

PCB 4723C: Physiology & Molecular Biology of Animals  
Spring 2020 – All Sections 12/19/19

## 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 unifying principles that are broadly applicable to animals including 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. Enrollment for this class is 5 credit hours.

The ‘discussion/lab’ portion of the course will utilize discussions, physiological simulators, 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.

## INSTRUCTORS

### Lecturer

Connie Rich, PhD, Carr Hall 522a, office hours Tuesday 2-3pm, Thursday 11am-12pm. Office hours will be extended leading up to each exam. Contact is by Canvas mail.

### Teaching Assistants

Undergraduate Teaching Assistants for lecture with office hours: **TBA**

Graduate TAs for discussion sessions: Mitch Walters ([mjw246@ufl.edu](mailto:mjw246@ufl.edu)) and Phil Shirk ([plshirk@ufl.edu](mailto:plshirk@ufl.edu))

## TENTATIVE COURSE OUTLINE – LECTURES CLB C130 TR 7-8

Approx. Week	#	Topics	Reading*
1/7	1	1-Homeostasis & Integration; 2-Cell & Molecular Physiology;	Chap. 1, 2, 3
1/14	2	2-Cell & Molecular Physiology; 3-Approaches to Physiology	Chap. 2, 3
1/21	3	4-Metabolism	Chap. 15
1/28	4	Catch-up & Review; Exam 1	
2/4	5	6-Transport of solutes and water	Chap. 3
2/11	6	7-Salt and water physiology; 8-Urine dilution	Chap. 13, 12
2/18	7	9-Urine concentration; 10-Evolution of osmoregulation	Chap. 12, 7, 13
2/25	8	Catch-up & Review; Exam 2	
3/10	9	11.1-Membrane potentials and Neurons	Chap. 3, 4
3/17	10	11.2 -Synapses	Chap. 5
3/24	11	12-Nervous Systems	
3/31	12	Catch-up & Review; Exam 3	
4/7	14	15-Endocrine control of stress; 16-Muscle physiology	Chap. 7, 8
4/14	13	16-Muscle physiology; 17-Cardiovascular physiology	Chap. 8, 9
4/21	15	17-Cardiovascular physiology; Catch-up; Exam 4	Chap. 9

\*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.

Tentative exam times: Exams 1, 2, 3, and 4 are in class on 1/30, 2/27, 4/2, and 4/21 (not cumulative).

## GRADING

Exam 1	100
Exam 2	100
Exam 3	100
Exam 4	100
Quizzes	80
In class response questions	*100
Simulations and exercises	**40
Problem sets	**30
<u>Literature presentation and participation</u>	<u>**50</u>
Total	700

**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.

**Quizzes** will be held in the last 30 minutes of class on Thursday most weeks, and they will be open-note, open-book, and collaborative. You may **not** use Google- these quizzes will be an extra form of studying through questions that will be challenging enough to facilitate conversation and debate with your classmates. This will greatly aid your understanding; Googling will not. There will be 10 quizzes and your lowest 2 will be dropped, so no make-ups will be offered. It is YOUR responsibility to budget these for illnesses, post-graduate school interviews, university sanctioned events, religious holidays, sleeping-in, etc...

At the discretion of the instructor, up to 2% of extra credit will be available. However, any other requests for extra credit will not be accepted.

\*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 1/4th 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, sleeping-in, 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.

However, once final grades are set, cut-offs will be strictly enforced, i.e. an 89.99 is a B+ and will not rounded up to an A.

## REQUIRED/RECOMMENDED COURSE MATERIALS

Animal Physiology: from genes to organisms, 2<sup>nd</sup> 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 ~\$100-250: From Cengage, Amazon, UF others...
- Rent Hardcover ~\$20-100
- Rent Electronic ~\$20-80
- 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 Top Hat Monocle instant response system in class to help stimulate understanding and discussions. Details on the system and how to register are at: <https://tophat.com/> (join code TBA).

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

## 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

### Come to class and participate

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 withdrawn 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” in the class and work hard to do well.

### Understand the concepts behind Top Hat questions

Top Hat 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 the study questions

There is an immense amount of material that is covered. To help provide focus, study questions 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. Rich and the undergraduate TAs for guidance, and share answers and uncertainties with other students on the discussion boards (see below). Dr. Rich 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 around 150 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. I also encourage you to find study groups in the class. 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 TA or Dr. Rich**

There is an undergraduate TA for this course who holds regular office hours. They did very well in this course just last semester. Dr. Rich 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 1/3 of your course load. So, that's  $1/3 \times 40 \text{ h} = 13.33 \text{ h}$  you should spend on this course.  $13.33 - 4 \text{ h lecture} - 3 \text{ h lab} = 6.33 \text{ h}$  you should spend outside of class each week or about **1.5 h per day for 4 days per week**.

## **OTHER POLICIES**

### **Communication with Dr. Rich**

Written communication should be made in Canvas (e.g., mail and announcements) unless there is an emergency. If a student fails to check Canvas, the instructor is not responsible for missed information. Grades will only be made available in person or via Canvas.

### **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. Cheating will not be tolerated and will result in an automatic fail and reporting to the Dean of Students' Office Student Conduct Committee.

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:

<http://www.dso.ufl.edu/judicial/procedures/academicguide.html>.

### **In class Top Hat response questions**

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 will be 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 100 questions so missing any single question due to equipment failure only affects about 0.14 percentage points of your final grade. An incorrect response is worth 0.25 points, and a missing response is worth 0.0 points. You can drop 1/4th of your missed or incorrect response questions. It is YOUR responsibility to budget these for illnesses,

post-graduate school interviews, university sanctioned events, religious holidays, sleeping-in, dead batteries, etc...

### **Grading discrepancies**

Concerns regarding the accuracy of graded assignments (discussions and lecture) will only be taken into consideration if the respective instructor has been notified **within 3 working days** after the assignment grade is posted. Keep a copy of all assignments in case there is a problem.

### **Attendance and Absences**

I may take attendance in lectures, but this by itself is not worth any points and is just to help me keep track. Alternatively, you must attend the lectures to complete the “Top Hat” questions. Missed clicker questions will be counted as “0”.

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 an exam or discussion 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 to the Dean of Students’ Office; it is not sufficient for the note to simply indicate that you were seen in a clinic on a given day.

If you are ill with an infection that may be contagious by casual contact (e.g., a cold or flu), you should not attend class. Furthermore, if you have a fever associated with any illness, you should not attend class until you have been free of fever for at least 24 hours. The instructor reserves the right to ask any student to leave the classroom at any time if there is a reasonable likelihood that the student's presence in the classroom places other students at substantial risk of infection.

### **Students with Special Needs**

Students with disabilities are required to register with the Disability Resource Center (DRC) if they are requesting accommodations. The DRC may be contacted at (352) 392-2565 or refer to the website at <http://www.dso.ufl.edu/drc>. It is the student’s responsibility to notify the instructor of any accommodation requests. I am happy to help throughout the semester and will work to accommodate as much as possible.

### **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: <http://www.counsel.ufl.edu/>.

Your well-being is important to the University of Florida and to me. 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](mailto: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. Please remember they are there for you.

### **A final note...**

Well done on making it through the syllabus! You're off to a great start! As a final thought, I am here for you guys and want you all to do well in this class. My aim is to arm you with knowledge and study techniques for wherever you go from here. So, if you are unhappy or stressed or overwhelmed or just needing some extra support, please come and talk to me or talk to someone at UF's Counseling and Wellness Center. Our job is to teach you, support you, and help you grow, and without you we couldn't do what we love.

