Chattanooga State Community College  
Chattanooga, Tennessee  
Nursing and Allied Health Division-Respiratory Care  
Course Syllabus  
RC 213 Fundamentals of Respiratory Care  
Class Hours: 3  
Credit Hours: 3  
Laboratory Hours: 0

Course Description: RC 213 consists of advanced respiratory therapy topics including fluid and electrolyte balance, special topics in mechanical ventilation, effects of specific diseases on respiratory function, hemodynamics and new techniques in respiratory care.

Entry Level Standards: Advancement to Semester VI in the Respiratory Care Program.

Prerequisites: RC 212, 221, 242, 243

Corequisites: RC 222

Textbooks: Later referred to as
Pilbeam  Mechanical Ventilation, 4th ed.
Hess & Kacmarek  Essentials of Mechanical Ventilation, 2nd ed.
Wilkins  Clinical Assessment in Respiratory Care, 5th ed.

Course Delivery Format: Standard
1. Lecture
2. Audiovisual aids, including transparencies and videos
3. Instructor prepared class handouts

Instructor:
Sharon Hall
Office hours are announced during the first class and posted on the office door.
Appointments can be made.
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Revised November 2009
Respiratory Care Program Student Learning Outcomes (PSLO) and Course Student Learning Outcomes (CSLO)

PSLO #1: Show the ability to interpret, comprehend, apply and evaluate patient data and clinical information relative to their role as an Advanced-Level Respiratory Therapist.
- CSLO #1: Explain the placement, function and uses of a pulmonary artery catheter.
- CSLO #2: Analyze and interpret hemodynamic values as part of patient assessment.
- CSLO #3: Explain SvO2 monitoring and interpret patient results.
- CSLO #4: State the causes, treatments, symptoms and pulmonary effects of cardiovascular failure.
- CSLO #5: Identify the basic indications and initial settings for mechanical ventilation with patients with various pre-existing lung diseases.
- CSLO #6: Explain the different types of pulmonary injuries that can occur with chest trauma and its treatment.
- CSLO #7: Explain the different types of pulmonary injuries that can occur with burns and smoke inhalation and the treatments for both.
- CSLO #8: Describe some common rapid-onset and gradual onset neuromuscular diseases and their pulmonary effects and treatments.
- CSLO #9: Describe the symptoms, pulmonary effects, treatments and complications that can occur with asthma.
- CSLO #10: Anticipate complications and recommend respiratory treatment for drug overdose patients.
- CSLO #11: Know normal and critical values for the most common blood components and electrolytes.
- CSLO #12: State common causes for head injuries, what clinical signs and pressures are monitored, and common respiratory treatments for head injuries.
- CSLO #13: Anticipate which post-operative patients are at risk for complications and interventions which can be performed.
- CSLO #14: Describe the physiological changes, clinical signs and treatments that are associated with Adult Respiratory Distress Syndrome.
- CSLO #15: Describe the physiological changes, clinical signs and treatments that are associated with Chronic Pulmonary Disease.
- CSLO #16: Describe basic mechanical ventilation weaning techniques and assess patient tolerance of weaning.
- CSLO #17: Explain the operation and application of basic and advanced mechanical ventilator modes, such as APRV, ATC, autoflow, and PRVC.

PSLO #2: Demonstrate the proficiency in all the mechanical and physical skills necessary to fulfill their role as an Advanced-Level Respiratory Therapist.
This PSLO is not addressed in this course.
PSLO --3). Demonstrate behaviors and attitudes consistent with professional and employer expectations for an Advanced-Level Respiratory Therapist. This PSLO is not addressed in this course.

PSLO-4) Provide the community with qualified individuals who can meet current and future needs of the workplace as respiratory therapists. This PSLO is not addressed in this course.

Student Indicators

For CSLO #1
1) When given a diagram of a pulmonary artery catheter, label each portion and indicate its correct position in the heart or lungs.
2) Know the normal values for cardiac output, cardiac index, pulmonary artery pressures, pulse pressure, stroke volume, systemic blood pressure, pulmonary wedge pressure, systemic vascular resistance, pulmonary vascular resistance, and central venous pressure. Calculate MAP, PAP, SVR, PVR, cardiac output, and cardiac index.
3) Define preload, afterload, ventricular contractility, Frank-Starling law, capacitance vessels, resistance vessels, distribution vessels, and change vessels.
4) Explain the three methods of determining cardiac output.
5) Identify the waveforms created during the placement of a pulmonary artery catheter.

