

Bergen Community College
Division of Health Professions
Respiratory Care Program
RSP-250, Respiratory Critical Care

Course Information

Course and Section Number: RSP-250-XXX

Meeting Time and Location:

Instructor:

Office Location:

Phone:

Departmental Secretary:

Office Hours:

Contact information:

Course Description

This course provides the student with advanced skills necessary to manage a critically ill patient. Students will be learning to evaluate, monitor, and use protocols to provide advanced management therapies based on the pathophysiology of a critically ill patient. The laboratory portion of this course will reflect the practical application of the topics presented in the lecture.

Credits: 4 (3 lecture hours and 3 laboratory hours)

Prerequisites: RSP-226.

Co-requisites: RSP-231 and RSP-240

Student Learning Outcomes: As a result of meeting the requirements in this course, the student will

1. Formulate methods to initiate mechanical ventilation for various adult pathophysiologic conditions.
2. Summarize select medication used in the management of critical care patients receiving mechanical ventilation.
3. Analyze adult patient data and correctly adjust the mechanical ventilator.
4. Apply methods for weaning an adult patient from invasive mechanical ventilation.
5. Use critical care guidelines for managing an adult patient.
6. Describe the principles of mechanical ventilation as they relate to clinical conditions that meet or fail to meet gas exchange requirements.

Means of Assessment

A student in this course is assessed through:

- Four (4) quizzes that contain multiple choice, short answer, or calculation questions that will be used to assess competency.
- Participate in class discussions necessary for the understanding of key themes and complete activities.
- A research presentation is used to assess communication skills and group performance.
- Three (3) laboratory exams that are used to assess practical competency.

Course Content

Module Learning Outcomes

Principles of Mechanical Ventilation

1. Define and explain the clinical significance of airflow resistance.
2. Define and explain the clinical significance of static compliance and dynamic compliance.
3. Describe the clinical application of plateau pressure and peak inspiratory pressure.
4. Describe the clinical application of pressure-volume (compliance) slope.
5. Describe the clinical application of the PIP-Pplat pressure gradient.
6. Describe the relationship between dead space ventilation and rapid shallow breathing pattern.
7. Define and describe the causes leading to ventilatory failures.
8. Define and describe the causes leading to oxygenation failures.
9. List the pulmonary and non-pulmonary conditions leading to mechanical ventilation.

Weaning from Mechanical Ventilation

1. Define success and failure for discontinuing mechanical ventilation.
2. Contrast simple, difficult, and prolonged weaning from mechanical ventilation.
3. Explain how criteria for assessing ventilation, oxygenation, and pulmonary measurements are used to evaluate patient readiness to start the weaning process.
4. Describe how to prepare patients to increase the likelihood of a successful weaning outcome.
5. Describe the following weaning procedures: spontaneous breathing trial, SIMV, and pressure support ventilation.
6. Describe assessment techniques for determining extubation readiness.
7. List options that can reduce the need for reintubation and the conditions when they would most likely be used.
8. Identify the causes of weaning failure.
9. Explain when a gradual weaning approach would be considered over a daily diagnostic spontaneous breathing trial.
10. Describe the leading causes of failure for attempts to liberate patients from mechanical ventilation and ways to correct them.
11. Differentiate withholding and withdrawing of mechanical ventilation.
12. Differentiate between prolonged mechanical ventilation and chronic ventilator dependence.

Classification of Mechanical Ventilation

1. Describe the normal physiology of ventilation, including inhalation and exhalation.
2. Describe ventilatory work and relate the equation of motion of the respiratory system to pulmonary physiology.

Modes of Mechanical Ventilation

1. Differentiate between the spontaneous modes of ventilation.
2. Differentiate between continuous positive airway pressure (CPAP) and positive end-expiratory pressure (PEEP).
3. Differentiate between pressure support, volume assured pressure support, and bilevel positive airway pressure (BiPAP).
4. Describe the characteristics of volume control ventilation.
5. Describe the characteristics of pressure control ventilation.
6. Describe the possible targeting and triggering schemes for both within breath delivery and between breath delivery.

Initiating Mechanical Ventilation

1. Differentiate between acute ventilatory failure (AVF) and respiratory insufficiency.
2. Differentiate between hypoxemic respiratory failure and hypercapnic respiratory failure.
3. Identify the goals of mechanical ventilation.
4. Explain how the need for mechanical ventilation is typically assessed.
5. Describe the benefits associated with using a protocol to initiate mechanical ventilation.
6. Select initial settings for volume and pressure-targeted mechanical ventilation.
7. Differentiate abnormal values from those that indicate the need for ventilatory support for relevant physiologic measurements.
8. Discuss modifications for initial settings for selected special conditions.

