COURSE SYLLABUS

Instructor: Dr. Catalina Reyes
E-mail: creyesgonzalez@ucsd.edu
Office: University Center 301 (UC301), Room 103

Office hours: Wednesday 9 – 10 AM
                 Zoom https://ucsd.zoom.us/j/97124884565

One-on-one or small group meetings are also available at selected times. To book a 30-minute meeting (Zoom or in person) please use the link below.

https://calendly.com/catalinareyes/30min

If you need a different meeting time or if the meeting periods are all taken, please email me and we will schedule a different time.

ELECTRONIC COMMUNICATION

Please contact your Instructional Assistant (IA) for general inquiries. Make sure to include **BIPN 100** in the subject line. Due to the large number of students in the class we will **NOT** be able to answer individual questions about the content of the lectures by email. To get your questions answered please attend Catalina's office hours, IAs office hours, discussion sections, schedule a one-on-one meeting with Catalina or ask during or after class. If you have questions about course organization, please refer to the Syllabus or post your question on the Canvas discussion board.

Course website: https://canvas.ucsd.edu/

Weekly To-Do-Lists, announcements, lectures slides, assignments and grades will be posted here. PLEASE check on a regular basis.

IMPORTANT – Lectures, discussion sections, midterms and the final exam are **in-person**. However, all lectures and discussion sections will be podcasted. You can access these materials through Media Gallery in Canvas or at www.podcast.ucsd.edu

ACCOMMODATIONS:

If you have a special circumstance or an emergency, please contact the instructor as soon as possible.

LECTURE: Monday, Wednesday, and Friday 11 – 11:50 AM, PETERSON 108.

The lecture schedule (see below) is subject to change. **Lecture slides** will be posted on Canvas at least 24 hours before each lecture.

Date	Topic	Problem sets
Sept 24	• Seating chart, Syllabus, and Membranes, membrane transport	
Week 1 Sept 27- Oct 1	• RMP, Ohm's law, Nernst equation, Goldman-Hodgkin-Katz equation	Problem set 1
	• Neuron structure and function, channels	
	• Action potentials, signal transmission along axons	
Week 2 Oct 4-8	**Assignment 1 Equilibrium potentials DUE M, Oct. 4 by 10 AM**	
	• Discuss assignment and Synaptic transmission	
	• Synaptic transmission, neurotransmitters	
Week 3 Oct 11-15	• Central nervous system components, functional anatomy of the brain	Problem set 2
	Assignment 2 Action potentials DUE M, OCT. 11 by 10 AM	
	• Functional anatomy of the spinal cord, reflex arcs	
	• Motor pathways, sensory physiology, example	
Week 4 Oct 18-22	**Assignment 3 NMJ, Spinal injury DUE M, Oct. 18 by 10 AM**	
	• Efferent division of the peripheral nervous system	Problem set 3
	• Endocrinology, signal transduction, homeostasis, feedback loops	Problem set 4
	• Endocrinology continuation	
Week 5 Oct 25-29	**MIDTERM 1 - OCTOBER 25 - IN LECTURE**	
	Assignment 4 Endocrine system DUE Wed, Oct. 27 by 10 AM	
	• Striated skeletal muscle – molecular mechanisms that generate force, contraction-relaxation cycle	Problem set 5
	• Motor units, mechanics of body movement, fiber types	
	• Smooth muscle	
Week 6 Nov 1-5	**Assignment 5 Muscle DUE M, Nov. 1 by 10 AM**	
	• Introduction to the cardiovascular system, cardiac anatomy	
	• Cellular cardiac physiology, myogenic contraction, electrophysiology	Problem set 6
	• Electrocardiogram	
Week 7 Nov 8-12	**Assignment 6 Vectorcardiograms DUE M, Nov. 8 by 10 AM**	
	• Cardiac mechanics	
	• Regulation of heart function by the ANS	Problem set 7
	• Hemodynamics: systemic and pulmonary loops, Ohm's law	
Week 8 Nov 15-19	**MIDTERM 2 - NOVEMBER 15 - IN LECTURE**	
	Assignment 7 PV loops DUE Wed, Nov. 17 by 10 AM	Problem set 8
	• Hemodynamics: Ohm's law, exchange between blood and tissues	
	• Regulation of the cardiovascular system: CO and BP	
Week 9 Nov 22-26	**Assignment 8 Wigger's diagram DUE M, Nov. 22 by 10 AM**	
	• Osmolarity, body fluid compartments: kidney anatomy and function	Problem set 9
	• Renal cortex: filtration and reabsorption	
	November 26 – NO CLASS	Problem set 10
Week 10 Nov 29- Dec 3	**Assignment 9/10 Osmolarity, Tonicity DUE Nov. 29 by 10 AM**	
	• Renal medulla: gradients, water permeability, Vasopressin	
	• Renal medulla: Vasopressin	
Dec 7	**Final Exam – CUMULATIVE – 11:30 AM – 2:30 PM**	

