

**COURSE SYLLABUS**

**Instructor:** Dr. Catalina Reyes, PhD, MSc

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**Office:** H&SS 1145A

**Office hours:** Wednesday and Friday 11-11:50 AM

Zoom <https://ucsd.zoom.us/j/96555563585>

I will be offering two office hours during the week. I will hold office hours over Zoom (see link above or access through Canvas calendar).

**One-on-one or small group meetings** are also available at selected times. To book a 30-minute meeting please email me.

**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 on Canvas. PLEASE check on a regular basis.

**IMPORTANT** – Lectures, discussion sections, midterms and the final exam are **in-person**, with the exception of Friday, April 28 and May 26 (days of the midterms), in which we will hold the lectures on Zoom (<https://ucsd.zoom.us/j/96555563585>).

- All lectures and discussion sections will be podcasted. You can access these materials through Media Gallery in Canvas or at [www.podcast.ucsd.edu](http://www.podcast.ucsd.edu)

**ACCOMMODATIONS:** If you have a special circumstance or a family or medical emergency, please contact the instructor as soon as possible, so that we can find an accommodation.

**LECTURE:**

BIPN 100 A00 - Monday, Wednesday, and Friday 12 – 12:50 PM, PETERSON 108

BIPN 100 B00 - Monday, Wednesday, and Friday 10-10:50 AM CTL 0125

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
Week 1 Apr 3-7	• Syllabus, and Membranes, membrane transport	
	• RMP, Ohm's law, Nernst equation, Goldman-Hodgkin-Katz equation	
	• Neuron structure and function, channels	
Week 2 Apr 10-14	• Action potentials, signal transmission along axons	Problem set 1
	• Synaptic transmission, neurotransmitters	
	• Discuss assignment 1	
	<b>Assignment 1 Equilibrium potentials DUE Friday, Apr. 14 - 9 AM</b>	
Week 3 Apr 17-21	• Central nervous system components, functional anatomy of the brain	Problem set 2
	• Functional anatomy of the spinal cord, reflex arcs	
	• Discuss assignment 2	
	<b>Assignment 2 Action potentials, NMJ DUE Friday, Apr. 21 - 9 AM</b>	
Week 4 Apr 24-28	• Motor pathways, sensory physiology, example	Problem set 3
	• Efferent division of the peripheral nervous system	Problem set 4
	• Endocrinology, signal transduction, homeostasis, feedback loops	
	<b>MIDTERM 1–Friday April 28, 6 PM -A PETER 108/B YORK 2722</b>	
Week 5 May 1-5	• Endocrinology continuation	Problem set 5
	• Striated skeletal muscle – molecular mechanisms that generate force, contraction-relaxation cycle	
	• Discuss assignment 3	
	<b>Assignment 3 Spinal injury DUE Friday, May 5 - 9 AM</b>	
Week 6 May 8-12	• Motor units, mechanics of body movement, fiber types	Problem set 6
	• Smooth muscle	
	• Introduction to the cardiovascular system, cardiac anatomy	
	• Discuss assignment 4	
	<b>Assignment 4 Muscle DUE Friday, May 12 - 9 AM</b>	
Week 7 May 15-19	• Cellular cardiac physiology, myogenic contraction, electrophysiology	Problem set 7
	• Electrocardiogram and Practice	
	• Cardiac mechanics and Practice	
Week 8 May 22-26	• Regulation of heart function by the ANS	Problem set 8
	• Hemodynamics: systemic and pulmonary loops, Ohm's law	
	• Hemodynamics: Ohm's law, exchange between blood and tissues	
	<b>MIDTERM 2 – Friday May 26, 6 PM -A PETER 108/B YORK 2722</b>	
Week 9 May 29- Jun 2	• <b>May 29 - NO CLASS</b>	Problem set 9
	• Regulation of the cardiovascular system: CO and BP	
	• Osmolarity, body fluid compartments: kidney anatomy and function	
	<b>Assignment 5 PV loops, Wigger's DUE Friday, June 2 by 9 AM</b>	
Week 10 Jun 5-9	• Renal cortex: filtration and reabsorption	Problem set 10
	• Renal medulla: gradients, water permeability, Vasopressin	
	<b>Assignment 6 PV Osmolarity DUE Friday, June 9 by 9 AM</b>	
<b>June 10</b>	<b>Final Exam – CUMULATIVE – 8 AM</b>	

**OPTIONAL TEXTBOOK:** Human Physiology, 8<sup>th</sup> edition by Dee Silverthorn. The 7<sup>th</sup>, 6<sup>th</sup> and 5<sup>th</sup> 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. If you keep access, you will be charged \$32.94 for perpetual access to the eBook. If you have any questions concerning Inclusive Access, please contact the Bookstore at [textbooks@ucsd.edu](mailto:textbooks@ucsd.edu) or email [help@redshelf.com](mailto: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, although there are a few Zoom discussion sections. Discussion sections are worth **3%** of your grade. If you attend 6 discussion sections, you will earn full points.

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.

