

## University of Florida Department of Physiology and Aging

**GMS 6414 Advanced Renal Physiology and Pathophysiology - Course Syllabus Course Number:** GMS 6414

**Credit Hours:** 2

**Format:** Online, asynchronous

**Instructor:** Peter Sayeski, PhD, Department of Physiology and Aging

**Course Administrator:** Taylor Greene, Academic Specialist III, Department of Physiology and Aging

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### Course Description

This is an advanced graduate class, also suitable for postdoctoral students, which will expose students to several aspects of kidney function, as follows: Physiological control of glomerular filtration and glomerular function in renal disease; regulation of renal sodium excretion; morphology of renal transporters; renal mechanisms of acid--base balance; the renal physiologic responses to normal pregnancy. The teaching faculty is drawn from a wide range of disciplines, and all are actively involved in research on their areas of expertise.

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### Learning Outcomes

By course completion, students will:

1. Understand how the renal circulation and the tubular epithelium play unique and interdependent roles in the regulation of body fluid balance and composition.
  2. Understand the hemodynamic control of GFR and that nitric oxide (NO) and angiotensin II (Ang II) exert opposing physiological actions. Also, to appreciate how an imbalance between NO and Ang II contributes to chronic kidney disease.
  3. Understand the consequences of a loss of renal function and how this may progress in chronic kidney disease.
  4. Understand how the collecting duct plays a key role in the final regulation of total body
  5. Understand the importance of ammonia transporters in the renal mechanism of acid base balance.
  6. Learn how renal hemodynamics and sodium balance are controlled in normal
  7. Develop and in depth understanding of some of the research contributions that are shaping our current views on kidney physiology
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## **Course Goals**

The kidney is the primary regulator of all the body fluid compartments and controls both volume and composition. The course explores: 1) the mechanisms by which filtration of fluid occurs at the glomerulus; 2) some current ideas on the causes of progression of chronic kidney disease; 3) molecular aspects of structural and functional regulation of renal sodium excretion; 4) advances in the molecular understanding of the kidney and acid base balance; 5) the complex renal

adaptations that occur in renal hemodynamics and sensing and control of sodium balance during normal pregnancy.

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## **Target Audience**

This course is designed for individuals wishing for an in---depth understanding of kidney physiology and pathophysiology. 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 renal research.

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## **Prerequisites**

BA/BS with at least five science courses in biology, chemistry, and/or physics; minimum GPA 2.0. Prior completion of Principles of Medical Physiology GMS 6400 required.

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## **Course Contacts**

Instructor: Peter Sayeski, PhD, (Email via Canvas, response in 1-2 business days)

Course Administrator: Taylor Greene (Email via Canvas, response 1-2 business days)

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## **Schedule**

Self-paced with weekly lectures, two open-book multiple-choice exams, and a research term paper.

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## Learning Resources

- Recorded lectures and handouts (PDF)

### Recommended Texts (not required, but highly recommended):

1. "*Ganong's Review of Medical Physiology, 26th Edition*" Authors: Kim E. Barrett, Susan M. Barman, Heddwen L. Brooks, & Jason X.J. Yuan. ISBN: 9781260122404.

**Free online:** <https://accessmedicine.mhmedical.com/book.aspx?bookid=2525>.

2. "*Berne & Levy Physiology, 7th Edition*" 2018. Authors: Bruce M.Koeppen & Bruce A. ISBN: 9780323393942.
3. Vander's Renal Physiology, 10th Edition, Douglas Eaton, John P. Pooler, 2023, 2018 McGraw Hill. ISBN 978-1-264-27852-7

Access free online:

<https://accessmedicine.mhmedical.com/books.aspx?view=library&categoryid=2188>

[Links to an external site.3](#)

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## VPN: Important instructions for getting to the reading materials linked in the course:

Many of the links to the course readings are journal articles, books and other items held by the UF Libraries. To get to those materials you must first log into a secure connection called a virtual private network or VPN. Once you are logged into the UF VPN, go back into the course and click on the reading links.

