selection and training of personnel that are qualified to provide artificial airway management. 6. Identify and discuss the advantages and disadvantages of the oral vs nasal endotracheal intubation. 7. Identify, select, and discuss the equipment needed for intubation. 8. Describe and discuss the intubation procedure, including indications, assessment, complications, and rapid sequence intubation techniques. 9. Identify, discuss, and demonstrate the proper placement and security of the endotracheal tube. 10. Identify and discuss common problems associated with endotracheal intubation and endotracheal tubes. 11. Identify, discuss, and demonstrate the steps of extubation. 12. Discuss and demonstrate the use of speaking valves and the steps to discontinuance of a tracheal airway. 13. Identify, discuss, and demonstrate the tracheostomy care procedure. 14. Discuss the decannulation procedure. 15. Discuss the surgical laryngectomy procedure and cautions associated with this airway type. 16. Identify, describe, and demonstrate methods to regulate cuff pressures. 17. Discuss and identify processes to troubleshoot airway issues and emergencies. 18. Discuss and demonstrate humidification of the artificial airway. 19. Identify, discuss, and demonstrate maintenance of the artificial airway. 20. Evaluate patient case scenarios to determine appropriate next steps in the care of patients with artificial airways. 21. Independently demonstrate proper assembly of equipment, patient assessment, therapy application, and problem troubleshooting for the following procedures: a) pharyngeal airways, b) intubation assistance, c) extubation, and d) maintenance of the artificial airway, following instructor demonstration in the laboratory setting.	6	6	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Airway Clearance	1. Identify and describe patient assessment findings that indicate the need for airway clearance. 2. Identify indications, complications, and hazards of the suction procedure. 3. Identify, describe, and demonstrate the selection of equipment used for suctioning. 4. Identify, describe, and demonstrate methods to minimize complications and hazards of airway clearance, including selection of catheters, safe vacuum ranges, depth guidelines, pre-oxygenation, and saline lavage. 5. Describe, discuss, and demonstrate airway clearance techniques, including sterile suction technique, closed suction technique, nasal suction, naso-tracheal suction, and oral suction. 6. Identify indications and demonstrate methods of sputum sampling. 7. Discuss indications and demonstrate the oral hygiene procedure. 8. Identify and describe airway management strategies to prevent ventilator associated pneumonia (VAP). 9. Identify, discuss, and demonstrate troubleshooting techniques for patient and equipment issues concerning airway clearance. 10. Evaluate patient case scenarios to determine appropriate next steps in the care of patients needing airway clearance interventions. 11. Independently demonstrate proper assembly of equipment, patient assessment, therapy application, and problem troubleshooting for airway clearance procedures including a) sterile suction technique, b) sterile suction technique, c) naso-tracheal suction, and d) oral suction, following instructor demonstration in the laboratory setting.	6	6	0
Mechanical Ventilator Operation	1. Discuss and describe the different types of power sources used in mechanical ventilators. 2. Describe and compare closed loop and opened loop ventilator control circuits. 3. Discuss and describe the components of a ventilator. 4. Identify and describe the basic elements of the internal and external pneumatic circuit. 5. Identify, compare, and explain the different types of power transmissions and conversion systems used in mechanical ventilators. 6. Independently demonstrate the assembly and application of a mechanical ventilator in the laboratory setting, including: a) power sources, b) pneumatic circuit setup, and c) identification of machine settings and parameters, following an instructor demonstration.	3	3	0
Mechanical Ventilation: Breath Delivery	1. Describe and explain the four control variables of a ventilator. 2. Describe the phase variables of a ventilator breath. 3. Identify and describe the two different types of mechanical ventilation breaths. 4. Describe the five phase variables of invasive mechanical ventilation. 5. Explain the difference between volume control and pressure control ventilation. 6. Describe the characteristics of 12 modes of ventilation. 7. Identify and discuss the components of pressure, volume, and flow waveforms. 8. Identify, discuss, and demonstrate use of the ventilator alarm system. 9. Independently identify the control variables, phase variables, modes of ventilation, waveform components, and alarm systems of a mechanical ventilator, following an instructor demonstration in the laboratory setting.	3	3	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Mechanical Ventilation: Selecting the Ventilator and the Mode	1. Describe, compare, and discuss the characteristics, advantages, and disadvantages of volume and pressure control ventilation. 2. Identify and explain the differences in function among mandatory ventilation, assisted ventilation, and spontaneous ventilation. 3. Identify and apply the terms "trigger", "cycle", and "limit" to define the following modes and to graph pressure/time to show the pressure delivered with each mode: a. Volume-targeted continuous mandatory ventilation (CMV-VC), b. Pressure-targeted continuous mandatory ventilation (CMV-PC), c. Volume-targeted synchronized intermittent mandatory ventilation (SIMV/VC), d. Pressure-targeted synchronized intermittent mandatory ventilation (SIMV/PC), e. Continuous positive airway pressure (CPAP), f. Volume support ventilation (VS), g. Pressure support ventilation (PSV), h. Variations/combinations of these modes, i. Additional modes of ventilation. 4. Demonstrate the application and settings for specific modes of ventilation in the laboratory setting, following an instructor demonstration, including: a) Volume-targeted continuous mandatory ventilation (CMV-VC), b) Pressure-targeted continuous mandatory ventilation (CMV-PC), c) Volume-targeted synchronized intermittent mandatory ventilation (SIMV/VC), d) Pressure-targeted synchronized intermittent mandatory ventilation (SIMV/PC), e) Continuous positive airway pressure (CPAP), f) Volume support ventilation (VS), and g) Pressure support ventilation (PSV).	6	6	0
Mechanical Ventilation: Settings	1. Perform calculations for specific patient case studies, including: a. body mass, b. minute ventilation, c. total cycle times, d. inspiratory times, e. expiratory times, f. flows, g. inspiratory to expiratory ratios, h. tidal volumes, and i. rates based on necessary patient data. 2. Discuss the application of settings in volume control ventilation and pressure control ventilation. 3. Discuss and calculate tubing compliance and determine volume loss caused by tubing compliance. 4. Discuss the concept of mechanical dead space, identifying items that can add mechanical dead space to the patient circuit. 5. Identify, discuss, and demonstrate the selection of appropriate flow rates and patterns applied to specific patient conditions. 6. Discuss and apply various alarms that are applicable in mechanical ventilation. 7. Identify and discuss various methods to troubleshoot ventilator and patient-ventilator issues. 8. Examine patient case scenarios to determine specific modes and settings of mechanical ventilation. 9. Demonstrate the application and manipulation of ventilator settings in volume control and pressure control modes in the laboratory setting, using instructor feedback and simulated patient responses to guide adjustments.	6	6	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
45	45	0