

COURSE FORMAT: This course is an introduction to physiology and will cover the endocrine system, the nervous system, the musculoskeletal system, the circulatory system, and the urinary system. This course will also introduce how physiological knowledge is used to diagnose and treat diseases.

Information about these topics from the prerequisite BILD 2 will be reviewed in **required readings**. In addition, you also need to review calculus, physics, and chemistry, in particular the topics that are mentioned in the outline that will be posted on TED.

LECTURES: Tuesday and Thursday 9:30a - 10:50 pm, PETER 108

TAs, SECTIONS, and OFFICE HOURS: (please see class schedule for locations)

Timothy Foster
tsfoster009@gmail.com

Office Hour: Monday 10:00a -10:50a
Sections: Monday 5:00p - 5:50p
Monday 6:00p - 6:50p

Leichtag Lobby
WLH 2206
WLH 2206

Ravi N Wettasinghe
rwettasi@ucsd.edu

Office Hour: Monday 6:00p - 6:50p
Sections: Monday 7:00p - 7:50p
Monday 8:00p - 8:50p

Price Center Theatre Lobby
WLH 2206
WLH 2206

Mary Fok
mfok@ucsd.edu

Office Hour: Monday, 3:00p - 3:50p
Sections: Friday, 2:00p -2:50p

Muir Biology 2165
CENTR 217A

Dr. Leutgeb

Office Hour: Tuesday 11:00a – 11:50a

Pacific Hall 3502

Sections will not meet on Jan 9th; they will start on Friday, Jan 13th. **The above schedule is the correct schedule. Attendance at sections is optional, but it is highly recommended that you attend at least one section per week.** Regular attendance and active participation in a section can weigh in your favor if your final grade is just below a grade line. To give credit to students who attend section regularly, the attendance will be monitored by a sign-up sheet; please be sure to sign in when you have attended a section. The sections are designed to provide a forum for you to ask questions about the course material, receive additional instruction, and receive help with solving problem sets. The sections during the first week may review basic chemistry, physics and mathematics concepts. The material will also be posted online and is a prerequisite for solving problem sets.

Each TA and the instructors will hold one office hour per week as long as they are well-attended. An additional review session will be offered before each exam. All office hours will be open to groups of students. If you need to discuss matters other than the course material, please make an appointment with the course instructors.

TEXT AND READINGS: Silverthorn. *Human Physiology: An Integrated Approach*, 5th edition (2010). The syllabus lists the pages in the text that encompass the entire topic. **In addition, the pages, which you need to read in preparation for each class are in bold. These pages are listed for all lectures until the first midterm. For subsequent lectures, I will announce the pages the you will need to read in preparation for each class at least one week before the class.**

BOOKS ON RESERVE: Course reserves for this course are at the BioMed library. The following books will be on reserve. Please use them if you need clarification about material in the course or if you want additional information about topics in the course that you find particularly interesting. If you read several sources, the authors of various books and articles may disagree with one another, with your text, and/or with what you hear in the lectures. Disagreement about some subjects is common in science, particularly in

fields in which there is very active research. For the purpose of the exams in this course, the material presented in lectures and in the Silverthorn text will be considered correct.

Bear, Connors, and Paradiso. Neuroscience: Exploring the Brain, 3rd edition. Lippincott, Williams and Wilkins, (2006).

Guyton and Hall. Textbook of Medical Physiology, 11th edition. Saunders Elsevier (2011).

Purves, Augustine, Fitzpatrick, Hall, LaMantia, McNamara, and White. Neuroscience (4th edition). Sinauer Associates (2008).

Randall, Burggren, and French. Eckert Animal Physiology, 5th edition. Freeman (2002)

Widmaier, Raff, and Strang Vander's Human Physiology. The Mechanisms of Body Function, 12th edition. McGraw-Hill (2011).

