

Course Objectives/Course Outline
Spokane Community College

Course Title: Critical Care I

Prefix and Course Number: RT 301

Course Learning Outcomes:

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

Apply the following in a patient care situation (First of a two course sequence)

- Respiratory Failure and the Need for Ventilatory Support
- Basic Terms and Concepts of Mechanical Ventilation
- Mechanical Ventilators (How ventilators work, Breath delivery, Classification, Invasive vs. Non-invasive, Positive vs. Negative Pressure)
- Physiology of Ventilatory Support
- Selecting the Ventilator and Mode
- Initial Ventilator Settings, ARDSnet
- Basic Alarms, Humidification
- Assessment of the Mechanically Ventilated Patient, Basic Waveforms Analysis
- Weaning and Liberation from Mechanical Ventilation, SBT
- Extubation
- Terminal Weaning, Advanced Directives and POLST
- Arterial Catheters and Blood Gas Sampling
- Chest Drainage Systems
- Introduction to clinical simulation (Invasive Ventilation - patient assessment)

Course Outline:

- I. Respiratory Failure and the Need for Ventilatory Support
 - A. Recognizing the Patient in Respiratory Distress
 - B. Physiological Measurements in Acute Respiratory Failure
 - C. Bedside Measurements of Ventilatory Mechanics
 - D. Failure of Ventilation and Increased Dead Space
 - E. Failure of Oxygenation
 - F. Overview of Criteria for Mechanical Ventilation
- II. Basic Term and Concepts of Mechanical Ventilation
 - A. Normal Mechanics of Spontaneous Ventilation
 - B. Ventilation and Respiration
 - C. Gas Flow and Pressure Gradients During Ventilation
 - D. Units of Pressure
 - E. Definition of Pressures and Gradients in the Lungs
 - F. Lung Characteristics
 - G. Compliance
 - H. Resistance
 - I. Time Constants
 - J. Definition of Pressures in Positive Pressure Ventilation: baseline pressure, peak pressure, plateau pressure, pressure at end of exhalation

- III. Mechanical Ventilators (How ventilators work, Breath delivery, Classification)
 - A. Internal Function
 - B. Power Source or Input Power
 - C. Control Systems and Circuits
 - D. Power Transmission and Conversion System
 - E. Basic Model of Ventilation in the Lung during Inspiration
 - F. Overview of Inspiratory Waveform Control
 - G. Phases of a Breath and Phase Variables
 - H. Types of Breaths
- IV. Physiology of Ventilatory Support
 - A. Effects of mechanical ventilation on ventilation
 - B. Effects of mechanical ventilation on oxygenation
 - C. Effects of positive pressure on lung mechanics
 - D. Minimizing adverse pulmonary effects of positive pressure ventilation
 - E. Cardiovascular effects of positive pressure ventilation
- V. Selecting the Ventilator and Mode
 - A. Full and Partial Ventilatory Support
 - B. Breath Delivery and Modes of Ventilation
 - C. Modes of Ventilation
- VI. Initial Ventilator Settings
 - A. Initial settings during volume-controlled ventilation
 - B. Initial settings during pressure-controlled ventilation
- VII. Basic Alarms and Providing Humidification
 - A. Initial alarm settings
 - B. Troubleshooting alarms
 - C. AARC clinical practice guideline "Humidification during invasive and non-invasive mechanical ventilation"
- VIII. Assessment of the Mechanically Ventilated Patient, Basic Waveform Analysis
 - A. Documentation of the patient-ventilator system
 - B. Monitoring airway pressures
 - C. Vital signs, blood pressure, and physical examination of the chest
 - D. Management of endotracheal tube and tracheostomy tube cuffs
 - E. Monitoring compliance and airway resistance
 - F. Relationship of flow, pressure, volume, and time
 - G. Scalars, curves, and loops
 - H. Using graphics to monitor pulmonary mechanics
 - I. Assessing patient-ventilator asynchrony
 - J. Advance applications
- IX. Weaning and Liberation from Mechanical Ventilation
 - A. Weaning techniques
 - B. Evidence based weaning
 - C. Factors in weaning failure
 - D. Final recommendations on weaning
- X. Extubation
- XI. Terminal Weaning, Advanced Directives, POLST
- XII. Arterial Catheters and Blood Gas Sampling Techniques

- A. Arterial catheter insertion techniques
- B. Arterial catheter maintenance and troubleshooting techniques
- C. Arterial catheter blood gas sampling techniques and equipment
- XIII. Chest Drainage Systems
 - A. Indications and Placement techniques
 - B. Complications and monitoring
 - C. Maintenance and troubleshooting techniques
 - D. Removal of chest tube
- XIV. Clinical simulation – care of a patient receiving invasive positive pressure ventilation