MEDICAL AND MUSCLE CARDIOVASCULAR PHYSIOLOGY COURSE SYLLABUS

Course Number: GMS 6474
Credit Hours: 3 credit hours
Course Format: This online course is tailored for asynchronous distance learners.

COURSE DESCRIPTION

Medical Cardiovascular and Muscle Physiology (GMS6474) teaches the functions of muscle and the cardiovascular system of human body at a level required for clinical medicine and basic research in medical physiology. The course covers normal physiology, as well as selected diseases. Concepts are taught using a combination of lectures, functional genomics research assignments, online problem sets, and discussion prompts. The problem sets and discussions are designed to test your knowledge of the lectures, and keep you on a comfortable pace with the large amount of content. The research assignments are designed to help the student understand the integration of cardiovascular physiology with genetics, genomics, molecular biology, and cellular physiology as a basis for a better understanding of human disease. Each recorded lecture lasts between 20 and 30 min.

TARGET AUDIENCE

This course is designed to meet the needs of individuals wanting to pursue a career in medicine, biomedical research, or in teaching topics related to physiology and medicine. For example, this course is designed to provide critical knowledge for individuals who wish to teach cardiovascular physiology at the secondary and post-secondary levels. However, this course will also provide a foundation for students who are wishing to attain or enhance knowledge of medical cardiovascular and muscle physiology.

PREREQUISITES

This course requires a BA or BS and a strong science foundation with at least 5 full semester courses related to Biology, chemistry and/or physics. A minimum undergraduate GPA = 2.0 is required for admission. Co- enrollment or prior passing grade in GMS 6440 required for enrollment in this class.

CONTACTS

Erin Bruce, Ph.D., Lecturer, Department of Physiology and Functional Genomics. Please use the email function within Canvas to contact Dr. Bruce. A response should be expected within 1-2 business days.

SCHEDULE

This is a self-paced course that is offered in the fall, spring, and summer. There are problem sets and discussions due weekly, and 3 research assignments due throughout the semester.

COURSE GOALS

The goal of this course is for students to develop an understanding of the integrated functions of the cardiovascular and muscle systems in the human body; as well as "problem solving" and "critical thinking" skills in evaluating clinical situations. This course will provide: 1) a foundation understanding of the basic functions of the muscle and the human cardiovascular system; 2) integration of individual facts for the purposes of understand how organ systems work independently and interdependently in the body; 3) examples of clinical situations in which integration of muscle and cardiovascular knowledge is used to diagnose and treat patients.

LEARNING OUTCOMES

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

1. Describe the structure and functions of skeletal, cardiac muscle, and smooth muscle during contraction and relaxation. Apply this knowledge to scenarios of exercise and disease. This will be assessed by weekly problems set with multiple choice and short answer questions, and discussion prompts.

2. Describe the normal function and regulation of the cardiovascular system, and explain the many adaptations that occur in response to exercise, the environment, or disease. This will be assessed by weekly problems set with multiple choice and short answer questions, and discussion prompts.

3. Apply the knowledge of these systems, while explaining how they act in an integrated manner to regulate overall body functions. This will be assessed by weekly problems set with multiple choice and short answer questions, discussion prompts, research assignments, and a cumulative multiple choice examination.

4. Describe how failure of these normal physiologic functions and integrations are associated with some diseases. This will be assessed by research assignments.

LEARNING RESOURCES

1. Recorded video lectures with PowerPoint presentations will be provided on the course website.

2. Recorded video clinical correlation(s) and/or case studies relating to the basic science material.

3. Lecture notes for each video lecture are available as PDF downloads enabled for direct note taking.

4. Recommended text: Student may wish to supplement the course videos and PDF handout by purchasing an online version of "*Berne & Levy Physiology, 7th Edition*" 2018. Author: Bruce M. Koeppen & Bruce A. Stanton. ISBN: 9780323393942.

5. Recommended Supplements: All UF students have free online access to the resources available at Access Medicine (accessmedicine.mhmedical.com) through UF libraries.

   "*Ganong's Review of Medical Physiology, 25e"* 2016. Authors: Kim E. Barrett, Susan M. Barman, Scott Boitano, and Heddwen L. Brooks. ISBN: 9780071825108

   "Cardiovascular Physiology, 9e" 2018. Mohrman and Heller. **Lange** McGraw-Hill Education. ISBN: 9781260026116

COMMUNICATION WITH FACULTY

If you have questions about the material or the course, please contact the course director (Dr. Erin Bruce) using the email function in Canvas.

STRUCTURE OF CONTENT

The course content is structured into sub-topical groups of lectures that are accompanied by Discussion Prompts and Problem Sets. Discussion prompts are designed to promote critical thinking of the content and prepare students for the problem sets. Problem sets are designed to help the student master the course material. These problem sets and discussion prompts are completed as take-home assignments (open book and open notes), but are graded. There are 3 Functional Genomics Research Assignments, which are designed to help the student integrate the concepts of physiology with functional genomics and human diseases of genetic origin. These self-guided research assignments are also completed as take-home assignments and are also graded.

