

PCB 4723C: Physiology & Molecular Biology of Animals
Fall 2024 – All Sections, version 1.1

COURSE OVERVIEW AND OBJECTIVES

In this course, you will learn physiology at the molecular, cellular, tissue, and systemic levels emphasizing application of concepts and analysis of information over recalling of facts. The course is not a survey of how different animals function, it is an in depth exploration of core unifying principles that are broadly applicable to animals and humans. This approach is well suited for students preparing to enter health professional schools (e.g., pre-med, pre-vet, pre-dental) and graduate school.

The ‘discussion/lab’ portion of the course will utilize discussions, a “hands-on” exercise, problem sets, and team projects to reinforce principles discussed in lectures, promote problem-based learning, introduce students to primary scientific literature, and give students experience working in teams and communicating scientific information.

Recommended prerequisites: General biology (BSC 2010&2011), general chemistry (CHM 2046/2046L), and general physics (either PHY 2048/2048L or PHY 2053/2053L), all with a grade of at least C. Genetics, cell biology, and biochemistry are also recommended. 4 Credit hours.

INSTRUCTORS

Lecturer

Keith P. Choe, PhD, Bartram Hall room 321A (inside lab), office hours TBA. Contact via Canvas mail is highly-preferred.

Teaching Assistants

Undergraduate Teaching Assistants for lecture:

Maria Olivera, office hours TBA

Shai Augoshe, office hours TBA

Graduate TAs for discussion sessions: Katheryn Feerst (kathrynfeerst@ufl.edu), Joseph Miguez (j.miguez@ufl.edu)

WEEKLY SCHEDULE – LECTURES MCCA G186 T 7 AND R 7-8

| Approximate Week | # | Topics | Reading* |
|------------------|----|---|-----------------|
| 8/19 | 1 | 1-Homeostasis & Integration | Chap. 1 |
| 8/26 | 2 | 2-Cell & Molecular Physiology; 3-Approaches to Physiology | Chap. 2, 3 |
| 9/2 | 3 | 3-Approaches to Physiology | None |
| 9/9 | 4 | Catch-up & Review; Exam 1 R 9/12 | |
| 9/16 | 5 | 6-Transport of solutes and water | Chap. 3 |
| 9/23 | 6 | 7-Salt and water physiology; 8-Urine dilution | Chap. 13, 12 |
| 9/30 | 7 | 9-Urine concentration | Chap. 12, 7, 13 |
| 10/7 | 8 | Catch-up & Review; Exam 2 R 10/10 | |
| 10/14 | 9 | 11.1-Membrane potentials and Neurons | Chap. 3, 4 |
| 10/21 | 10 | 11.2 –Synapses; 12-Nervous Systems | Chap. 5 |
| 10/28 | 11 | Catch-up & Review; Exam 3 R 10/31 | |
| 11/4 | 12 | 15-Endocrine control of stress; 16-Muscle physiology | Chap. 7 |
| 11/11 | 13 | 16-Muscle physiology; 17-Cardiovascular physiology | Chap. 8 |
| 11/18 | 14 | 17-Cardiovascular physiology | Chap. 8 |
| 12/25 | 15 | Holiday | Chap. 9 |
| 12/2 | 16 | 17-Cardiovascular physiology; Catch-up | Chap. 9 |
| 12/9 | 17 | Exam 4 W 12/11 7:30 AM (yikes) – finals week | |

Lecture recordings: https://mediasite.video.ufl.edu/Mediasite/Channel/pcb4723_fall2024/browse/null/most-recent/null/0/null

*Note that chapters are listed only as a rough guide; we will not cover all sections or material in each chapter. Use your judgement to read the sections of the book that are most relevant to the study questions and learning objectives.

Exam times: Exams 1, 2, and 3 are in class on Thursdays in class according to the schedule above. Exam 4 is on the Wednesday of finals week (not cumulative).

