# Course Information Form (CIF)

**Course Code:** RTT 213

**Course Title:** Respiratory Therapy VI

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

**Effective Date:** Summer 2026

## Credit Hours

**Catalog Notation:** 4-0-4
**Credit Hour Distribution:**

| Lecture: 4 | Lab: 0 | Clinical: 0 | **Total: 4** |
|---|---|---|---|

## General Course Information

### Catalog Description

Respiratory care management of the critically ill patient with emphasis on cardiopulmonary anatomy and physiology, bedside monitoring tools, comprehensive patient assessment, hemodynamics, diagnostic and therapeutic interventions.

### General Course Objectives

Upon completion of this course the student will be able to explain the alterations in the cardiovascular anatomy and physiology that occur in the critically ill patient; to demonstrate appropriate assessment of the patient; to evaluate clinical data and physical assessment findings; and to apply assessment findings to the care of the severely compromised cardio-pulmonary patient.

### 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 136 and RTT 137
Concurrent enrollment in RTT 212, RTT 215, and BIO 123
Admission into the Respiratory Care program

### Methods of Evaluation

Weekly homework, weekly quizzes, 1 comprehensive critical care patient case study project, 3 unit exams, 1 final exam.

**Instructional Materials and Additional Supplies**

Egan's Fundamentals of Respiratory Care, 9780323811217
Egan's Fundamentals of Respiratory Care Workbook, 9780323598057
Pilbeam's Mechanical Ventilation Physiological and Clinical Applications, 9780323551274
Oakes' Clinical Practitioner's Pocket Guide to Respiratory Care, 978-0-932887-64-1

## Course Content

### General Learning Outcomes (GLOs)

- Reasoning and Inquiry: Students will demonstrate the ability to solve problems using deductive reasoning and logic, quantitative reasoning, or the scientific method.

### Course Segments and Student Learning Outcomes

| Course Segment | Learning Outcomes | Lecture Hours | Lab Hours | Clinical Hours |
|---|---|---|---|---|
| Introduction to the Critically Ill Patient | 1. Identify specific physiologic changes or conditions that designate admission as critical care status.<br>2. Identify standard monitoring equipment utilized in the intensive care unit.<br>3. Identify and explain the function of invasive lines, drains, and tubes commonly seen in critical care.<br>4. Discuss techniques used to validate the measurements of invasive and non-invasive monitoring devices.<br>5. Identify safety procedures utilized in critical care areas to assure patient safety.<br>6. Identify and discuss the roles and duties of the respiratory care practitioner in critical care.<br>7. Identify and discuss infection control policies and procedures that prevent common infections in critical care areas.<br>8. Describe the comprehensive assessment of the critical care patient including: physical and neurological assessment, evaluation of bedside monitoring tools, and collection and analysis of diagnostic testing results.<br>9. Discuss the responsibilities, benefits, liabilities, and potential hazards of implementation of respiratory care protocols in the critical care area.<br>10. Discuss the essential components of patient hand-off using effective interprofessional communication. | 1 | 0 | 0 |
| Cardiopulmonary Anatomy and Physiology | 1. Identify and describe the anatomical structures of the cardiopulmonary system including chambers, valves, and vessels.<br>2. Identify and describe blood flow patterns through the cardiopulmonary and peripheral (systemic) vascular system.<br>3. Identify and discuss the coronary blood flow of the heart including coronary anatomy and coronary perfusion.<br>4. Identify, describe, and discuss the different vessel types of the peripheral (systemic) vascular system including distribution, resistance, exchange, and reservoir vessels.<br>5. Identify and describe pressures of the peripheral (systemic) vascular system and pulmonary vascular systems. | 2 | 0 | 0 |

