

**Midland College**  
**Syllabus**  
**RSPT 1340**  
**Advanced Cardiopulmonary Anatomy and Physiology**  
**(3-0-0)**

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**Course Description:**

An introduction to the anatomy and physiology of the cardiovascular and pulmonary systems.

**Text, References, and Supplies:**

Textbooks (**Required textbook is in bold print**)

**Des Jardins, Cardiopulmonary Anatomy and Physiology, 6th Edition. Delmar. 2013.**

Kacmarek, The Essentials of Respiratory Care, 4th Edition. Mosby. 2005.

Wilkins, Egan's Fundamentals of Respiratory Care, Ninth Edition. Mosby. 2009.

**Students MUST actively participate by completing an academic assignment required by the instructor by the official census date. Students who do not actively participate in an academically-related activity will be reported as never attended and dropped from the course.**

**Course Goals/ Objectives:**

Upon successful completion of the course the student will:

1. Identify the role of the **nervous system** in maintaining homeostasis.
2. Classify the organs of the nervous system into central and peripheral divisions
3. Contrast the histological characteristics and functions of neuroglia and neurons.
4. Classify neurons by shape and function.
5. List necessary conditions for nerve regeneration.
6. Discuss the initiation and conduction of a nervous impulse
7. Define saltatory conduction
8. Describe the all-or-none principle of nervous conduction
9. Discuss the factors that determine the rate of impulse transmission
10. Define a synapse and describe conduction of an impulse across the synapse
11. Discuss excitatory transmitter-receptors versus inhibitory transmitter-receptors
12. Discuss the role of transmitter substances for conduction across the synapse
13. List factors that may inhibit or block nerve impulses
14. identify principle parts of the brain and brain stem
15. Briefly discuss the function of principle parts of the brain and brain stem
16. List the cranial nerves

## Chapter 1

17. Identify the role of the **respiratory system** in maintaining homeostasis.
18. Identify structures of the upper airways
19. Discuss the functions of the upper airways
20. Identify structures of the lower airways
21. Discuss functions of the lower airways
22. Compare and contrast cartilaginous vs. non-cartilaginous airways
23. Identify structures responsible for gas exchange
24. Identify structures which compose the pulmonary vascular system
25. Discuss the function of the pulmonary vascular components
26. Briefly discuss the lymphatic system
27. Discuss neural control of the lungs
28. Identify structures of the lungs
29. Identify structures of the mediastinum
30. Identify structures of the pleurae
31. Discuss the function of the pleurae
32. Identify structures of the thorax
33. Describe the use of respiratory muscles

## Chapter 2

34. Describe ventilation
35. Discuss pressure changes associated with breathing
36. Discuss compliance
37. Explain the importance of surface tensions
38. Explain the principles associated with flow through tubes
39. Discuss airway resistance
40. Describe the use of time constants
41. Differentiate between ventilation and dead space
42. Calculate alveolar ventilation
43. Describe various ventilatory patterns

## Chapter 3

44. Identify lung volumes and capacities
45. Differentiate between obstructive and restrictive lung disease using PFTs
46. Describe pulmonary mechanics measurements
47. Discuss the use of flow/volume curves
48. Explain dynamic compression
49. Discuss measurements associated with respiratory muscle strength
50. Describe  $D_LCO$

## Chapter 4

51. Discuss diffusion of pulmonary gases
52. State gas laws associated with diffusion of pulmonary gases
53. Identify partial pressures of gases in air, alveoli, and blood
54. Calculate  $P_{AO_2}$  using the alveolar air equation
55. Differentiate between perfusion limited and diffusion limited

Chapter 5

56. Identify components of the **circulatory system**
57. Describe the functions of the various components of the circulatory system
58. Describe how blood flows through the heart
59. Explain the neural control of the vascular system
60. Discuss the distribution of blood flow in the lungs
61. Explain cardiac output
62. Discuss pulmonary vascular resistance

Chapter 6

63. Describe oxygen transport
64. Describe carbon dioxide transport

Chapter 7

65. Describe acid/base balance

Chapter 8

66. Discuss ventilation/perfusion relationships

Chapter 9

67. Explain neural control of ventilation

Chapter 10

68. Discuss fetal lung development
69. Describe fetal circulation
70. Discuss cardiopulmonary changes associated with birth

Chapter 11

71. Describe the effects of aging on the respiratory system
72. Describe the effects of aging on the cardiovascular system

Chapter 12

73. Discuss the electrophysiology of the heart

Chapter 13

74. Explain the standard 12-lead ECG system
75. Identify components of an ECG

Chapter 14

76. Interpret various ECGs

## Chapter 15

77. Identify direct hemodynamic measurements
78. Identify calculated hemodynamic values
79. Calculate hemodynamic values

## Chapter 16

80. Identify structures of the **renal system**
81. Discuss urine formation
82. Explain the significance of urine volume and concentration
83. Describe regulation of electrolytes
84. Discuss the role of the kidney in acid/base balance and blood volume
85. Explain renal failure
86. Relate cardiopulmonary disorders associated with renal failure

## Chapter 17

87. Discuss sleep physiology and its association with the cardiopulmonary system

## Chapter 18

88. Discuss the effects of exercise on the cardiopulmonary system

## Chapter 19

89. Discuss high altitude effects on the cardiopulmonary system

## Chapter 20

90. Discuss high pressure environments effects on the cardiopulmonary system

**Enrichment**

91. Explain nerve, heart, lung, kidney interrelationship
92. Explain fluid electrolyte significance
93. Demonstrate physical assessment technique

**Student  
Contributions**

Each student will spend at least 6 hours per week preparing for class. Attendance is critical in this class. The college attendance policy will be followed.