For CSLO #2
1) Explain what conditions and drugs can increase/decrease systemic vascular resistance and pulmonary vascular resistance.
2) Compare perfusion and circulation evaluate patient for each.
3) Describe hemodynamic changes caused by the application of mechanical ventilation or PEEP.
4) Give examples of clinical conditions that might cause changes in CVP, PWP, blood pressure, pulmonary hypertension and systemic hypertension.

For CSLO #3
1) Describe how SvO2 monitoring is done and where it is measured.
2) Analyze changes in SvO2 to determine possible causes and treatments.

For CSLO #4
1) Explain the causes and clinical signs for congestive heart failure.
2) State the physiologic changes that occur with cor pulmonale.
3) Compare the similarities and differences between cardiogenic and noncardiogenic pulmonary edema.
4) Describe the clinical signs and symptoms of pulmonary edema.
5) Analyze a patient scenario and identify whether the patient has left ventricular failure, right ventricular failure, or noncardiogenic pulmonary edema.
6) Identify signs and symptoms of left ventricular failure.
7) Describe respiratory therapy treatments for cardiovascular failure.

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8) Explain the indications for mechanical ventilation and PEEP in cardiovascular failure.
9) Describe the techniques used in weaning congestive heart failure patients from mechanical ventilation and PEEP.

For CSLO #5
1) State the four basic indications for mechanical ventilation and recognize clinical examples.
2) Give the appropriate ventilator settings for patients with COPD, restriction and normal.
3) Identify safety precautions taken with the use of 100% O2 and maximum peak pressures.

For CSLO #6
1) State the types of chest injuries that can occur with blunt trauma and with penetrating trauma.
2) Describe the clinical signs of a flail chest and the treatment protocol for it.
3) Define barotrauma and explain risk factors for developing it.
4) Describe the three types of pneumothorax; simple, tension and open.
5) State the early and late clinical signs of a tension pneumothorax.
6) Compare the signs of a pneumothorax which occur with volume-cycled ventilation and pressure-cycled ventilation.
7) Analyze different patient scenarios to identify different types of barotrauma.
8) Explain the indications for mechanical ventilation with a patient with chest trauma.
9) Give the appropriate ventilator settings used for patients with chest trauma.
10) Explain the clinical signs and symptoms of pulmonary embolus.

For CSLO #7
1) State the clinical predictors of inhalation injury.
2) Describe the types of pulmonary complications that can happen at different stages of injury.
3) Explain other potential respiratory complications that can result from burns.
4) Describe the three types of inhalation injury and what problems can result from each.
5) Identify the treatments necessary for the three types of inhalation injury.
6) Describe the effects smoke inhalation has on the upper and lower respiratory tract.
7) Explain the problems carbon monoxide poisoning causes and how it is identified.
8) Describe how a typical blood gas for a burn patient would look.
9) State the treatment used for carbon monoxide poisoning and how long it is used.
10) State the indications for mechanical ventilation on a burn patient.
11) Describe how a burn patient should be monitored.
12) Explain the unique problems that exist with pulse oximetry monitoring on a burn patient.

For CSLO #8
1) Define rapid onset and gradual onset neuromuscular disease and give examples of each.
2) Explain the indications for mechanical ventilation in patients with neuromuscular disease.
3) Describe ventilator settings which are appropriate for normal lungs and restricted lungs.
4) State the different monitoring needs of neuromuscular disease patients.
5) Explain the weaning techniques used for patients with neuromuscular diseases.
6) Know the common clinical signs and symptoms of Guillain-Barre and myasthenia gravis.
7) Define myasthenic crisis, cholinergic crisis, dysphagia, ptosis and diplopia.

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8) Compare how myasthenic crisis and cholinergic crisis and differentiated and treated.
9) State the uses for the drugs Tensilon and Neostigmine.