Monitoring in Mechanical Ventilation

1. Describe monitoring the ventilation of a patient receiving mechanical ventilation.
2. Explain how oxygenation and ventilation are monitored physiologically on a patient receiving mechanical ventilation.
3. Differentiate the effects of mechanical ventilation on other organ systems and how these effects are monitored.

Management of Mechanical Ventilation

1. Formulate strategies to improve ventilation and oxygenation.
2. Select the initial ventilator alarm settings.
3. Explain how prone positioning, tracheal gas insufflation, and mechanical insufflation-exsufflation improve ventilation or oxygenation.
4. Choose the initial ventilator settings for various clinical conditions.
5. Differentiate the ventilator settings between noninvasive and mechanical ventilation for severe asthma and acute exacerbation of COPD.

Pharmacotherapy in Critical Care

1. Discuss the pharmacotherapy of medications that are instilled directly into the airway.
2. Explain the mechanism of action, indications, contraindications, and adverse effects of sedative and hypnotic agents.
3. Discuss dosage and delivery options for analgesics.
4. Explain the mechanism of action, indications, contraindications, and adverse effects of depolarizing and nondepolarizing neuromuscular blocking agents.
5. Describe the indications and mechanism of action for reversal agents.
6. Describe the mechanism of action, indications, contraindications, and adverse effects of diuretics.

Medical Critical Care Issues

1. Describe the clinical presentations and treatment algorithm of ARDS.
2. Discuss the criteria and classification of ventilator-associated events (VAEs) and subgroups of VAE (including ventilator-associated pneumonia).
3. Describe the strategies to prevent VAE, including the VAP bundle.

Critical Care Guidelines and Bundles

1. Discuss the ABCDEF categories.
2. Discuss the advantages and disadvantages of enteral and parenteral feeding.
3. Explain the significance of gastric residual volume.

Course Texts

Required

- Chang, D. Respiratory Critical Care, 1st ed. Jones & Bartlett Learning, 2021. ISBN: 9781284177503, eBook ISBN: 9781284177527
- Kacmarek, R. Egan's Fundamentals of Respiratory Care, 12th ed. Elsevier, 2021. Paperback ISBN: 978-0-323-51112-4
- Clinical Trac online clinical management tool

Recommended

- Kacmarek, R. Workbook for Egan's Fundamentals of Respiratory Care, 11th ed. Elsevier, 2017. Paperback ISBN: 9780323358521

Quiz, Laboratory, Presentation Requirements

Quizzes

The course will have four (4) quizzes covering the modules presented. Quizzes consist of multiple-choice, matching, true-false, or short-answer essay type questions.

Presentation

Students will either present a research article related to the critical care management of a critically ill patient or outline a Module on special ventilatory techniques. Articles related to the resource administration or allocation in the ICU are also acceptable. The special ventilatory techniques can be outlined from the texts or two or three research articles. Scoring rubric and schedule are posted on Canvas. Articles are limited to no more than 5 years old. Review articles or teaching (case studies) are not acceptable. Article choice should be submitted for approval.

Laboratory

The laboratory exams will be a practical evaluation that requires higher-level critical thinking skills. The final exam laboratory will be a comprehensive evaluation. The laboratory-grade will be the three examinations. These grades will be calculated as part of the course points.

Grading Policy

Assessments	Points
Quiz 1	30
Quiz 2	30
Quiz 3	30
Quiz 4	20
Class activities	20
Presentation	20
Laboratory Exam 1	100
Laboratory Exam 2	100
Laboratory Exam 3	100
Total points	450

Grade Scheme

Letter	Description	Range
A	The student must show superior theoretical knowledge and demonstrate superior laboratory skills.	93 – 100
B+	The student must merit high-quality classroom work and theoretical knowledge and demonstrate high-quality laboratory skills.	88 – 92.9
B	The student must show above-average knowledge and laboratory skills.	83 – 87.9
C+	The student meets the standard of achievement with reasonable knowledge and demonstrates reasonable laboratory skills.	78 – 82.9
F	The student fails to meet minimum course standards.	<78

Missed Quizzes and Late Work

Missed quizzes and late work will be penalized with a grade being no greater than seventy-eight percent (78%). In-class activities cannot be reconciled because of the evaluation method participatory and will be recorded as zero (0). Quizzes are scheduled during the last two weeks of the semester but before the last scheduled class. All late coursework must be completed before the last scheduled class. A grade of zero (0) will be recorded if a quiz is not completed before the last scheduled day of the class day.

