

**UNIVERSITY OF SOUTH ALABAMA
COLLEGE OF ALLIED HEALTH PROFESSIONS
DEPARTMENT OF CARDIORESPIRATORY CARE**

CRC 435 Critical Care Concepts
Fall 2017

3 semester hours

Description: This lecture course is a survey of issues to supplement the Cardiorespiratory Care curriculum to include selected content on the NBRC Adult Critical Care Specialist examination. Issues discussed include the difficult airway, diseases and disorders, diagnostics, nutrition, end-of-life, mass casualty and patient air transport.

Web blended

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For each topic: Many of these slide and lecture presentations are beyond the realm of the RT (but, that seems to be the intention of the critical care exam), but will provide a good overview of the topic for those who work with these types of patients in the ICU or elsewhere. In class, we'll have some enrichment lectures from the references and answer questions. Then, watch and listen to the slide presentation and/or webcasts as applicable.

Objectives

Following this course, the student will be able to:

Generally describe the epidemiology, pathophysiology, diagnostic criteria, medical/surgical therapy, and role of the therapist for each of the disorders described in this course, and:

Module I: Advanced Patient Assessment

List the indications for a CT scan, VQ scan, PET scan, and angiography.

Identify pulmonary abnormalities on a CT scan, VQ scan, PET scan, and angiography.

Discuss how to assess for the presence of kidney disease.

List and define three forms of renal failure.

Discuss how to assess for the presence of gastrointestinal disease.

List the measurements made during indirect calorimetry.

Discuss diagnostic techniques applied to ICU patients who have conditions of the neurologic, renal, gastrointestinal, musculoskeletal and cardiovascular systems.

Describe metabolic studies.

Discuss the complications of malnutrition.

List the complications of nutritional repletion.

Compare and contrast the indications, advantages, disadvantages and complications of various feeding routes.

Describe the Krebs or Citric Acid Cycle

Discuss nitrogen balance.

Discuss the nutritional needs special to the patient with COPD.

Describe therapy directed at the outcomes of laboratory testing

Module II: Advanced Respiratory Care

List the indications for specialty gas administration

Describe administration of specialty gases

Describe patient assessment when considering specialty gas administration

List the indications for specialty modes of mechanical ventilation

Describe the ventilator settings used in specialty modes of mechanical ventilation

Describe how the therapist assesses the effectiveness of specialty modes of ventilation

List the indications for proning and recruitment

Describe the techniques of proning and recruitment

List the complications of proning and recruitment

Describe the components of transporting a critically-ill mechanically ventilated patient

List the causes of patient-ventilator asynchrony

Describe how the therapist manages patient-ventilator asynchrony

Describe indications and pharmacologic effects of antiarrhythmics, ACE inhibitors, angiotensin receptor blockers, and inotropic agents

Understand the role of pharmacologic therapy in arrhythmias heart failure, acute coronary syndrome, myocardial infarction, and angina.

Understand the variables that effect blood pressure

Define key terms related to blood pressure and antithrombic agents

Relate cardiovascular physiology to pharmacologic treatments for hypertension

Describe indications and pharmacologic effects of antihypertensive agents

Relate renal physiology to diuretic treatment

Describe indications and pharmacologic effects of anticoagulants, antiplatelet agents and fibrinolytic agents

Describe the difficult airway and how it is managed.

See chapter 15 objectives, page 348, Heuer & Scanlan: Wilkin's Clinical Assessment in Respiratory Care.

Module III: Surgical Issues

List physiologic criteria for a trauma alert.

Describe the therapist's role in a trauma alert.

Describe patient assessment during a trauma alert.

Define mass casualty respiratory failure

List the most likely disaster scenarios likely to result in mass casualty respiratory failure

Describe the requirements of devices required to provide ventilation in mass casualty respiratory failure

Describe issues related to respiratory consumables and oxygen in mass casualty respiratory failure

Discuss the role of the respiratory therapist in a disaster

Justify a system for triage of patients based on severity of illness in a mass casualty respiratory event

Cite the abnormal ICP.

Describe how head trauma is diagnosed managed.

Describe ICP monitoring.

List the features of physical examination in thoracic trauma.

Describe the types of thoracic trauma and how they are managed.

List the anatomic alterations of the lungs associated with smoke injury and thermal injuries

Describe the causes of smoke inhalation and thermal injuries

List the cardiopulmonary clinical manifestations associated with smoke inhalation and thermal injuries

Describe the general management of smoke inhalation and thermal injuries

Describe the ventilatory strategy used in a patient with inhalation injury

Module IV: Medical Issues

Describe diagnosis of shock

Describe resuscitation from shock

Define the types of shock

Describe the organ system pathophysiology of shock

Describe the outcomes of shock

List causes of myopathy and neuropathy in the ICU.

Discuss management of critical illness myopathy and neuropathy.

Describe the pulmonary function values in restrictive disease.

Define Virchow's triad.

List the signs and symptoms of pulmonary embolism.

Describe diagnosis of pulmonary embolism

Define pulmonary arterial hypertension.

List factors associated with pulmonary arterial hypertension.

Describe the hemodynamic changes present in PAH.

