

9-2013

# AHRC 235.01: Cardipulmonary, Anatomy and Physiology

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**THE UNIVERSITY OF MONTANA  
MISSOULA COLLEGE  
RESPIRATORY CARE PROGRAM**

**COURSE SYLLABUS**

**COURSE NUMBER AND TITLE:** AHRC 235 CARDIOPULMONARY, ANATOMY  
AND PHYSIOLOGY

**DATE REVISED:** Fall 2013

**SEMESTER CREDITS:** 3

**CONTACT HOURS PER SEMESTER:** 45, TR 11:00 – 12:30

**PREREQUISITE:** M 105 or M115 or M121, BIOH 201, SCN 175

**FACULTY:**

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**RELATIONSHIP TO PROGRAM:**

This course offers the students the opportunity to develop more detailed knowledge of cardiopulmonary anatomy and physiology. They will be able to apply this knowledge to their critical care experiences and disease pathophysiology.

**COURSE DESCRIPTION:**

An in-depth study of the macro-and micro-anatomy of the cardiopulmonary system with a focus on structure, and function. Other topics which include calculations of physiological parameters as applicable to clinical practice are: the mechanics and regulation of ventilation, gas exchange and transport, and the ventilatory aspects of acid-base problems. Finally, the dynamics of the cardiac and pulmonary systems are brought into focus as a single and integrated unit in relation to hemodynamics, and physiology of ventilatory support.

**STUDENT PERFORMANCE OUTCOMES:**

*Upon completion of this course, the student will be able to:*

1. Describe the general principles of the respiratory system and list terms and symbols relevant to respiratory physiology.
2. Discuss the structures and functions as they pertain to the macro-and micro-anatomy of the cardiopulmonary system, including principles of lung development.
3. Describe the mechanics and regulation of ventilation and be able to calculate values for minute alveolar ventilation, compliance, and airway and vascular resistance.
4. Discuss how gases are exchanged and transported in the body and calculate alveolar-arterial oxygen differences and oxygen contents, and various hemo-dynamic parameters.
5. Describe the histology of the tracheobronchial tree, and circulatory system.
6. Describe in detail the alveolar gas exchange unit (acinus).
7. Define and explain the significance of the ventilation-perfusion ratio.
8. Draw the trachealbronchial tree including all segments.
9. Describe the function of the respiratory neurons of the medulla oblongata.
10. Discuss fetal lung development.
11. Describe how blood flows through the heart and lung and the influence of gravity on the blood flow.
12. Describe the pulmonary, bronchial and coronary circulations.
13. Define and calculate various hemodynamic measurements and determinants of cardiac output.

**METHOD OF INSTRUCTION:**

Lecture, demonstrations, reference reading, and group discussion.

**STUDENT ASSESSMENT METHODS AND GRADING PROCEDURES:**

***Grading Scale***

A = 4.0	95-100%	C = 2.00	74-76%
A- = 3.67	90-95%	C- = 1.67	70-73%
B+ = 3.33	87-89%	D+ = 1.33	67-69%
B = 3.00	84-86%	D = 1.00	64-66%
B- = 2.67	80-83%	D- = .667	60-63%
C+ = 2.33	77-79%	F = 0.00	

Students in the Respiratory Care Program must have a "B-" final grade in order to progress within the program.

**ATTENDANCE:**

The study of advanced pulmonary anatomy and physiology requires exposure to the material from a practical and a theoretical approach. Regular attendance to both the demonstrations and lectures is required to successfully complete this course. Class attendance is an integral part of this course. Quizzes will be given throughout the semester. Absence for the quizzes will result in a zero being recorded and used in computing your average. You are responsible for all materials, notes, homework or handouts you miss. A 10% reduction on points for late

assignments will be applied. Be there on time everytime. Always bring a small calculator and pencil to class.

**EXAMINATIONS and WORKSHOPS:**

Several written concept evaluations will be given. The emphasis is on concepts. Essay questions will be in descriptive terms such as, discuss, compare, and contrast, describe, and explain. You must write clear, concise sentences to receive full credit for these questions. The above terms do not mean to list or simply draw a diagram with no further explanation. Write neatly, and use a pencil for all calculations. Always write the complete equation with correct pulmonary symbols. Show the progression of work as you solve the problem. Box your final answer and always include the correct units of measurement for full credit.

A few workshops will be scheduled for this course. Workshops are graded during the class period and there are no makeups. Attendance is required.

