Fundamentals of Medical Physiology

Course Syllabus

Course Number: **GMS 6440**

Credit Hours: 1 credit hour

Course Format: This online course is tailored for asynchronous distance learners.

COURSE DESCRIPTION

Fundamentals of Medical Physiology (GMS6440) teaches the basic functions of the human body at a level required for clinical medicine and basic research in medical physiology. This is an introductory course to be taken before or simultaneous with courses on specific organ systems physiology. The course covers normal physiology, as well as selected diseases. Concepts are taught using a combination of lectures, online workshop, and online problem sets. The workshops are designed to help the student understand the integration of physiology with genetics, genomics, molecular biology, and cellular physiology as a basis for a better understanding of human disease. The ultimate goal is for students to develop an understanding of the integrated functions of the normal body and "problem solving" and "critical thinking" skills in evaluating clinical situations. 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 physiology at the secondary and post-secondary levels. However, this course will also provide a foundation for students who wish to take one or more of the following courses: GMS 6401, GMS 6402, GMS 6419, GMS 6474, and GMS 6479.

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.

CONTACTS

Tanja Taivassalo, PhD, Associate Professor of Physiology and Functional Genomics. Please use the email function within Canvas to contact Dr. Taivassalo.

SCHEDULE

This is a self-paced course that is offered in the spring, fall and summer.

COURSE GOALS

Physiology is the science of how the body functions, and is the basis for understanding modern clinical medicine and the biomedical sciences. This course will provide: 1) a foundation understanding of basic physiological processes; 2) integration of individual facts in order to understand how organ systems work independently and interdependently in the body. One example of this integration is in the understanding of the role of the autonomic nervous system in physiological control mechanisms.

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

1. Understand the basics of human physiology, anatomy and common disease in each organ system.
2. Understand the normal functions of ion channels and transporters at a level required for an understanding of clinical medicine.
3. Understand membrane potentials.
4. Understand the physiology of body fluids and their control mechanisms.
5. Understand the autonomic nervous system.
6. Understand how physiological processes can be manipulated genetically.
7. Demonstrate the ability to apply physiological principles of clinical and basic science relevancy by multiple choice examinations, workshops, and quiz exercises.

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 text: "*Medical Physiology: The Big Picture*". Authors: Johnathan Kibble & Colby Halsey. ISBN: 9780071485678.
   Free online: https://accessmedicine.mhmedical.com/book.aspx?bookid=1291.
6. Recommended text: "*Ganong's Review of Medical Physiology, Twenty-Fifth Edition*" 2016. Authors: Kim E. Barrett, Susan M. Barman, Scott Boitano, & Heddwen L. Brooks. ISBN: 9780071825108.
   Free online: https://accessmedicine.mhmedical.com/Book.aspx?bookid=1587.

COMMUNICATION WITH FACULTY

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

STRUCTURE OF CONTENT

The course content is structured into sub-topical groups of lectures that are accompanied by Problem Sets. Problem Sets are designed to help the student master the course material. These problem sets are completed as take-home assignments, but are graded. There is one Functional Genomics Research Assignment, which is designed to help the student to understand how to generate mouse models of human diseases of genetic origin. The Research Assignment is also completed as a take-home assignment and is also graded.

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. Students will make the arrangements for exam proctoring. The exam may be taken any time during the window of availalability; 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

The final examination accounts for 45% of the total grade, Functional Genomics Research Assignment 20% of the total grade, and Problem Sets 35% of the 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 complete description of the UF Honor Code and procedures, please visit: https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/

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

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/.

FUNDAMENTALS OF PHYSIOLOGY AND FUNCTIONAL GENOMICS (1 credit hour)

Lecture 1: Introduction and Overview
Lecture 2: Overview of Human Body I
Lecture 3: Overview of Human Body II
Lecture 4: Transporters, Pumps, and Channels I
Lecture 5: Transporters, Pumps, and Channels II
Problem Set 1: Overview of Human Body and Transporters

Lecture 6: Physiology of Voltage and Concentration Gradients I
Lecture 7: Physiology of Voltage and Concentration Gradients II
Problem Set 2: Voltage and Concentration Gradients.

Lecture 8: Body Fluids I
Lecture 9: Body Fluids II
Problem Set 3: Body Fluids

Lecture 10: Receptors and Signaling I
Lecture 11: Receptors and Signaling II
Lecture 12: Autonomic Nervous System I
Lecture 13: Autonomic Nervous System II
Lecture 14: Autonomic Nervous System III
Problem Set 4: Signaling

Lecture 15: Genetic Approaches to Physiological Problems I
Lecture 16: Genetic Approaches to Physiological Problems II
Problem Set 5: Genetic Approaches

Functional Genomics Research Assignment: Knockout Mouse Technology

Final Examination