| Course Segment | Learning Outcomes | Lecture Hours | Lab Hours | Clinical Hours |
|---|---|---|---|---|
| Fluid Filled Monitoring Systems | 1. Identify the main components and specifics of a fluid filled monitoring system.<br>2. Identify and discuss arterial line monitoring including monitoring purposes, insertion sites, and common hazards.<br>3. Identify and discuss arterial pressures including normal arterial pressures, calculation of the mean blood pressure, and calculation and significance of monitoring pulse pressures.<br>4. Identify and discuss the determinants of blood pressure including cardiac output, stroke volume, heart rate, preload, afterload, contractility, and peripheral vascular resistance.<br>5. Identify, describe, and assess the arterial pressure waveform including waveform quality; waveform tracing when drawing, flushing, and monitoring; and the correlation of invasive blood pressure compared to non-invasive measurements.<br>6. Identify and discuss systolic and diastolic phases of the cardiac cycle including protodiastole, isometric relaxation, atrial contraction, isometric contraction, and rapid ventricular ejection.<br>7. Identify and discuss central venous lines including indications for use, insertion sites, monitoring of waveform, placement on chest radiograph, and complications.<br>8. Identify and discuss the components of the central venous pressure waveform.<br>9. Identify and discuss central venous pressure waveforms during spontaneous breathing compared to positive pressure ventilation.<br>10. Identify and discuss pulmonary arterial lines including anatomy of the pulmonary artery catheter, insertion sites, RT role in insertion, confirmation of placement on chest radiograph, monitoring capabilities, monitoring procedures, and waveform assessment.<br>11. Identify and discuss pulmonary artery line normal values of monitored values including central venous pressure (right atrial pressure), right ventricular pressure, pulmonary artery pressure (PAP) pulmonary capillary wedge pressure (PCWP), cardiac output (CO), and saturation of venous oxygen (SvO2). | 4 | 0 | 0 |
| Hemodynamic Values and Measurements | 1. Identify normal values for invasive and non-invasive measured and derived hemodynamic parameters.<br>2. Identify normal pressures in the chambers and great vessels of the heart.<br>3. Identify, define, and discuss the components of hemodynamic function including: heart rate, chronotropy, contractility, pulsus paradoxus, preload, afterload, end diastolic ventricular volume, ejection fraction, peripheral (systemic) vascular resistance, pulmonary vascular resistance, and indexing measurements. | 2 | 0 | 0 |

| Course Segment | Learning Outcomes | Lecture Hours | Lab Hours | Clinical Hours |
|---|---|---|---|---|
| Cardiac Testing and Interventions | 1. Identify, explain, and discuss cardiac diagnostic testing procedures including: a) electrocardiogram, b) Holter monitor, c) event monitor, d) echocardiogram, e) trans-esophageal echocardiogram, f) treadmill stress test, g) chemical stress test, h) isotope stress test, i) echo stress test, and j) tilt table test.<br>2. Identify and discuss indications, contraindications, risks, rationale, and specifics for the following cardiac interventions: a) cardiac catheterization, b) stent insertion, c) balloon angioplasty, d) inter-aortic balloon pump device, e) left ventricular assist device, f) coronary artery bypass graft, and g) hypothermic protocol.<br>3. Identify indications and discuss rationale for various procedures used for cardiac testing and interventions.<br>4. Discuss the indications and procedure of therapeutic hypothermia in the post resuscitation care of the cardiac arrest patient.<br>5. Examine patient case studies, assess clinical findings, and explain indications for cardiac diagnostic testing, interventions, and medications. | 3 | 0 | 0 |
| Critical Care Pharmacology and Fluid Balance | 1. Identify, describe, and discuss various intravenous fluid types.<br>2. Identify, describe, and discuss various medications used in cardiac pharmacology for the critically ill patient.<br>3. Identify the components of fluid balance assessment.<br>4. Identify patient signs and symptoms of positive and negative fluid balances.<br>5. Identify and discuss fluid balance effects on hemodynamic values.<br>6. Discuss the use and administration of crystalloid and colloid intravenous products to maintain hemodynamic homeostasis.<br>7. Evaluate patient case studies, assess clinical indications, then select appropriate cardiac medications, crystalloid solutions, and colloid products for the patient's condition. | 2 | 0 | 0 |
| Hemodynamic Application of Disease States and Case Studies | 1. Differentiate projected hemodynamic measurements for cardiopulmonary disease and fluid balance states including: a) hypovolemia, b) hypervolemia, c) cardiac valve stenosis, d) ventricular failure, e) cor pulmonale, f) pulmonary hypertension, g) acute respiratory distress syndrome, and h) pulmonary emboli.<br>2. Examine patient case studies; discuss appropriate hemodynamic management and interventions as indicated for clinical presentation. | 3 | 0 | 0 |
| Oxygen Indices | 1. Identify, explain, and discuss the principles of gas transport including distribution, diffusion, perfusion, and ventilation.<br>2. Identify, explain, and discuss signs of decreased tissue perfusion.<br>3. Identify, explain, and determine hypoxemic and hypoxic states for given specific patient case studies.<br>4. Identify and discuss types of cardiopulmonary shunts, normal shunt values, and calculation of shunt values.<br>5. Identify, explain, calculate, and discuss oxygen indices including: a) oxygen delivery, b) oxygen consumption, c) arterial and mixed venous oxygen content, d) arterial and venous saturation, e) arterial to mixed venous oxygen content difference, f) oxygen extraction ratio, g) shunt equation, h) alveolar oxygen content, and i) P/F ratio.<br>6. Examine, calculate, and assess oxygen indices for specific patient cases. | 3 | 0 | 0 |

