

Human Physiology (Biol 2420-2)

Fall Semester 2019

GENERAL INFORMATION

Instructor: David H. Temme

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Office hours: While I am happy to meet with any student, I have found that regularly scheduled office hours are not the best way to facilitate such interactions. So instead, note that right after both classes I am always available for brief discussions. Alternatively if more time is needed, please contact me to set up another time that works for both of us.

Teaching assistants: Patrick Abel, John Burton, Jena Chambers, Sam Gaufin, Mary Golub, Ashton Lee, Austin Montgomery, Myra Repetto, Ana Rosa, Sabrina Rowland, Max, Shin, Ali-Abbas Sial, Christine Spencer,

Note: Opportunities to interact with TAs will come in a variety of forms. The most common will be TA hours held in the Group Study Area on the third floor of Marriott Library. The schedule will be announced by the end of the first week of class. There may also be a classroom help session each week on Fridays, if we can figure out a time and room that would be useful. Furthermore, if you feel additional individual or small group interactions would be useful, please feel free to contact either me or one of the TAs, and we will try to arrange a time.

Recommended Text: Human Physiology: An Integrated Approach (8th, 7th, 6th, or 5th editions) by Dee Silverthorn, Pearson Education, Inc. (Note: This class does not follow this textbook per se. But it is recommended in the sense that it may prove to be a useful reference to further read about topics discussed in class.)

Class lecture outlines: The course is structured around an extensive series of lecture outlines (which will be made available on the course web site). Lecture outlines contain both pictures and some text organized in a way to help you take notes during class. In essence, we will build a physiology manual in class. If you have a portable computer that allows note taking on pdf files, then bring that to class; otherwise print out a hardcopy of each set of lecture notes prior to when the material is covered.

Course web site: Access to different types of course handouts is available through the University of Utah's Campus Information System (CIS). To access the course website log into CIS, click on "Go to This Class" for Biol 2420. From there you can download (as pdf files) the course syllabus, and when made available, lecture outlines, vocabulary quiz lists, study questions and the current exam review outlines.

University Policies:

• ***The Americans with Disabilities Act.*** The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, (801) 581-5020. CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in an alternative format with prior notification to the Center for Disability Services.

• ***University Safety Statement.*** The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit safeu.utah.edu.

• ***Addressing Sexual Misconduct.*** Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

• **Names/Pronouns.** Class rosters are provided to the instructor with the student’s legal name as well as “Preferred first name” (if previously entered by you in the Student Profile section of your CIS account, which managed can be managed at any time). While CIS refers to this as merely a preference, I will honor you by referring to you with the name and pronoun that feels best for you in class or on assignments. Please advise me of any name or pronoun changes so I can help create a learning environment in which you, your name, and your pronoun are respected. If you need any assistance or support, please reach out to the LGBT Resource Center. https://lgbt.utah.edu/campus/faculty_resources.php

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• **Wellness.** Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student’s ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness at www.wellness.utah.edu or 801-581-7776.

• **Diversity / Inclusivity.** It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students’ learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you.

• **Veterans Center.** If you are a student veteran, the U of Utah has a Veterans Support Center located in Room 161 in the Olpin Union Building. Hours: M-F 8-5pm. Please visit their website for more information about what support they offer, a list of ongoing events and links to outside resources: <http://veteranscenter.utah.edu/>. Please also let me know if you need any additional support in this class for any reason.

• **English Language Learners.** If you are an English language learner, please be aware of several resources on campus that will support you with your language and writing development. These resources include: the Writing Center (<http://writingcenter.utah.edu/>); the Writing Program (<http://writingprogram.utah.edu/>); the English Language Institute (<http://continue.utah.edu/eli/>). Please let me know if there is any additional support you would like to discuss for this.

TENTATIVE OUTLINE OF LECTURE TOPICS:

BACKGROUND

Relevant Chapters: pp. 8th ed. (7th ed.) (6th ed.) (5th ed.)

Building some perspective	
Two views of multicellular physiology	(1)
Some more chemistry	(2, 6 pp. 181-190 (182-191) (192-200) (196-209))
Epithelium (Cells and tissues only discussed in chapter)	(3)
Energy metabolism	(4)
Movement across (cell) membranes	(5)
Intercellular communication	(6)
An overview of nervous and endocrine systems	(7&8)

COORDINATING MOTION

Action potentials	(8)
Nervous pathway basics	(8, 11 pp. 368-371 (371-375) (391-395) (396-401))
Muscle cells: basic features	(12)
Overview of spinal cord organization and reflex arcs	(9 pp. 272-282 (275-285) (289-299) (297-307), 13 pp. 415-423 (418-426) (442-452) (447-458))

Overview of brain organization	(9 pp. 282-302 (285-304) (299-319) (309-326))
Sensory physiology: sense to image	(10)
Sensory physiology: sensation	(9)
Memory: connecting image and sensation	(9)
Basic motor pathways	(13 pp. 422-428 (426-431) (452-458) (457-463))
Overview of cerebral cortex organization	(9)