Performance Evaluations:

Multiple choice, matching, diagram labeling, graphing and essay type questions may be used. Essay questions will be used to assess whether the student understands concepts, logic and the significance of detailed information and data. Can the student represent data graphically or symbolically? Developing a concise and unambiguous form of written and verbal communication is a critically important part of your education. Write complete sentences to explain, discuss, and describe answers to essay questions. Do not just list or outline answers for essay questions. There will be no leaving the room, talking or cell phones during the examination period.

**REQUIRED TEXTS:**

**Title:** 1) Cardiopulmonary Anatomy and Physiology, Fifth Edition  
ISBN: 13:978-1-4180-4278-3 Text

*Please purchase your text before or on the first day of class.*

**Author:** Des Jardins, T  
**Publisher:** Thomas/Delmar

**COURSE OUTLINE:  
THE CARDIOPULMONARY SYSTEM  
(Tentative schedule)**

- I. Anatomy and Physiology of the Respiratory System (1)
- II. Ventilation (2)
- III. Diffusion of Pulmonary Gases (3)

**\*Examination 1 (10 October 2013)**

- IV. Anatomy and Physiology of the Circulatory System (5)
- V. Hemodynamic Transport (15)
- VI. Oxygen Transport (6)
- VII. Ventilation Perfusion (8)

**\*Examination 2 19 November 2013)**

- VIII. Control of Ventilation (9)
- IX. Fetal Development and Fetal Circulation (10)

**\*Examination 3 (11 December 2013)**

**\*dates are tentative**

**INSTRUCTOR EXPECTATIONS:**

Because the course has a great deal of new material, it is very important to study consistently. Some suggestions for better study are:

1. Read the unit objectives and key terms at the beginning of each chapter - find out what you are expected to learn.
2. Read the material before class. This will help you understand the lecture.
3. Attend every class and take notes - but do not try to write down everything. Concentrate on concepts. Do not ask the instructor for the overhead notes.
4. Study notes/material and compare with objectives.
5. Study diagrams, clinic, applications and critical thought questions.
6. Relate information to prior learning/examples to develop a "picture" in your mind.
7. Ask instructor for clarification as needed - during or after lecture.
8. Study regularly in a quiet place; set study hours and keep them.
9. Plan something for a fun and relaxation - stress management.
10. See you instructor when you think you need help. Your instructor wants you to succeed and will have some ideas which should help. You are responsible to obtain notes, handouts, and to hand in assignments if you miss a class. Do not expect a mini individual lecture on the missed material.

## **COURSE EXPECTATIONS:**

This course is designed for students who already have a sound foundation in human anatomy and physiology and basic algebra.

### **Learning Expectations:**

I use traditional lecture format to cover the vast amount of material. The reading and problem sets assignments and objectives are meant to complement the lecture material. I expect you to understand the material more deeply than simply memorizations and regurgitation of facts. I lean heavily on trying to discover if the student truly understands concepts, the reasoning behind arguments, and the clinical application of science-based medicine. The best way to find out if you understand a concept is to explain it successfully to somebody without the use of notes. Learn to accurately sketch and explain important concepts with graphs and drawings.

#### **Reading/Homework assignments:**

I expect you to read the assigned text and take good lecture notes. Recording the lecture may not be time efficient and may postpone the note-taking and synthesis of material that should take place in the classroom.

There will be a workshop component. This time will be spent in discussion or review, and in using mathematical formulas to support broad concepts already developed in lectures. Bring a calculator and mechanical pencil.

Learning objectives will be used from the text at the beginning of each chapter. Problem sets and practice thought questions may be assigned.

### **Problem Sets and/or workshops:**

#### **USE A PENCIL Bring a basic calculator to class.**

Problem solving in technical fields is more than plugging data into formulas. It is necessary for you to develop skill in taking data, analyzing the problem, and finding a solution in a neat systematic manner. In all problem solving in this course the following problem-solving method will be used:

1. Read the problem thoughtfully.
2. Make a sketch if appropriate.
3. List all given data including units of measurement.
4. Write down the unknown or quantity asked for in the problem.
5. Write the basic equation with correct pulmonary symbols that relates the known and unknown quantities.
6. Find a working equation by solving the basic equation for the unknown quantity.
7. Substitute the data in the working equation, including the appropriate units.
8. Neatly and sequentially perform the indicated operations and work out the solution.
9. Ask yourself, “Is the answer reasonable? Did I answer the question and box my answer with the unit(s) measurement?”