Describe the therapy for PAH.

Define barotrauma and volutrauma

Describe how barotrauma and volutrauma occur

Describe how to avoid barotrauma and volutrauma

List and discuss the eligibility for hospice care.

Illustrate death trajectory for various conditions.

Outline the respiratory therapist's role in end-of-life and palliative care.

Modules of Instruction:

- I. Advanced patient assessment
- II. Advanced respiratory care
- III. Surgical issues
- IV. Medical issues

Student Evaluation:

Students will be evaluated using quizzes and written examinations. There will be 4 written examinations each worth 15%, a final examination worth 20%, attendance worth 10% (see also: attendance policy), and an in-class presentation worth 10%. Quizzes, if given, will be 40% of each respective written examination. The course grading scale is as follows:

- A 90-100%
- B 80-89%
- C 70-79%
- D 60-69%
- F 50-59%

An examination may be rescheduled for an individual in the event of extenuating circumstances. See the instructor. The self-assessment examination of the NBRC Adult Critical Care Specialist Examination will be used in preparation for the actual examination. This self assessment examination is not part of the final grade. A grade of F* will be assigned in cases where the student does not officially withdraw, but fails to attend, or fails to complete assignments, or who fails to participate in class activities. It will be used when, in the opinion of the instructor, completed assignments or course activities are insufficient to make normal evaluation of

academic performance possible. **Students who are absent unexcused from an examination will receive a 0 for that examination. See the instructor BEFORE an absence.**

Class presentation

Review the Adult Critical Care Specialist Examination Detailed Content Outline. Find a topic you are interested-in. Using your texts, articles or other resources, prepare an outline, a lecture and some slides to address your topic. Present this topic in-class in 15-20 minutes. Usually, this means that you will prepare about a 2-page outline and perhaps 10-15 slides. Specify the section of the detailed content outline you are discussing and learning objectives. Email your presentation to the instructor and your classmates.

Texts:

Kacmarek, et al, Eds. Egan's Fundamentals of Respiratory Care, 11th ed., Chicago, Mosby-Yearbook, 2012.

Heuer & Scanlan Eds. Wilkin's Clinical Assessment in Respiratory Care, 7th ed., St. Louis, Mosby-Yearbook, 2014.

DesJardins T, Burton GC. Clinical Manifestations and Assessment of Respiratory Disease, 6th ed., Mosby Elsevier, Maryland Heights, MO, 2011.

Webcasts:

AARC Webcasts: go to <http://www.aarc.org/past-programs/> and find the program by date.

ICON academy webcasts: go to <http://intensivecareonline.com/Education/AcademyArchive> and find the program by date, check the title as some dates have more than one topic

Office Hours:

You may consult with the instructors whenever they are available and not busy with another person. Stop at the desk of the Department secretary to inquire about the availability of the instructor you wish to see. Please make an appointment if you desire. Contact may also be made via email.

Class Attendance:

Each class session must be viewed/attended as applicable. Role will be taken. Unexcused absence from an exam will result in a score of 0. Discuss absence from an exam IN ADVANCE with the instructor.

Students with Disabilities:

In accordance with the Americans with Disabilities Act, students with bonafide disabilities will be offered reasonable accommodation. The Office of Special Student Services (OSSS) will certify a disability and advise faculty members of reasonable accommodations. If you have a

specific disability that qualifies you for academic accommodations, please notify me and provide certification from Disability Services in the Office of Special Student Services. The Office of Special Student Services is located in Room 270 of the Student Center (460-7212).

Changes in course requirements:

Since all classes do not progress at the same rate, thus course requirements might have to be modified as circumstances dictate. You will be given written notice if the course requirements need to be changed.

Academic Disruption:

The University of South Alabama's policy regarding Academic Disruption is found in The Lowdown, the student handbook.

<http://www.southalabama.edu/lowdown/academicdisruption.shtml>: Disruptive academic behavior is defined as individual or group conduct that interrupts or interferes with any educational activity or environment, infringes upon the rights and privileges of others, results in or threatens the destruction of property and/or is otherwise prejudicial to the maintenance of order in an academic environment. We expect students to be cordial, courteous and respectful of faculty members and fellow students.

STUDENT ACADEMIC CONDUCT POLICY

The University of South Alabama's policy regarding Student Academic Conduct Policy is found in The Lowdown <http://www.southalabama.edu/lowdown/academicconductpolicy.shtml>: The University of South Alabama is a community of scholars in which the ideals of freedom of inquiry, freedom of thought, freedom of expression, and freedom of the individual are sustained. The University is committed to supporting the exercise of any right guaranteed to individuals by the Constitution and the Code of Alabama and to educating students relative to their responsibilities.

If a student violates these standards, they may be asked to leave.

- Students enrolled in online courses are expected to adhere to the Academic Conduct Policy. In particular, students are expected to complete their own coursework and not provide unauthorized information or materials to another student.

ONLINE WRITING SUPPORT

The University of South Alabama provides online writing tutoring services through SMARTHINKING, an online tutoring service. SMARTHINKING is available at <http://services.smarthinking.com>. Students may enter the site by logging on with their Jag number and using the last four digits of the social security number as the password. For log-on problems, technical questions and/or on-campus writing assistance, contact

the USA Writing Center at 251-460-6480 or e-mail csaint-paul@usouthal.edu.