CIRCULATION

Some physics of flow	(14 pp. 433-440 (436-443) (463-471) (468-475))
Maintaining blood flow through capillaries	(15 pp. 477-495 (478-496) (509-528) (513-526))
The heart as a pump	(14 pp. 440-471 (443-473) (471-502) (476-505))
Microcirculation and the lymphatic system	(15 pp. 495-504 (496-505) (528-538) (526-540))
Blood cells and blood clotting	(16)

INPUTS AND OUTPUTS

The kidney's role in maintaining some forms of balance	(19, 20)
Maintaining oxygen and carbon dioxide balance	(17, 18)
pH and potassium balance	(20)
Designing a digestive tract	(21)
Digestion and absorption	(21, 22)
Regulating blood levels of glucose and calcium	(22, 23)
The input and output of viruses and bacteria	(24)

REPRODUCTION

Regulation of growth and development	(23, 26)
Mating, fertilization, implantation, and birth	(26)

TESTS

Quizzes (40% of grade): Six times throughout the semester you will be given a short quiz consisting of some combination of defining vocabulary terms and answering questions covering specific core ideas introduced in the course. The major purpose of these quizzes is to provide continually feedback on whether you understand (and can work with) those concepts that form the foundation for all the various topics we will discuss, along with keeping you abreast of the associated terminology. Given that adding quizzes to this class is still relatively new, I am still uncertain as to how overall performance will be converted into grades. Although I will guarantee that the grading scale will not go any higher than the standard 90-80-70... percent scale. That is 90% and above is the A range (which includes A and A-), 80 to 89% is the B range (which includes B+, B, and B-) and so on.

TENTATIVE QUIZ DATES: There is no set schedule, although all quizzes, along with the material potentially covered, will be announced as least a week prior.

Examinations (60% of grade): The purpose of exams will be to test your understanding of concepts presented in class. There will be three exams. Each exam covers approximately one-third of the class. The final is comprehensive only in the sense that each section builds on earlier material. With exams I wait to set grading scales until after I see the results. In other words, to at least some degree I adjust the grading scale based on the overall performance of the class. However, the likely scale is: A range—87.5% and up, B range—72.5-87%, C range—55-72%, etc. Note: The cumulative average (or median, if it is higher) for the three exams will never be lower than 70%, as scores below that point indicates to me that overall the tests have been too hard, and thus I will adjust scores as needed.

EXAM TEST DATES: Thursday, September 19 (3:30-5:30 pm); Thursday, October 31 (3:30-5:30 pm);
Thursday December 12 (3:30-5:30 pm)

(**Note:** No exams are given during normal class times, so make sure that you are able to attend the scheduled exam times.)

GRADING

The final class grade will be based on combining scores from the two types of tests in the proportions indicated above, with one important caveat: For all students that fall just below any borderline, I will look at a variety of factors (such as an upward trend in exam scores) to see if it makes sense to boost their final grade beyond the overall point total.

Doing some type of outside assignment to improve your grade is **not** an option. You should spend your time trying to master the material presented in class.

MAKING UP QUIZZES OR EXAMS

There are **only** two circumstances under which you will be allowed to make up a missed quiz or exam:

- You have spoken to me prior to the time that the exam was scheduled and I agreed that your reason for missing is legitimate.
- There is a verifiable reason that accounts both for why you were unable to contact me prior to the exam and for why you were unable to attend the exam at its scheduled time.

IN ALL OTHER CASES YOU WILL RECEIVE A ZERO FOR THE EXAM.

WITHDRAWALS AND INCOMPLETES

Friday, August 30 and **Friday, October 18** are two days to be aware of. Up to August 30 you can drop this course. After August 30 and up to October 18 you can withdraw from this or any other course you are taking this semester. Withdrawal, in essence, is a means to decide to not complete the course and still avoid receiving a failing grade. Instead a W appears on your transcript. To withdraw just go to the registrar's office and fill out the necessary form. Continuing the course past March 8 is to make the decision to complete the course.

A student may receive an incomplete if (and **ONLY** if)) that student has taken at least two out of the three exams and because of extenuating circumstances is unable to complete the course. To finish an incomplete, the student will be expected to make up the missed exam as soon as possible.

LEARNING OBJECTIVES

The answer to the question: What should I do in a human physiology course? seems so obvious—I should introduce what is known about human physiology. Typically this is done by starting with a brief introduction to cells and tissues, and then moving through the basic features of each of the body's systems (i.e., nervous, circulatory, digestive, immune, etc.)

The problem is that information surveys tend to never get to the root of an educational experience—to literally reshape the brain in ways that makes it possible to not only repeat information but to better think, question, and organize it. And that is not likely to happen in the absence of guidance.