GRADING

| | |
|--|-------------|
| Exam 1 | 50 |
| Exam 2 | 50 |
| Exam 3 | 50 |
| Exam 4 | 50 |
| In class response questions | *50 |
| Simulations and exercises | **30 |
| Problem sets | **30 |
| <u>Literature presentation and participation</u> | <u>**50</u> |
| Total | 360 |

Exams will test your understanding and application of concepts presented in lecture, in study questions, and presented in the discussion sessions. There will be many “connect the dots” questions and few based on regurgitation of material.

Up to 10 points of extra credit may be given at the discretion of instructor.

*The total number of in class response questions will not be known until the end of the course, and your total ‘clicker’ points earned will be calculated as a percentage of 100 points. You can drop 25% of your incorrect and missing response questions. It is YOUR responsibility to budget these for illnesses, post-graduate school interviews, university sanctioned events, religious holidays, internet problems, dead batteries, etc...

**Discussion points will be covered by your graduate teaching assistants.

Grading scale

| low | high | letter |
|-------|--------|--------|
| 94.00 | 100.00 | A |
| 90.00 | 93.99 | A- |
| 87.00 | 89.99 | B+ |
| 84.00 | 86.99 | B |
| 80.00 | 83.99 | B- |
| 77.00 | 79.99 | C+ |
| 70.00 | 76.99 | C |
| 67.00 | 69.99 | D+ |
| 64.00 | 66.99 | D |
| 61.00 | 63.99 | D- |
| 0 | 60.99 | E |

At the end of the course, grade ranges may or may not be adjusted down, but they will not be adjusted up. For example, if you earn 84.00% of all possible points then you guaranteed a B grade.

REQUIRED/RECOMMENDED COURSE MATERIALS

Animal Physiology: from genes to organisms, 2nd Edition by Sherwood, Klandorf, and Yancey, Brooks/Cole 2013. This version has an owl on the cover. Options for access are:

- Buy new or used Hardcover ~\$100-150: From Cengage, Amazon, UF others...
- Rent Hardcover ~\$20-50
- Rent Electronic ~\$40-80

- First Edition (2004) new or used from \$3 and up. This version has a mountain lion on the cover: From Amazon, Textbooks.com, others... Note – The instructor has not seen the first edition. Some material may be outdated, and in different places, but this can be an inexpensive option if you want to spend the least amount of money. Use this option at your own risk.
- Search Google/shopping for more options

We will heavily use the iClicker Cloud instant response system during lectures to help stimulate understanding and discussions. Use this code to join if you were not automatically added: <https://join.iclicker.com/ALUUN>

Calculator – any scientific calculator should be sufficient and must be brought to class and exams.

CONTAGIOUS ILLNESSES

In response to COVID-19, the following recommendations are in place to maintain your learning environment, to enhance the safety of our in-classroom interactions, and to further the health and safety of ourselves, our neighbors, and our loved ones.

- If you are not vaccinated, get vaccinated. Vaccines are readily available and have been demonstrated to be safe and effective against the COVID-19 virus. Visit one.ufl.edu for screening / testing and vaccination opportunities.
- If you are sick, stay home. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 to be evaluated.
- Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work.

DISCUSSIONS & EXERCISES

You will participate in a mixture of discussions, computer-based physiology simulations, and a “hands-on” exercise. Details are in the Discussions/Lab syllabus in Canvas/Resources. A portion of exams 2, 3, and 4 will be related to papers you discuss as groups.

SUGGESTED STUDY METHODS

Participate during lectures

There is tremendous variation in how people learn and in the foundation they have upon entering this course. However, one thing that is certain is that you will not do well if you do not attend class. Seniors have failed or withdraw from this class and had to repeat it. Some of them had GPAs above 3.5 and were already conditionally accepted to medical or dental schools. They decided they would miss class and get through by cramming for exams. *They were wrong and it cost them.* You will need to “participate” and work hard to do well.

Understand the concepts behind iClicker questions

iClicker is used to help you learn concepts while in class and to generate an “active learning” environment. It will also introduce you to the types of questions and concepts that will be on the exams. Review questions and try to anticipate how different versions of the questions might show-up on exams.