OPTIONAL TEXTBOOK: Human Physiology, 8th edition by Dee Silverthorn. The 7th, 6th and 5th editions are fine.

IMPORTANT – the textbook is **NOT** mandatory. However, a digital inclusive version of the textbook will be provided by the UC San Diego Bookstore through the RedShelf tool on Canvas. You have a two-week period to decide if you want to keep access or opt out (**before October 9**). If you keep access, you will be charged $29.18 for perpetual access to the eBook. If you have any questions concerning Inclusive Access, please contact the Bookstore at textbooks@ucsd.edu or email help@redshelf.com

Even though the text is **not required**, and the exams will **only** include the material seen in class, I provided recommended readings from the text for each topic. During the quarter journal articles may be posted as assignments.

OBJECTIVES FOR THE COURSE

1. Learn how different systems in the human body work together to maintain homeostasis.
2. Learn the anatomy of the systems discussed in class.
3. Learn anatomical, physiological, and biomedical terms.
4. Learn how to read graphs and images.
5. Ability to apply the knowledge acquired to solve physiological and medical problems.
6. Develop critical thinking skills

TO SUCCEED IN THIS COURSE, YOU MUST DO THE FOLLOWING:

1. Work hard. Go over the material every week.
2. Learn the terminology and concepts. There are two components important when learning physiology: memory and understanding. You will have to memorize anatomical and physiological terms, but to succeed you must understand the concepts and physiological processes and learn to critically think about physiology.
3. Read through the power point presentations before lectures.
4. Take notes while listening to the lectures.
5. Attend a discussion section.

DISCUSSION SECTIONS: During section, IAs will cover problem sets, you will be able to ask questions about the lecture material and important material will be reviewed.

Discussion sections will take place at the scheduled times and locations. Discussion sections are optional but encouraged. If you attend 7 discussion sections, you will earn a **1% BONUS in the final exam**.

You will be able to attend any discussion section **if there is space**. Please contact the IA in your registered section and the IA of the discussion section you want to attend to inquire about switching sections. IAs will approve or deny your request by week 2.

IA	email	Section	Room	Section time
Luisa Coelho	lbcoelho@ucsd.edu	B03	SEQUO 147	M 5-5:50 pm
		B05	SOLIS 111	F 12-12:50 pm
Valerie Le	v1le@ucsd.edu	B06	SOLIS 111	F 1-1:50 pm
Emily Tran	e6tran@ucsd.edu	B07	CENTR 217A	F 3-3:50 pm
Harjot Dhaliwal	hsdhaliw@ucsd.edu	B04	SEQUO 147	M 6-6:50 PM
Chia-Chen Ho (Jamie)	c8ho@ucsd.edu	B02	SOLIS 111	M 1-1:50 pm
Boris Ip	bip@ucsd.edu	B01	SOLIS 111	M 12-12:50 pm
Steven Ocon	socon@ucsd.edu	B10	CENTR 217A	F 7-7:50 pm
Josefina Pavez	jpavez@ucsd.edu	B09	CENTR 217A	F 6:00-6:50 pm
Miguel Pesqueira	mpesqueira@ucsd.edu	B08	CENTR 217A	F 5:00-5:50 pm