| Course Segment | Learning Outcomes | Lecture Hours | Lab Hours | Clinical Hours |
|---|---|---|---|---|
| Radiology Findings | 1. List the four tissue densities seen on the chest radiograph.<br>2. Describe how to evaluate the technical quality of a chest radiograph.<br>3. List the anatomical structures seen on the chest radiograph.<br>4. Identify the value of computed tomography (CT) scanning, high-resolution CT scanning, and CT angiography.<br>5. Describe the common radiographic abnormalities seen in the pleura, lung parenchyma, and mediastinum.<br>6. Identify and discuss the terms radiolucent and radiopaque in relationship to the radio-densities of tissues seen on a chest radiograph.<br>7. Identify, assess, and discuss the technical quality of a chest radiograph.<br>8. Identify, describe, and differentiate the characteristics between various radiographic positioning techniques including PA and AP films.<br>9. Identify the anatomical structures seen on the chest radiograph including the trachea, carina, right main stem bronchi, left main stem bronchi, right atria, heart, hilum, aorta, aortic arch, diaphragm, costophrenic angle, breast tissue, stomach or gastric bubble, clavicle, and ribs.<br>10. Identify and describe the common radiographic abnormalities and disease seen in the pleura, lung parenchyma, and mediastinum.<br>11. Identify, describe, and systematically evaluate a chest radiograph.<br>12. Identify, describe, and evaluate correct positioning of the endotracheal tube in relation to the carina on a chest radiograph.<br>13. Discuss the indications and value of radiographic imaging including computer tomography (CT), high-resolution (HRCT), CT angiography, ultrasonography, Magnetic Resonance Imaging (MRI), and Positron Emission Tomography (PET). | 3 | 0 | 0 |
| Laboratory Testing | 1. Discuss the clinical importance of reference ranges and critical value reporting.<br>2. Identify, describe, and discuss the elements of the complete blood count (CBC) including red blood cells, hemoglobin, hematocrit, platelets, and white blood cells.<br>3. Identify and discuss the complete blood count abnormal values including leukocytosis, leukopenia, anemia, polycythemia, and thrombocytopenia.<br>4. Identify, describe, and discuss the the elements of serum electrolytes including sodium, potassium, chloride, carbon dioxide, calcium, magnesium, phosphorus, and lactate.<br>5. Identify and discuss abnormal values of serum electrolytes including hypernatremia, hyponatremia, hyperkalemia, hypokalemia, hyperchloremia, hypochloremia, hypercalcemia, hypocalcemia, hyperphosphatemia, and hypophosphatemia.<br>6. Identify, describe, and calculate the anion gap to determine the cause of acidosis.<br>7. Identify, describe, and discuss renal function labs including bun nitrogen urea (BUN) and creatine phosphokinase (CPK).<br>8. Identify, describe, and discuss cardiac function labs values including troponin, creatine phosphokinase (CPK), and brain natriuretic peptide (BNP).<br>9. Identify, describe, and discuss serum glucose lab values including conditions of hyperglycemia and hypoglycemia.<br>10. Identify and discuss the role of a sputum culture and sensitivity, and characteristics of infected sputum.<br>11. Examine, assess, and identify abnormal values of the complete blood count, serum electrolytes, serum glucose, and renal and cardiac testing values given specific case studies.<br>12. Identify, explain, and discuss expected interventions for abnormal lab values. | 3 | 0 | 0 |

