**Course Description**

<table>
<thead>
<tr>
<th>Lecture hours, laboratory hours, and credits:</th>
<th>3 hours, 0 hours lab, 3 credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisites:</td>
<td>RSP-110, RSP-119, and RSP-121; Co-requisites: RSP-210, RSP-222, RSP-225</td>
</tr>
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</table>

Course Description: Respiratory Critical Care Fundamentals is a study of the respiratory therapist role as a member of the critical care team. The course provides a continuation of knowledge and skills for respiratory care. Students will be introduced to advance management devices utilized to maintain patent airways. Students will learn interpretation of blood gases and sampling techniques. Introductory preparation to conduct therapeutic procedures needed to achieve adequate artificial ventilation with emphasis on non-invasive support and invasive support. Students will learn procedures to needed to assist the physician.

**Student Learning Objectives:** As a result of meeting the requirements in this course:

**Unit One – Airway Management**

*Goal: Review the concepts of airway management and utilization of advance airway devices.*

1. Describe and discuss the oropharyngeal airway, nasopharyngeal and list the indications and contraindications for these devices.
2. Describe the different types of cuffs available and the advantages and disadvantages.
3. Discuss the significance of cuff pressure and demonstrate the procedure for obtaining cuff pressure. List the equipment required for endotracheal intubation.
4. List the indications for various specialty airways
   - 4.1. Esophageal obturator
   - 4.2. Double lumen
   - 4.3. High-frequency Jet Ventilation tubes
   - 4.4. High-low Evac Tubes
   - 4.5. Double-lumen Airway
   - 4.6. Laryngeal Mask Airway
5. Describe the use and maintenance of aspiration equipment.
6. List the factors that affect the FIO2 delivered via a manual resuscitator.
7. Describe the procedure for maintaining a patient airway.
8. Describe the proper procedure for insertion of an artificial airway.
9. List the proper procedure for tracheobronchial aspiration and include the possible complications.
10. Be able to list, and clinically describe, at least four indications for endotracheal intubation.
11. Be able to describe the clinical indications for auffed endotracheal tube.
12. Be able to list the advantages, disadvantages, and hazards of endo / nasotracheal intubation compared to a tracheostomy, and discuss when a patient should benefit in having a tracheostomy performed.
13. Be able to list the advantages, hazards and surgical complications (early/late) of tracheostomy.
14. Identify and differentiate between high and low pressure tracheal tube cuffs, and describe the rationale and physiological basis for low-pressure cuffs.
15. Define capnometry
   15.1. Understand the primary uses of capnography
   15.2. Identify the normal and abnormal tracing produced on a capnogram
   15.3. Identify certain conditions that can elevate and lower capnometer reading
   15.4. Be able to troubleshoot different errors that can occur while monitoring a patient on capnometry.
16. Identify and differentiate the sterile apparatus used for suctioning versus in-line suction catheters.
   16.1. Demonstrate the procedure of tracheobronchial / nasotracheal aspiration
   16.2. Indications
   16.3. Patient preparation
   16.4. Equipment preparation
   16.5. Sterile technique
   16.6. Patient monitoring techniques
   16.7. Hazards / side effects
   16.8. Special problem situations
   16.9. Bronchoalveolar lavage

Unit Two – Clinical Interpretation of Blood Gases and Sampling
Goal: The student will be able to sample blood from the radial arterial site and interpret the results obtained.
1. Discuss the indications for obtaining an arterial blood gas sample.
2. Describe the procedure for obtaining an arterial sample from the radial, brachial, and femoral sites.
3. Discuss the hazards of arterial blood gas sampling.
4. Discuss safety precautions that are necessary when obtaining an arterial sample.
5. Discuss the procedure for analyzing an arterial sample, and the interpretation of the results from the arterial blood gas sample.
6. Discuss the procedure for analyzing an arterial sample.
7. Evaluate the results of the arterial blood sample.
8. Interpret the results from the arterial sample according to acceptable medical standards:
   8.1. Respiratory acidosis
   8.2. Respiratory alkalosis
   8.3. Metabolic acidosis
   8.4. Metabolic alkalosis
9. Discuss the oxygenation status of the arterial blood gas sample.

