



# INSTRUCTIONAL PACKAGE

RES 141

Respiratory Skills III

Effective Term  
Fall/2019

# INSTRUCTIONAL PACKAGE

## Part I: Course Information

Effective Term: Fall 2019 (201910)

COURSE PREFIX: RES

COURSE TITLE: Respiratory Skills III

CONTACT HOURS: 2 Lecture/3 Lab

CREDIT HOURS: 3

### **RATIONALE FOR THE COURSE:**

Respiratory skills is a course that will introduce the basic history and principles of mechanical ventilation. The course will allow respiratory care students to understand the terms related mechanical ventilation providing a foundation to troubleshoot, critically think, and create a plan for managing patients on a mechanical ventilator.

### **COURSE DESCRIPTION:**

This course covers mechanical ventilation systems, pediatrics, and associated monitors.

### **PREREQUISITES/CO-REQUISITES:**

Respiratory Care Program course RES 246. Required prerequisite courses must be completed with a grade of "C" or better.

Required prerequisite courses must be completed with a grade of "C" or better.

### **REQUIRED MATERIALS:**

Cairo, J. M. (2016). Pilbeam's Mechanical Ventilation (6<sup>th</sup> ed). St. Louis, MO: Elsevier/Mosby. ISBN: 9780323321013

Please visit the Bookstore online site for most current textbook information. Use the direct link below to find textbooks.

[BOOKSTORE](#).

Enter the semester, course prefix, number and section when prompted and you will be linked to the correct textbook.

### **TECHNICAL REQUIREMENTS:**

Access to Desire2Learn (D2L), HGTC's student portal for course materials.  
WaveNet and D2L email access.

## **CLASSROOM ETIQUETTE:**

As a matter of courtesy to other students and your professor, please turn off cell phones and other communication/entertainment devices before class begins. If you are monitoring for an emergency, please notify your professor prior to class and switch cell phone ringers to vibrate.

**NETIQUETTE:** is the term commonly used to refer to conventions adopted by Internet users on the web, mailing lists, public forums, and in live chat focused on online communications etiquette. For more information regarding Netiquette expectations for distance learning courses, please visit [Online Netiquette](#).

It is recognized that personal communication devices, including smart phones, can play a fundamental role in both education and urgent personal connections (for example, a school calling about a sick child). For this reason, use of such devices is permitted in the classroom, with specific reservations:

1. Please set all devices to 'silent' or 'vibrate' during instructional time.
2. Use of devices during testing is NOT allowed.
3. Please limit use of devices to urgent personal connections and educational purposes directly related to the course material being discussed.
4. If you receive an urgent text/call during class that requires immediate attention, please quietly excuse yourself from the classroom to respond to the call.
5. Please refrain from using 'ear buds' or continually using the device as a learning distraction. Professor retains the right to disallow the use of such devices should the policy become a distraction.
6. When on clinical rotations, students are expected to abide by the policies of that institution.

## **PLAGIARISM & CHEATING:**

Refer to the College catalog & Student Handbook. The student may be assigned a failing grade for the course, or may be required by the professor to withdraw from the course and/or the respiratory care program. Such actions are deemed to be unprofessional behavior within this program and will not be tolerated.

## **Part II: Student Learning Outcomes**

### **COURSE LEARNING OUTCOMES and ASSESSMENTS\*:**

Module 1:

Material Covered: Mechanical Ventilation History

Basic Terms and Concepts of Mechanical Ventilation Chapter 1

How Ventilators Work Chapter 2

How a Breath is Delivered Chapter 3

Assessments:

- Homework/Quizzes/Projects/Skills

- Exam

#### Learning Outcomes:

1. Define ventilation, external respiration, and internal respiration.
2. Provide the value for intraalveolar pressure throughout inspiration and expiration during normal, quiet breathing.
3. Describe the changes in airway conditions that can lead to increased resistance.
4. Calculate the airway resistance given the peak inspiratory pressure, a plateau pressure, and the flow rate.
5. Discuss the principle of operation of negative pressure, positive pressure, and high-frequency mechanical ventilation.
6. Learn the basic types of power sources used for mechanical ventilators: electrical or pneumatic.
7. Give historical perspective on ventilator classification.
8. Explain the difference in function between positive and negative pressure ventilators.
9. Distinguish between a closed-loop and an open-loop system.
10. Give two other names for pressure ventilation and volume ventilation.
11. Compare pressure, volume, and flow delivery in volume-controlled breaths and pressure-controlled breaths.
12. Name the two most commonly used patient-trigger variables.
13. Recognize the effects of a critical leak on pressure readings and volume measurements.
14. Define the effects of inflation hold on inspiratory time.
15. Give an example of a current ventilator that provides negative pressure during part of the expiratory phase.
16. Describe the methods of using continuous pressure to the airways to improve oxygenation in patients with refractory hypoxemia.

#### Module 2:

Material Covered: Adult Critical Care

Establishing the Need for Mechanical Ventilation Chapter 4

#### Assessments:

- Homework/Quizzes/Projects/Skills
- Exam

#### Learning Outcomes: (Psychomotor-Skills)

1. Differentiate between acute respiratory failure (ARF) and respiratory insufficiency.
2. Describe 3 category of disorders that may lead to respiratory insufficiency or ARF.
3. Compare normal values for Vital Capacity (VC), Maximum Inspiratory Pressure (MIP), Maximum Expiratory Pressure (MEP), FEV1, Peak Expiratory Flow, Physiological Dead Space/Tidal Volume (TV) ratio, alveolar-arterial oxygen pressure difference, and arterial

to alveolar partial pressure of oxygen ratio with abnormal values that indicate the need for Ventilatory support.

### Module 3:

Selecting the Ventilator and the Mode Chapter 5

Initial Ventilator Settings Chapter 6

Assessments:

- Homework/Quizzes/Projects/Skills
- Exam

Learning Outcomes:

1. Select an appropriate Mechanical ventilator, breath type, and mode of ventilation based on clinical findings derived from patient assessment data.
2. Describe how continuous positive airway pressure (CPAP) and Noninvasive positive pressure ventilation (NIV) are used to deliver NPPV.
3. Discuss the advantages and disadvantages of volume-controlled and pressure-controlled ventilation.
4. Explain the differences in function among continuous mandatory ventilation, intermittent mandatory ventilation, and spontaneous ventilation.
5. Describe the functions of trigger, cycle, and limit variables as they are used in volume-controlled continuous mandatory ventilation, pressure-controlled continuous mandatory ventilation, volume-controlled intermittent mandatory ventilation, pressure-controlled intermittent mandatory ventilation, and pressure support ventilation.
6. Define the following term: pressure-regulated volume control.
7. Calculate tubing compliance.
8. Determine volume loss caused by tubing compliance.
9. Calculate minute ventilation given a patient's respiratory rate and tidal volume.
10. Calculate total cycle time, inspiratory time, expiratory time, flow in L/sec, and inspiratory-to-expiratory ratios given the necessary patient data.
11. Calculate an appropriate flow rate and pattern.
12. Calculate initial minute ventilation, tidal volume and rate for a patient placed on VC-CMV based on the patient's sex, height, and ideal body weight.
13. Choose an appropriate initial mode of mechanical ventilation, and determine flow, tidal volume, respiratory frequency, and positive end-expiratory settings based on the patient's lung pathology, body temperature, metabolic rate, altitude, and acid-base balance.
14. Evaluate the response in peak inspiratory pressure and plateau pressure when the flow waveform is changed.

15. Measure plateau pressure using pressure-time and flow-time waveforms during pressure-controlled mechanical ventilation.
16. List the possible causes for a change in pressure during pressure regulated volume control.