For CSLO #9
1) List some common symptoms of asthma.
2) Describe the some unique characteristics of an acute, severe asthma attack.
3) Explain the changes that occur in breath sounds, spirometry and work of breathing during a worsening asthma attack.
4) Describe the indications, settings and risks of mechanical ventilation for an asthmatic patient.
5) By analyzing arterial blood gases, label an asthmatic attack as early, later and late stages.
6) Explain the unique problems which may arise while mechanically ventilating an asthmatic.
7) Define permissive hypercapnia.
8) Explain the uses and physiologic effects of permissive hypercapnia.
9) Describe the indications, techniques and hazards for weaning an asthmatic patient.
10) Explain the risk factors, hazards and clinical signs of autoPEEP.
11) Describe the use of heliox in treating asthmatic patients.

For CSLO #10
1) State the complications of drug overdose that particularly concern respiratory therapists.
2) Explain indications and appropriate settings for mechanical ventilation of drug overdoses.
3) State some unique respiratory problems can occur with different classes of drugs.
4) Compare the indications for intubation versus indications for mechanical ventilation.

For CSLO #11
1) State the normal blood values for the following (male and female values) hemoglobin, hematocrit, platelets, white blood cells, sodium, chloride, and potassium.
2) Explain the types of white blood cells and the percentage each sub-type makes up of the total.
3) Define the following: cation, anion, electrolytes, erythrocyte, erythropoiesis, plasma, serum, hematocrit, eosinophils, platelets, polymorphonuclear neutrophils, basophils, neutrophils, mononuclear monocytes and leukocytes, granulocytes, megakaryocytes, differential count, hemolysis, phagocytosis, crystalloid, third-space fluid and osmotic pressure.
4) Explain what effect hypoventilation and hyperventilation have on electrolyte balance.
5) Describe how the kidney chooses what electrolytes to preserve and which to release, particularly the relationship between chloride and bicarbonate.
6) Describe how intracellular and extracellular fluids differ in electrolyte concentration and volumes.

For CSLO #12
1) Identify some common causes of head injuries,
2) Explain the significance of intracranial pressure (ICP), list normal and critical values and how it is measured.
3) Describe clinical signs of increased intracranial pressure.
4) Explain which respiratory therapy procedures can increase or decrease intracranial pressure.
5) Define neurogenic pulmonary edema, including causes, symptoms and treatments.

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6) Give examples of appropriate mechanical ventilator settings for head injury patients.
7) Explain iatrogenic hyperventilation, how it is performed and why it works.

For CSLO #13
1) Describe the pulmonary effects caused by thoracic or abdominal surgeries.
2) Analyze arterial blood gases and clinical signs to determine when a post-operative patient needs mechanical ventilatory support.
3) Explain what ventilator settings should be used for normal patients, COPD patients and restrictive patients.
4) Explain how hypothermia affects blood gases and ventilator settings.
5) Describe the weaning procedures used for post-operative patients.

For CSLO #14
1) Identify 15-20 potential causes for Adult Respiratory Distress Syndrome (ARDS)
2) Describe the types of pulmonary changes that take place in ARDS.
3) Explain the two phases of ARDS and the unique characteristics of each.
4) Apply the “Guidelines for the Management of Oxygenation in ARDS” to a patient scenario.
5) Describe the weaning procedures used for ARDS patients.
6) State the other medical complications that can occur with ARDS,
7) Apply the indications for performing CPAP and mechanical ventilation to any given patient.

For CSLO #15
1) List some common problems which can lead to increased work of breathing in chronic obstruction pulmonary disease (COPD) patients.
2) Describe some common non-respiratory complications which are common in COPD.
3) Give the appropriate mechanical ventilator settings for these patients.
4) Define auto-PEEP, describe how it is identified and how it can be treated.
5) Analyze arterial blood gases from COPD patients and label them acceptable or unacceptable.
6) Develop appropriate mechanical ventilator settings when given arterial blood gas values.
7) Describe paradoxical breathing.

