

Fundamentals of Respiratory Physiology

VME 6200: Class 30522

Credits: 3

Class Periods: Tuesday, Period 4; Thursday Periods 3 and 4

Location: TBD

Academic Term: Spring, 2023

Instructor:

Paul W. Davenport, PhD

pdavenpo@ufl.edu

(352) 294-4025

Office Hours: Monday, Wednesday, Thursday, by appointment, B3-29, BSB

Teaching Assistants:

- None

Course Description

Provides the fundamental concepts of respiratory physiology. This will be accomplished by learning the physiological mechanisms involved in the movement of air into the lung, transfer of oxygen and carbon dioxide across the gas exchange surface, transport of these gases by the blood, delivery of these gases to the tissues, acid-base balance in the blood and the neural control of breathing. Each course module is available as a recorded video in Canvas. Students may complete the course using the recorded videos or by attending 28 lecture classes Feb 6, 2023 – Mar 6, 2023.

Course Pre-Requisites / Co-Requisites

Permission of the program, BCH 3025 Fundamentals of Biochemistry or equivalent

Permission of the program, MAC 2233 Survey of Calculus 1 or equivalent

Permission of the program, PHY 2020 Introduction to Principles of Physics or equivalent

Course Objectives

The overall objective of this course is to introduce basic concepts of respiratory physiology to graduate students including an understanding of how oxygen is brought to the cells of the body for metabolism and how the waste product of that metabolism, carbon dioxide, is removed from the body. This will be accomplished by learning the physiological mechanisms involved in the movement of air into the lung, transfer of oxygen and carbon dioxide across the gas exchange surface into the blood, transport of these gases by the blood and delivery of these gases to the tissues. The expected outcome of the course is that students will obtain new knowledge about respiratory physiology and understand how the respiratory system integrates into whole body physiology. Based on this new knowledge it is expected that the student will have sufficient understanding to predict responses when the respiratory system is disturbed. It is also expected that the students will be able to explain the responses that occur when the system is disturbed.

Student Learning Outcomes

After successful completion of this course, students will be able to:

1. To develop an understanding of how oxygen is brought to the cells of the body for metabolism.
2. To develop an understanding of how the waste produce of that metabolism, carbon dioxide, is removed from the body.
3. To develop an understanding of the physiological mechanisms involved in the movement of air into the lung.
4. To develop an understanding of the transfer of oxygen and carbon dioxide across the gas exchange surface into the blood.
5. To develop an understanding of the transport of these gases by the blood and delivery of these gases to the tissues.
6. To develop an understanding of how the brain controls breathing.

7. To develop an understanding of how the concentration of hydrogen ions are controlled by the respiratory system.

Materials and Supply Fees

None

Required Textbooks and Software

No required textbooks, all class material will be provided on Canvas, Lecture Slides and Fundamentals of Respiratory Physiology notes developed by the instructor.

Recommended Materials

- 1. Respiratory Physiology - the essentials, John B. West (this is the recommended text), Publisher : LWW; Tenth edition (2015) or most recent edition.
- 2. Comparative Biology of the Normal Lung, Richard A. Parent, editor, Publisher: Elsevier; Second Edition (2015) or most recent edition.
- 3. Fundamentals of Respiratory Physiology, A. S. Chakrabarty and K. Chakrabarty, Publisher : I K International Publishing House (2006) or most recent edition.
- 4. Respiratory Physiology of Vertebrates, Goran E. Nilsson, Publisher: Cambridge University Press (2012) or most recent edition.
- 5. Pulmonary Physiology, 6th Edition, Michael G. Levitzky, Publisher : McGraw-Hill Education / Medical, 9th edition (2018) or most recent edition.
- 6. Berne & Levy Physiology 7th Edition, edited by Koeppen and Stanton, Publisher : Elsevier; 7th edition (2017) or most recent edition.
- 7. Medical Physiology, edited by Boron and Boulpaep, Publisher : Elsevier; 3rd edition (2016) or most recent edition.

Course Schedule

1/10 & 1/12	Introduction and Gas Laws	Davenport
1/17 & 1/19	The Respiratory Pump	Davenport
1/24 & 1/26	Minute Ventilation and Breathing Patterns	Davenport
1/31 & 2/2	Respiratory Compliance	Davenport
2/7 & 2/9	Lung Volumes, Spirometry, FRC	Davenport
2/14 & 2/16	Respiratory Resistance	Davenport
2/21 & 2/23	Equal Pressure Point and Dynamic Airway Compression	Davenport
2/28 & 3/2	Alveolar Ventilation and Work	Davenport
3/7 & 3/9	Movement of Gas from Alveoli	Davenport
3/21 & 3/23	Pulmonary Circulation	Davenport
3/28 & 3/30	Gas Transport by the Blood	Davenport
4/4 & 4/6	Gas Delivery	Davenport
4/11 & 4/13	Hypoxemia and VA/Q	Davenport
4/18 & 4/21	Acid/Base	Davenport
4/25	Neural and Chemical Control of Breathing	Davenport
5/2	FINAL EXAM	Davenport

Each course Module (1-15) has a quiz. Each quiz is worth 5 points.

Attendance Policy, Class Expectations, and Make-Up Policy

Attendance is expected. Use of laptop or computer notebook for class notes and slides is expected. Use of cell phones for class notes and slides is acceptable but must be silenced. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Excused absences must be consistent with university policies in the [Graduate Catalog](#) and require appropriate documentation. Additional information can be found in [Attendance Policies](#).

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Quizzes (15)	75	50%
Final Exam	75	50%
		100%

Grading Policy

The following is given as an example only.

Percent	Grade	Grade Points
90.0 - 100.0	A	4.00
87.0 - 89.9	A-	3.67
84.0 - 86.9	B+	3.33
81.0 - 83.9	B	3.00
78.0 - 80.9	B-	2.67
75.0 - 79.9	C+	2.33
72.0 - 74.9	C	2.00
69.0 - 71.9	C-	1.67
66.0 - 68.9	D+	1.33
63.0 - 65.9	D	1.00
60.0 - 62.9	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:

[UF Graduate Catalog](#)
[Grades and Grading Policies](#)

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the [Disability Resource Center](#). It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. [Click here for guidance on how to give feedback in a professional and respectful manner](#). Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via ufl.bluera.com/ufl/. [Summaries of course evaluation results are available to students here](#).

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." [The Honor Code](#) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as

appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see the [Notification to Students of FERPA Rights](#).

In-Class Recording

•Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor. A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session. Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Campus Resources:

Health and Wellness

U Matter, We Care:

If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or police.ufl.edu.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling.

Library Support, Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.

[Writing Studio](#), 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.

[Student Complaints Campus](#)

[On-Line Students Complaints](#)