HORRY GEORGETOWN TECHNICAL COLLEGE

INSTRUCTIONAL PACKAGE

RES 141

RESPIRATORY SKILLS III

Effective Term

Summer/2018

INSTRUCTIONAL PACKAGE

Part I: Course Information

EFFECTIVE TERM: Summer 2018 (201730)

COURSE PREFIX: RES 141 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:

General Education courses BIO 210, 211, 225, MAT 120, ENG 101, PSY 201, and HUM. Respiratory Care Program first semester courses RES 101, RES 121, RES 246, and RES 152. *Required prerequisite courses must be completed with a grade of "C" or better.*

REQUIRED MATERIALS:

Kacmarek, R.M., Stoller, J.K., & Heuer, A.H. (2017). Egan's Fundamentals of Respiratory Care (11th ed). St. Louis, MO: Elsevier/Mosby. ISBN: 9780323341363

Kacmarek, R.M., Stoller, J.K., & Heuer, A.H. (2017). Egan's Fundamentals of Respiratory Care (11th ed). St. Louis, MO: Elsevier/Mosby. ISBN: 9780323358521

Cairo, J. M. (2016). Pilbeam's Mechanical Ventilation (6th 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.

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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:
- Please set all devices to 'silent' or 'vibrate' during instructional time.
- Use of devices during testing is NOT allowed.
- Please limit use of devices to urgent personal connections and educational purposes directly related to the course material being discussed.
- 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.
- 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.
- **When on clinical rotations, students are expected to abide by the policies of that institution.**

PLAGIARISM & CHEATING:

Refer to the College catalog & Student handbook 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:

- List in writing and verbally the ability to identify the pressure gradients created during normal spontaneous breathing, positive and negative pressure ventilation and their effects on the cardiopulmonary system.
- Describe in writing and verbally the factors relating to goals, indications, and contra-indications, hazards of mechanical ventilation.
- Explain how hemodynamics, diffusion, oxygenation, ventilation, and acid base balance can be affected by ventilator settings.
- Demonstrate the ability to perform initial ventilator set-up, patient ventilator assessment, identify the ventilator graphic waveforms, and their related importance to patient ventilator care.

- Perform mathematical calculations to initially set, then evaluate and monitor a patient on mechanical ventilation by making ventilator adjustments based on arterial blood gas values, lung compliance, airway resistance, and optimal PEEP levels.

Lab/Lecture I
Material Covered: Mechanical Ventilation History
Basic Terms and Concepts of Mechanical Ventilation Chapter 1 Pilbeam
How Ventilators Work Chapter 2
How a Breath is Delivered Chapter 3
Assessments:
Case Study
Skill Check Assessment/Laboratory Competency
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 typos 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.

Lab/Lecture II
Material Covered: Adult Critical Care
Establishing the Need for Mechanical Ventilation Chapter 4
Final Considerations for Ventilator Setup Chapter 7
Respiratory Failure and the Need for Ventilatory Support Chapter 44 Egan's
Mechanical Ventilators Chapter 45
Patient-Ventilator Interactions Chapter 47
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Assessments:
Case Study
Skill Check Assessment/Laboratory Competency
Exam
Learning Outcomes: (Psychomotor-Skills)

1. Differentiate between acute respiratory failure (ARF) and respiratory insufficiency.
2. 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.
3. Recommendations fractional inspired oxygen concentration (FIO2) settings when initiating mechanical ventilation.
4. Describe the use of sigh breaths.
5. List actions for necessary for final ventilator setup.
6. Explain the use of extrinsic positive end-expiratory pressure (PEEP).
7. Calculation of desired FIO2 and current partial pressure of arterial oxygen (PAO2) and FIO2 values.
8. 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.
9. Define a mechanical ventilator.
10. Differentiate between automatic and mechanical resuscitators.
11. Describe the key design features of mechanical ventilators.
12. Describe the operating characteristics of mechanical ventilators used along the continuum of care.
13. List the three main goals of mechanical ventilator support.
14. Discuss the reasons why appropriate patient-ventilator interactions are critical to ensuring safe and effective mechanical ventilation.
15. Discuss synchronous and asynchronous mechanical ventilation.

