

Biology 3200 – Principles of Physiology
Winter 2020, 3 Credits

Instructor: Dr. Karen Myhr
Contact: kmyhr@wayne.edu (preferred over phone), 313-577-1504 (often goes to email via voicemail), office in 2113 Biological Sciences Building
Office Hours: Dr. Myhr's office hours will be Tuesdays in the STEM Commons, usually from 11:10 am to 12:30 pm; most Thursdays after lecture in the lecture hall; and by appointment. See Canvas for link to request an appointment and for ongoing updates of times.

Lectures: 4 to 5:15 pm on Tuesdays and Thursdays, Room 100 General Lectures

Required Materials:

1. Access to *Human Physiology: An Integrated Approach*, Eighth Edition by Dee Unglaub Silverthorn. **ISBN-10:** 0134605195, **ISBN-13:** 978-0134605197. Copies are available on campus on reserve in the STEM Commons and the undergraduate library (UGL).
2. An **IClicker2** is required. (The UGL has a limited number to loan for free each semester. First come first served.)
3. **Access to Canvas through the internet.** If you do not have access to Canvas at home, there are connected computers on campus in the UGL. Plan time on campus to use them, if that is your plan.

Objectives: You will describe and analyze the structure and function of each body organ and system and the interaction among systems under normal conditions. You will organize processes logically based on cause and effect, compare and contrast similar processes, and identify common exceptions.

You will describe and analyze the integration of physical and chemical processes in physiology. You will explore integration across both levels of organization from molecules to organ systems (e.g. integrating membrane potentials and ion flow into a description of neuronal and whole-body function), as well as across organ systems (e.g. how the renal, cardiovascular, and endocrine systems maintain blood osmolarity and pressure). Practicing integrating (de-compartmentalizing) knowledge is an important part of a deep understanding of physiology and your future professional activity.

Physiology is primarily about regulation, thus you will describe how, when and where physiological processes are regulated. As the semester progresses, this integration becomes more and more evident.

You will be expected to recall numerous specific and detailed facts about each tissue and organ system. This means recognizing and using lots of vocabulary - specific molecules, cell types, and specific core physiology processes and/or concepts of homeostasis. Effective use of this new language is critical to your ability to communicate in class and in your future endeavors.

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Study Cycle: The key to success in this course is using the Study Cycle. It includes

- **Preview** (homework)
- **Engage** in class (clickers)
- **Review** (quizzes, teams)
- **Study** (quizzes, teams, Dr. Myhr)
- **Assess** your processes and achievements (quizzes, teams, exams)

It will take hard work and discipline, but everyone should be able to meet their goal for the course by creating smaller goals and strategies, and following through all semester at the level of their goal. The course structure is set up to help you meet your course goals by breaking the work into small achievable tasks using the Study Cycle. For more on the Study Cycle see *Teach Yourself How to Learn* by Sandra McGuire in the STEM Commons; and see our Canvas site and the course components below for how to apply it in this course.

Grades:	Exam 1	(2/6/20, in class)	140 points
	Exam 2	(3/5/20, in class)	140
	Exam 3	(4/16/20, in class)	140
	Drop Lowest Unit Exam		-140
	Final Exam	(4/28/20, 2:45-4:45 pm)	140
	Quizzes		35
	Homework		25
	Clicker Points		20
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	Total		500 points total

Grading Policy: Grades will be calculated on the following scale:

	A	92.5-100%	A-	90.0-92.4%	
B+	87.5-89.9%	B	82.5-87.4%	B-	80.0-82.4%
C+	77.5-79.9%	C	72.5-77.9	C-	70.0-72.4%
D+	67.5-69.9%	D	62.5-67.4%	D-	60.0-62.4%
	F	0-59.9%			

I do not curve grades. Instead I provide support so everyone knows what to do to meet their goals. I do not offer extra credit because extra projects distract you from the regular course assignments that will help you meet your goals.

