

PCB 3713C - Cellular and Systems Physiology
Spring 2019

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

Instructors

Course Instructor

Lecturer – Andrew Hill, PhD, Bartram Hall room 123

Office hours TR 3-4 pm. Contact is by Canvas mail.

Course Graduate TA

Joni Wright

Ph.D. candidate, Department of Biological Sciences

Course Undergraduate TA

Sydney Levy

Course Fee

There is no course fee, but you will need to purchase subscriptions for Peerceptiv (\$7.50), Learning Catalytics (\$12), and JustPhysiology (\$20). 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. 8th Edition, by Dee Silverthorn. Pearson, 2019.

Please note that this course will be participating in the UF All Access program. Students have two options to gain access to the REQUIRED MasteringA&P with materials when classes begin.

- Students will have the choice to "opt-in" to MasteringA&P access through Canvas once classes begin for a reduced price and pay for these materials through their student account. The price for UF All Access is **\$116.00**.

- Students who do not choose to "opt-in" will be able to purchase a standalone MasteringA&P access code through the UF Bookstore. The price for the standalone MasteringA&P access code is **\$156.00**. Both options provide access to the same materials. Note that the UF All Access is quite a bit less expensive.

There will also be a loose-leaf print version of the textbook available at the UF Bookstore for students who wish to have a physical copy of the text. The price for the loose-leaf print version is about **\$38.00**.

MasteringA&P online system

We will use the MasteringA&P online system to both aid in your understanding of the course material and for assessment of your understanding. If you have difficulty registering for the Pearson course content see the document entitled "UF All-Access - Student Instructions Fall 2018.pdf" in the "Files" section of the course in Canvas. If you are still not able to register for the Pearson course content contact Brad Maynard, our Pearson Representative at "brad.maynard@pearson.com". He can answer all Pearson related issues.

Classroom Response System

We will use the Learning Catalytics, a classroom response system, to both aid and assess your understanding of the course material. You can access Learning Catalytics through Canvas by clicking on "MyLab and Mastering" and then clicking "Open MyLab & Mastering." Then click on "Course Home." You will see a "Learning Catalytics" button.

Learning Catalytics is a software utilizing your personal device (computer, smartphone, and tablet) for in-class assessment. The systems page is listed below.

<https://www.pearson.com/us/higher-education/products-servicesteaching/learning-engagement-tools/learning-catalytics/training-support/systemrequirements.html>

The main takeaways are that you have the latest version of the browser, iOS, etc., and that your popup blocker is disabled! 2. To join a Learning Catalytics session in class simply sign in at Learningcatalytics.com and type in the session ID. After you have participated in one session in the class, the ID should begin to appear for you to click on and join. A. This is also where you will review your previous class sessions. They will usually appear a couple hours after class has ended. When reviewing, you will see your responses and if they were correct or incorrect. Some questions may not have a correct/incorrect answer. TECH SUPPORT Any tech support questions should begin at the Pearson support website listed below.

<https://support.pearson.com/getsupport/s/>

Pearson tech support provides 24/7 assistance. You will always receive a "case number" that can be referenced later.

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 0.2 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...

Peer-Review System

- Peerceptiv license cost during the 2018-19 academic year is **\$12.50** (peer assessment technology, improves writing and critical thinking skills by engaging students in the role of the teacher). The website is at <https://go.peerceptiv.com/> You will enroll yourself into the Peerceptiv class by creating your own account, as follows. If you are new to Peerceptiv, you should click on "Sign up" rather than "Login." They will ask for your first name, last name, email, and password. The email must be your **UF email**. Select "Student" as your Role. Peerceptiv will then send an email to your UF account. You can then login to Peerceptiv and join the class using the class code. The name of the course in Peerceptiv is **PCB3713C Spring 2019**. The course code is **shape5**. You will be asked to create a pseudonym. The pseudonym is the name that other students will see. You should pick something that doesn't identify who you are because the reviewing process works best if it is completely anonymous.

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

- JustPhysiology, physiology simulation software, is **\$15**. The teacher will send a list of student UF email addresses to JustPhysiology about halfway through the first week. JustPhysiology will then create an account using your UF email address as the username. You will be sent an email from JustPhysiology with further instructions. Once you login, you have to pay **\$15** using the PayPal, and then you can go to My Account at top of page and change password.

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 25% (normally \$20).

Other Content

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

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. Conduct your experiment, collect and analyze the data, and draw conclusions from the results.
4. Craft a clear, well-supported first-draft report.
5. Submit your first-draft report. This will be scored through peer review and by the graduate teaching assistant.
6. Participate in peer reviews of other student first-draft reports.
7. Back-evaluate your reviewer feedback, indicating how helpful it was.
8. Revise your first-draft report based on reviewer feedback (this may involve designing and running new experiments).
9. Submit your second-draft (final) report for peer review.
10. Participate in peer reviews of other student second-draft (final) reports.
11. Back-evaluate your reviewer feedback, indicating how helpful it was.

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. Reports that are not formatted correctly will receive a score of zero. You are welcome to work on your 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 **three exams**: two midterms and a final. These will consist mostly of problem-based, multiple choice, fill-in-the-blank, ordering and numeric (calculation) questions. Each midterm will consist of approximately 40 questions and will be administered during a normal lecture session (115 minutes in duration).

