

# Advances in Hypertension Research

## Course Syllabus

**Course Number:** GMS 6413

**Credit Hours:** 2 credit hours

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

### **COURSE DESCRIPTION**

This is an advanced graduate class, also suitable for postdoctoral students, which will expose students to important, current aspects of Hypertension research. It begins with clinical trials and pharmacogenomics, and then considers mono- and polygenic forms of hypertension, as well as dietary/environmental influences leading to salt dependent hypertension/metabolic syndrome/type 2 diabetes. The course continues with neural control of BP and stress-induced hypertension, then endothelial dysfunction/inflammation in hypertension. The course concludes with hypertension in pregnancy and fetal programming of hypertension. The teaching faculty are drawn from a wide range of disciplines and are all actively involved in research on their areas of expertise.

The structure of this course involves 1) Lectures by research faculty on areas of their expertise; 2) assigned readings; 3) examinations on the lecture material; and 4) a term paper.

### **TARGET AUDIENCE**

This course is designed for individuals wishing for an in-depth understanding of current state of hypertension research. This course will be useful for students who have not met the entry requirements for medical school and who are interested in a career in cardiovascular and/or nephrology medicine, and for those wishing to enhance their applications into Masters and Ph.D. programs in the medical sciences in cardiovascular research.

### **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. In addition, Principles of Medical Physiology (GMS6400) is required.

To access the journal articles from off-campus, students must use UF's VPN (virtual private network).

Instructions and installers for various operating systems can be found at:

<https://net-services.ufl.edu/provided-services/vpn/clients/> (use your Gatorlink account to log in).

To view the online videos, a high-speed internet connection is required, as well as a web browser with the latest Microsoft Silverlight plugin installed.

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## **CONTACTS**

The course coordinator is Abdel Alli, Ph.D., MPH, Assistant Professor of Physiology and Functional Genomics. Dr. Alli can be contacted using the email function in Canvas.

## **SCHEDULE**

This is a semester long course that is offered each semester. It is designed to be taken as part of the Medical Physiology Certificate course and should be preceded by GMS 6400C, GMS6410, and GMS6414. Although the course can be taken concurrently with GMS6410 and/or GMS6414.

## **COURSE GOALS**

Hypertension is a multifactorial disease and this course explores: 1) some of the current treatments available; 2) how cardiovascular, neural, endocrine, and renal function all influence blood pressure control; 3) how vascular endothelial dysfunction and inflammation are associated with hypertension; 4) how genetic, epigenetic, and environmental factors can determine the level of blood pressure; 5) the complexity of the factors that lead to hypertension.

## **LEARNING OUTCOMES**

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

1. Understand how many individual body systems cooperate in the control of the normal blood pressure.
2. Understand how impairments in cardiovascular, neural, endocrine, and/or renal function can lead to hypertension.
3. Understand why the majority of hypertension is classified as “essential” or of unknown origin.
4. Understand the role of genetic, epigenetic, and environmental factors in the development of hypertension.
5. Develop an in-depth understanding of some of the research contributions that are shaping our current views on high blood pressure causes and consequences.

## **LEARNING RESOURCES**

1. Recorded lectures with PowerPoint presentations and PDF handouts of the lectures (which may include additional explanatory material) is provided on the course website.
2. Required text: There is no required textbook although general background information can be obtained the online version of "*Berne & Levy Physiology, 7th Edition*" 2018. Author: Bruce M. Koeppen & Bruce A. Stanton. ISBN: 9780323393942. This is the required textbook for the preceding “Principles of Medical Physiology course (GMS 6400C)”.

## EXAMINATIONS AND GRADING

There are 2 examinations. Both exams are open book. You will receive an MS Word document with questions and space for answers. This will be provided 2 ½ weeks before the exam is due.

You will be assigned a topic for an assigned essay. You will be expected to write a short essay (5-10 pages of text, double spaced; no more than 30 references). The topic will be assigned to you, but you will also be given the opportunity to choose your own topic with the approval of the course director.