#### Module 4:

Material Covered: Mechanical Ventilator Setup

Final Considerations in Mechanical Ventilator Setup Chapter 7

Initial Patient Assessment Chapter 8

Assessments:

- Homework/Quizzes/Projects/Skills
- Exam

Learning Outcomes:

1. Recommendations fractional inspired oxygen concentration (FIO<sub>2</sub>) settings when initiating mechanical ventilation.
2. Describe the use of sigh breaths.
3. List actions for necessary for final ventilator setup.
4. Explain the use of extrinsic positive end-expiratory pressure (PEEP).
5. Calculation of desired FIO<sub>2</sub> and current partial pressure of arterial oxygen (PAO<sub>2</sub>) and FIO<sub>2</sub> values.
6. Provide initial ventilator settings for the following conditions: COPD, acute asthma exacerbation, neuromuscular disorders, closed head injuries, acute respiratory distress syndrome, and acute cardiogenic pulmonary edema.
7. Understand the importance of performing an operational verification procedure.
8. State the recommended times an oxygen analyzer is used to measure the fractional inspired oxygen concentration (FiO<sub>2</sub>) during mechanical ventilation.
9. Identify various pathophysiological conditions that alter a patient's transairway pressure, peak pressure, and plateau pressure.
10. Identify a system leak from a volume-time curve.
11. Use physical examination and radiographic data to determine whether pneumonia, acute respiratory distress syndrome (ARDS), flail chest, pneumothorax, asthma, pleural effusion, or emphysema is present.
12. Determine whether a lung compliance problem or an airway resistance problem is present, using the ventilator flow sheet and time, volume, peak inspiratory pressure (PIP), and plateau pressure data.
13. Estimate a patient's alveolar ventilation based on ideal body weight, tidal volume, and respiratory rate.
14. Detect a cuff leak by listening to breath sounds.

15. Recognize inappropriate endotracheal tube cuff pressures and an inappropriate tube size, and recommend measures to correct these problems.
16. Evaluate flow sheet information about a patient on pressure control ventilation and recommend methods for determining whether compliance and airway resistance changed.
17. Explain the technique for measuring endotracheal tube cuff pressure using a manometer, syringe, and three-way stopcock.
18. Describe two methods that can be used to remedy a cut pilot tube without changing the endotracheal tube.

#### Module 5:

Material Covered:

Ventilator Graphics Chapter 9

Assessments:

- Homework/Quizzes/Projects/Skills
- Exam

Learning Outcomes:

1. Identify ventilator variables and ventilator parameters and their values from flow-volume and pressure-volume loops.
2. Identify ventilator variables and ventilator parameters and their values from flow-volume and pressure-volume loops.
3. Use ventilator scalars and loops to detect changes in lung compliance and airway resistance, inappropriate sensitivity settings, inadequate inspiratory flow, auto-positive end-expiratory pressure (auto-PEEP), leaks in the ventilator circuit, active exhalation during pressure support ventilation, and an inspiratory pressure overshoot during pressure support ventilation.
4. Describe how changes in airway resistance and lung compliance affect scalars and loops during volume-targeted and pressure targeted ventilation when airway resistance increases and lung compliances decreases.
5. Recognize periods of patient-ventilator asynchrony using scalars and loops.

#### Module 6:

Material Covered: Oxygen Disorders

Improving Oxygenation and Management of Acute Respiratory Distress Syndrome Chapter 13

Ventilated-Associated Pneumonia Chapter 14

Assessment:

- Homework/Quizzes/Projects/Skills
- Exam

Learning Outcomes:

1. Calculate a desired  $\text{FiO}_2$  required to achieve a desired  $\text{PaO}_2$  based on current ventilator settings and blood gases.
2. Calculate a patient's pulmonary shunt fraction.
3. Identify indications and contraindications for continuous positive airway pressure (CPAP) and positive end-expiratory pressure (PEEP).
4. List the primary goals of PEEP and the conditions in which high levels of PEEP are most often used.
5. Describe the most appropriate method for establishing an optimum level of PEEP for a patient with acute respiratory distress syndrome (ARDS) using recruitment-derecruitment maneuver and the deflation point (lower inflection point during deflation or derecruitment).
6. Explain the effects of PEEP/CPAP therapy on a patient with unilateral lung disease. Describe the problems associated with initiating PEEP in a patient with an untreated pneumothorax.
7. Recommend adjustments in PEEP and ventilator settings based on the physical assessment of the patient, arterial blood gases (ABGs), and ventilator parameters.
8. Compare static compliance, hemodynamic data, and ABGs when it is appropriate to change from CPAP to mechanical ventilation with PEEP.
9. Identify the severity of ARDS using the  $\text{PaO}_2/\text{FiO}_2$  ratio.
10. Recommend an appropriate tidal volume ( $V_t$ ) setting for a patient with ARDS.
11. Identify the maximum Plateau value to use for patients with ARDS.
12. Identify the criteria that should be used to liberate a patient from PEEP or CPAP.
13. Recommend a PEEP setting based on the inflection point on the deflation curve using the pressure-volume loop for a patient with ARDS.
14. Describe various ways to treat ARDS for patients on mechanical ventilation and the hazards associated with prone positioning.
15. Define VAP and HAP.
16. Discuss the difference between early-onset and late-onset VAP.
17. Discuss the prognosis for VAP.
18. Identify the most common pathogens associated with VAP.
19. List the nonpharmacologic and pharmacologic therapeutic interventions that have been shown to increase the risk of development of VAP.
20. Describe the sequence of events that are typically associated with the pathogenesis of VAP.
21. Discuss how ventilator bundles can be used to prevent VAP and the emergence of MDR pathogens in the clinical setting.



## Part III: Grading and Assessment

### EVALUATION OF REQUIRED COURSE MEASURES/ARTIFACTS\*

Students' performance will be assessed and the weight associated with the various measures/artifacts are listed below.

Competency Areas:

Noninvasive Ventilator Setup

Noninvasive Ventilator Check

Mechanical Ventilator Setup

Routine Ventilator Check

### EVALUATION\*

Homework/Quizzes/Skills/Projects	15%
Test	60%
Final Exam	25%
	100%

***\*Students, for the specific number and type of evaluations, please refer to the Instructor's Course Information Sheet.***

Late Assignments:

1. A maximum of one (1) scheduled exam may be made up at the discretion of the course instructor. Any subsequently missed exams will receive a grade of 0.
2. Makeup examinations will be taken in the testing center on campus or a location designated by the instructor.
3. A 10% overall deduction will be applied to the makeup examination score for missed examinations unless faculty are notified in advance (more than 12 hours) or medical documentation is provided.
4. Late homework assignments will have a deduction of ten points of the total assignment grade.
5. Quizzes cannot be made up if you are absent from class a grade of zero (0) will be assigned.
6. Each student must demonstrate safety and competence in required laboratory skill check assessments and laboratory competency practical examinations. Each course with a laboratory component includes skill check assessments that must be mastered within the course.

Lab Competency and Skill Check Assessment:

The student is required to successfully complete each skill check assessment for the course prior to the final laboratory competency practical examination or per the instructor's schedule. Three attempts can be made to pass the lab competencies and skill check. The course instructor will announce the due date of the skill check assessments in the course calendar informational sheet.

Summary Performance Evaluation

The following will be used to evaluate the clinical/lab performance:

Satisfactory – Completion of first attempt (85-100%) Performed procedure accurately or was able to correct performance without injury to the patient or decreasing effect of therapy being given.

Each competency and skill check are considered a pass/fail. If a student makes less than 85% on the first attempt. The student may repeat the competency/skill check two additional times after the first attempt.

Unsatisfactory performance – Completion of first attempt (less than <85%). Requires remediation under the following categories.

- The psychomotor portion of the performance evaluation is a pass/fail grading criterion. After a student's second attempt, if the student does not pass the physical portion with an 85% or greater. Failure of the physical portion of the course will result in failure of the course.
- Failure to complete a critical skill after the second attempt within the psychomotor evaluation will also result as a failure of the course.

