

# **Cardiovascular Physiology for Professors**

HAPS Institute Graduate Credit Course  
offered in conjunction with Alverno College

## **Course Number:**

## **Instructor:**

Patrick Eggena, M.D.  
Novateur Medmedia, LLC  
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Carmel, NY 10512

## **Description of this Course:**

This is a 2 credit course designed for professors interested in teaching Cardiovascular Physiology in Basic Science Departments of Medical, Osteopathy, Nurse Practitioner, or Podiatry Schools. Since the course is offered during the summer, it is also particularly suitable for First Year Medical Students who have shown a borderline performance in their regular course and require a remedial course in Physiology before entering their second year.

Participants begin their preparatory background work by watching thirteen 50-minute black board video lectures given by Patrick Eggena, M.D. to First Year Medical Students in Cardiovascular Physiology. Each lecture is followed by relevant reading assignments in the same iBook entitled, "Lectures in Cardiovascular 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 Cardiovascular Physiology in evaluating and caring for patients with Circulatory and Cardiogenic Shock, Valvular Heart Disease, Myocardial Infarction, and Hypertension. 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.

**These patient simulation videos will be discussed by Dr. Eggena in live sessions with participants in a "Google Meet" conference room.**

Participants will take the initiative in developing a similar case study by interviewing a patient (e.g., from a Nursing Home) with cardiovascular 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.

Medical students are given a written examination in addition to developing a case study. During a one hour exam students are asked to answer two of the eight essay questions posed at the end of the Problem Solving Sessions. The essay exam is proctored by an instructor who emails the essays to Dr. Eggena for grading.

### **Course Objectives:**

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

1. teach Cardiovascular Physiology in a Basic Science Department of a Medical, Osteopathic, Nurse Practitioner, Dental or Podiatry School.
2. refine and apply their knowledge of cardiovascular physiology to human conditions.



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

4. Medical students take a proctored one-hour essay examination in addition to submitting a case study .

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: June 26 - August 14, 2017.**

**Instructions for Weeks 1-4:** All videos and assigned readings are in "Lectures in Cardiovascular Physiology" by Patrick Eggena, M.D. (Apple iBook)

**Week 1 —**

1. Watch lecture-video on page 6: In this one hour video-lecture Dr. Eggena gives an overview of the cardiovascular system and considers cardiac action potentials.

2. Assigned reading: pages 7-24.

3. Watch lecture-video on page 25: In this 46 minute video-lecture Dr. Eggena discusses depolarization and repolarization of the heart and considers cardiac vectors, waves and intervals.

4.

Assigned reading: pages 26-37.

5. Watch lecture-video on page 38: In this 52 minute video-lecture Dr. Eggena discusses the leads of the ECG, myocardial

hypertrophy, and the mean electrical axis of the heart.

6.

Assigned reading: pages 39 - 50.

## **Week 2—**

1. Watch lecture-video on page 51: In this 40 minute video-lecture Dr. Eggena considers ECG changes in Myocardial Infarction and discusses regular, irregular, and fast rhythms.

2.

Assigned reading: pages 52 -70.

3. Watch lecture-video on page 71: In this 45 minute video-lecture Dr. Eggena considers fast rhythms, AV blocks and Potassium Imbalance.

2. Assigned reading: pages 72-92.

4. Watch lecture-video on page 93: In this 46 minute video-lecture Dr. Eggena discusses the structure of the myocardium, the sliding filament hypothesis, excitation-contraction coupling and force-velocity relationship of cardiac muscle..

5. Assigned reading: pages 93-109.

6. Watch lecture-video on page 110: In this 49 minute video-lecture Dr. Eggena discusses the LaPlace equation, ventricular compliance, the Frank-Starling law of the heart, homeometric regulation of cardiac contraction, and volume-pressure changes during the cardiac cycle, preload and afterload.

7. Assigned reading: pages 111-139.

## **Week 3 —**

1. Watch lecture-video on page 140: In this 41 minute video-lecture Dr. Eggena discusses cardiac output, hemodynamic monitoring in the ICU, and Pressure changes during the cardiac cycle.

4. Assigned reading: pages 141-151.

2. Watch lecture-video on page 152: In this 43 minute video-lecture Dr. Eggena discusses and listens to heart sounds and

the murmurs of mitral and aortic stenosis and mitral and aortic insufficiency in Dr. Eggena's multimedia Authorware computer program.

