

Respiratory Physiology for Professors

HAPS Institute Graduate Credit Course

BI 698 offered in conjunction with Alverno College

Instructor:

Patrick Eggena, M.D.

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Description of this Course:

This course is designed for professors interested in teaching Respiratory Physiology in Basic Science Departments of Medical, Osteopathy, Nurse Practitioner, or Podiatry Schools.

Participants begin their preparatory background work by watching six 50-minute black board video-lectures given by Patrick Eggena, M.D. to First Year Medical Students in Respiratory Physiology. Each video-lecture is followed by relevant reading assignments in the same iBook entitled, "Lectures in Respiratory Physiology."

These initial background lectures and reading assignments are followed by four hours of patient simulations captured on video as Dr. Eggena talks to students at a College of Podiatry. In these patient scenarios students listen to heart and lung sounds and are challenged to apply their knowledge of Respiratory Physiology in evaluating and caring for patients with Asthma, Chronic Obstructive Pulmonary Disease, Congestive Heart Failure, and the Infant Respiratory Distress Syndrome. Each of these video-simulations is followed by an integrative reading assignment in Dr.

Eggena's iBook, "Medical Physiology of the Heart-Lung-Kidney", which emphasizes the close interrelationships between these three organ systems in health and disease.

Participants then take the initiative in developing a similar case study by interviewing a patient (e.g., from a Nursing Home) with breathing problems. Although this involves a brief description of the symptoms and treatment, the focus of the case-study is on the underlying Physiology. Participants receive feedback from their peers and from Dr. Eggena on the suitability of the case for small group learning.

Course Objectives:

Upon completion of this course, participants will be able to:

1. teach Respiratory Physiology in a Basic Science Department of a Medical, Osteopathic, Nurse Practitioner, or Podiatry School.
2. refine and apply their knowledge of respiratory physiology to human conditions.
3. integrate pulmonary physiology with cardiovascular, renal, and other areas of physiology as well as with pharmacology.
4. explain in physiologic terms the causes for the signs and symptoms of human diseases and the reason why certain medicines may help or hurt.
5. understand the causes for hypoxemia and appreciate preventative and therapeutic strategies.
6. construct appropriate case-studies for small group sessions.
7. address common patient concerns, such as: "why can't I catch my breath? Why do I have to sleep with three pillows? Why did my doctor prescribe a water pill?"

Evaluation:

1. The participant interviews a patient (e.g., in a Nursing Home) with breathing problems in order to obtain the basic information for her/his case study. For example:

Student: "What bothers you most?" Patient: "I can't breathe".

Student: "What makes your breathing better or worse?" Patient: "I can't breathe lying flat -- I use three pillows".
Student: "What medicines are you taking for your breathing problem?" Patient: "A water pill."

2. The participant uses the information from the interview to construct a "Case" that focusses on the relevant underlying Physiology which she/he has learned in this course. The Case should be suitable for a small group conference and should include not only questions but also answers to be used for a handout following the discussion.

3. The participant submits the Case with answers to Patrick Eggena, M.D. for comments and consideration for course credits. .

All HAPS-I courses follow grading policies on a "credit / no credit" basis. Like many progressive graduate programs, HAPS-I does not use letter grades in our courses. However, a "credit" grade is equivalent to a letter grade of B or better.

A "credit" grade is earned by satisfactorily accomplishing a set of specific goals (at a "B" level or better) as outlined in this course syllabus and in the online course material as determined by the course faculty.

Course Schedule: May 1 - June 12, 2017.

Instructions for Weeks 1-3: All videos and assigned readings are in “Lectures in Respiratory Physiology” by Patrick Eggena, M.D. (Apple iBook)

Week 1 —

1. Watch lecture-video on page 6: In this 27 minute video-lecture Dr. Eggena discusses the functional anatomy of the lung and structural changes encountered in obstructive and restrictive lung diseases.
2. Assigned reading: pages 7-16.
3. Watch lecture-video on page 17: In this 25 minute video-lecture Dr. Eggena discusses the ventilatory apparatus, lung volumes, lung compliance, and the work of breathing.
4. Assigned reading: pages 18-46.
5. Watch lecture-video on page 47: In this 25 minute video-lecture Dr. Eggena discusses the ventilatory apparatus, lung volumes, lung compliance, and the work of breathing.
6. Assigned reading: pages 48 - 61.