### **GRADING SYSTEM:**

State the College's or departmental grading system as delineated in the Catalog. Please note the College adheres to a 10 point grading scale A = 100 – 90, B = 89- 80, C = 79 – 70, D = 69 – 60, F = 59 and below. You must have your Dean's approval if changes in the scale are made.

Grades earned in courses impact academic progression and financial aid status. Before withdrawing from a course, be sure to talk with your instructor and financial aid counselor about the implications of that course of action. Ds, Fs, Ws, WFs and Is also negatively impact academic progression and financial aid status.

The Add/Drop Period is the first 5 days of the semester for **full term** classes. Add/Drop periods are shorter for accelerated format courses. Please refer to the academic calendar for deadlines for add/drop ([ACADEMIC CALENDAR](#)). You must attend at least one meeting of all of your classes during that period. If you do not, you will be dropped from the course(s) and your Financial Aid will be reduced accordingly.

A grade of "C" or better must be achieved in all required respiratory care program courses for a student to progress through the program. A final grade of less than 75 is not passing in the Respiratory Care Program and does not meet the requirements for progression within the program. This policy is different than the Horry Georgetown Technical College Grading Policy.

### GRADING SCALE:

100-90 = A

89-80 = B

79-75 = C

74-69 = D

68 - 0 = F

Each student must demonstrate safety and competence in required laboratory skill check assessments and laboratory competency practical examinations. Each course with a laboratory component includes skill check assessments that must be mastered within the course.

## Part IV: Attendance

Horry-Georgetown Technical College maintains a general attendance policy requiring students to be present for a minimum of 80 percent (80%) of their classes in order to receive credit for any course. Due to the varied nature of courses taught at the college, some faculty may require up to 90 percent (90%) attendance. Pursuant to 34 Code of Federal Regulations 228.22 - Return to Title IV Funds, once a student has missed over 20% of the course or has missed two (2) consecutive weeks, the faculty is obligated to withdraw the student and a student may not be permitted to reenroll. **Instructors define absentee limits for their class at the beginning of each term; please refer to the Instructor Course Information Sheet.**

Attendance for Face-to-Face Courses:

For a 15-week course (fall and spring) the allowed number of absences for a M only class is as follows: 3 absences are allowed regardless of reason. After the allowed number of misses, the student will be dropped from the course with a W or a WF.

For a 15-week course (fall and spring) the allowed number of absences for a MW class is as follows: 6 absences are allowed regardless of reason. After the allowed number of misses, the student will be dropped from the course with a W or a WF.

A tardy is given if the student arrives ten minutes after class starts or before class ends. Three tardies are equivalent to one absent.

## Part V: Student Resources



### The Student Success and Tutoring Center (SSTC)

The SSTC offers to all students the following **free** resources:

- 1. Academic coaches** for most subject areas, **Writing Center Support**, and **college success skills**.
- 2. On-line student success and academic support resources.**

Visit the SSTC website: [Student Success & Tutoring Center](#) and visit the student services tab in your WaveNet account to schedule appointments using TutorTrac. For more information, call: SSTC

Conway, 349-7872; SSTC Grand Strand, 477-2113; and SSTC Georgetown, 520-1455 or go to the [Online Resource Center](#) to access on-demand resources any time.



## Student Information Center: WaveNet Central (WNC)

WNC offers to all students the following **free** resources:

2. **Getting around HGTC:** General information and guidance for enrollment!
3. Use the [Online Resource Center \(ORC\)](#) for COMPASS support, technology education, and online tools.
4. **Drop-in technology support or scheduled training** in the Center or in class.
5. **In-person workshops, online tutorials and more services** are available.

Visit the WNC website: [Wavenet Central](#). Live Chat and Center locations are posted on the website. Or please call one of the following locations: WNC Conway, 349-5182; WNC Grand Strand, 477-2076; and WNC Georgetown, 520-1473.

## Student Testing: (If course is offered in multiple format include this section, delete if only F2F sections are offered.)

Testing in an **online/hybrid** course may be accomplished in a variety of ways:

- Test administered within D2L
- Test administered in writing on paper
- Test administered through Publisher Platforms

Further more tests may have time limits and/or require a proctor.