Homework: Free homework in Canvas will help you **preview** to prepare for each lecture. Assignments are due before every lecture. The purpose of homework is to support your learning by guiding your preparation for lecture, not to evaluate you. Therefore, homework is open book, open note, and you can help each other in person, the Canvas Discussions board, or other mechanisms. You may do each assignment as many times as you want to before its deadline. Your best score before the deadline will count towards your grade. There will be at least 23 homework assignments worth at least 1 point each, totaling more than the course maximum of 25 homework points.

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The reason for the extra opportunities over the maximum is to accommodate technical or personal reasons you may miss an occasional assignment, or points on an assignment. You do not need to tell me about technical or personal reasons you may miss points occasionally. I will assume you had a good reason. These occasional problems are taken into account by having more opportunities to earn points than the maximum, not by deadline extensions or make-up assignments. Please do let me know about chronic or systematic problems as soon as possible. **Policies in this paragraph also apply to clickers and quizzes.**

Clickers: We will be using clickers to support your **engagement during class**. Clicker questions help you learn, work together, and make class more fun. You need to have an IClicker2 and use it in class starting the first day. It is a remote control device that allows me to collect answers and see how everyone is doing, so I can give the class more tools if there is a general problem.

You will earn one point for each day you answer most of the clicker questions. You do not need to answer correctly to earn credit, because the purpose is engagement in learning, not ultimate achievement. There will be 23 opportunities to earn clicker points, starting on the first day of class, and not including exam days. There is a maximum of 20 points for the semester.

Quizzes: There will be quizzes in Canvas to help you **review** and **study** the course content and **assess** your learning. There will be multiple-choice questions, which are my old exam questions, and short answer paragraphs with peer review. There will be at least 25 multiple-choice quizzes worth at least 1 point each. There will be at least six one-point short-answer assignments. There will be more total quiz point opportunities than the maximum of 35 points.

You have unlimited attempts on each multiple-choice quiz until its deadline. Quizzes are open book, open note, open classmates and you can help each other in person, on the Canvas Discussions board, or other media. Submit your own answers. Your best score before the deadline counts towards your grade.

For the short-answer questions you will write a paragraph in response to a prompt. You may check any resources and discuss with other people to prepare, but your submission **must be in your own words**. For technical reasons, you will only have one submission opportunity per assignment. To earn full credit you will anonymously review two other submissions by a second deadline.

Teams: You will have the option to join a study team that meets weekly in the STEM Commons. Honors students and students with peer mentor experience will lead the teams. During part of your team meeting, you will write multiple choice exam questions. The course grader will filter and edit them. I will post the best questions to Canvas and use some similar questions on the exams. I strongly

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recommend that you join a team that meets for an extra hour, especially if you have limited study time. Teams are free and generally will raise your grade 10%.

Exams: There will be three unit exams and a cumulative final exam, each worth 140 points. Your lowest unit exam score will be dropped. Missed exams will be scored as zero, but a missed exam may be the dropped unit exam. There will not be any alternate make-up exams dates or times other than possibly for University-sanctioned obligations, such as WSU team athletic competitions arranged at least a week in advance. The final exam will be cumulative and cannot be dropped. For the final exam schedule and policies, search for “WSU, Wayne, final exam schedule” (the URL changes). See Canvas for tips on preparing for exams and details of exam procedures. Knowing how the exam will go can help reduce any anxiety and improve your grades.

I highly recommend using your textbook to prepare for lectures, and as a reference to clarify material after lectures as part of the Study Cycle. **Exams will focus on what is covered in lecture and assignments, not details from the textbook, except specific assignments made in class to do on your own.**

Course Grader: In addition to course structure, Despina Tsitlakidou, the course grading assistant, can help you succeed. She will help filter and edit student-submitted multiple-choice questions, and will have drop-in hours to answer questions. See Canvas for drop-in times.

The lectures will be captured and posted in Echo360 Recordings in Canvas. The purpose is for you to be able to look up a piece of information that you missed. You should still come to class, and you should still engage fully during class. See *Engaging During Lecture* and *Studying the Material* in Canvas for more tips on effective engagement so you use your time and energy efficiently. Sometimes there are technical problems with the EchoCenter. I do not control this, nor can I fix it. You are welcome to make your own recordings of lecture for your personal use.