| Course Segment | Learning Outcomes | Lecture Hours | Lab Hours | Clinical Hours |
|---|---|---|---|---|
| Nutritional Assessment | 1. Describe the effects of nutritional status on the respiratory system.<br>2. Identify and explain the principal components of a nutrition assessment.<br>3. Identify and discuss methods used to estimate nutrient needs and provide nutritional support for patients with acute and chronic lung disease.<br>4. Discuss the role of indirect calorimetry in the nutrition assessment.<br>5. Identify and discuss enteral and parenteral feedings, including types of enteral formulas.<br>6. Identify and discuss the effects of malnutrition for the respiratory-compromised, critically ill patient.<br>7. Identify and discuss nutritional support guidelines for patients with chronic lung disease. | 1 | 0 | 0 |
| Pain Assessment | 1. Identify, describe, and discuss clinical signs and symptoms of inadequate pain control.<br>2. Identify, discuss, and compare common pain scales utilized in the medical setting.<br>3. Identify and compare the differences in medications for pain control and medications for sedation.<br>4. Examine individual case studies and identify signs and symptoms of pain conditions that may affect the patient's respiratory status. | 1 | 0 | 0 |
| Renal Assessment | 1. Discuss the role of the renal system in the management of body fluids and removing waste products from the body.<br>2. Identify and discuss the stages of renal failure.<br>3. Identify, discuss, and anticipate common causes that can contribute to renal failure disease.<br>4. Identify and discuss laboratory tests commonly ordered to assess renal function.<br>5. Identify, explain, and categorize urine output including oliguria, polyuria, and anuria in specific patient case presentations.<br>6. Identify and discuss treatment for renal failure including hemodialysis, peritoneal dialysis, continuous renal replacement therapy, and kidney and conservative treatment. | 1 | 0 | 0 |
| Neurological Assessment | 1. Identify, describe, categorize, and evaluate the Glasgow Coma Scale domains and scores to specific patient cases.<br>2. Identify, describe, categorize, and evaluate levels of consciousness including confused, delirious, lethargic, obtunded, stuporous, and comatose to specific patient cases.<br>3. Identify and discuss common drugs that suppress consciousness.<br>4. Identify, describe, and discuss evaluation of sedation levels using the Ramsey Sedation Scale.<br>5. Identify and discuss signs of neurological injury including pupillary response and posturing.<br>6. Identify and discuss the anatomy and function of the central nervous system, peripheral nervous system, and the brain.<br>7. Identify and discuss brain injury classifications including ischemic encephalopathy and traumatic brain injury.<br>8. Identify and discuss normal values and the relationship between intracranial pressures and cerebral perfusion pressures.<br>9. Identify, describe, and discuss measurements and management strategies to lower intracranial pressures.<br>10. Identify, describe, and discuss the components of brain death testing including evaluation of coma, rule-out causes of coma, and evaluation of brainstem reflexes.<br>11. Identify, describe, and discuss the brain death testing procedure and diagnosis.<br>12. Explain and discuss end of life organ donation after brain death. | 3 | 0 | 0 |