Attendance Policy and Academic Integrity

Academic Integrity

Academic dishonesty is a serious violation of BCC policy and personal ethics and will be treated as such if the reason for suspicion should arise. Students should be careful to avoid plagiarism, falsification, and compliance. Academic integrity is vital to an academic community and for fair evaluation of student

assessments. All assessments submitted must be your own, completed in accordance with the college's academic policies and the student code of conduct. You may not engage in unauthorized collaboration or make use of any artificial intelligence (AI) composition systems. Academic dishonesty also includes cheating on examinations. Refer to the BCC student code of conduct, student handbook for additional information, and the statement on plagiarism (<https://catalog.bergen.edu/content.php?catoid=4&navoid=163#academic-dishonesty>).

BCC Attendance Policy

All students are expected to attend punctually every scheduled meeting of each course in which they are registered. Attendance and lateness policies and sanctions are to be determined by the instructor or program policy. The instructor will keep attendance for administrative and counseling purposes. Class attendance and student participation are essential to the successful completion of this course.

Course Attendance Policy

Attendance and punctuality in all class sessions is required. Attendance for lectures is factored into the total grade for the course. Two (2) points are deducted for every absence. One (1) point is deducted if the student arrives after the attendance is recorded. If you are late, be sure to see the professor in that class so the absence can be corrected to a lateness.

Departmental Policy Statements

- Acceptable quality of work and mature behavior is always expected from every student. Students are regarded as professionals and are expected to conduct themselves accordingly.
- High standards of professional performance demand that students maintain good academic progress throughout their course of study in the program.
- Students demonstrating chronic tardiness or absenteeism will be placed on academic warning or probation and may be subjected to termination from the program.
- 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 email or phone to the department office.
- All students are required to adhere to the policies and procedures of the school as outlined in the college catalog.
- Additional department policies are in the Respiratory Care Program – Student Policies and Procedures Manual.
- Remediation
 - The program's defined process for addressing deficiencies in a student's knowledge, skills, professional behavior, and competencies so that the correction of these deficiencies can be ascertained and documented. The program must conduct these evaluations equitably and with sufficient frequency to facilitate prompt identification of learning deficiencies and the development of a means for their remediation within a suitable time frame.
 - The remediation process is initiated by faculty when any student is at risk of failing a course due to difficulty accomplishing course objectives and / or requirements. At risk behaviors include academic deficiency (non-passing quiz, examination, laboratory competency), lack of clinical competency (not abiding by policy and procedures, unsafe behavior), and lapses in professional conduct.

Support Services

- The program faculty maintains office hours for counseling and is available to provide tutorial assistance to students.
- Students must make appointments in advance to meet with the respective instructors.
- Students may also obtain assistance from the [College Tutoring Center](#). Appointments must be made in advance through this center.
- The College has a [personal counseling center](#) for those students who may need personal assistance. Appointments are made directly through this center.
- Any problems, concerns, or questions should be directed to the course instructor or the student's advisor.
- Statement on Civility
 - Refer to the [Standards of Conduct](#) Subsection found in the Student Judicial Affairs Policies & Procedures Section found in the Student Handbook.
- Academic Integrity
 - Refer to the Academic Integrity Subsection; found in the [Academic Regulations](#).
- Other possible College, Divisional, or Departmental Policy Statements to be referenced.
 - ADA statement.
 - Students with documented disabilities who require accommodations by the American with Disabilities Act (ADA) can request support services from the Office of Specialized Service of Bergen Community College located in room L-115 of the Pitkin Learning Center. (www.bergen.edu/oss)
 - Sexual Harassment statement.
 - Statement on acceptable use of [BCC technology](#).
- Student and Faculty Support Services
 - List support services, e.g., the [Writing Center](#), the [Math Lab](#), the Tutorial Center, [Online Writing Lab](#) (OWL), [Office of Specialized Services](#), etc.
- BCC Library
 - The [Sidney Silverman Library](#) is committed to providing a quiet, welcoming, respectful atmosphere conducive to study and research in an environment that is comfortable, clean, and safe. The use of the library will be beneficial in providing resources on researching topic information, citation styles, finding current articles among many other media services available.