General Policies:

1) In fairness to the vast majority of the class who does not cheat, and to maintain the value of your grades, anyone caught cheating will receive a failing grade for the exam or class, have a temporary or permanent record of violations in their record, and may be expelled.

You may only use your own clicker in class. **If you are caught with someone else’s clicker in class, or someone else has your clicker in class you will both earn a zero for ALL of the clicker points for that unit or the whole semester, whether or not you used the clicker(s).** The only exception is if both students are sitting next to each other in the lecture hall (not in the lobby or bathroom) and one person is just holding both clickers due to the small desks.

For homework and quizzes for this class, you may work with other people and look up answers while you are working. The point of the homework and quizzes is to learn the material, so use

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these activities to help you reach that goal. Knowing to get help during the learning phase is a sign of a good student, so this is not cheating. You must answer the questions in your account yourself, and short answer and essay questions must be entirely in your own words, or used with proper attribution. It is cheating to get or give help on evaluations, such as in-class exams. If you are not sure when you are allowed to get help in this or another class, please ask for clarification. For discussions of cheating see the “Student Code of Conduct,” which can be found at doso.wayne.edu/assets/codeofconduct.pdf

2) On exams, I want to give you credit for answers that are correct given reasonable assumptions, even if it is not the answer I expected. If you would like an alternative answer considered, post your **reasoning** in the Exam topic in the Discussions board in Canvas. I will consider all posts, but I do not give credit for reasoning along the lines of “the question confused me,” or “the question was similar to a quiz question that had a different answer.” As you practice with the quizzes you will notice that there are many similar questions with different answers. One point of the quizzes is to help you notice and learn the concepts and details that have tripped students up in the past, so you do not make those mistakes on the exams and in the future.

3) **Students who have accommodations for disabilities on file with Student Disability Services must bring their paperwork to me during office hours** (or at a time arranged by email, if you have classes during office hours). There is no retroactive accommodation to before I know of the issue. You need to register documented disabilities with Student Disability Services for coordination of your academic accommodations. They need a week or more to arrange accommodations, so make an appointment early. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577-3365 (TTY: telecommunication device for the deaf; phone for hearing impaired students only).

Once you have your SDS accommodations in place, I will be glad to meet with you privately **by appointment** to discuss your special needs. **You need bring your paperwork so I can process it.** Please refer to the SDS website for further information about students with disabilities and the services we provide for faculty and students: studentdisability.wayne.edu/ **If accommodating you will require advance preparation, please contact me as soon as possible, even if your paperwork is not yet completed.**

4) **Missing Class.** Students are expected to attend every class in person. If you are going to miss class, please see the grading policies above. I do NOT give individual extensions or exceptions on assignments for personal reasons, including but not limited to hospitalization, illness, travel, weddings, transportation problems, weather, funerals, dependent care or family obligations. The general course policies systematically take into account that sometimes students will need to miss one or two classes.

There are exceptions for Student Disability accommodations, and some civic duties. If you have a disability please see general policy 3 above. If you have jury duty, a mandatory court date that

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must be during class, military obligation, or religious obligations with inflexible dates during lecture, please email kmyhr@wayne.edu by January 17, 2020 or as soon as possible as the situation arises. In your email include what the conflict is, the date(s), and whether or not you will miss any exams; and attach a pdf or picture of your documentation. You may redact personal information. You may also come to talk to me during office hours. I will do my best to come to a reasonable accommodation that is fair to you and the other students in the course.

5) **Electronic Devices and Professional Behavior.** Professional behavior is expected, which includes respecting your classmates by arriving on time, not having distractions on electronic devices and not talking about non-course topics, or while I am lecturing. All students must show respect in language and attitude towards the instructors and their fellow students. You are encouraged to discuss differences of opinion with each other, respectfully. Disrespectful students will be asked to move seats or leave, and may lose their opportunity to turn in any missed assignments or earn any points for the day. Children may not attend class. They are adorable, but distracting.

