



BI 698 Advanced Cardiovascular Physiology – The Heart and Vascular System

Dr. George Ordway

(2 credits) Sept 22, 2014 – Jan 31, 2015

Course Format and Description:

This unique course is designed to provide college-level instructors with an opportunity to develop their understanding of the anatomy and physiology of the cardiovascular system, including key cellular and molecular mechanisms responsible for function of the heart and blood vessels. The course also will include examples of pathophysiology that result in common acute and chronic cardiovascular diseases. Participation in the course will be **online only** with weekly directed readings and assignments that will be posted to a discussion board for instructor and peer review, along with regularly scheduled interactive conference sessions. *Cardiovascular Physiology* (7th ed.) by Mohrman and Heller will be used as the course text along with available internet resources and databases. In addition, selected articles from the primary literature will be used to help participants foster an appreciation of the research that has advanced our knowledge of cardiovascular physiology and pathophysiology. Participants also will complete a final project supporting the teaching of cardiovascular biology in a college-level anatomy and physiology course. The project may take a variety of forms; however, developing a case study or review article will be emphasized. A total of approximately 60 hours will be required to complete all course work. Grading will be on a pass/fail basis and evaluation will include successful completion of weekly assignments, pre- and post-course knowledge assessments, a final project, and participation in scheduled conference sessions. A pass grade will require 75% of a total of 100 points. This course will serve as the basis for future on-line-only offerings of advanced topics dealing with cardiovascular physiology and pathophysiology.

Topical Outline:

| <u>Dates</u> | <u>Topic</u> | <u>Reading¹</u> |
|---------------|--|----------------------------|
| Sept 22-26 | Course introduction; cardiovascular system overview | Chap. 1 |
| Sept 29-Oct 3 | Cardiac muscle cells; E-C coupling; automaticity | Chap. 2 |
| Oct 6-10 | Heart as a pump; cardiac output; valves and one-way flow | Chap. 3 |
| Oct 13-17 | ECG; rhythm disturbances | Chap. 4 & 5 |
| Oct 20-24 | Cardiac cycle; heart sounds and murmurs | Chap. 3 & 5 |

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| Oct 27-31 | Control of ventricular performance | Chap. 2 & 3 |
| Nov 3-7 | Review of a Starling experiment | Supplement 1 |
| Nov 10-14 | Regulation of peripheral blood flow | Chap. 6 & 7 |
| Nov 17-21 | Regulation of arterial blood pressure | Chap. 9 |
| Nov 24-28 | Thanksgiving Break | |
| Dec 1-5 | Coronary blood flow | Chap. 7 |
| Dec 8-10 | Coronary atherosclerotic heart disease and MI | Supplement 2 |
| Dec 15-19 | Case Study/Final Project Outline | |
| Dec 22-Jan 31 | Final Project | |

¹Readings will be from selected pages of the indicated chapters in the text, *Cardiovascular Physiology* (7th Edition) by David E. Mohrman and Lois Jane Heller (Lange Physiology Series – McGraw Hill) and the two supplemental papers.

Supplement 1 S. W. Patterson and E. H. Starling. On the mechanical factors which determine the output of the ventricles. *J Physiol* 48(5): 357-379, September 8, 1914.

Supplement 2 Elizabeth G. Nabel and Eugene Braunwald. A Tale of Coronary Artery Disease and Myocardial Infarction. *N Engl J Med* 366: 54-63, January 5, 2012.

Evaluation:

Grading will be on a pass/fail basis and evaluation will include successful completion of weekly readings and assignments, pre- and post-course knowledge assessments, a final project, and participation in scheduled conference sessions. A pass grade will require 75% of a total of 100 points.

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| Readings, assignments & conference sessions | 50 points |
| Pre- and post-course knowledge assessments | 10 points |
| Final Project | 40 points |
| Total | 100 points |

Weekly readings and assignments. Participants will be expected to complete the weekly reading assignments and associated Study Questions for the indicated chapters in the text. In addition, students will complete and post on the online discussion board answers to several integrative-type questions related to material covered that week and previously.

Pre- and post-course knowledge assessments. Participants will complete a brief exam of multiple-choice questions to assess pre- and post-course knowledge.

Final project. Participants will complete a final project supporting the teaching of cardiovascular biology in a college-level anatomy and physiology course. As indicated, the recommended format is a case study or review article appropriate for A&P faculty teaching undergraduate courses that enhances their understanding of key concepts related to cardiovascular physiology and/or pathophysiology. Other formats such as an inquiry-based lab activity, a problem set, or an interactive computer model or activity must be approved prior to the final day of the course. All projects will be posted on the discussion board for peer review and evaluation. The due date for the final project is January 31, 2015.

Conference sessions. Participants will contribute to regularly scheduled conference sessions, which will allow interactive exchange of course content.