

PCB 3713C – Cellular and Systems Physiology

Syllabus Policy

You are solely responsible for reading and following the instructions, guidelines and schedules in this syllabus, and for checking the e-Learning site at least weekly for announcements regarding any changes. Not having read the information in this syllabus or the announcements will not constitute an excuse for missing an assignment or deadline.

Course Description

How cells, organs, and higher level systems are integrated and coordinated in the functions of humans and other animals. Emphasis will be placed on the use of model organisms, mathematical models and the physical sciences to understand the mechanistic basis of normal physiology and dysfunction. 4 credits.

Prerequisites

One semester of general biology (BSC 2010), and two semesters of general chemistry (CHM 2046 or CHM 2047 or CHM 2051 or CHM 2096) and two semesters of general physics (PHY 2049 or PHY 2061), all with a minimum grade of C.

Corequisite

None

Course Schedule

Section 004D (BME) and 25HD (non-BME)
Tuesdays and Thursdays, periods 6-7 (12:50 – 2:45 pm) in CSE E235 (CSE Active Learning Center)

Instructors

Course Instructor

David Julian, Ph.D. (Physiology)
Associate Professor, Department of Biology
Student hour: Fridays, period 5 (11:45 am -12:35 pm) in Bartram Hall 123

Course Graduate TA

Rola Zeidan, M.S., M.Sc. (Biology, Bioanalytical Toxicology)
Ph.D. candidate
Department of Physiological Sciences, College of Veterinary Medicine
Student hour: Tuesdays, period 8 (3:00-3:50) in Bartram Hall 123

Course Fee

There is no course fee, but you will need to purchase subscriptions for Peerceptiv (\$7.50), Learning Catalytics (\$12), and JustPhysiology (\$10). Instructions for purchasing these subscriptions are below.

Course Objectives

At the end of the course, students should be able to:

- Explain physiological mechanisms of humans and representative model organisms by applying basic principles of physics, chemistry and engineering.
- Describe the fundamental mechanisms underlying normal function of cells, tissues, organs, and organ systems in humans and other animals.
- Explain the basic mechanisms of homeostasis by integrating the functions of cells, tissues, organs, and organ systems.
- Effectively solve basic problems in physiology, working independently and in groups.
- Apply knowledge of functional mechanisms and their regulation to explain the pathophysiology underlying common diseases.
- Generate hypotheses about physiological processes, design experiments to test these hypotheses using mathematical models of complex physiological systems, and then analyze, interpret and report experimental results.
- Use primary literature readings to understand basic physiological principles and mechanism
- Read and critically evaluate the design, results and conclusions of experiments published in primary physiology literature
- Interpret and knowledgeably discuss primary literature among peers

Required Course Materials, Software, Licenses, and Hardware

Primary Course Textbook

Human Physiology: An Integrated Approach (7th Edition), by Dee U. Silverthorn, 2015

Classroom Response System

We will use the [Learning Catalytics](#) classroom response system to both aid and assess your understanding of the course material. A six-month subscription is \$12.

To register and subscribe, do the following:

1. Go to <http://www.learningcatalytics.com>
2. Click on the REGISTER icon near the top of the screen
3. Under the "Student" option, select "No" for the question "Are you using Learning Catalytics with a MyLab or Mastering product?"
4. In the Register window, select "No, I would like to buy access"
5. Purchase a 6 month subscription (unless you believe you will need it for another course in the next year, in which case the 12-month subscription is a better deal).

6. Follow the remaining instructions to purchase the subscription. If you do not already have a Pearson Education account, use your UF email address as your Login Name.

Peer-Review System

We will use the [Peerceptiv](#) peer-review system for the research report. The subscription is \$8.25. You will receive an email at your UFL address with instructions for paying the subscription fee and activating your account. The class code is "**star96**".

If you attempt to self-register without using the instructions in the activation email, you will receive an on-screen message indicating that an account already exists with your email address. In that case, or if you no longer have access to the activation email, use the Forgot Password link to access your account.