During lecture, electronic devices may ONLY be used for the purposes of the class, such as taking notes. Electronic devices in class can be useful tools, but too often they are distractions to you and those around you. The consequences for misusing an electronic device in class will be that I will require you to put away your electronics, or I will take your device to return at the end of class. **You will lose your participation (clicker) points for the day, unit, or semester.**

6) If you need to see Dr. Myhr and cannot come during office hours, you are welcome to set up an appointment by email. To make this easier for everyone I have set up a system for you to let me know when you want an appointment. You will complete a form with your available times. I will select a time that also works for me and post appointments to the Canvas Calendar. You will select an appointment in the Calendar and then come to my office. I usually set up multiple appointments so others can also claim an appointment, if they want to, even if they did not make the original request.

7) **Email guidelines:** Email is best only for quick questions that do not belong on the Discussions board because they are personal. I am happy to discuss longer biology content questions during drop-in hours, when I can stay after class on Thursdays or by appointment. I will not reply to emails when the answer can be found in the syllabus or on Canvas. Please post problems or questions of general interest, such as those on course policies, biology content, homework, quizzes or exams, in the Discussions board in Canvas. Longer questions that require discussions do not work well by email.

I will respond to most emails within **two business days**. After two business days, you may email me again. **Due to privacy laws and for professionalism you must email me from your WSU email account or from Canvas.** I expect emails to be in a professional style, with your course number and a description of the issue (not your name, or just the course number) as the subject, a proper greeting, e.g. "Dear Professor Myhr," a proper salutation, e.g. "Sincerely, Chris Smith," correct punctuation including capitalization and no texting abbreviations. Emails that do not

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follow these rules may go into spam or take longer get a reply. If I cannot figure out what you want, I cannot help you. Following these email guidelines even outside of this course will enhance your success at WSU and beyond.

8) Letters of recommendation are to give people an idea of who you are beyond the grades and classes on your transcript. I do not write letters for students who I only know from my classes. You are likely to need letters from professors. Start planning now how you will get involved on campus so you will have professors who know you well enough to write a letter for you. Examples of how you can get involved include doing research with a professor (urop.wayne.edu) , joining a student organization (doso.wayne.edu/org-services), joining a learning community as a member or peer mentor (wayne.edu/learning-communities/), or becoming a supplemental instruction leader (success.wayne.edu/pal/si/).

9) **Withdrawals:** If you request a withdrawal, you will receive a WN on your transcript if you never completed any assignment; a WP if you have greater than 60% of the points possible at the time of your request on exams, quizzes, homework and class participation; or a WF if you have less than 60% of the points possible at the time of your request. No exams or other grades are dropped in this calculation. In Academics: select "Course Withdrawal" from the Registration Menu under Student Resources. A *****SMART Check***** is required. After the registrar processes your request they send it to Dr. Myhr to assign a grade. It can take up to five business days after I receive your request for processing. For the academic and registration calendar, see wayne.edu/registrar/registration/calendar19-20/

10) University closures will be publicized through:

- the university emergency broadcast system (broadcast.wayne.edu),
- WSU Homepage (www.wayne.edu),
- the University Newline (313) 577-5345,
- WDET-FM (Public Radio 101.9)

If the university is closed, the closure includes lecture, any team meetings, and office hours. If a unit exam is scheduled on a day when the University or lecture room is officially closed during class, the exam will be held during the next scheduled meeting of lecture that occurs when the University and room are open, or as indicated on our Canvas site. I will give you instructions through Canvas or WSU email (or possibly Academics if things are going particularly badly) as soon as possible if there is a closure or emergency.

11) For any and all issues not covered in this syllabus, refer to the "Student Code of Conduct," which can be found at doso.wayne.edu/assets/codeofconduct.pdf

12) Updates to this syllabus and schedule may be posted on the course Canvas website at canvas.wayne.edu. You are responsible for checking Canvas announcements and your University email account. I recommend checking at least once each business day of a semester in which you are enrolled.

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Course Detailed Learning Objectives. Chapters 2 through 5 were covered in your prerequisite courses. You will have a quiz early in the semester so you can check if you need to review any of the material in these chapters.

We will cover the rest of the book focusing on several overriding questions for each chapter, as described below.