COURSE CALENDAR AND RECOMMENDED TIME MANAGEMENT

The videos and corresponding PDF notes are available throughout the entire time the course is open, from the first day through the end of the course on the day the grades are reported to the Registrar. However, the Exam is open ONLY during the window of time shown on the website. The course content lecture titles should be viewed in the order shown later in this syllabus. Discussions and Problem Sets are due weekly as there is a large amount of content, and a weekly pace helps students keep up with the material. Please note the due dates in your calendar.

EXAMINATION AND GRADING

There will be one multiple choice examination covering the material taught in the lectures. The exam will be monitored by ProctorU, a UF chosen service that allows the students to complete their exams at home while still ensuring academic integrity. Students will take the exam at a computer that meets the technical requirements of ProctorU, including a web cam and microphone (please review the technical requirements found on the ProctorU support page). Students will make the arrangements for exam proctoring. The exam may be taken any time during the window of availability; however, it can only be taken once.

We recommend you make an appointment with ProctorU at least two weeks in advance of your preferred exam date. All costs of the exam are covered in the registration costs. Scores are reported as a percent.

The points used to compute final grades will be determined after all assignments and the exam have been completed.

GRADING SCALE:

A numerical grade will be given at the end of the course and will be scored as follows, per University of Florida standards:

93-100% = A
90-92% = A-
87-89% = B+
83-86% = B
80-82% = B-
77-79% = C+
73-76% = C
70-72% = C-
67-69% = D+
63-66% = D
<63% = E

Problem Sets	30% of the total grade
Functional Genomics Research Assignments	30% of the total grade
Final Exam	30% of the total grade
Discussion Participation	10% of the total grade

GRADING POLICY:

There are no make-up exams unless otherwise granted by the course coordinator prior to an examination date. Failure to take an exam without prior permission from the course coordinator will be recorded as 0.

ACADEMIC HONESTY

Please review the complete policy of the University of Florida regarding academic dishonesty, found in the online student handbook at: http://graduateschool.ufl.edu/media/graduate-school/pdf-files/handbook.pdf .

Students are expected to abide by the University of Florida Academic Honesty Guidelines and to adhere to the following pledge:

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

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."

IMPORTANT NOTICE ABOUT PLAGIARISM

Plagiarism is not tolerated at the University of Florida. Plagiarism may be punishable by expulsion from the course or the certificate program. If the plagiarism is detected after the certificate has been awarded, the certificate may be rescinded. The University of Florida has an honor code that defines plagiarism as follows: Section 3a: Plagiarism.

A student shall not represent as the student's own work all or any portion of the work of another. Plagiarism includes but is not limited to:

1. *Quoting oral or written materials including but not limited to those found on the internet, whether published or unpublished, without proper attribution.*
2. *Submitting a document or assignment which in whole or in part is identical or substantially identical to a document or assignment not authored by the student.*

Please note that intent is not an element of this kind of violation, so it is important to take great care to complete the written assignments in your own words.

For a good discussion about plagiarism and how to properly cite your sources, please visit: http://mediasite.video.ufl.edu/Mediasite/Play/adaa44500eaf460a84f238e6b9a558f9

For a complete description of the UF Honor Code and procedures, please visit: https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/

COURSE EVALUATION POLICY

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. 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 https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

Medical and Cardiovascular Physiology (3 credit Hours)

Module 1: muscle Structure, Function, and Regulation

1. Structure of Muscle I, II, III
2. Muscle Function I, II, III
3. Muscle Force Modulation I, II, III, IV
4. Comparing Skeletal and Cardiac Muscle I, II, III, IV
5. Comparing Skeletal, Cardiac, and Smooth Muscle I, II, III
6. Clinical Correlation: Muscular Dystrophy I, II, III

Module 2: Introduction to Cardiovascular Physiology

1. Introduction to Cardiovascular Physiology I, II, III

Module 3: Cardiac Ion Channels

1. Cardiac Ion Channels I, II, III, IV

Module 4: Electrocardiogram

1. Introduction to ECG I, II, III
2. ECG and Arrhythmias I, II, III
3. ECG and the MEA I, II, III

Module 5: The Working Heart

1. Cardiac Cycle I, II
2. Cardiac Output I, II, III

Module 6: Hemodynamics

1. Hemodynamics I, II, III, IV, V, VI
2. Venous Return I, II

Module 7: Special Circulations

1. Fetal Circulation I, II, III
2. Pulmonary Circulation I, II, III, IV

Module 8: Neural Control Mechanisms

1. Neural Control Mechanisms I, II, III, IV, V, VI

MODULE 9: VASCULAR CONTROL MECHANISMS

1. Local Control of Blood Flow I, II, III
2. Microcirculation I, II, III
3. Regulation of Arterial Pressure I, II, III

MODULE 10: INTEGRATION

1. Integrated Control of Cardiovascular System I, II, III, IV
2. Integration of Muscle and Cardiovascular Physiology I, II
3. Exercise and Cardiovascular Function I, II, III

MODULE 11: SPECIAL CIRCUMSTANCES

1. Clincial Correlation: Shock and Heart Failure I, II
2. Pregnancy: A view from the fetus I, II
3. Aging and the Cardiovascular System I, II