Physiology Simulation System

We will use JustPhysiology to conduct physiology experiments. The subscription is \$10. JustPhysiology is a web application based on the HumMod simulation engine, which has a mathematical model of human physiology that utilizes over 14,000 physiological variables. The model was initially developed at the University of Mississippi Medical Center.

You will receive an email from JustPhysiology to your UFL account with instructions to pay the subscription fee and activate your account. Note that the subscription can currently only be paid using PayPal.

If you lose the original email from JustPhysiology, go to <https://justphysiology.com/users/login> and click on "Reset Password." You will then be asked for your email address. Enter your UF email address and select Reset Password. Enter the new password and then continue to pay the subscription fee as noted above.

Note that UF subscriptions are discounted by 50% (normally \$20). Dr. Julian is associated with HC Simulation LLC (the company that produces JustPhysiology) but he will receive no financial benefit from subscriptions associated with this course.

Digital Lessons

All non-textbook, digital content will be accessible from the Canvas website (<https://elearning.ufl.edu>).

Activities and Assessments

The class content will include textbook reading, in-class lessons, in-class problem-based learning ("active learning" questions), experiments using physiological simulations, and writing and peer-review of research reports.

Problem-based Learning

During most "lecture" sessions you will be asked to work with your classmates to answer questions and solve problems. You will use the classroom response system to provide your answers.

Research Report

You will individually complete a research report during the term. For this report, you will be provided with a research problem about a physiological phenomenon. You will be expected to do the following:

1. Develop a hypothesis for the assigned problem.
2. Design an experiment to test your hypothesis using the physiology simulation software.
3. Craft a proposal that describes the experiment.
4. Submit an experiment proposal. This will be scored by the graduate teaching assistant.
5. Conduct your experiment, collect and analyze the data, and draw conclusions from the results.
6. Craft a clear, well-supported first-draft report.
7. Submit your first-draft report. This will be scored through peer review and by the graduate teaching assistant.
8. Participate in peer reviews of other student first-draft reports.
9. Back-evaluate your reviewer feedback.
10. Revise your first-draft report based on reviewer feedback (this may involve designing and running new experiments).
11. Submit your second-draft report for peer review.
12. Participate in peer reviews of other student second-draft reports.
13. Back-evaluate your reviewer feedback.
14. Revise your second-draft report based on reviewer feedback (this may involve designing and running new experiments).
15. Submit your final report for peer review. This will be scored through peer review and by the graduate teaching assistant.
16. Participate in peer reviews of other student final reports.
17. Back-evaluate the reviewer feedback you received on your final report.

Your proposal and research report must each be formatted according to the detailed instructions provided for each, which will be posted on the course home page. Proposals and reports that are not formatted correctly will receive a score of zero. You are welcome to work on proposal and report with other students in the course, but the final product must represent your own work.

All research reports, evaluations, and other associated activities are due at 23:59:00 Eastern time on the date indicated in the syllabus schedule. The timestamp for every submission is based on the clock of the Peerceptiv server (which is synchronized with the NIST Internet time service), not the clock of the personal computer you are using. Problems with your computer or your internet access will not be grounds for extending the deadline, so don't wait until the last few minutes to complete any submission.

The total grade for each research report will be determined from the following criteria:

- **Review Grade** - a combination of the Accuracy and Helpfulness grades, which are then curved, after which any Reviewing Late Penalties are subtracted.
- **Accuracy** - correlation of your own ratings to mean ratings by others on same documents.

- **Helpfulness** - how helpful the author thought your comments were via back evaluation.
- **Writing Grade** - average score given by reviewers which is then curved, and then any Writing Late Penalties are subtracted.
- **Task Grade** - accounts for the percentage of assigned reviews and back-evaluations that were done. It represents only your reviewing activities, which is then curved.
- **Weighting** – How each category is weighted. The breakdown is 40% reviewing, 40% writing, and 20% task.
- **Overall** - The sum of all of the weighted grades

Exams

There will be a midterm exam and a final exam. These will consist mostly of problem-based, multiple choice, fill-in-the-blank, ordering and numeric (calculation) questions. The midterm will cover all course material through week 7, will consist of approximately 40 questions, will be administered during a normal lecture session (115 minutes in duration), and will be worth 100 points. The final exam will cover all course material from the entire term but will focus primarily on the last half of the course. It will also consist of approximately 40 questions and will be worth 100 points, but it will be administered during the final exam period (2 hours duration). Both exams will be closed-book and you will not be allowed to use notes, but you will be expected to utilize the physiology simulation software to answer some of the questions.