Unit Three – Intermittent Positive Pressure Breathing
Goal: The student will be able to discuss the principles of IPPB
1. Define IPPB therapy.
2. Construct a list of indications, contraindications and hazards of IPPB therapy.
3. Describe the principles of operation of the IPPB equipment.
4. Discuss the following procedures involved with the implementation and termination of an IPPB treatment:
   4.1. Preparation of the patient for the treatment
   4.2. Pre-treatment measurements
   4.3. Assessment of therapy
4.4. Modification of treatment
4.5. Post-treatment measurements
4.6. Record results properly

Unit Four – Assisting the Physician
Goal: The student will be able to describe the responsibilities of working with physician performing specific tasks.
1. Identify the indications for thoracentesis.
2. Explain the procedure for performing and assisting the physician during thoracentesis.
3. Describe the use for ultrasound.
4. Describe how the ultrasound improves diagnostic imaging.
5. Identify the indications and contraindications for chest tube placement.
6. List the medications used for moderate sedation.
7. Explain the procedure for administration of sedative medications and reversal agents

Unit Five – Non-Invasive Positive Pressure Ventilation (NIV or NPPV)
Goal: Understand the function and operation of negative pressure and non-invasive positive pressure ventilators. Establish the initial setting for NIV of non-invasive ventilation. Define the selection criteria and exclusion criteria for patients to receive NIV. Review the management of patient receiving NIV.
1. Discuss the use of NIV in patients with sleep apnea.
2. What is ventilation?
3. Describe the principles of operation of negative pressure ventilators.
4. Define non-invasive positive pressure ventilation (NIV or NPPV)
5. Describe the principles and operation of non-invasive ventilation
6. Identify the different modes available on common bi-level ventilators
7. Identify the patient that would benefit from NIV
8. Discuss the initial settings and recommend changes
9. List criteria for monitoring patients on NIV
10. List the complications of NPPV
11. Discuss the management of patients receiving non-invasive ventilation
12. Discuss the management of Sleep Apnea Patients

Unit Six – Invasive Positive Pressure Mechanical Ventilation
Goal: The student will be able to classify and describe the functional parameters of select ventilators; the student will be able to select a ventilator according to the physiologic needs of the patient, the demands of the physician, and the limitations of the apparatus.
1. Describe the theoretical operation of pressure and flow producing mechanisms.
2. List and discuss events that cause cycling of a ventilator from inspiration to expiration.
3. Be able to state the clinical indications that might favor one class or type of ventilator over another in the following patient care categories:
   3.1. Patients with normal lungs
   3.2. Patients with restrictive disorders
   3.3. Patients with obstructive disorders
4. Describe the common modes of ventilation
   4.1. Assist control – pressure control
   4.2. Assist control – volume control
   4.3. Pressure regulated
   4.4. Synchronized intermittent mechanical ventilation
5. Become proficient with the setup and utilization of the various options and accessories that increase or alter the capabilities of ventilators including but not limited to:
   5.1. Oxygen blender systems
   5.2. PEEP
   5.3. Pressure support
   5.4. CPAP
6. List and explain the different categories of alarms associated with mechanical ventilators.
7. Be able to correctly alter the parameters of ventilation and oxygenation according to proper
therapeutic standards.
8. Develop, evaluate, explain and modify respiratory care ventilator flow sheets that provide a clear,
   concise, and accurate indication of all necessary parameters of the patient.
9. List hazards and complications associated with mechanical ventilation and demonstrate the
   appropriate steps that can be initiated to prevent these hazards and complications.
10. List and explain the various weaning methods and procedures.

**Course Content**
This course will be presented and delivered in a formal lecture with student discussions, selected
multimedia aids, and guest speakers. The laboratory sessions will utilize exercises and computer
simulation problems.

**Special Features of the Course**
MoodleRooms is used to enhance the interaction with the student. The course will utilize a laboratory
sessions to practically apply the knowledge obtained through lecture sessions.

**Course Texts and/or Other Study Materials**
- Egan’s Fundamentals of Respiratory Care Evolve Online

**Research, Writing, and Examination Requirements**
Examinations:
The course will have two examinations and four quizzes covering the units presented during class. All
exams and quizzes will consist of multiple-choice format or short-answer essay type questions. The
final exam will be a comprehensive evaluation of all the semesters topics.

**Means of Assessment**
Students will be assessed in the following methods: Quizzes: Consists of short answer, fill-in, or true-false
questions based on select units readings and class presentations, and a final written exam in multiple
choice format via the computer in Moodle Rooms.

**Grading Policy**
Grade Determinations

- **Quizzes/Exams (5)** 100%
- Egan Online Module

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<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>Student must show superior work, excel in laboratory contribute positively to class discussions.</td>
<td>92 – 100</td>
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<tr>
<td>B+</td>
<td>Student must merit superior work classroom work and in practical exercises</td>
<td>86 – 91.9</td>
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<tr>
<td>B</td>
<td>Student must show above average work and an above average standard of achievement in laboratory</td>
<td>80 – 85.9</td>
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<tr>
<td>C+</td>
<td>Student must meet and attain the standard of achievement with reasonable theoretical knowledge and laboratory skills</td>
<td>75 – 79.9</td>
</tr>
<tr>
<td>F</td>
<td>Student fails to meet acceptable standards in classroom or laboratory performance</td>
<td>&lt;75</td>
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Late work or Assignments:
Late work and make-up examinations will be penalized with a grade being no greater than 75%. Late
work will be submitted as soon as possible; makeup exams will be completed at the end of the
semester.