PROBLEM SETS
Problem sets will be posted on Canvas weekly. These questions are intended to further your understanding of the concepts learnt in lecture. Problem sets will be covered during discussion sections and the answers will be posted before the midterms. Problem sets are for practice, and you do not need to hand them in, unless you have a special circumstance and will still like to obtain the 1% bonus points.

DISCUSSION FORUMS will be available through CANVAS for students to post questions.

EXAMS, ASSIGNMENTS AND GRADING:

Assignments:
- Assignments are short physiology exercises evaluating each week's lecture materials. They are intended to give you an idea of the midterm and final exam questions.
- There are a total of 10 assignments worth 15% of the final grade.
- 5% will be given for completion and 10% will be given for accuracy, for a total of 15%
- Assignments will be posted every **Friday at 9 PM** on Canvas. To access the Assignment, go to the Quiz Tab on the left panel of your Canvas page. Please use Chrome and don't click submit until you have answered all questions.
- Assignments are **timed** (allotted time will vary) and will close by **10 AM** of **Monday or Wednesday** of the following week (see dates below and on the schedule).

Assignment	Due date
Assignment 1	Monday, October 4 by 10 AM
Assignment 2	Monday, October 11 by 10 AM
Assignment 3	Monday, October 18 by 10 AM
Assignment 4	Wednesday, October 27 by 10 AM
Assignment 5	Monday, November 1 by 10 AM
Assignment 6	Monday, November 8 by 10 AM
Assignment 7	Wednesday, November 17 by 10 AM
Assignment 8	Monday, November 22 by 10 AM
Assignment 9	Monday, November 29 by 10 AM
Assignment 10	Wednesday, December 1 by 10 AM

Two midterm exams:
- Each in-person midterm exam will be based on material for that section of the course up to the lecture preceding the exam.
- Each midterm is worth 25% of the final grade
- Midterm 1 – Monday, October 25 – in lecture
- Midterm 2 – Monday, November 15 – in lecture

Final exam: Tuesday, December 7, 11:30 AM – 2:30 PM
- The final exam will be cumulative and in-person.
- 35% of the final grade
- No make-up Final Exam and no time or date change

There are no make-up exams, see grading below. If you miss a midterm exam, you will be required to provide official documentation of an unavoidable emergency.

Grading:

- If your final exam score is higher than **BOTH** midterms, the final exam will be worth 85% and the midterms grades will be removed.

- If one of your midterm exams (for example Midterm 1) is lower than the final exam, then the 25% of the lower midterm will be split in the following way:

1. If your other midterm score (in this case Midterm 2) is higher than your final exam score, then 10% of the missed/low score midterm will be placed on the higher score midterm (in this case Midterm 2) to make that midterm worth 35% of your final grade. The remaining 15% (from Midterm 1 in this example) will be added to your final exam score, so that the final exam would be worth 50% of your final grade.

2. If the other midterm score (in this example Midterm 2) is also lower than your final exam score, then both midterms are lower than the final exam and the final is worth 85% of your final grade.

GRADE SCALE
The top 5 grades in each exam will be averaged and normalized to a 100%. All other exam grades will be normalized accordingly.

The final grade will follow the table below. This grade break down is not negotiable. The final grade may be curved.

Letter Grade	Percent grade
A+	98-100
A	92-97
A-	90-91
B+	88-89
B	82-87
B-	80-81
C+	78-79
C	72-77
C-	70-71
D	60-69
F	<60

REGRADES
Occasionally errors, or ambiguities occur in an exam question. If you have a specific issue with a question, please email Catalina within 24 hours of completing the exam. The IAs and I will evaluate the question and we could either not change anything (if we think the questions is fair) or we could remove the question from the exam for the whole class.