Grading

Assessments

Assessment Type	Quantity	Points	Subtotal	Pct of Total
Problem-based Learning	~ 100	1	100	25%
Research Proposal	1	20	20	5%
Research Report	1	80	80	20%
Midterm Exam	1	100	100	25%
Final Exam	1	100	100	25%
<i>Total</i>			400	100%

Grade Distribution

Point Range (%)	Letter Grade
93.33 or higher	A
90-93.32	A-
86.66-89.99	B+
83.33-86.65	B
80-83.32	B-
76.66-79.99	C+
73.33-76.65	C
70-73.32	C-
66.66-69.99	D+
63.33-66.65	D
60-63.32	D-
< 60	E

Grades will not be assigned by a curve, but the grade cutoffs may be adjusted downward. In other words, if your final point accumulation is 93.33%, then you are guaranteed to receive an A. This means there is no upper limit to the number of "A" grades that can be assigned.

A "C-" is not a qualifying grade for critical tracking courses at UF. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). A "C-" average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. More information on grades and grading policies is here: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Extra Credit

There will be no opportunities for extra credit.

Time Commitment

The UF College of Liberal Arts and Sciences assumes that you will devote 3-4 hours per week per credit-hour to each course during the regular fall and spring semesters. This course is 4 credits, so you should therefore expect to devote 12-16 hours per week to this course (for a total of 180-240 hours over the semester), of which only 4 hours per week will be spent in class. Therefore, you are responsible for budgeting more than 2/3 of the time you will spend on this course. If you find yourself spending more than 16 hours per week on average, discuss this with your course instructor to see if you can refine your work and study habits. If you find yourself spending less than 12 hours per week on average, you should recognize that you may have difficulty fully learning and comprehending the material in this time, which will probably be reflected in poor performance on the various activities and assessments, causing you to receive a lower overall course grade.

Activity	Minimum Time (Hours)
Lectures/Problem-based Learning	56
Textbook Readings and Reviewing Notes	80
Research Report	40
Midterm Exam	2
Final Exam	2
<i>Total</i>	<i>180</i>

Communication

Updates and changes to the course schedule, this syllabus, and any other aspects of the class content and structure will be communicated to you via announcements on the course e-Learning site. You are responsible for checking this site regularly for announcements.

Communicating electronically with the Instructor and Graduate Teaching Assistant

There are two primary modes of electronic communication for this class -- the discussion forum and Canvas mail. To ensure that your questions are answered as promptly as possible, please follow the communications guidelines below:

Discussion Forum: This course is participatory. Use the discussion forum on the course website for questions/answers about the course content, structure, assignments and activities. You are strongly encouraged to respond to your peers if you know the answer or can provide guidance. The course Graduate TA will monitor this area, but the TA may not be able to read every posting and therefore this should **not** be used to communicate with the instructors.

Direct Canvas Mail to the Instructors: Direct email to Dr. Julian or to the graduate teaching assistant should be used only for messages that are **private** in nature or that have been posted to the Discussion Forum but were not solved. Use the Mail tool in Canvas for all such direct email. If you use any other email tool, it may be filtered as spam or otherwise not be seen by your instructors.

Course Policies

Academic Honesty

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 [Honor Code](#) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Policy related to absences and make-up work

Requirements for class attendance and make-up exams, assignments, and other work are consistent with [university attendance policies](#).

If you must miss an assignment or 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 assignment or exam due to an allowable but unscheduled and unpredictable 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 complete the assignment or take the exam on the day(s) in question.