A numerical grade will be given for each graded component of the course.

### Grading scale:

A numerical grade will be given at the end of the course and will be scored as follows:

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

## GRADING POLICY

The 2 open book exams will consist of “short note” questions, and each is worth 35% of the final grade. The assigned essay will be worth 30% of the final grade.

## ACADEMIC HONESTY

Please review the complete policy of the University of Florida regarding academic dishonesty, found in the online student handbook at:

<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>

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, 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/>.

## GMS 6413 – Advances in Hypertension Research

2 credits

### Lectures

1. Introduction to GMS6413	Dr. Baylis
2. Clinical Trials for Therapy	Dr. DeHoff
3. Pharmacogenomics and Hypertension	Dr. DeHoff
4. Metabolic Syndrome and Diabetes	Dr. DeHoff
5. Single Gene Polymorphisms and Hypertension	Dr. Wingo
6. The Kidney in Hypertension	Dr. Baylis
7. Populations and Hypertension	Dr. Segal
8. Salt Dependent Hypertension	Dr. Weiner
9. Stress-Induced Hypertension	Dr. Scheuer
10. Endothelial Dysfunction in Hypertension	Dr. Christou
11. Fetal Programming in Hypertension	Dr. Keller-Wood
12. Hypertension in Pregnancy	Dr. Conrad
13. Oxidative Stress	Dr. Sumners

Examinations: There will be 2 short note examinations that will be take-home examinations based on the lectures. The first exam will cover lectures 1-7, and the second examination will cover lectures 8-12.

Term paper (assigned essay): Please use the following as a guide for your term paper. Remember that this is not an examination. It is a paper, in which you will search the appropriate literature and cite primary literature or reviews (not basic textbooks). You are limited to a total length (without references) of 5-10 pages double spaced, and you are limited to 30 references.

Assigned topic for term paper

Increased activity of the renin-angiotensin-aldosterone system contributes to the etiology of many experimental models of hypertension, and drugs that antagonize components of the system play an important role in the treatment of hypertension in humans.

For this assignment:

**Explain the roles of the systemic renin-angiotensin- aldosterone system and tissue renin-angiotensin systems in the control of blood pressure and as targets for the treatment of hypertension.**

Please use at least 3 references that have been published within the last 3 years.

Your discussion should be grounded in your basic knowledge of physiology and supported by relevant scientific literature.

## EXPECTATION OF PROFESSIONALISM

**Student Learning Objective (SLO):** Students will conduct themselves in a professional manner in all aspects of the course, as described below.

The University of Florida College of Medicine is committed to developing and nurturing professionalism in its learners. Specifically, the following areas are emphasized in our interactive program:

1. Honesty
2. Respect
3. Caring
4. Work Ethic
5. Reflection and self-assessment
6. Seeking excellence

Professionalism is also a component of the curriculum and academic expectations for this program. Accordingly, the following aspects of a learner's conduct will be considered as part of the learner's grade,

1. Respect for students, faculty, and staff
2. Collegiality and collaboration with others
3. Demonstrated engagement in all parts of the learner's curriculum, including professional growth and development
4. Positive response and receptiveness to feedback from faculty
5. Constructive approach to conflict resolution that avoids disruption
6. Punctuality in relation to College activities and project/assignment deadlines

In instances where a lack of professional behavior is deemed to have potentially occurred, the impact of said behavior on grading will be made collectively by the Course Director, the Program Director, and the Department Chair. Additionally, unprofessional conduct that is disruptive to the academic or professional environment may be referred to appropriate University officials to review for potential student conduct violations, that may lead to disciplinary action.

Professionalism is determined by the following sources of assessment:

1. The faculty's interaction with the student.
2. Observation by faculty of a student's interaction with other students.
3. Observation by faculty of a student's interaction with other faculty and staff (e.g., secretaries and assistants).
4. Reports of student interactions by staff (e.g., secretaries and assistants).
5. Reports of student interactions with their peers.