For CSLO #16
1) Describe, in detail, the basic techniques used in weaning with the t-piece, SIMV and pressure support methods.
2) Describe advantages and disadvantages of each type of weaning technique.
3) Evaluate all relevant factors and conditions to determine appropriateness of extubation.
4) Assess those patients undergoing weaning techniques for tolerance of procedures.
5) Describe how each of the following modes and techniques operate, which types of patients are candidates for these, and how to evaluate patients’ progress.
   a) Autoflow
   b) Automatic tube compensation (ATC)
   c) Pressure regulated volume control mode (PRVC)
   d) Airway pressure release ventilation (APRV)
e) Rise time

**Required Assessments:**

**Assessment Names and Descriptions:**

**Test #1:** Student must describe mechanical ventilation weaning techniques, evaluate and assess patient tolerance, describe the operation of, and indications for, advanced ventilator modes.

**Test #2:** Student must explain respiratory therapy procedures specifically needed for the care of persons with congestive heart failure, neuromuscular disease, chest trauma and burns.

**Test #3:** Covers clinical changes and specific, necessary respiratory procedures needed for patients with chronic pulmonary disease, ARDS, asthma, and ventilator lung complications.

**Test #4:** Covers the respiratory care needed for head injuries and drug overdoses, laboratory and electrolyte tests for respiratory patients and the interpretation of mechanical ventilation graphics.

**Final Exam:** Covers hemodynamics and equipment, objectives from class tests #1-4.

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**III Instructional Activities**  
Week/Topic

A systemic and orderly list of activities and/or events that will comprise the total allotted time for the course in the classroom.

**Week I**  
Review of Classic Ventilator Modes/Settings, Intro to New Modes, etc.  
_Hess_ 44, 46-48, 51-54, 55  
Points to Remember, handouts, Pilbeam

**Week II**  
(New and review pages) 35-37, 44-47, 51-54, 87-97, 109, 121-123 448 -449  
New Ventilator mode -APRV  
Pilbeam 57, 99, 550 -555  
_Hess_ 53-54

**Week III**  
Weaning from mechanical ventilation: Chapter 20  
Pilbeam 444-464

**Week IV**  
Weaning continued, Cardiovascular Failure  
_Hess_ 190-195, handouts

**Week V**  
Test # 1, Neuromuscular Disease, handouts  
_Hess_ 182-189

**Week VI**  
Chest Trauma, Burns/Smoke Inhalation,  
_Hess_ 205-213, 159-165, handout,  
Asthma, pg. 196-203

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Week VII  Ventilator Induced Lung Injury, Initial Settings Hess 16-24, 105-111,113-120
Test # 2

Week VIII  COPD, ARDS assessment and treatments, Hess 139-147, 149-158,

Week IX  Drug Overdose Hess 226-229, Head Injury Hess 166-174, 222-226

Week X  Test # 3, Mechanical Ventilator Graphics Wilkins 270-275, Hess 271-283,

Week XI Mechanical Ventilator Graphics and interpretation, continued

Week XII Electrolyte, Special Procedures & lab tests, Wilkins 96-117

Week XIII Hemodynamics Wilkins 291-308, Cardiac Output handouts Wilkins 312-330, handout

Week XIV  Test # 4, Hemodynamics continued

Week XV  Hemodynamics continued, Final Review, Finals Week Comprehensive Final, see College Finals schedule

IV Grading Scale (per college)
A = 90-100
B = 80-90
C = 70-79
D = 65-69 (see Respiratory Care program retention policy)
F = 64 or less

V Assessment and Grading:
Test material will come from text reading, handouts and class lectures and activities. The student is responsible for material assigned in texts, but not presented in class. All tests may be comprehensive. Each test must be passed with a minimum grade of 75. Any test below a 75 must be retaken within ten days to achieve a 75 or better. On a retest, the original grade or a 70, whichever is higher, will be used to calculate the class average. Only one retest will be given for any specific exam.

Only two tests may be retaken during the semester. A 75 on every test (or retake) is required to pass the course, regardless of the overall average. A grade of 70 or better is required on the final. A grade less than 70 on the final exam will result in a grade of D or F. There will be

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no retest on the final.

4 Objective Tests = 80%
Comprehensive Final = 20%
100%

VI College Policies
This class is governed by the policies and procedures stated in the current Chattanooga State Student Handbook. Additional or more specific guidelines may apply.