- Information about the University Writing Center and Online Writing Lab can be found online at <http://www.southalabama.edu/univlib/instruction/antiplagiarism/writinghelp.html>.

Course Schedule

Wednesdays and Thursdays 3-4:30 pm

Module 1: Advanced Patient Assessment

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|------|---|---|
| 8/16 | Advanced Chest Imaging Techniques
CT, angiography, plain films | class lecture/ Donna Cleveland & Chucri Jalk Wilkins, ch. 10
DesJardins, p. 95-103
Egan's, ch. 21 |
| 8/17 | V/Q, chest ultrasound and PET scan | Egan's, ch. 21 |
| 8/23 | Renal and gastrointestinal examination | Dr. Crook's lecture slides |
| 8/24 | Metabolic assessment | Amanda Kelly's lecture slides
Egan's ch. 23
Wilkins, ch. 18 |
| 8/30 | Feeding and complications of malnutrition
(Nutrition Case Studies) | Amanda Kelly's lecture slides
AARC Webcast 10/29/2013 |
| 8/31 | Anticipating care based on laboratory results | Lecture: Wilkins, ch. 7 |
| 9/6 | Exam 1 | |

Module 2: Advanced Respiratory Care

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|------|---|---|
| 9/7 | Specialty gas administration | Egan's, p. 931-934
ICON Webcast 4/7/2014:
Use of Inhaled Vasodilators
in ALI and ARDS
Class lecture |
| 9/13 | Advanced ventilator management
(modes, ILV, HFV, APRV, etc.) | Pilbeam p. 505-515
AARC webcast 1/18/2012
ICON webcasts 10/22/2014
parts I and II
Lectures by JB Horton RRT
& Op't Holt
Article: Ferguson, NEJM
2013; 368:795-805. |

9/14	Proning and recruitment, transport, asynchrony	ICON webcasts 2/12/13, 3/14/13, 1/20/2015 AARC webcasts 9/27/12, 6/15/11, 3/15/12 Pilbeam p. 282-286 Holets & Davies RCJ 2016; 61(6):839-853. Class lecture
9/22	Difficult airway	Class lecture, assigned references
9/21	Pharmacology	Egan's p. 732-736 ICON webcast 7/14/15 Class lecture
9/27	Pharmacology	Rau's Pharmacology ch. 21, & 22 Class lecture
9/28	Hemodynamics	Wilkins, ch 15 handout. Class lecture

10/4 Exam 2

Module 3: Surgical Issues

10/11	Trauma alert and rapid response	Dr. Brevard's lecture, class lecture AARC resources: professional documents Rapid Response Teams
10/12	Disaster planning	Hess, ch. 27 Class lecture AARC webcast 3/12/15
10/18	Head injury	Dr. Gonzalez' slides
10/19	Thoracic trauma; 2 class presentations	Dr. Simmons' slides
10/25	Smoke inhalation and thermal injury 2 class presentations	DesJardins, ch. 43 Class lecture
10/26	Exam 3	

Module 4: Medical issues

- 11/1 Shock <http://www.accessmedicine.com/content.aspx?aID=2284372>
Class lecture
2 class presentations
- 11/2 Shock
Class lecture
- 11/8 Neuromuscular disease and weakness
DesJardins, ch 29 & 30
Latronico N, Bolton C. Critical illness polyneuropathy: a major cause of muscle weakness and paralysis. The Lancet 2010;10:931-941.
Deem S. Intensive care unit acquired muscle weakness. Respir Care 2006;51(9):1042-1052.
Hashem; Respir Care 2016;61(7):971-979.
Class lecture
2 class presentations
- 11/9 Restrictive disease
DesJardins, ch 26
Egan's, ch. 24
Class lecture
2 class presentations
- 11/15 Pulmonary vascular disease (PE and PAH)
DesJardins, ch. 21
Barst RJ, et.al. Clinical perspectives with long-term pulsed inhaled nitric oxide for the treatment of pulmonary arterial hypertension. Pulm Circ 2012;2:139-147.
Badesch DB, et al. Medical therapy for pulmonary arterial hypertension. Chest 2004;126(1):35s-62s: sections on Iloprost and NO.
Class lecture
2 class presentations
AARC Webcast 11/4/2014
- 11/16 Barotrauma and volutrauma
Dr. Broughton's slides
2 class presentations
- 11/29 Palliative care, End of life and brain-death criteria
Ms. Op't Holt's lecture
Selecky PA. Palliative and end-of-life care for patients with cardiopulmonary diseases. Chest 2005;128(5):3599-3610.
Lanken PN. An Official American Thoracic Society Clinical Policy Statement: Palliative Care for Patients with Respiratory Diseases and Critical Illnesses. AJRCCM 2008;177:912-927.
Grandhige et al. Respir Care 2016;61(7):891-896.
Wilkin's p. 188
AARC Webcast 2/11/2015
- 11/30 Exam 4 & Critical Care Practice Examination
- TBA Final exam during exam week