**Attendance Policy**
Departmental Policy Statements

1. Acceptable quality of work and mature behavior are expected from every student at all times. Students are regarded as professionals and are expected to conduct themselves accordingly.
2. High standards of professional performance demand that students maintain good academic progress throughout their course of study in the program.
3. Students demonstrating chronic tardiness or absenteeism will be placed on academic warning or probation, and may be subjected to termination from the program.
4. Absence from a class during a scheduled exam will be subject to the policy of the instructor for that specific course. If the student is going to miss a scheduled exam it is expected that the student will contact the instructor ahead of time by e-mail or phone to the department office.
5. All students are required to adhere to the policies and procedures of the school as outlined in the college catalogue.

Student and Faculty Support Services

1. The program faculty maintain office hours for counseling and are available to provide tutorial assistance to students.
2. Students must make appointments in advance to meet with the instructor outside of office hours.
3. Students may also obtain assistance from the College Tutoring Center. Appointments must be made in advance through this center.
4. The College has a personal counseling center for those students who may need personal assistance. Appointments are made directly through this center.
5. Any problems, concerns, or questions should be directed to the course instructor or the student’s advisor.
6. Statement on Civility
   a. Refer to the Standards of Conduct Subsection found in the Student Judicial Affairs Policies & Procedures Section found in the Student Handbook.
7. Academic Integrity
   a. Refer to the Academic Integrity Subsection; found in the Academic Regulations, Academic Policies Section found in the Academic Policies & Regulations Area of the College Catalog
8. Other possible College, Divisional, and/or Departmental Policy Statements to be referenced
   a. ADA statement.
   b. Sexual Harassment statement.
   c. Statement on acceptable use of BCC technology.
**Weekly Assignments / Objectives**

<table>
<thead>
<tr>
<th>Week #</th>
<th>Topic</th>
<th>Reading Assignments (Egan's or Principles &amp; Practice)</th>
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</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Intro to Acid-Base; Clinical Interpretation of Blood Gases</td>
<td>Egan’s Ch.18</td>
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<tr>
<td>Week 2</td>
<td>Clinical Interpretation of Blood Gases and Sampling; Covering the Arterial Stick</td>
<td>Egan’s Ch. 18</td>
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<tr>
<td>Week 3</td>
<td>Clinical Interpretation of Blood Gases and Sampling; Competency on Arterial Stick</td>
<td>Egan’s Ch.18</td>
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<tr>
<td>Week 4</td>
<td>Quiz 1 Intro to Airway Management</td>
<td>Egan’s Ch. 33</td>
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<td>Week 5</td>
<td>Emergency Cardiovascular Life Support</td>
<td>Egan’s Ch. 34</td>
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<td>Week 6</td>
<td>Quiz 2 Intermittent Positive Pressure Breathing</td>
<td>Lung Expansion Therapy</td>
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<td>Egan’s Ch.39</td>
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<td>Week 7</td>
<td>Assisting the Physician</td>
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<td>Week 8</td>
<td>Intro to Non-Invasive Positive Pressure Ventilation</td>
<td>Egan’s Ch.45</td>
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<td>Spring Break</td>
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<td>Week 9</td>
<td>Quiz 3 Non-Invasive Positive Pressure Ventilation</td>
<td>Noninvasive Ventilation</td>
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<td>(Egan’s Ch.45)</td>
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<td></td>
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<td>Noninvasive Ventilation and Continuous Positive Airway Pressure (P&amp;P)</td>
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<td>Week 10</td>
<td>Non-Invasive Positive Pressure Ventilation</td>
<td>Egan’s Ch.44</td>
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<tr>
<td>Week 11</td>
<td>Quiz 4 Intro to Invasive Positive Pressure Mechanical Ventilation</td>
<td>Egan’s Ch.44</td>
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<td>Week 12</td>
<td>Invasive Positive Pressure Mechanical Ventilation</td>
<td>Initiating and Adjusting Ventilatory Support (Egan’s Ch.42)</td>
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<td></td>
<td></td>
<td>Mechanical Ventilators: Classification and Principles of Operation (P&amp;P)</td>
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<tr>
<td>Week 13</td>
<td>• Invasive Positive Pressure Mechanical Ventilation</td>
<td>Egan’s Ch.42</td>
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<td>Week 14</td>
<td>• Exam review</td>
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<tr>
<td>Week 15</td>
<td>Quiz 5</td>
<td>Final Exam</td>
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**Note to Students:** This course outline and is tentative and subject to change, depending upon the progress of the class.

**Online Topic Modules / Workbook**

<table>
<thead>
<tr>
<th>Egan Online Modules</th>
<th>Beachey Workbook</th>
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<tbody>
<tr>
<td>Acid-Base Balance</td>
<td>Acid-Base Regulation</td>
</tr>
<tr>
<td></td>
<td>Clinical Assessment of Acid-Base and Oxygenation Status</td>
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