Lab/Lecture III
Material Covered: Continuous Mechanical Ventilation
Initial Ventilator Settings Chapter 6
Initiating and Adjusting Invasive Ventilatory Support Chapter 48
Assessments:
Case Study
Skill Check Assessment/Laboratory Competency
Exam
Learning Outcomes: (Affective-Behavior)

1. Calculate tubing compliance and volume loss.
2. Calculate minute ventilation given a patient's respiratory rate and tidal volume.
3. Calculate total cycle time, inspiratory time, expiratory time, flow in L/sec, and inspiratory-to-expiratory ratios given the necessary patient data.
4. Evaluate proper ventilator settings based on the patient's lung pathology, body temperature, metabolic rate, altitude, and acid-base balance.

5. Recommend the selection and initial settings for the various modes of pressure ventilation, including bi-level positive airway pressure, pressure support ventilation, pressure control ventilation, and Servo-controlled (dual modes) ventilation.
6. Recognize the presence of barotrauma or extra alveolar air based on patient assessment.
7. Name the types of ventilator-induced lung injury (VILI).
8. Compare the clinical findings associated with hyperventilation and hypoventilation.
9. Recommend ventilator settings for patients demonstrating hyperventilation and hypoventilation.
10. Describe clinical laboratory findings associated with metabolic acid-base disturbances.
11. Identify a patient with air-trapping.
12. Provide strategies to reduce auto-PEEP.
13. Suggest methods to reduce the work of breathing during mechanical ventilation.
14. List the possible responses to an increase in mean airway pressure in a ventilated patient.
15. Describe the currently available modes of mechanical ventilation.
16. Explain how to adjust the ventilator on the basis of the patient's response.

Lab/Lecture IV
Material Covered: Ventilator Implementation
Methods to Improve Ventilation in Patient-Ventilator Management Chapter 12
Ventilator-Associated Pneumonia Chapter 14
Troubleshooting and Problem Solving Chapter 18
Basic Concepts of Noninvasive Positive-Pressure Ventilation Chapter 19
Noninvasive Ventilation Chapter 49
Assessments:
Case Study
Skill Check Assessment/Laboratory Competency
Exam
Learning Outcomes:

1. Calculate the appropriate suction catheter size, length, and amount of suction pressure needed for a specific size endotracheal tube and patient.
2. Compare the benefits of closed-suction catheters to the open-suction technique.
3. List the pros and cons of instilling normal saline to loosen secretions before suctioning.
4. List the clinical findings that are used to establish the presence of a respiratory infection.
5. Describe the use of MDI and small-volume nebulizers during mechanical ventilation.
6. Describe complications associated with using small-volume nebulizers powered by external flowmeters during mechanical ventilation.
7. Discuss the importance of patient-centered mechanical ventilation in the treatment of critically ill patients.
8. Discuss the complications associated with the in-house transport of a mechanically ventilated patient.
9. Define ventilator-associated pneumonia (VAP) and hospital acquired pneumonia (HAP), the onset, prognosis, most common pathogenic microorganisms, and list modalities to treat VAP.
10. Identify types of technical problems encountered during mechanical ventilation of critically ill patients, and describe the steps that can used to protect a patient when problems occur.

11. Explain the correct procedure for determining whether a problem originates with the patient or with the ventilator during patient-ventilator asynchrony.
12. Recognize abnormalities in ventilator graphics and patient response in the event of inadequate gas flow delivery to a patient.
13. Identify the causes and potential problems related to electrolyte imbalances and their causes.
14. Identify a problem associated with an artificial airway or a mask used for noninvasive positive pressure ventilation.
15. Define noninvasive ventilation, indications, contraindications, benefits, modes of ventilation, and equipment used.
16. Identify indicators of success for patients on NIV.
17. Describe concepts to weaning the patient from NIV.

Lab/Lecture V
Material Covered: Ventilation Monitoring
Initial Patient Assessment Chapter 8
Ventilator Graphics Chapter 9
Assessments:
Case Study
Skill Check Assessment/Laboratory Competency
Exam
Learning Outcomes:

1. Identification of various pathophysiological conditions that alter a patient's transairway pressure, peak pressure, and plateau pressure.
2. 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.
3. Determine whether a lung compliance or resistance problem is present, using ventilator data.
4. Detect a cuff leak by listening to breath sounds.
5. Provide respiratory quotient (QR).
6. Discuss utilization of metabolic monitoring in critically ill patients.
7. Briefly describe devices that are used to measure airway pressures, volumes, and flows during mechanical ventilation.
8. Calculate mean airway pressure, dynamic compliance, static compliance, and airway resistance.
9. Compare the effects of spontaneous and mechanical ventilation breathing on hemodynamic values.
10. Identify ventilator variables and ventilator parameters and their values from flow-volume and pressure-volume loops.
11. 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.
12. Determine the presence of auto-PEEP using ventilator graphics.
13. Explain the phases of ventilation during airway pressure release ventilation (APRV) using pressure and flow scalars.