Berne, Levy, Koeppen, and Stanton Physiology (6th edition). Mosby Elsevier (2010)

COURSE WEB SITE. There will be a Triton Education site (TED) for the course <http://ted.ucsd.edu>. Student accounts are added on the first day of classes. Concurrent enrollment (Extension) students are not added automatically. Extension students should obtain a registration token from Extension's student services or the ACS Help Desk. More information is at <<http://sdacs.ucsd.edu/~icc/ce.php>>

Announcements, updates, postings, previous lecture notes, class discussion forums, and exam grades will all be communicated using TED.

CLICKERS. Clickers will be used throughout the lectures. **Please register your clicker using TED. Twenty points (corresponding to approx. 5 % of the course grade) will be given by responding to at least 75 % of ALL clicker questions (excluding questions during the first class on Jan 10th). Twenty points of extra credit can be earned by answering at least 50 % of the reading quiz questions correctly (approx. 5 questions at the beginning of each lecture).** These questions will cover the the required reading for each lecture. Questions throughout the lecture will be used to achieve an in-depth understanding of the material. These additional questions will not be graded and it is therefore irrelevant whether they are answered correctly or incorrectly. **Each student's responses to clicker questions will be posted on TED once a week so that you can estimate whether you are on track for receiving full extra credit.**

PODCASTS OF LECTURES. Lectures will be podcast as long as students are using this resource. If students use Podcasts as a substitute for attending lectures or do not use them at all, podcasting will stop without advance notice. To reach the podcasts use your Web browser to go to <podcast.ucsd.edu>. You can listen to each lecture from that site or download it to your MP3 player. These are audio files; no figures are included.

ELECTRONIC COMMUNICATION. You can ask questions by posting a message or sending an e-mail on TED. If you have questions about the course material, please use the **Discussion Board on TED** so that the answers will be available to others in the class. Please use the regular e-mail address of the instructor (sleutgeb@ucsd.edu) only for matters that **require** the instructor's personal attention and **be sure to include <BIPN148> in the subject line.** Note that e-mail will not be checked after 6 pm, including evenings before exams.

LECTURE OUTLINES, LECTURE SLIDES WILL BE AVAILABLE ON TED ON THE DAY OF THE LECTURE. PROBLEM SETS WILL BE POSTED EACH WEEK. These problem sets are intended for practice and do not

need to be turned in. Problems/questions require that you **use** information and critical thinking skills. A typical exam question states an experimental observation and asks you to apply what you have learned and to be able to explain, interpret, or predict something.

PROBLEM SETS. Problem sets will be posted each week (typically on Thursday so that they can be discussed in sections on the following Friday and Monday). Solutions to the problems will be (a) discussed in sections and (b) posted on WebCT after the final section of each week meets. **All information introduced to you on problem sets is part of the course material.** You may see questions on exams that are based on information that was presented **only** in a problem set problem, so be sure you study the problems as part of the course.

Most of the problems require you to **use** information, and often present new information and ask you to apply what you have learned to explain, interpret, or predict something. **TO DO WELL ON EXAMS, YOU MUST PRACTICE THIS KIND OF THINKING BEFORE THE EXAMS.** Physiologists think in terms of "word problems," not in terms of memorization.

You are most likely to do well in the course if you approach the study of physiology more like you would physics than like descriptive biology. In order to "do physiology," you **MUST** be able to solve problems. You will do much better on the exams if you have studied physiology as you would physics or math. That is, **do the problems in writing on paper by yourself** or in a study group in which you *actively* participate. You cheat yourself if you just read the solutions and say "Oh yeah, that makes sense." People who study passively by reading and then writing an outline of the text or recopying their notes, skipping the problem sets or maybe just reading through them, are often surprised at how difficult they find the exams, whereas students who work the problem sets typically do very well on the exams. **PRACTICE IS IMPORTANT, and recopying your notes is not practicing the skills of problem-solving.**

HOW TO GET THE MOST OUT OF THE PROBLEM SETS:

Step 1. For each problem set, begin your work by treating it like a closed-book exam: that is, write the best, most complete, answer you can on paper.