If you have a specific concern about how an answer to an exam question was graded email the IA who graded the question, include BIPN 100 in the subject. You must do this within **one week** of the exam being graded and available for viewing. Late regrades **WILL NOT** be accepted.

Cheating Any student caught cheating will receive an F in the course and will be reported to the Academic Integrity office. For information on academic integrity at UCSD visit the following website http://senate.ucsd.edu/manual/appendices/app2.htm

IMPORTANT – Please do not post any class lectures, documents, problem sets, assignments or exam questions on public websites. These materials are my intellectual property, and you must not make them public without my authorization.

Reading list

Topic	Silverthorn 8th ed
• Background, membranes, membrane transport	32-47, 130-160, 175-177
• Resting membrane potential, Ohm's law, Nernst equation, Goldman-Hodgkin-Katz equation	161-166, 248-251
• Neuron structure and function, channels	239-245
• Action potentials, signal transmission along axons,	251-261
• Synaptic transmission, neurotransmitters	266-273, 274-277
• Central nervous system components, functional anatomy of the brain	299-308
• functional anatomy of the spinal cord, reflex arcs	291-298, 442-451
• Motor pathways, sensory physiology	
• Efferent division of the peripheral nervous system	327-340, 391-393, 454-457
• Endocrinology, signal transduction, homeostasis, feedback loops	207-216
• Endocrinology continuation	219-223
Striated skeletal muscle – molecular mechanisms that generate force, contraction-relaxation cycle	400-413
• Motor units, mechanics of body movement, fiber types	414-420
• Smooth muscle	427-433
• Introduction to the cardiovascular system, cardiac anatomy	463-464, 471-479
• Cellular cardiac physiology, myogenic contraction, cardiac electrophysiology	483-485
• Cardiac electrophysiology, electrocardiogram	486
• Cardiac mechanics	487-498
• Regulation of heart function	
• Hemodynamics: systemic and pulmonary circulatory loops, Ohm's law for blood flow	
• Hemodynamics: material exchange between blood and tissues	466-471

•	Regulation of the cardiovascular system: CO and BP	513-528
•	Body fluid compartments: kidney anatomy and function	627-633
•	Renal cortex: filtration and reabsorption	634-646
•	Renal medulla: gradients, water permeability, Vasopressin	644-677
•	Metabolism, membranes, diffusion, osmosis, tonicity	61-62, 134-150
•	Resting membrane potential, Ohm's law, Nernst equation, Goldman-Hodgkin-Katz equation	153-158, 236-239
•	Neuron structure and function, channels	227-233
•	Action potentials, signal transmission along axons,	240-251
•	Signal transmission along axons continuation, synaptic transmission	253-263
•	Central nervous system components, spinal cord, reflex arcs	277-284, 291, 421
•	Functional anatomy of the brain	285-294
•	Sensory physiology, motor pathways	294, 311-324, 371
•	Efferent division of the peripheral nervous system	360-367
•	Endocrinology	169-175, 197-213
•	Striated skeletal muscle – molecular mechanisms that generate force, contraction-relaxation cycle	379-396
•	Motor units, mechanics of body movement, fiber types	393, 396-400
•	Smooth muscle	404-410
•	Introduction to the cardiovascular system, cardiac anatomy	436-437, 443-447, 439-442
•	Cellular cardiac physiology, myogenic contraction, cardiac electrophysiology	449-455, 490
•	Electrocardiogram	457
•	Cardiac mechanics	461-464
•	Hemodynamics: systemic and pulmonary circulatory loops, Ohm's law for blood flow	479-495
•	Hemodynamics: material exchange between blood and tissues	496-497
•	Regulation of the cardiovascular system: Cardiac output and BP	482-487
•	Body fluid compartments: anatomy and function of the kidneys	590-591
•	Renal cortex: filtration and reabsorption	594-606
•	Renal medulla: gradients, water permeability and Vasopressin	619-632