How to install the UF VPN:

1. [Review the instructions](#)
- [Links to an external site.](#) on how to install the VPN client for your
- [Download the latest Cisco Anyconnect client](#)
2. [Links to an external site.](#) --- select from the list the one that's appropriate for your computer's operating You will be prompted to enter your Gatorlink login credentials (Once installed it will automatically update, so no need to do additional downloads).
3. Open the Anyconnect client and log in with your Gatorlink credentials whenever you need to get to (It is preferred that you use the Anyconnect client you downloaded, but if you are ever in a pinch and can't get to the Anyconnect client, you can log into VPN from the web,

at <https://vpn.ufl.edu>

[Links to an external site.](#))

4. Log into the course in Canvas at <http://elearning.ufl.edu>
4. [Links to an external site.](#) and click on the links to the reading

**Borrowing from the UF Library:** Distance learners may borrow materials from the UF Libraries. They may also borrow from associated non-UF libraries using Interlibrary Loan (ILL). See the main library site for distance learners at <http://guides.uflib.ufl.edu/distancelearne>

[Links to an external site.](#)rs. See more on ILL -- including an FAQ specially for distance learners --at <http://cms.uflib.ufl.edu/accesssupport/InterlibraryLoan>

[Links to an external site.](#).

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## Course Structure

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.

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## Course Schedule

**Unless otherwise noted, all assignments are due on the dates specified in the course Assignment page.**

Syllabus Quiz - This is a required **ungraded** assignment that ensures you have read the syllabus in its entirety and understand what is required of you as a student in this course. You will not be able to access the rest of the course assignments until you have successfully completed the syllabus quiz.

Lecture	Lecture Title	Instructor
1	Recent Advances in Understanding Renal Anatomy	Dr. Gumz
2	Renal Hemodynamics I	Dr. Kolli
3	Renal Hemodynamics II	Dr. Kolli
4	Circadian Clock and Kidney Function	Dr. Gumz
5	Renal Sodium Transport	Dr. Gumz

6	Calcium Homeostasis MCQ Exam # 1 (Lectures 1-6)	Dr. Canales
7	Phosphate Homeostasis	Dr. Canales
8	Acid Base Balance	Dr. Hatamizadeh
9	Nitric Oxide and Angiotensin II in the Control of Renal Hemodynamics	Dr. Kolli
10	Immunology	Dr. Yogesh
11	Acute Kidney Injury (AKI)	Dr. Yogesh
12	Chronic Kidney Disease (CKD)	Dr. Kolli
13	States of Dysregulated Sodium Handling MCQ Exam # 2 (Lectures 7-13) Essay Term Paper	Dr. Gumz

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## Technical Requirements

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

**Technical Support:** If you have technical difficulties with downloading and accessing course files or ProctorU scheduling, email the academic administrator, Taylor Greene by Canvas email with a detailed description of the problem. If your technical issues are trouble with accessing the VPN or your UF account, please contact the UF Help Desk at 352-392-4357.

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## Grade Breakdown:

- MCQ Exam #1: 30%
  - MCQ Exam # 2: 35%
  - Essay Term Paper: 35%
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## Grading Scale:

A 93-100% | A- 90-92.99%

B+ 87-89.99% | B 83-86.99% | B- 80-82.99%

C+ 77-79.99% | C 73-76.99% | C- 70-72.99%

D+ 67-69.99% | D 63-66.99% | E <63%

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## MCQ Exams & Term Paper

There are two open-book multiple-choice question (MCQ) examinations:

- **MCQ Exam 1** covers material from Lectures 1–6 and is worth 30% of the final
- **MCQ Exam 2** covers material from Lectures 7–13 and is worth 35% of the final

The term paper, worth 35% of the final grade, will be based on an assigned topic. However, you may propose your own topic with the course director's approval. The paper should be 5–10 pages of double-spaced text, with no more than 30 references.

A numerical grade will be assigned to each graded component of the course.

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## Late Work Policy

For assignments that require manual grading (e.g., research papers, projects), the following will apply:

- Unless you have an approved excused absence, a 10% deduction will be applied for each week the assignment is late.
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## Accommodations for Students with Disabilities

Students requesting accommodations must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student, who must then provide this documentation to the course director when requesting an accommodation. Contact the Disability Resources Center, <https://dso.ufl.edu/>

[Links to an external site.](#) for information about available resources for students with disabilities.