Step 2. THEN **improve** your answers by consulting your lecture notes, Course Outlines, textbook, Podcasts, etc.

Step 3. FINALLY (and not before steps 1 and 2) compare your answers with the solutions to the problem set, **concentrating on the DIFFERENCES between your answer and the answer on the key.** The similarities indicate what you know—and that's good--but the differences indicate what you don't yet know or don't yet understand.

Your textbook includes questions at the end of each chapter. Solving these problems will give you further practice. Some of problems from the chapters may be included in each week's problem sets.

REVIEW SESSIONS: Will be conducted by TAs on during the days before the exam. A schedule will be posted.

EXAMS:

1. GRADING: Your grade for this course will be based on your performance in the two mid-term exams and in the final. In addition, responding to 75 % of the clicker questions will also contribute approx. 5 % (20 points) of the score. Each mid-term exam will be worth approx. 100 points and will consist largely of short-answer questions and problems. The final will be worth approx. 200 points and may include multiple-choice questions in addition to the short-answer questions and problems. **Your grade in this course will depend on your performance on the three exams (400 points) and on your responses to clicker questions (20 points plus 20 points of extra credit).** On your exam, make sure to write clear and precise answers. Extra credit (20 points; earned by correctly answering clicker question at the beginning of the lecture) will be added to each student's score.

2. EXAM SCHEDULE:

Midterms:	Thursday, January 26	9:30a - 10:50a
	Thursday, February 23	9:30a - 10:50a
Final:	Friday, March 20	8:00a - 11:00a

Locations will be announced in class and on TED. If no changes are announced, the midterms and the final will be in the lecture hall (PETER 108).

3. MAKE-UP EXAMS: You are expected to take the exams when they are scheduled. To be fair to your fellow students, make-up exams can be arranged only in the following three circumstances:

- A. You are too ill to take the exam. In order to be excused from an exam or to take a make-up exam (The instructor decides which is most appropriate for you) you must call Dr. Leutgeb (858-246-0824) and let him/her know that you are ill as soon as it is possible to do so (before the exam, if it is at all possible). Wrongly excusing yourself from an exam as being ill will be considered **academic dishonesty and will have all the consequences that are listed below.**
- B. You have an extremely pressing need to be out of town at the time when the exam is scheduled (not the day before or the day after) AND you have arranged the make-up exam at least one week in advance. You cannot arrange a make-up exam after the fact. It will help in making these arrangements if you bring written confirmation of your need to miss the regularly scheduled exam when you ask to schedule a make-up exam. In any case, you will also need to bring the corroborating documents to the make-up exam.
- C. You are taking an exam **for a course for academic credit toward graduation** that conflicts with the exam for this course AND you have arranged the make-up exam at least one week in advance. You must bring corroborating documents to the make-up exam.

Your last chance to schedule a make-up exam for the circumstances that are listed in B and C is by talking to Dr. Leutgeb after the class that is held one week before the day of the exam. If you fail to talk with an instructor before or at that time, you must take the exam as scheduled (unless you are too sick to do it--see part A above).

PLEASE NOTE: Having another mid-term scheduled on or near the day of our mid-term is not a reason to take a make-up exam.

4. GETTING BACK GRADED EXAMS: Each exam will include a waiver that you can sign to have your exam put in a box in the elevator lobby on the 3rd floor of Pacific Hall, so it will be available to you any time when Pacific Hall is open. Grading usually takes about a week. If you do not sign the waiver, you can pick your exam up for Kathleen McPherson's office (PH3100) from 8 – 11 am after the exams have been made available to the rest of the class.