Proctoring can be accomplished either face-to-face at an approved site or online through RPNOW, our online proctoring service. To find out more about proctoring services, please visit the [Online Testing](#) section of the HGTC's Testing Center webpage.

The **Instructor Information Sheet** will have more details on test requirements for your course.

## Disability Services:

HGTC is committed to providing an accessible environment for students with disabilities. Inquiries may be directed to Beth Havens, Director of Student Development on the Conway Campus Jaime Davis, Counselor/Advisor on the Georgetown Campus or Kristin Griffin, Counselor on the Grand Strand Campus. These individuals will review documentation of the student's disability and, in a confidential setting with the student, develop an educational accommodation plan.

Note: It is the student's responsibility to self-identify as needing accommodations and to provide acceptable documentation. After a student has self-identified and submitted documentation of a

disability, accommodations may be determined, accepted, and provided.

## Statement of Equal Opportunity/Non-Discrimination Statement

Horry-Georgetown Technical College prohibits discrimination and harassment, including sexual harassment and abuse, on the basis of race, color, sex, national or ethnic origin, age, religion, disability, marital or family status, veteran status, political ideas, sexual orientation, gender identity, or pregnancy, childbirth, or related medical conditions, including, but not limited to, lactation in educational programs and/or activities.

Inquiries regarding the non-discrimination policies: Students and prospective student inquiries concerning Section 504, Title II, and Title IX and their application to the College or any student decision may be directed to the Vice President for Student Affairs, Dr. Melissa Batten, VP Student Affairs, Title IX Coordinator, Building 1100, Room 107A, Conway Campus, PO Box 261966, Conway, SC 29528-6066, 843-349-5228, [Melissa.Batten@hgtc.edu](mailto:Melissa.Batten@hgtc.edu). Employee and applicant inquiries concerning Section 504, Title II, and Title IX and their application to the College may be directed to the Vice President for Human Resources, Jacquelyne Snyder, VP Human Resources, Section 504, Title II, and Title IX Coordinator, Building 200, Room 212A, Conway Campus, PO Box 261966, Conway, SC 29528-6066, 843-349-5212, [Jacquelyne.Snyder@hgtc.edu](mailto:Jacquelyne.Snyder@hgtc.edu).

### Title IX Requirements

All students (as well as other persons) at Horry-Georgetown Technical College are protected by Title IX—regardless of their sex, sexual orientation, gender identity, part- or full-time status, disability, race, or national origin—in all aspects of educational programs and activities. Any student, or other member of the college community, who believes that he/she is or has been a victim of sexual harassment or sexual violence may file a report with the college’s Chief Student Services Officer, campus law enforcement, or with the college’s Title IX Coordinator, or designee.

\*Faculty and Staff are required to report incidents to the Title IX Coordinators when involving students. The only HGTC employees exempt from mandatory reporting are licensed mental health professionals (only as part of their job description such as counseling services).

<b>Inquiries regarding the non-discrimination policies:</b>	
Student and prospective student inquiries concerning Section 504, Title II, and Title IX and their application to the College or any student decision may be directed to the Vice President for Student Affairs.	Employee and applicant inquiries concerning Section 504, Title II, and Title IX and their application to the College may be directed to the Vice President for Human Resources.
<b>Dr. Melissa Batten, VP Student Affairs</b> <i>Title IX Coordinator</i>  Building 1100, Room 107A, Conway Campus PO Box 261966, Conway, SC 29528-6066	<b>Jacquelyne Snyder, VP Human Resources</b> <i>Section 504, Title II, and Title IX Coordinator</i>  Building 200, Room 212A, Conway Campus PO Box 261966, Conway, SC 29528-6066

**Inquiries regarding the non-discrimination policies:**

843-349-5228

[Melissa.Batten@hgtc.edu](mailto:Melissa.Batten@hgtc.edu)

843-349-5212

[Jacquelyne.Snyder@hgtc.edu](mailto:Jacquelyne.Snyder@hgtc.edu)