The final exam will focus primarily on the last portion of the course but assumes that you have retained the general principles and information that you learned in earlier in the course. It will also consist of approximately 40 questions and 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. You will be allowed to use scratch paper and a calculator.

Grading

Assessments

Assessment Type	Quantity		Percent of Total
MasteringA&P	20		15%
Learning Catalytics			15%
Simulation (Just Physiology)	12		10%
Simulation Research Report (Peerceptiv)	2		15%
Midterm Exams	2		30%
Final Exam	1		15%
<i>Total</i>			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+

Point Range (%)	Letter Grade
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

The letter grades will be assigned by based on the point ranges given in the table above. 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	Time (hours)
Lectures/Problem-based Learning	56
Textbook Readings and MasteringA&P	80
Simulation Tutorials	18
Simulation Research Report	20
Midterm Exams	4
Final Exam	2
Total	180

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. Hill 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.

Technical Support

MasteringA&P: Contact Brad Maynard, our Pearson representative at brad.maynard@pearson.com.

JustPhysiology: Contact your instructor (Andrew Hill) or Robert Hester at robert@justphysiology.com.

Robert is the president of JustPhysiology so he will not know details about the lessons or your grades. However, he will be able to help with technical issues like the site being down.

Peerceptiv: support@peerceptiv.com

E-Learning in Canvas. For help with E-Learning, call the UF Computing Help Desk at 352-392-4357, or visit the E-Learning support website: <https://lss.at.ufl.edu/help.shtml>.

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

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. 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/> (Links to an external site.)Links to an external site.

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> (Links to an external site.)Links to an external site..

Career Resource Center: Reitz Union, 392-1601. Career assistance and counseling. <http://www.crc.ufl.edu/> (Links to an external site.)Links to an external site..

Library Support: <http://cms.uflib.ufl.edu/ask> (Links to an external site.)Links to an external site.. 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/ (Links to an external site.)Links to an external site.) 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> (Links to an external site.)Links to an external site.. 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/> (Links to an external site.)Links to an external site..

Course Schedule (subject to change)

Wk #	Week of	Reading Topic (Chapter)	Simulation Tutorial	Research Report
1	Jan 7	Introduction to Physiology (1)	None	
2	Jan 14	Molecular Interactions (2); Compartmentation: Cells and Tissues (3);	Glucose Homeostasis_ Short-Term	
3	Jan 21	Energy and Cellular Metabolism (4)	Glucose Homeostasis_ Long-Term	
4	Jan 28	Membrane dynamics (5); Communication, Integration, and Homeostasis (6)	None	Report1 1st draft & Excel file
5	Feb 4	Introduction to the Endocrine System (7) Midterm1 on chapters 1 to 6 (Thursday Feb 7th)	TBA	Report1 1st draft review
6	Feb 11	Introduction to the Endocrine System (7) continued; Neurons: Cellular and Network Properties (8)	None	Report1 1st draft back evaluation; Report1 2nd draft
7	Feb 18	Sensory Physiology (10); Efferent Division: Autonomic & Somatic Motor Control (11)	TBA	Report1 2 nd draft review
7	Feb 25	Muscles (12); Control of Body Movement (13)	TBA	Report1 2nd draft back evaluation
8	Mar 4	Spring break		
9	Mar 11	Cardiovascular Physiology (14) Midterm2 on chapters 7, 8, 10, 11, 12, 13 (Thursday, Mar 14)	TBA	
10	Mar 18	Cardiovascular Physiology (14) continued	TBA	Report2 1st draft & Excel file
11	Mar 25	Blood Flow (15)	TBA	Report2 1st draft review
12	Apr 1	Mechanics of Breathing (17)	None	Report2 1st draft back evaluation; Report2 2nd draft

13	Apr 8	Gas Exchange and transport (18)	TBA	Report2 2nd draft review
14	Apr 15	Kidneys (19)	TBA	Report2 2nd draft back evaluation
15	Apr 22	Electrolyte Balance (20)	TBA	
16	Apr 28	Final Exam on chapters 14, 15, 17, 18, 19, 20. Monday 4/29/2019 @ 5:30 PM - 7:30 PM in CSE E235		

1. 1st day of classes is Jan 7th
2. Monday Jan 7th is a holiday (Martin Luther King Jr. Day).
3. No class on the week of Mar 4th due to spring break.
4. Last day of classes is Apr 24th.
5. Reading days April 25, 26

Assignments are due at 11:59 p.m. on the date indicated on the course e-Learning site schedule

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 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” in the class and work hard to do well.

Understand the concepts behind the Learning Catalytics questions

Learning Catalytics is used to help you learn concepts while in class in 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 homework questions, Learning Catalytics questions, and JustPhysiology questions.

There is a large amount of material covered. Exams will be limited to the concepts and material in the homework questions, Learning Catalytics questions, and JustPhysiology simulation questions. Work on these questions as we progress. Compare your answers with those of other students, ask Dr. Hill and the undergraduate TAs for guidance, and share answers and uncertainties with other students on the discussion boards (see below). Dr. Hill 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 many 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 Learning Catalytics 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. Hill

There are two undergraduate TA for this course who holds regular office hours.

Dr. Hill is also happy to answer questions after class and in office hours.