5. GRADES: All the points that each student earned on all three exams will be totaled. The final course grade will be determined either by using a standard curve or a straight grading scale. For the straight scale, the top five scores will be averaged, and that average will be considered "100%." An A will be 90% and above, a B 75%-89%, a C 60%-74%, and a D 50%-59%. Plus or minus signs will be added for grades within 2% of the cutoff between letter grades. For the standard curve, I will calculate the mean and standard deviation. An A will be assigned for scores that are greater than one standard deviations above the mean, a B for scores that are above the mean, a C for scores that are below the mean, a D for scores that are more than one standard deviation below the mean, and an F for scores that are more than two standard deviations below the mean. The final course grade will be determined either by using the standard curve or the straight grading scale. The scale that yields the better average grade will be selected. **Extra credit will**

not be included in the calculation of the grading scale and will thus result in better grades without affecting the calculation of the cutoffs.

6. REGRADES: If you have an objection to a **particular exam question**, you have 24 hours from the end of the exam to raise your concerns. Objections to exam question must be made in person with a prepared, written argument of why that question was unfair. A decision will then be made whether to not grade that question for the entire class.

If you have objections to the grading of a question on **your** exam, you can e-mail a written argument to the teaching assistant who graded the question. **The e-mail has to be received within a week after you receive the exam. You then have to meet with the TA during her/his next office hour.** If you and the TA do not agree, you can have the TA forward your petition and exam to an instructor. Note that a regrade by the instructor may result in a gain or loss of points; regrading may not be limited to the question you petitioned about. Graded exams will be randomly copied before being returned. If you are found altering your answer to an exam question and resubmitting that question for a regrade, you will be given a zero on the entire exam and reported for academic dishonesty. Note that false statements that are sent by e-mail are equal grounds for academic dishonesty as those that are stated in person.

7. ACADEMIC DISHONESTY: All suspicions of academic misconduct will be reported to the Academic Integrity Office according to university policy. Academic misconduct is not just blatant cheating (e.g., copying off another student during an exam), but what you might have thought of as "minor cheating" in high school. In particular academic misconduct includes **writing e-mail that includes fabricated statements and using other student's clickers.** The Policy on Integrity of Scholarship (academicintegrity.ucsd.edu) and this syllabus list some of the standards by which you are expected to complete your academic work, but your good ethical judgment (or asking for advice) is also expected as we cannot list every behavior that is unethical or not in the spirit of academic integrity.

Any student caught cheating on an exam will receive a zero for that exam. Any student caught cheating with clickers will not receive any clicker points. **Cheating will be considered as severe as taking another student's exam.** The academic sanctions for academic dishonesty can include an F for the entire class.

Those students found to have committed academic misconduct will not only face the mentioned academic sanctions imposed by the instructor, but will also face **administrative sanctions imposed by their college Dean of Student Affairs.** The standard administrative sanctions include: the creation of a disciplinary record (which will be checked by graduate and professional schools); disciplinary probation; and attendance at an Academic Integrity Seminar (at a cost of \$75). Students can also face suspension and dismissal from the University; **those sanctions are not at the instructor's discretion.** The appropriate sanctions are determined by the egregiousness of the Policy violation. Students who assist in or are complicit with cheating could also be in violation of the Policy. Thus, students who become aware of their peers either facilitating academic misconduct or committing it should report their suspicions to an instructor for investigation.

See <http://weber.ucsd.edu/~dkjordan/resources/cheat.html> for additional information.

SCHEDULE OF CLASSES AND TOPICS: Required readings after the first midterm will be announced at least one week before each lecture. The topics may be adjusted depending on the progress through the material.