Late Work

Late work will not be accepted unless it is the direct result of an allowable but unscheduled and unpredictable absence (e.g., illness), as defined above, at the discretion of the instructor.

Using Electronic Devices in Class

The class will meet in a computer classroom and you will have access to the UF computers for all in-class activities, including the classroom response system. Therefore, you are not expected to bring a computer to the lectures to utilize the classroom. You may not use the classroom computers for activities unrelated to the class. If you fail to follow this policy, or if you use a personal computer in the classroom for activities that are a distraction to any other members of the class, you will be warned that you are being disruptive. Multiple disruptions will be considered grounds for the assignment of a failing grade.

Campus Resources:

Health and Wellness

U Matter, We Care: If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc/>, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS): Student Health Care Center, 392-1161.

University Police Department: 392-1111 (or 9-1-1 for emergencies).
<http://www.police.ufl.edu/>

Academic Resources

E-learning technical support: 352-392-4357 (select option 2) or e-mail to Learningsupport@ufl.edu. <https://lss.at.ufl.edu/help.shtml>.

Career Resource Center: Reitz Union, 392-1601. Career assistance and counseling.
<http://www.crc.ufl.edu/>.

Library Support: <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Accommodations for Students with Disabilities

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation Process

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

Course Schedule (subject to change)

All research report activities are due at 23:59:00 on the dates indicated below.

Wk	Date	Lecture / Problem-based Learning Topic and Readings	Research Report
1	Jan 09	Course Introduction Chapter 1: Introduction to Physiology	
	Jan 11	Chapter 2: Molecular Interactions	
2	Jan 16	Chapter 3: Compartmentation: Cells and Tissues Chapter 4: Energy and Cellular Metabolism	
	Jan 18	Chapter 5: Membrane Dynamics	
3	Jan 23 ¹	Chapter 6: Communication, Integration, and Homeostasis	
	Jan 25 ¹	Chapter 7: Introduction to the Endocrine System	
4	Jan 30	Chapter 22: Metabolism and Energy Balance	
	Feb 01	Chapter 23: Endocrine Control of Growth and Metabolism	
5	Feb 06	Chapter 8: Neurons: Cellular and Network Properties	
	Feb 08	Chapter 9: The Central Nervous System	
6	Feb 13	Chapter 10: Sensory Physiology	
	Feb 15	Chapter 11: Efferent Division: Autonomic and Somatic Motor Control	
7	Feb 20	Chapter 12: Muscles	
	Feb 22	Chapter 13: Integrative Physiology I: Control of Body Movement	Research Proposal
8	Feb 27	Review	
	Mar 01	Midterm on weeks 1-7. Normal class time and location	
		Spring Break March 3 – 10	
9	Mar 13	Chapter 14: Cardiovascular Physiology	
	Mar 15	Chapter 14: Cardiovascular Physiology (cont.)	
10	Mar 20	Chapter 15: Blood Flow and the Control of Blood Pressure	
	Mar 22	Chapter 16: Blood	Draft Report
11	Mar 27	Chapter 17: Mechanics of Breathing	
	Mar 29	Chapter 18: Gas Exchange and Transport	Draft Reviews
12	Apr 03	Chapter 19: The Kidneys	
	Apr 05	Chapter 20: Integrative Physiology II: Fluid and Electrolyte Balance	Draft Back Evals
13	Apr 10	Chapter 21: The Digestive System	
	Apr 12	Chapter 24: The Immune System	Final Report
14	Apr 17	Chapter 25: Integrative Physiology III: Exercise	
	Apr 19	Chapter 26: Reproduction and Development	Final Report Reviews
15	Apr 24	Review (Last regularly scheduled class meeting)	Final Back Evals
	May 03	Final Exam: 20:00-22:00 in the normal class location (CSE E235)	

1. January 15 is a holiday (Martin Luther King Jr. Day).
2. Last class meeting is April 25, Reading Days are April 26-27.
3. Final exam schedule code 3F.