3. Assigned reading: pages 153 - 177

4. Watch lecture-video on page 178: In this 54 minute video-lecture Dr. Eggena discusses pressures and blood volumes in the circulation, laminar and turbulent blood flow, Poiseuille's equation, resistance in the circulation, and measurement and determinants of blood and pulse pressure.

5. Assigned reading: pages 179- 217.

6. Watch lecture-video on page 218: In this 52 minute video-lecture Dr. Eggena discusses the Starling-Landis principle, autoregulation of blood flow and Raynaud's disease, neural regulation, the baroreceptor reflex, orthostatic hypotension, and the Cushing phenomenon.

7. Assigned reading: pages 219 - 243.

#### **Week 4 —**

1. Watch lecture-video on page 244: In this 44 minute video-lecture Dr. Eggena discusses hormonal regulation of blood pressure, vasopressin, aldosterone, and epinephrine secretion and action, hypertension, and physiological approaches in the treatment of hypertension.

2. Assigned reading: pages 245 - 254.

3. Watch lecture-video on page 255: In this 46 minute video-lecture Dr. Eggena discusses the regulation of cardiac output and venous return and the use of Guyton's curves in the graphic analysis of altered states.

4.

Assigned reading: pages 256 - 297.

**Instructions for Weeks 5:** Video-simulations are in "Cardiovascular Physiology: Video Course in Problem Solving" by Patrick Eggena, M.D. (Apple iBook). Integrative reading assignments are in "Medical Physiology of the Heart-Lung-Kidney" by Patrick Eggena, M.D. (Apple iBook).

## Week 5

1. Watch video on page 7: In this is a 54-minute video-simulation Dr. Eggena presents a girl in Hypovolemic Shock.
2. Integrative readings: pages 12 - 18; 139-141; 795-796; 813; 888: 961-962; 977; 983;
3. Watch video on page 9: In this 34-minute video-simulation Dr. Eggena presents a man with Aortic Stenosis and Myocardial Infarction.
4. Integrative readings: pages 39-40; 137-139; 503-510; 738 -754; 791-805
5. Watch video on page 11: In this 51-minute video-simulation Dr. Eggena presents a man with Aortic Insufficiency and Congestive Heart Failure.
6. Integrative readings: pages 56- 58; 70-72; 137-139; 142; 578; 730; 735; 748; 888; 957; 972; 982.
7. Watch video on page 13: In this 42-minute video-simulation Dr. Eggena presents a man with Hypertension.
8. Integrative readings: pages 26; 28; 40; 108; 142; 156; 773; 880; 957; 979; 982.

(Note: These patient simulations will be discussed by Dr. Eggena during office hours already starting in week 3.)

## Instructions Week 6—

1. Interview patient with a Cardiovascular Problem and develop a Physiology case study for use in a one-hour small group conference.
2. Obtain comments and suggestions from peers, and email a copy to Dr. Eggena at [patrickeggena@yahoo.com](mailto:patrickeggena@yahoo.com). by August 20, 2017.
3. In addition to submitting a case study, Medical Students take a one-hour written essay examination which is proctored by an instructor and emailed to Dr. Eggena for grading by August 20, 2017.

**Dr. Eggena's Office hours** on "Google Meet" on Tuesdays from 3-4 pm EST as follows:

1. June 27 —Introduction to EKG
2. July 11 — EKG lab
3. July 18 — The Rider
- 4, July 25 —The Painter
5. August 1 —The Farmer
6. August 8 —Epistaxis

**Required Course Materials:**

***Course Requirements from the Apple iBook Store:***

1. Lectures in Cardiovascular Physiology, by Patrick Eggena, M.D. - \$9.99
2. Cardiovascular 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 .

***Requirements for Office Hours***

1. Download "Google Chrome" Browser (free) from internet to access "Google Meet" conference room. (A different link to enter each of the six sessions will be emailed to you.)
2. Kardia Mobile by AliveCor —Instant mobile EKG Reading —\$99 on Amazon. (Each participant will record her/his own EKG during the lab session. (Only the "Basic" EKG recording —not the "Premium Service".)