**Class  
Policies:**

**All classroom performance and behavior will be considered academic.**

**Evaluation of Students:**

A minimum of four (4) tests will be given including a comprehensive final (unless otherwise designated by the instructor). The final exam will carry the same weight as other exams (not quizzes). Weekly quizzes will be averaged and will equal one exam. Test questions will come from lecture, reading assignments and homework assignments. Most tests will be objective in nature.

1.	Tests (minimum of four)	
	A. term project required	80%
	B. if term project not required	90%
2.	Attendance, participation and attitude	10%
3.	Term project or paper if required	10%
	Total	100%

**Course Schedule:**

The class meets for 3 lecture hours per week. 1 1/2 hours each on Tuesday/Thursday from 1:30 to 3:00 PM.

**Students with Disabilities****AMERICANS WITH DISABILITIES ACT (ADA):**

The Americans With Disabilities Act (ADA) and Section 504 of the Rehabilitation Act require that no otherwise qualified person with a disability be denied access to, or the benefits of, or be subjected to discrimination of any program or activity provided by an institution or entity receiving federal financial assistance. It is this Section 504 mandate that has promoted the development of disability support service programs in colleges and universities across the country. Sub-part E of Section 504 deals specifically with this mandate for institutions of higher education.

While it does not require development of special educational programming, for students with disabilities, it does require that an institution (public or private) be prepared to make appropriate academic adjustments and reasonable accommodations to allow the full participation of students with disabilities in the same programs and activities available to non-disabled students. Disabilities may include things such as physical/mobility problems such as paralysis or academic problems like learning disabilities. Some examples of accommodations are extra time for tests, testing in a quiet location, and providing architectural access to buildings.

Midland College provides services for students with disabilities through Student Services. In order to receive accommodations, students must place documentation on file with the Counselor/Disability Specialist. Students with disabilities should notify Midland College prior to the beginning of each semester. Student Services will provide each student with a letter outlining any reasonable accommodations. The student must present the letter to the instructor at the beginning of the semester.

**Non Discrimination Statement:** Midland College does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities. The following individuals have been designated to handle inquiries regarding the non-discrimination policies:

**Tana Baker, Title IX Coordinator/Compliance Officer, 3600 N. Garfield, SSC 242, Midland, TX 79705, (432) 685-4781, [tbaker@midland.edu](mailto:tbaker@midland.edu);**

**Natasha Morgan, Director Human Resources/Payroll, 3600 N. Garfield, PAD 104, Midland, TX 79705, (432) 685-4534, [nmorgan@midland.edu](mailto:nmorgan@midland.edu).** For further information on notice of non-discrimination, visit <http://wdcrobcolp01.ed.gov/CFAPPS/OCR/contactus.cfm> or call 1 (800) 421-3481.

### **Spanish**

Midland College no discrimina por motivos de raza, color, nacionalidad, sexo, discapacidad, o edad en sus programas o actividades. Las siguientes personas han sido designadas para responder a cualquier pregunta o duda sobre estas políticas no discriminatorias:

**Tana Baker, Title IX Coordinator/Compliance Officer, 3600 N. Garfield, SSC 242, Midland, TX 79705, (432) 685-4781, [tbaker@midland.edu](mailto:tbaker@midland.edu);**

**Natasha Morgan, Director Human Resources/Payroll, 3600 N. Garfield, PAD 104, Midland, TX 79705, (432) 685-4534, [nmorgan@midland.edu](mailto:nmorgan@midland.edu).** Para más información sobre estas políticas no discriminatorias , visite <http://wdcrobcolp01.ed.gov/CFAPPS/OCR/contactus.cfm> o llame al 1 (800) 421-3481.

### **Division Information**

Division Dean: Dr. Carmen Edwards, Ed.D., MSN, RN  
 Division Secretary: Karen Harris, CPS  
 Division Office Location: 208 DHS  
 Division Telephone: 685-4600  
 Program Chair, Bob Weidmann, M.Ed., RRT, RPFT, RRT-NPS, RCP  
 Program Office Location: AMS A34  
 Program Telephone: 685-5549

Students are encouraged to contact the instructor at any time; however, making an appointment will guarantee the instructor's availability at a specific time.

### **Licensure Eligibility Notification**

Completion of Midland College degrees and/or certificates does not guarantee eligibility to take a certification/registry/licensure examination. The eligibility of each person is determined on an individual basis by the regulatory body of the specific discipline. If you have a conviction of a crime other than a minor traffic violation, physical or mental disability/illness, hospitalization/treatment for chemical dependency within the past five years, current intemperate use of drugs or alcohol or a previous denial of a licensure or action by a licensing authority, you will need to contact the specific regulatory body for an individual ruling. Some programs require a criminal background check and urine and drug screen.