ADA Statement
Students who have educational, psychological, and/or physical disabilities may be eligible for accommodations that provide equal access to educational programs and activities at Chattanooga State. These students should notify the instructor immediately, and should contact Disabilities Support Services within the first two weeks of the semester in order to discuss individual needs. The student must provide documentation of the disability so that reasonable accommodations can be requested in a timely manner. All students are expected to fulfill essential course requirements in order to receive a passing grade in a class, with or without reasonable accommodations.

Disruptive Students
The term "classroom disruption" means student behavior that a reasonable person would view as substantially or repeatedly interfering with the activities of a class. A student who persists in disrupting a class will be directed by the faculty member to leave the classroom for the remainder of the class period. The student will be told the reason(s) for such action and given an opportunity to discuss the matter with the faculty member as soon as practical. The faculty member will promptly consult with the division dean and the college judicial officer. If a disruption is serious, and other reasonable measures have failed, the class may be adjourned, and the campus police summoned. Unauthorized use of any electronic device constitutes a disturbance. Also, if a student is concerned about the conduct of another student, he or she should please see the teacher, department head, or division dean.

Affirmative Action
A student who feels that he or she has not received equal access to educational programming should contact the college affirmative action officer.

Academic Integrity/Academic Honesty
In their academic activities, students are expected to maintain high standards of honesty and integrity. Academic dishonesty is prohibited. Such conduct includes, but is not limited to, an
attempt by one or more students to use unauthorized information in the taking of an exam, to submit as one’s own work, themes, reports, drawings, laboratory notes, computer programs, or other products prepared by another person, or to knowingly assist another student in obtaining or using unauthorized materials. Plagiarism, cheating, and other forms of academic dishonesty are prohibited. Students guilty of academic misconduct, either directly or indirectly through participation or assistance, are immediately responsible to the instructor of the class. In addition to other possible disciplinary sanctions, which may be imposed through the regular institutional procedures as a result of academic misconduct, the instructor has the authority to assign a “F” or zero for an activity or to assign an “F” for the course.

VII Instructor Policies

Attendance and Punctuality
Punctual attendance at all scheduled classes is expected. The final class grade will be reduced 1% for each unexcused absence (acceptable excuses are doctor’s excuse for illness, subpoena, jury duty, court orders) after the second absence. Students are responsible for signing attendance sheet. Final grade will be reduced ½ % for each tardiness (greater than 5 minutes) starting with the second tardy. The student is solely responsible for signing attendance logs. Notifying the instructor about an absence does not guarantee an “excused” absence.

Electronic Devices
The use of any electronic devices is at the discretion of the instructor. All electronic devices, including cell phones, beepers, MP3 players, and any similar devices, must be turned OFF during class, not just set to silent or vibrate. Students violating this policy, even if the device isn’t answered, will be asked to leave the classroom and will be recorded as absent for that day. Violation of this policy during an examination will result in a grade of “0” for that exam.

Cameras, tape recorders and video cameras may only be used with the specific permission of the instructor. Use of these devices must not interfere with the normal activities of the classroom. Laptop computers may only be used in class for note taking and classroom related activities. It must be operated in a totally silent manner.

Internet Access
Students will access “eLearn” on the Chattanooga State Tiger web site. The site for RC 213 will contain syllabi, test objectives, supplemental material, announcements and academic references. Each student is expected to access this site at least once a week and whenever he or she is notified of a new posting to the site by the instructor. Students may access several computer labs on campus including HSC 1002, which allows printing, and the Respiratory lab HSC 2057, when it is not in use.

Instructor: Sharon Hall
Office: HSC 2078
Office hours are announced at the beginning of the semester, appointments are available)
Telephone  423 697-4772  
E-mail: sharon.hall@chattanoogastate.edu  

The instructor reserves the right to modify this syllabus in writing during the course of the semester.

Student Acceptance of Policies

Revised November 2009
I have read all of the policies contained in the syllabus for Respiratory Care (RC) 213, understand them and agree to abide by them.

You must tear off this page and return it to the instructor by the second day of class.

Student Name (please print)

_____________________________________
Date____________________________

Signature

_____________________________________

Date____________________________