

# PCB4723C: Physiology and Molecular Biology of Animals

Spring 2022

## 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 4 credit hours.

The 'discussion/lab' portion of the course will utilize discussions, physiological simulators, an 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. These skills are useful for any career involving critical thinking.

Recommended (but not required) 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

Dr. Connie Rich, PhD, office hours Tuesdays 1-2:30pm in person and on Zoom. Office hours will be extended leading up to each exam. *Contact is by Canvas mail.*

### Teaching Assistants

Undergraduate Teaching Assistants (lecture): TBA

Graduate TAs (discussion sessions): Ella Nicklin ([e.nicklin@ufl.edu](mailto:e.nicklin@ufl.edu)) and Laurel Meke ([lmeke@ufl.edu](mailto:lmeke@ufl.edu)), Vanessa Muhl ([vanessa.muhl@ufl.edu](mailto:vanessa.muhl@ufl.edu))

## REQUIRED/RECOMMENDED COURSE MATERIALS

**RECOMMENDED:** 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.

- Buy new or used Hardcover ~\$100-250: From Cengage, Amazon, UF others...
- Rent Hardcover ~\$20 From Amazon
- First Edition (2004) \$3 and up. From Amazon, Textbooks.com, others... Note – The instructor has not seen the first edition. Use this option at your own risk.
- Search Google/shopping for more options

**REQUIRED:** We will heavily use the TopHat 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 689240)

You can purchase TopHat access for \$48 for the year or \$35 for the semester (may be discounted for Spring 2022).

## DISCUSSIONS & EXERCISES

In addition to lecture, you will participate in a mixture of discussions, computer-based physiology simulations, and an exercise. Details are in the Discussions/Lab syllabus in Canvas/Files. A portion of exams 2, 3, and 4 will be related to papers you discuss as groups.

## 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 in the discussion sessions. There will be many “connect the dots” questions (Bloom’s Taxonomy level 2/3) and VERY few based on regurgitation of material (level 1).

**Quizzes** will be held about the last 30 minutes of class on Thursday most weeks (see schedule), 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. Further, use of Chegg, Coursehero, Quizlet, etc for these questions will result in an Honor Code violation, a zero on the assignment, and one full letter drop in your final grade. 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...*

**Classroom Response System:** We will be using TopHat (see above), where questions will be available from 8am until 11:59pm on the day of lecture. 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...*

**Extra Credit:** 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 and will be met with annoyance.

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

## GRADING SCALE

| low   | high   | letter |
|-------|--------|--------|
| 93.33 | 100.00 | A      |
| 90.00 | 93.32  | A-     |
| 86.66 | 89.99  | B+     |
| 83.33 | 86.65  | B      |
| 80.00 | 83.32  | B-     |
| 76.66 | 79.99  | C+     |
| 70.00 | 76.65  | C      |
| 66.66 | 69.99  | D+     |
| 63.33 | 66.65  | D      |
| 60.00 | 63.32  | D-     |
| 0     | 59.99  | E      |

At the end of the course, grade ranges may or may not be curved up, but they will not be curved down. For example, if you earn 80.00% 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.

## COURSE POLICIES

### Fun for Spring 2022 (seriously... 2 years later.)

Our class sessions [and office hours] may be audio-visually recorded for students in the class to refer back and/or for those who are not able to attend live. [These recordings will only be posted through Canvas.] Students who participate verbally are agreeing to have their voice recorded. The Zoom chat will not be recorded, so students are encouraged to participate via the chat if they are uncomfortable being recorded. Students may NOT publish recorded lectures without the consent of the instructor in any capacity.

### 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 (DRC) by visiting the [Get Started page](#). 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. 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.

## **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 of the assignment and reporting to the Dean of Students' Office Student Conduct Committee. This is likely to result in you failing the class. **For this course, any academic dishonesty, by definition in the Honor Code, will result in the dropping of at least 1 letter grade and a 0 on the relevant assignment.**

If you witness any instances of academic dishonesty in this class, please notify the instructor or contact the Student Honor Court (392-1631). Helping others cheat or allowing them to cheat only hurts your grade by preventing any curve. 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>.

## **Grading discrepancies**

Concerns regarding the accuracy of graded assignments (lab 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.

## **Attendance and Absences**

If you must miss an exam or discussion due to an allowable scheduled absence (for example, to participate in a sanctioned university function- why are those still happening??), 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, and you will have to get an excused absence from the Dean of Students' Office. In the case of illness, you must provide a signed note from your primary care provider indicating that you were *unable to take the exam* 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.

## **Communication with Dr. Rich**

Written communication should be made in Canvas (e.g., mail and announcements) or messenger pigeon 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 via Canvas.

To contact Dr. Rich, please use Canvas mail. Expect a response within 24-48 business hours. Correspondence with your instructor, TAs, and classmates is expected to be kind and respectful. Disrespectful emails will not receive a response.

## 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.

## SUGGESTED STUDY METHODS

### Attend 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 participate. This can be difficult in a virtual format, but we will make it work and I will walk you through how to do well! It is important that you put in the work- seniors have failed this class and had to put off graduation. 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.

### Answer and understand the concepts behind the TopHat, quiz, and study questions

There is an immense amount of material that is covered. To help provide focus, study questions will be posted for each exam in addition to the TopHat questions presented in each lecture and quizzes each week. 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. 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 125 other students in the class trying to learn the same material. I recommend that you utilize the discussion boards on Canvas. 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 build 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. And importantly- ask if you have questions!

### **Visit the undergraduate TAs or Dr. Rich**

There are undergraduate TAs for this course who hold regular office hours. They did very well in this course just last semester. Dr. Rich is also happy to answer questions in office hours and over email.

### **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**. If you are spending significantly more time than that, talk to Dr. Rich or the undergraduate TAs to discuss how to optimize your study methods. If you are spending less, it is unlikely you will be able to gain a deep enough understanding of the material to do well.

## **TENTATIVE COURSE OUTLINE**

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

\*Note that chapters are listed only as a rough guide; we will not cover all sections or material in each chapter. Only material covered in class will be covered on the exams.

Tentative exam dates: Exam 1- **2/1**; Exam 2- **2/24**; Exam 3- **3/29**; Exam 4- **4/19** (not cumulative).

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

Well done on making it through the syllabus! You're off to a great start! As a final thought, I want you all to know that I am here for you guys and want you all to do well in this class. My aim is to arm you with knowledge, study techniques, and critical thinking skills for wherever you go from here. I also know that this semester may be a tough one, as was the last one... and the one before that... 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.