So my goal in this course is to attempt to guide students through an exploration of physiology that will help them see patterns nested within its workings, which in turn will facilitate the building of a mental framework that will allow them to better think about any aspect multicellular function. Aspects of this goal include:

- helping students view each new piece of information as more than another thing to be memorized, but as something that fits into a network of core ideas.
- helping students discover how to apply core ideas to figure things out for themselves. Only then do students escape the trap of making everything a special case. And when that starts to happen, it begins to be fun. Education in its truest form is enticing.
- helping students go beyond their own expectations, and understand “things” that they never thought they could.

While these goals may seem (ambitious, unreasonable, esoteric, or whatever word you want to fill in here), the bottom line is that I am trying to help students prepare for upcoming challenges. I feel confident that any student that strives to make continual progress is on the path to excel in future studies (in whatever form they pursue). The extensive feedback I have had from former students continually reinforces this belief.

There is one important caveat to consider: While I am commonly referred to as a “teacher”, recognize that it is a poor word choice. No one can teach anybody anything. That is, I cannot transfer any information, ideas, or understanding to anyone, they have to learn them. And learning is an active, engaged process of discovery, whose route starts with confusion and proceeds through struggle. So unless a student is willing to take on the challenge, which involves effort and participation, nothing will happen. My job is to help guide that discovery as best as I possibly can. My hope is that each student comes with the energy needed to embark on a journey.

COMMENTS FROM PREVIOUS STUDENTS:

It is very important to attend lecture all the time or you miss the concepts. The book doesn't present things how they are presented in class—with the WHYs. If you miss a lot of lecture, it makes things really frustrating because you miss important pieces that cannot be gotten just from reading the book.

Physiology Truths... (found on the back of a vocabulary quiz)

Life is loopy (and so is your brain after you study too long).

Diffusion is slow (especially at the start of a big marathon)

Embrace confusion (even when your arms get tired from the “sustained hug”)

Keep up (even when you're failing your other classes, getting two hours of sleep, and neglecting your hygiene)

When in doubt, the liver produces it.

Always enter Dave's class ready to laugh because whether Dave shares his jokes with you or not, he's always entertained and makes physiology entertaining.

Some student answers to the question: What advice would you give students taking this class from me next spring semester?

Take biology and chemistry before taking this class.

Have a biology background and a basic understanding of anatomy.

Take an introductory biology class if it has been a while since you have taken a biology class.

Drop now if you do not have the background.

Always come to class and look for patterns.

Try not to get behind—it's no fun to try to cram all the info right before a test. And look for connections—this class is so loopy it can make you dizzy.

Come to class everyday, the information covered in class is very different from what is in the book.

Do not procrastinate, study daily.

Main thing: Stay up to date and don't get behind. You cannot successfully “cram” for a Temme test.

Don't miss a day and attend on Fridays (even if there is no class, its a good review session).

STUDY, don't take your normal full-load of credit hours, and don't take for granted that you will “naturally” do well.

The man goes a little fast—you must come to every class, even if you are sick and dying. Study each week's handouts constantly, not just before a test.

Start doing vocabulary early and study early.

Keep up as everything builds on everything else.

Read ahead in the some physiology book about the subject Dave will talk about if you have time.

Read the chapters as often charts and diagrams help that aren't in handouts or presented in class.

Give it your best... then you will never wonder "what if".

Take good notes to correspond with the drawings in the handouts.

Watch how many times Dave swings around the faucet if you start to get drowsy.

Link concepts; try to apply the things you're learning to real life.

It's okay to trace your food, urine, and well other stuff. Great way to learn despite all the weird looks you get from other people.

Don't think in the way that you have been throughout "traditional education"—put yourself outside the box and think more abstractly.

Try to not be stubborn-minded about Dave's style of teaching—it will get you nowhere by just memorizing information.

If you don't get it, go over it until you do. You can apply what this class teaches you to anything.

Go over lecture notes immediately following lectures and ask questions!

Ask questions and be involved in the discussion.

THINK!

Learn how to think, consider, probe, and question every thing you learn or hear from Dave and other professors.

First learn everything, then be sure you can put it all together and make connections.

Use the notes and study questions as a source of learning, but make sure to understand the concepts so that you can apply them.

Don't just memorize—it won't help on exams.

Be prepared to think like Dave and figure out everything about each concept to be able to answer any related questions on tests.

Try to think about the big picture.

Always ask: How can I tie this all together and why is this like it is?

Just learn to look for the general patterns and to always ask why things are happening.

Think of why things are happening more than how. The how is easy, it is the why that tends to go unanswered.

Have fun and enjoy this class. Don't make it harder than it really is.

Have fun, this class rocks.

Get out fast!!!!

Good luck and pray.

"Get out while you still can!!" Just kidding—just keep up with the material and don't get behind.

When taking a test, relax and apply what you know.

Take the vocabulary quizzes seriously, as they will help in understanding principles.

Use the vocab to see connections—it's a great study guide.

His tests are like a box of chocolates, you never know what you're going to get. So eat the whole box before the test.

Then go buy three more boxes and eat them before the test.

If you know all the answers to Dave's questions, then sit in the front row because it is annoying when you mumble every single answer from the back row when Dave can't even hear you.