	Date	Topic	Page and figure numbers for readings in Silverthorn, 5th edition (Required readings are in bold)
1	January 10	Introduction Body fluid compartments and homeostasis Transport, Osmosis, and Tonicity	3-8 Page 55 and Fig. 3-2 133-151, Fig. 5-22 to 28
2	January 12	Prepare for Jan. 12 lecture Renal physiology	158-163 623-629 629-643
3	January 17	Prepare for Jan. 17 lecture Control mechanisms for volume and osmolarity	181-183 653-656, 659-661 657-658, 662-669
4	January 19	Prepare for Jan 19 lecture Signal pathways and feedback loops	39-43, 179-180 181-209
5	January 24	Prepare for Jan 21 lecture Endocrine system	Figs. 7-13 and 16 216-238
M1	January 26	MIDTERM EXAM	
6	January 31	Membrane dynamics The resting membrane potential Integrated topic: insulin secretion	133-152 164-171
7	February 2	Neuronal signal transmission: action potentials	247-273
8	February 7	Communication between neurons: synaptic transmission	273-289
9	February 9	Organization of the nervous system Sensory pathways	297-318 334-349
10	February 14	Sensory physiology	349-378
11	February 16	Motor pathways	396-401, 447-463
12	February 21	The autonomic nervous system, the brainstem, and the limbic system	386-396, 318-322
M2	February 23	MIDTERM EXAM	
13	February 28	Striated skeletal muscle: molecular mechanisms for generating force Striated skeletal muscle: organ physiology	407-432
14	March 1	Smooth and cardiac muscle	432-441, 481-489
15		Introduction to the cardiovascular system; cardiac anatomy	468-471, 476-481
16	March 6	Signal conduction through the heart; the electrocardiogram	489-505
17	March 8	The systemic and pulmonary circulatory loops, hemodynamics, transfer of materials between blood and tissues	471-478, 513-524
18	March 13	Regulation of cardiac function and blood pressure	524-540
19	March 15	Integrated control of blood volume, blood pressure, osmolarity, and pH	668-680
F	March 20	FINAL EXAM 8:00a - 11:00a	

INSTRUCTIONS FOR TAKING EXAMS

The exams in this course are closed book, closed notes, and electronics-free. That is, you must use only what is in your brain to answer questions. Using anything else (e.g, electronic devices or someone else's exam) constitutes a breach of academic integrity and will be treated accordingly. We will enforce all of the following conditions. You can minimize the time it takes to get set up for an exam--and thus maximize the time you have available to complete the exam--by learning the rules and following them without being reminded. YOU have the power to make exams go efficiently and smoothly or not, which will eat into your time for the exam.

1. Students will sit every-other-seat. Your TAs will tell you the seating arrangement in your room.
2. All electronic devices must be turned off and stored in a bag/backpack that is placed under your desk. This rule applies to cell phones, MP3 players (iPods), calculators, notebooks, earphones--all electronic devices except digital watches. Setting your cell phone to "vibrate" isn't turning it off, and putting devices into your pockets isn't putting them under your desk. If we can see or hear an electronic device, we will confiscate it.
3. All of your belongings--except what you will write with--must be placed UNDER the seat that YOU are sitting in. Please don't put anything on the desk next to you, on the floor in front of you, or anywhere else except under your desk where you can't see them and we can't trip over them.
4. You can have one clear plastic bottle of water or anything you may need because of medical reasons (doctor's notice is required). You cannot have large pencil boxes filled with lots of things or any snacks.
4. Hats can either be removed or turned with the bill to the back of your head. Once the exam begins, you can't touch your hat, wherever it is. Hooded sweatshirts or jackets must be worn with the hood down, not on your head or covering your face.
5. You can write either with a pen or with a pencil. Please use whatever allows you to write legible answers. If the person grading your answer can't read it, you will not be given credit, so keeping your exam neat and legible is definitely in your best interest. **IF YOU USE PENCIL, WE CANNOT CONSIDER REGRADE REQUESTS.**
6. **BRING YOUR UCSD ID CARD TO EVERY EXAM.** You will have to show it when you turn in your exam.
7. Be sure you turn your exam in as you leave the exam room. Don't take any exam materials with you when you leave. You may be asked to leave through a particular door.
8. Put your name and ID number on EVERY page. We take the exams apart, and if pages are unlabeled, we won't know whose they are.
9. Depending on circumstances, we may or may not be able to allow restroom breaks. Arrive early at the exam room to learn how this issue will be handled in your room.
10. Anything that is written on the back of exam pages will not be graded. You can use the backs of pages as scratch paper. If you need to write something on the back of a page and you want us to grade it, you must get explicit permission from an instructor BEFORE you begin writing on the back of the page.