Lab/Lecture VI
Material Covered: Ventilator Weaning
Weaning and Discontinuation from Mechanical Ventilation Chapter 20
Long-term Ventilation and Noninvasive Positive Pressure Ventilation Chapter 21
Assessments:
Case Study
Skill Check Assessment/Laboratory Competency
Exam
Learning Outcomes:

1. List weaning parameters and acceptable values for ventilator discontinuation.
2. Compare three standard modes of weaning in relation to their success in discontinuing ventilation.
3. Describe criteria used to determine whether a patient is ready for extubation.
4. Recognize post extubation difficulties from a clinical case description.
5. Recommend appropriate treatment for post-extubation difficulties.
6. Discuss various therapist driven protocols and their success.
7. Discuss the fail to wean criteria and long-term care.

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.

COMPETANCY AREAS

Mechanical Ventilator
Hemodynamic Monitoring
Patient Assessment
Mathematical Calculations
Artificial Airways
Noninvasive Ventilation
Extubation and Weaning on Ventilator

EVALUATION*

Quizzes/Homework	10%
Case Study	15%
Test	50%
Final Exam	25%
	100%

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.

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.

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. The course instructor will announce the due date of the skill check assessments in the course calendar informational sheet. Failure to complete a skill check assessment will not allow the student to complete the laboratory competency practical examination, which will result in failure of the course.

Laboratory Competency Practical Examination

A minimum of 75% and all critical elements must be achieved to pass the laboratory competency practical examination. Three attempts will be given for the competency. Repeat competency will be awarded a maximum of 75%. Students will only be allowed to try the competency one time per day. Failure to pass the competency within three (3) attempts will result in repeat of the failed course.

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.
- **Unsatisfactory performance** – Completion of first attempt (less than <85%. Requires remediation under one of the following categories.
  - The psychomotor portion of the performance evaluation is a pass/fail grading criteria. 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:

A grade of "C" or better must be achieved in all required respiratory care program courses in order 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.

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.

GRADING SCALE:

100-90 = A

89-80 = B

79-75 = C

74-69 = D

68-0 = F

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.

Part IV: Attendance

Horry-Georgetown Technical College maintains a general attendance policy requiring students to be present for a minimum of eighty percent (80%) of his or her classes in order to be eligible to receive credit for any course. However, due to the varied nature of courses taught at the College, a more rigid attendance policy may be required by individual instructors. At a minimum, a student may be withdrawn from a course(s) after he or she has been absent in excess of ten percent (20%) of the total contact hours for a course. **Instructors define absentee limits for their class at the beginning of each term; please refer to the Instructor Course Information Sheet.**

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. Room locations and Live Chat is available on the SSTC website.

Student Information Center: WaveNet Central (WNC)

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

1. **Getting around HGTC**: General information and guidance for enrollment!
2. Use the **Online Resource Center (ORC)** for COMPASS support, technology education, and online tools.
3. **Drop-in technology support or scheduled training** in the Center or in class.
4. **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.

Disability Services

HGTC is committed to providing an accessible environment for students with disabilities. Inquiries may be directed to Jocelyn Williams, 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, gender, national or ethnic origin, age, religion, disability, marital status, veteran status, sexual orientation, gender identity, or pregnancy in educational programs and/or activities.

Title IX Requirements

Horry Georgetown Technical College prohibits the offenses of domestic violence, dating violence, sexual assault, and stalking. Any student who believe he or she has experienced or witnessed discrimination including sexual harassment, domestic violence, dating violence, sexual assault or stalking is encouraged to report such incidents to one of the College's Title IX Coordinators.

*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).

Inquiries regarding the non-discrimination policies:	
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 Associate 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 Associate Vice President for Human Resources.
Dr. Melissa Batten, AVP 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	**Jacquelyne Snyder, AVP 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