| Course Segment | Learning Outcomes | Lecture Hours | Lab Hours | Clinical Hours |
|---|---|---|---|---|
| Thoracic Complications | 1. Identify and describe the anatomy and function of the visceral and parietal pleural.<br>2. Identify and discuss pleural effusions including causes and assessment of size.<br>3. Identify how pleural effusions occur and the difference between transudative effusions, exudative effusions, empyema, chylothorax, and hemothorax.<br>4. Identify and explain the treatment of pleural effusions including diuretics, thoracentesis, and pleurodesis.<br>5. Identify and describe the etiology of a pneumothorax.<br>6. Identify and explain the anatomic changes that are associated with a pneumothorax.<br>7. Identify and describe clinical manifestations and radiological findings associated with a pneumothorax.<br>8. Identify and explain the management of a pneumothorax.<br>9. Describe and explain the procedure for needle decompression of a tension pneumothorax.<br>10. Identify, explain, and discuss a chest tube insertion and equipment required for the procedure.<br>11. Identify and describe the parts and functions of the chest tube collection chamber.<br>12. Examine, assess, identify, and categorize pneumothoraces including etiology, physical examination findings, radiology findings, function of chest tube system, chest tube drainage fluid type, amount of drainage, and presence of leak given specific patient case studies. | 3 | 0 | 0 |
| Sepsis Assessment and Management | 1. Identify and define sepsis and different stages of sepsis.<br>2. Identify and discuss the signs and symptoms of sepsis and septic shock.<br>3. Identify and discuss the causes, risk factors, laboratory testing, and treatment of sepsis.<br>4. Examine, recognize, and anticipate hemodynamic changes, lab testing results, and expected treatments for sepsis and septic shock given specific patient case studies. | 2 | 0 | 0 |
| Interventional Pulmonary Procedures | 1. Identify indications, contraindications, and complications of flexible fiber optic bronchoscopy and rigid bronchoscopy.<br>2. Discuss appropriate patient selection for bronchoscopy.<br>3. Discuss patient preparation for bronchoscopy procedure.<br>4. Discuss assessment and management of the patient during a bronchoscopy.<br>5. Identify and discuss the role of the respiratory therapist in assisting with a bronchoscopy.<br>6. Identify and discuss special considerations in mechanical ventilation during bronchoscopy.<br>7. Identify and describe interventional procedures during a fiber optic bronchoscopy including: a) airway examination, b) bronchoalveolar lavage, c) bronchoscopic washing, d) bronchoscopic brushing, e) endobronchial biopsy, f) transbronchial biopsy, and g) transbronchial needle aspiration.<br>8. Discuss the role of bronchoscopy in difficult intubation.<br>9. Discuss treatment interventions including: a) endobronchial stent placement, b) thermal ablation, c) cryotherapy, and d) brachytherapy.<br>10. Demonstrate, facilitate, and evaluate the patient when assisting during a bronchoscopy procedure. | 3 | 0 | 0 |

| Course Segment | Learning Outcomes | Lecture Hours | Lab Hours | Clinical Hours |
|---|---|---|---|---|
| Difficult Airway Management | 1. Identify and discuss indications for airway intubation.<br>2. Identify, describe, and recognize patient characteristics associated with potentially difficult airways.<br>3. Identify and discuss methods to assess and score the potentially difficult airway.<br>4. Identify and describe methods, tools, and techniques to manage the difficult airway.<br>5. Identify and discuss methods to confirm airway placement. | 3 | 0 | 0 |
| Healthcare Ethics | 1. Define ethics.<br>2. Describe and discuss methods by which an ethical orientation is formed.<br>3. Identify and discuss the differences between ethical and legal behavior.<br>4. Identify and discuss the rights and responsibilities of the patient in regard to their healthcare management.<br>5. Identify and discuss common ethical dilemmas associated with the delivery of patient care in the critical care areas.<br>6. Examine and identify common ethical principles in specific patient case scenarios.<br>7. Describe and discuss the role of ethics committees in the healthcare setting.<br>8. Describe and discuss the key components of the American Association for Respiratory Care statement of ethics and professional conduct. | 3 | 0 | 0 |
| Application of Critical Care Concepts to Simulated Patient Cases | 1. Demonstrate and apply knowledge and skills in various patient-based case scenarios using a range of low, medium, and high fidelity simulators.<br>2. Demonstrate computer-based charting for patient simulation.<br>3. Demonstrate interdisciplinary and peer teamwork involving patient care during simulation.<br>4. Discuss self and peer performance during simulation debriefing.<br>5. Express critique of individual performance as well as peer performance in patient-based simulation scenarios. | 6 | 0 | 0 |
| Application of Critical Care Concepts and Practices to Current Patient Care | 1. Analyze and interpret data from patient-based patient case studies.<br>2. Discuss and explain various data and patient treatments based on case study findings.<br>3. Prepare and demonstrate patient hand off of care report.<br>4. Evaluate the patient plan of care as it relates to current standards of care and evidence-based practice. | 4 | 0 | 0 |
| Critical Care Patient Case Study | 1. Evaluate patient clinical presentation and testing results and formulate a clinical plan for the Critical Care Patient Case Study project. | 4 | 0 | 0 |

**Total Contact Hours**

| Lecture Hours | Lab Hours | Clinical Hours |
|---|---|---|
| 60 | 0 | 0 |