Week 2 —

1. Watch lecture-video on page 62: In this 30 minute video-lecture Dr Eggena discusses laminar and turbulent air flow through the airways and what makes the airways constrict or relax.
2. Assigned reading: pages 63 - 75.
3. Watch lecture-video on page 76: In this short 6 minute video-lecture Dr. Eggena discusses how one measures airway resistance in the pulmonary function lab.
4. Assigned reading: pages 77-84.

5. Watch lecture-video on page 85: In this 17 minute video lecture Dr. Eggena discusses partial pressures of oxygen, and how one estimates oxygen tensions in the alveoli with the alveolar gas equation.
6. Assigned reading: pages 86-91.
7. Watch lecture-video on page 92: in this 14 minute video-lecture Dr. Eggena considers factors influencing the diffusion of oxygen across the alveolar-capillary membrane from lung to blood.
8. Assigned reading: pages 93-97.
9. Watch lecture-video on page 98: In this 20 minute video-lecture Dr. Eggena considers the oxygen carrying capacity of blood and the delivery of oxygen to tissues.
10. Assigned reading: pages 98-120.

Week 3 —

1. Watch lecture-video on page 121: In this 14 minute video-lecture Dr. Eggena considers the role of peripheral chemoreceptors in the regulation of ventilation..
2. Assigned reading: pages 122 - 129
3. Watch lecture-video on page 130: In this 13 minute video-lecture Dr. Eggena discusses the role of central chemoreceptors in the regulation of ventilation.
4. Assigned reading: pages 131- 139.
5. Watch lecture-video on page 140: In this 21 minute video-lecture Dr. Eggena discusses the roles of the Hering-Breuer Reflex and of centers in the brain stem in regulating breathing.
6. Assigned reading: pages 141 - 154.
7. Watch lecture-video on page 155: In this 29 minute video-lecture Dr. Eggena discusses how air flow and blood flow to the lungs are integrated.

8. Assigned reading: pages 156 - 175.

Instructions for Weeks 4 and 5: Video-simulations are in “Respiratory Physiology: Video Course in Problem Solving” by Patrick Eggena, M.D. (Apple iBook). Integrative readings are in “Medical Physiology of the Heart-Lung- Kidney” by Patrick Eggena, M.D. (Apple iBook).

Week 4 —

1. Watch video on page 6: In this 47 minute video-simulation Dr. Eggena presents a woman with Asthma.
2. Integrative readings: pages 39; 40; 361; 475; 552 - 559.
3. Watch video on page 9: In this 40 minute video-simulation Dr. Eggena continues the discussion of the woman with an Asthma Attack.
4. Integrative readings: pages 650-665; 934-941; 946-954.

Week 5 —

1. Watch video on page 11: In this 52 minute video-simulation Dr. Eggena presents a man with COPD.
2. Integrative readings: pages 41; 619-627
3. Watch video on page 13: In this 39 minute video-simulation Dr. Eggena presents a Pregnant Woman and her Premature Infant —both in Respiratory Distress.
4. Integrative readings: pages 366-369; 600-603; 738-754; 842-853; 981-982.

Instructions for Week 6 —

1. Interview a patient with Respiratory Problems and develop a case-study for use in a small group conference.
2. Obtain comments and suggestions from peers and email a copy to Dr. Eggena at patrickeggena@yahoo.com by June 20, 2017.

Dr. Eggena Office Hours

3. Office hours are on Skype (Tel. # 8452281786) every Tuesday from 3-4 pm EST for the duration of the course

Required Course Materials:

Course Requirements from the Apple iBook Store:

1. Lectures in Respiratory Physiology, by Patrick Eggena, M.D. - \$6.99
2. Respiratory Physiology: Video Course in Problem Solving, by Patrick Eggena, M.D. - \$3.99
3. Medical Physiology of the Heart-Lung-Kidney, by Patrick Eggena, M.D. - \$14.99 .