General Course Expectations

Students are expected to:

- Use their BCC email address when emailing the instructor and fellow students.
- Interact during class and complete in-class activities.
- Review and follow the course calendar concerning module discussions and material.
- Submit assignments in Canvas according to the syllabus deadlines.
- Utilize the discussion forum to post questions for the instructor.
- Purchase the course textbooks.

Faculty are expected to:

- Respond within 24 hours of a communication request (except Thursdays, weekends or holidays).
- Ensure all assignments are available and complete.
- Monitor discussion boards and replies, as necessary.
- Adhere to the course calendar.
- Include grading rubrics for key class assignments (posted within Canvas).

Course Schedule

Module	Topic	Readings and Pre-Class Activities	Class Activities and Assessments
Module 1	Essential principles of normal and abnormal respiratory physiology	Principles of Mechanical Ventilation (Chang) Respiratory Failure and the Need for Ventilatory Support (Egan's) Review lecture presentation	
Module 2	Current weaning techniques and new approaches	Weaning from Mechanical Ventilation (Chang) Discontinuing Ventilatory Support (Egan's) Review lecture presentation	Develop a chart to reference normal and abnormal parameters.
Module 3	Fundamental knowledge of the physiology of ventilation	Classification of Mechanical Ventilation and Modes of Mechanical Ventilation (Chang) Mechanical Ventilators (Egan's) Review lecture presentation	
	Quiz 1		<i>Quiz 1 - Module 1 & 2</i>
Module 3	Understand the various modes	Modes of Mechanical Ventilation	Develop a chart outlining the various ventilation modes listed on the NBRC exams.
Module 4	Systematic approach to selecting initial ventilation settings	Initiating Mechanical Ventilation (Chang) Initiating and Adjusting Invasive Ventilatory Support (Egan's) Review lecture presentations	
	Selecting initial ventilation settings (cont.)	Learn about the profession	Develop a chart outlining common alarms and triggering conditions.
	Quiz 2		<i>Quiz 2 - Module 3 & 4</i>
Module 5	Monitoring the settings can help the therapist fine-tune the ventilator	Monitoring in Mechanical Ventilation (Chang) Monitoring the Patient in the Intensive Care Unit (Egan's)	

		Review lecture presentation	
Module 6	Fundamental ventilator management strategies	Management of Mechanical Ventilation Review lecture presentation	Develop a disease versus ventilation strategies chart
	Student research presentations		Presentations
	Quiz 3 Student presentations		<i>Quiz 3 - Module 5 & 6</i>
Module 7	Student presentations Pharmacology	Pharmacotherapy in Critical Care (Chang) Aerosol Drug Therapy (Egan's) Review lecture presentation	Presentations Develop a medication table listed on the NBRC exams.
Module 8	Issues that occur in the ICU.	Medical Critical Care Issues and Critical Care Guidelines and Bundles Review lecture presentation	
	Quiz 4		<i>Quiz 4 - Module 7 & 8</i>

Laboratory Schedule

Week	Topic	Chapter Reading	Competency
Week 1	Weaning techniques, Parameters, and Calculations Introduction to computer simulations	Discontinuing Ventilatory Support	Pulmonary Mechanics for Weaning Ventilator Weaning
Week 2	Weaning techniques, Parameters, and Calculations Non-invasive ventilation	Discontinuing Ventilatory Support Noninvasive Ventilation	Initiation of BiPAP/NIPPV
Week 3	Non-invasive ventilation		
Week 4	<i>Exam 1</i>		
Week 5	Setup & Adjusting ventilators	Initiating and Adjusting Invasive Ventilatory Support	Initiation Of Mechanical Ventilation Ventilator Circuit Change
Week 6	Ventilator modes	Mechanical Ventilators	Ventilator Parameter Change

Week 7	Troubleshooting alarms		
Week 8	Ventilator check		Routine Ventilator Check
Week 9	Ventilator simulation exercises		
Week 10	<i>Exam 2</i>		
Week 11	Ventilator waveforms & analysis	Monitoring the Patient in the Intensive Care Unit	Ventilator Graphics Analysis
	No class – Thanksgiving break		
Week 12	Caring for the ICU patient	Monitoring the Patient in the Intensive Care Unit	
Week 13	Caring for the ICU patient		
Week 14	<i>Exam 3</i>		
Week 15	Online exam and simulation computer lab		

Note to Students: This course and laboratory schedule is tentative and subject to change, depending upon the progress of the class. All material will be covered, and students are responsible for the content.