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## Using, Citing, and Formatting References

As you go through the course, you will consult with many different types of sources to obtain supporting data or information for any points or arguments you make in your assignments. You are required to cite your sources when you do the following:

1. Refer to facts or quantitative data
2. Paraphrase another author's view point, idea, or theory

### 3. Quote an author directly

Your sources may include your online lecture notes from within Canvas, academic or scholarly journals, print or online newspapers, magazines, books, videos, apps, blogs, podcasts online discussion forums such as Reddit's AMA, or personal communication with an expert or other person. When citing references, in each case you are required to do six things:

1. Include the source of the information you are presenting
2. Cite the source within body of your discussion, essay or other text (this is known as in-text citation)
3. Paraphrase where necessary (see note on paraphrasing below)
4. Put language taken word-for-word from another source in quotation marks or block quotes
5. List your references at the bottom of your discussion, essay or other text
6. Format the references (both the in-text citation and the reference list) according to the required style convention.

To properly cite and format a reference, find as many details about the source as possible and carefully consider the following (Paiz et al., 2015):

**In-text citation:** Sources must be cited within the body of the text for any information or data presented in support of arguments or examples given. In-text citations go at the end of a sentence. They generally include the author's last name, followed by a comma, and the year of publication, all enclosed in parentheses, e.g. (Goldman, 2012), but there is some variation depending on the type of source and the number of authors.

**Paraphrasing:** If you are referencing ideas or information from another work and you feel the need to cite or quote the author in each and every line of your body of text, stop! Instead, you should paraphrase the work and include an in-text citation the first time the work is mentioned.

Paraphrasing means synthesizing an author's original statements and then saying them in your own words (Purdue Online Writing Lab [OWL], 2014). Visit the [Purdue OW](#)

[Links to an external site.](#)L for tips on effective

paraphrasing.

**Quoting:** If you do have the need to take some language word-for-word from another source, put it in quotation marks or block quotes.

**Reference list:** This should be ordered alphabetically by the last name of the first person listed on the paper or other source material (APA, 2009).

**Formatting:** For instructions and detailed examples of how to format in-text citations and reference lists for a variety of source types, consult the [Purdue OWL APA style guide](#)

[Links to an external site.](#)e. You may also contact the UF reference librarian for assistance (see the library resources section in your course syllabus).

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## **Academic Honesty**

Online classes are subject to the same requirements of academic honesty as all on-campus classes. Please review and be familiar with the Student Conduct Code and Student Honor Code, which can be found at <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct->

[Links to an external site. code/](#)

[Links to an external site.](#) UF students are bound by The Honor Pledge which states, “We, the members of the

University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. 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.” The Student Honor Code specifies a number of behaviors that violate the code, and the possible sanctions. Furthermore, you are obliged to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult the instructor or course coordinator.

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## **Plagiarism**

Plagiarism is presenting another person's work as your own. Cheating and plagiarizing are against the University of Florida Student Conduct Code. Submissions in this course are checked via Turnitin (<http://www.turnitin.com>

[Links to an external site.](#)), a service that compares documents with each other as well as with pages on the Internet and with other assignments previously submitted by other students. If portions of your document were directly copied and pasted from another student’s assignment (past or present) or from the Internet, that constitutes plagiarism. Any form of plagiarism will be investigated as set out by the University of Florida Student Conduct Code. From your citations and references, the reader of your paper should be able to tell the source of all your outside information. It may be acceptable to place a few comments in quotes with a citation, but it is never acceptable to copy and paste a long string of text from a source, even if it is cited and even if you change a few words. Anything from another source that is not in quotations must be paraphrased. Also, please note that UF policies require that you create original work for each course. Thus, students are not permitted to submit papers they prepared previously outside of this class, such as for high school or other UF courses.

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## **Artificial Intelligence (AI) Use Policy:**

For this graduate level course, GMS6401 Medical Renal Physiology, it is imperative that all work submitted is your own. The use of AI tools, including but not limited to, generative language models, code generation tools, and automated essay writer, is strictly prohibited for all assignments. Any work found to have been produced with the aid of such AI tools will result in a zero for that assignment. This policy is in place to ensure the integrity of your learning experience and to respect the academic standards of this course. If you have any questions about this policy or need assistance with your work, please do not hesitate to reach out to your instructor.

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## **GatorEvals UF Faculty Evaluation**

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/>

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## **Professionalism Expectation**

Maintain honesty, respect, responsibility, and integrity in all course interactions.

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## **Course Disclaimer**

This course (including all materials, ideas, research or clinical observations written or electronically conveyed) is for educational purposes only. The course does not substitute for and does not

provide clinical or treatment recommendations or endorsements for the treatment of any individual

person's condition.

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**Syllabus changes:** You will be notified if there are major changes to the syllabus.

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