At the end of the course you should be able to

- Describe how the human body maintains a constant internal environment despite large changes in the external environment through communication, **homeostasis** and feedback. (Sections 1.4, 1.5, 6.1, 6.2, 6.4, 6.5)
- Describe the organs and signaling molecules of the **endocrine system**, and how the plasma concentrations of hormones for reproduction, metabolism and ion and water balance are regulated. Include the organs of the endocrine system, types of hormones, reflex pathways, feedback control and pathologies. (Sections 7.1, 7.2, 7.3, 7.4, 7.5)
- Describe the fundamental properties of **brain cells**, neuronal signaling, synaptic communication and signal coding (Sections 5.6, 5.7, 8.1, 8.2, 8.3, 8.4, 8.5)
- Describe the organization, regions, protection, complex processing and pathology of the **central nervous system**. (Sections 9.1, 9.2, 9.3, 9.4, 9.5, 9.6)
- Describe the general principles and some examples of how **sensory information** about the environment gets to and is processed by the brain. (Select topics from Chapter 10)
- Describe how the **output of the central and peripheral nervous systems** are organized into autonomic (parasympathetic, sympathetic) and somatic functions. (Sections 11.1 and 11.2)
- Describe how **skeletal muscles** generate and regulate force; and compare skeletal, smooth and cardiac muscle function. (12.1, 12.2, 12.3, 12.4)
- Describe how movement and posture is controlled by **reflexes** and more complex pathways, including the spindle reflex, the knee jerk reflex and the crossed extensor reflex. (13.1, 13.2, 13.3, 13.4, 13.5)
- Describe the organization of the **cardiovascular system**, the cellular function of cardiac contractile and autorhythmic cells, the heart cycle and cardiac output. (14.1, 14.2, 14.3, 14.4)
- Describe how **blood flows** through the body, how flow velocity affects capillary exchange, how the lymphatic system integrates with fluid flow, and how **blood pressure** is regulated. (15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8)
- Describe the components of the **blood**, hemostasis and blood types. (16.1, 16.3, 16.4, 16.6)
- Describe the mechanics of **breathing** and the distribution of gasses via exchange in the lungs and tissues, transport in the blood and the regulation of ventilation. (17.1, 17.2, 17.3, 18.1, 18.2, 18.3)
- Describe how the **kidneys and renal system** remove waste products from the blood by filtration, reabsorption, secretion and excretion; how they regulate blood pressure and ion balance via countercurrent exchange and hormone regulation (vasopressin, aldosterone, the renin angiotensin pathway and the natriuretic peptides); and how they balance body pH. (19.1, 19.2, 19.3, 19.4, 19.5, 19.6, 19.7, 19.8, 20.1, 20.2, 20.3, 20.4, 20.5, 20.6, 20.7)

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- Describe how the **digestive system** selectively absorbs nutrients from what we eat, and how the system is regulated. Describe the anatomy motility and secretion of the digestive system. Describe the cephalic, gastric and intestinal phases of digestion and absorption. Describe the immune function of the digestive system. (21.1, 21.2, 21.3, 21.4, 21.5, 21.6, 21.7)
- Describe how energy is stored and released by **metabolic control**, and analyze what happens when there are complications like diabetes. (22.1, 22.2, 22.3, 22.4, 22.5, 22.6, 22.7)
- Describe how the **endocrine system** affects body shape and size through cortisol, thyroid hormones, growth hormone, bone growth, and calcium metabolism. (23.1, 23.2, 23.3, 23.4, 23.5)
- Describe how the **immune system** prevents infection by pathogens, and analyze the causes and consequences of inappropriate immune responses. (24.1, 24.2, 24.3, 24.4, 24.5, 24.6, 24.7, 24.8, 24.9, 24.10, ass time allows)
- (Depending on time) Describe how the body responds to normal homeostatic imbalance caused by **exercise**, including synthesizing and analyzing the integration of metabolic, respiratory and cardiovascular responses. (Chapter 25)
- Describe how the anatomy, function and endocrine regulation of the male and female **reproductive systems** enable fertilization, pregnancy and birth of the next generation. (26.2, 26.3, 26.4, 26.5, 26.6)