Answer and understand the concepts behind learning objectives

There is an immense amount of material that is covered. To help provide focus, learning objectives will be posted for each exam. Exams will be limited to these concepts and material. Work on these questions as we progress. Compare your answers with those of other students, ask Dr. Choe and the undergraduate TAs for guidance, and share answers and uncertainties with other students on the discussion boards (see below). Dr. Choe will not post complete answers to these questions, as the best way to learn is to discover the answer

yourself. However, the TAs and I are always happy to help YOU come to the correct answers or CONFIRM if you are correct.

Participate in discussion boards and chats

There are about 100 other students in the class trying to learn the same material. Post and answer general questions and comments in the chat related to daily lectures and clicker questions. Use the discussion boards to ask and answer questions about the study questions as you prepare for exams. Teaching other students is a great way to make sure you know the material. Undergraduate TAs and the instructor will monitor and direct the discussions as necessary. These are read by all students and instructors, so make sure your comments are appropriate and respectful.

Keep up with material

This is likely to be one of the most conceptually difficult courses you will take. It also has the potential to be one of the most stimulating and rewarding. You will be required to build on what you have learned in other courses and to apply concepts as opposed to memorizing facts. Physiology is where you actually get to apply what you learned in courses like algebra, physics, chemistry, biochemistry, and cell biology.

You will need to be able to interpret graphs, calculate quantitative physiological variables, and integrate multiple physiological systems to understand and predict outcomes. This will require you to learn incrementally and built on concepts as they are learned. Everyone learns differently, but the best advice I can give you is to stay current on the notes, study questions, reading, and synthesis of material.

Visit the undergraduate TAs or Dr. Choe

There are undergraduate TAs for this course who will hold regular office hours. They did very well in this course just last year. Dr. Choe is also happy to answer questions before and after class and in office hours.

How much time should I be spending?

The minimum full-time work week in the US is 40 h. Most professionals work far more hours (e.g., 55-70), but let's use 40 h/week as a minimum. If you are taking 15 credit hours, then this course is about 1/4th of your course load. So, that's $1/4 \times 40 \text{ h} = 10 \text{ h}$ you should spend on this course per week.

OTHER POLICIES

Academic Honesty

All students are expected to hold themselves to a high standard of academic honesty.

Of course, you must work alone on all exam questions.

If you witness any instances of academic dishonesty in this class, please notify the instructor or contact the Student Honor Court (392-1631) or Cheating Hotline (392-6999). For additional information on Academic Honesty, please refer to the University of Florida Academic Honesty Guidelines at: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>

In class iClicker response questions

iClicker questions during lectures serve as attendance, because you receive 0.5 points for each question you attempt, regardless of your answer.

You are responsible for making sure that you bring a fully functioning responder (phone with text service or WIFI device) to each class meeting. There are no make-up questions or other allowances made for failure of your unit to work properly. Please keep in perspective that there will likely be as many as 80 questions and you can drop 1/4th of your missed or incorrect response questions. It is YOUR responsibility to budget these for

unexcused absences. For excused absences (e.g., illnesses, university sanctioned events, and religious holidays), see Dr. Choe before the following lecture to make-up missed questions.

Absences for an Exam

If you must miss an exam due to an allowable scheduled absence (for example, to participate in a sanctioned university function), you must notify the instructor as soon as the event is scheduled or during the first week of classes. If you miss class due to an allowable but unscheduled absence (e.g., illness), you must contact the instructor as soon as possible. In the case of illness, you must provide a signed note from your primary care provider indicating that you were *unable to attend class* on the day(s) in question; it is not sufficient for the note to simply indicate that you were seen in a clinic on a given day.

If you are feeling ill, you are encouraged to seek medical attention at SHCC <https://shcc.ufl.edu/>.

Teacher Evaluations

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/>.

Students with Special Needs

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center at <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

No accommodations are available to students who lack this documentation. It is the policy of the University of Florida that the student, not the instructor, is responsible for arranging accommodations when needed.

UF counseling Services

Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include: 1) UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services. 2) Career Resource Center, Reitz Union, 392-1601, career and job search services. Many students experience test anxiety and other stress related problems. “A Self Help Guide for Students” is available through the Counseling Center (301 Peabody Hall, 392-1575) and at their web site: <https://counseling.ufl.edu/>.

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.