### BIPN 100 A00

IA	Email	Section	Room	Section time
Jacob Usita	<a href="mailto:jusita@ucsd.edu">jusita@ucsd.edu</a>	A01	YORK 3000A	M 8-8:50 am
Kevin Moreno	<a href="mailto:kmoreno@ucsd.edu">kmoreno@ucsd.edu</a>	A02	YORK 3000A	M 9-9:50 am
Isabel Cohen	<a href="mailto:imcohen@ucsd.edu">imcohen@ucsd.edu</a>	A03	YORK 3000A	M 5-5:50 pm
Shadi Charara	<a href="mailto:sacharara@ucsd.edu">sacharara@ucsd.edu</a>	A04	YORK 3000A	M 6-6:50 pm
Cindy Tran	<a href="mailto:cht010@ucsd.edu">cht010@ucsd.edu</a>	A05	APM 2301	W 8-8:50 am
Cindy Tran	<a href="mailto:cht010@ucsd.edu">cht010@ucsd.edu</a>	A06	HSS 1305	W 3-3:50 pm
Mohona Datta	<a href="mailto:modatta@ucsd.edu">modatta@ucsd.edu</a>	A07	RCLAS	W 8-8:50pm
George Luo	<a href="mailto:geluo@ucsd.edu">geluo@ucsd.edu</a>	A08	APM 2301	F 2-2:50 pm
James Chang	<a href="mailto:jcc003@ucsd.edu">jcc003@ucsd.edu</a>	A09	APM 2301	F 3-3:50 pm
Vinicius Melone	<a href="mailto:vmelone@ucsd.edu">vmelone@ucsd.edu</a>	A10	APM 2301	F 4-4:50 pm

**BIPN 100 B00**

IA	Email	Section	Room	Section time
<u>Mihali Dieguez</u>	<a href="mailto:Madiegue@ucsd.edu">Madiegue@ucsd.edu</a>	B01	APM 2301	W 9-9:50 am
Harjot Dhaliwal	<a href="mailto:hsdhaliw@ucsd.edu">hsdhaliw@ucsd.edu</a>	B02	YORK 3000A	M 11-11:50 am
Harjot Dhaliwal	<a href="mailto:hsdhaliw@ucsd.edu">hsdhaliw@ucsd.edu</a>	B03	YORK 3000A	M 1-1:50 pm
Hannah Schmidtler	<a href="mailto:hschmidtler@ucsd.edu">hschmidtler@ucsd.edu</a>	B04	YORK 3000A	M 2-2:50 pm
Jim Yoon	<a href="mailto:doyoon@ucsd.edu">doyoon@ucsd.edu</a>	B05	YORK 3000A	M 3-3:50 pm
Kriti Iyer	<a href="mailto:kaiyer@ucsd.edu">kaiyer@ucsd.edu</a>	B06	YORK 3000A	M 7-7:50 pm
Justin Mya	<a href="mailto:jmya@ucsd.edu">jmya@ucsd.edu</a>	B07	RCLAS	M 8-8:50 pm
Mohona Datta	<a href="mailto:modatta@ucsd.edu">modatta@ucsd.edu</a>	B08	RCLAS	M 9-9:50 pm
Rebecca Clague	<a href="mailto:rclague@ucsd.edu">rclague@ucsd.edu</a>	B09	APM 2301	F 1-1:50 pm
<u>Jim Yoon</u>	<a href="mailto:doyoon@ucsd.edu">doyoon@ucsd.edu</a>	B10	WLH 2206	W 2-2:50 pm

**PROBLEM SETS**

Problem sets are posted on Canvas. 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 3% of your grade.

**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 6 assignments worth **10%** of the final grade.
- **4%** will be given for **completion** and **6%** will be given for **accuracy**, for a total of 10%
- Assignments will be posted on Canvas by 9 AM on **Fridays** (except on Midterm weeks). 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 **9 AM** on Friday of the following week (see dates below and on the schedule).

<b>Assignment</b>	<b>Release date</b>	<b>Due date</b>
Assignment 1	Friday April 7	Friday April 14 – 9 AM
Assignment 2	Friday April 14	Friday April 21 – 9 AM
Assignment 3	Friday April 28	Friday May 5 – 9 AM
Assignment 4	Friday May 5	Friday May 12 – 9 AM
Assignment 5	Thursday May 26	Friday, June 2 – 9 AM
Assignment 6	Friday June 2	Monday June 9 – 9 AM

**CLASS PARTICIPATION**

Active participation in lecture is important for your learning. There will be several opportunities during lectures to participate. Participation points will be **2%** of your grade.

Lecture participation points will start counting on the Monday of week 2, April 10. To accommodate for technology issues, absences or any other circumstances, full attendance points will be given if you attend and click in **15 lectures out of 27**. This allows you to miss 3 weeks (9 lectures) and holidays or Midterm days after the first week. If you are sick, please use this dropped lectures and stay home.

If you have a situation that will cause you to miss more than three weeks, please contact us right away, so that we can consider other options.

**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 – Friday, **April 28, 6 PM -Class A00 PETER 108**  
**Class B00 YORK 2722**
  - Midterm 2 – Friday, **May 26, 6 PM -Class A00 PETER 108**  
**Class B00 YORK 2722**

**Please attend the classroom assigned to you by the Registrar.**

Exam scores will be available after grading, but the exam answers will not be posted. All questions about the content of the exams will be addressed in office hours.

**MISSING MIDTERM EXAMS**

If you miss a midterm exam, you will be required to provide official documentation of an unavoidable emergency (serious illness, etc.) as soon as possible. The policy stated below (Grading) will **accommodate for the eventuality of disease or any other emergency**. Regardless, if you are sick or concerned that you would endanger other by attending an in-person exam, please contact me as soon as possible to go over your options.

**FINAL EXAM:**

Please note that the final exam has been scheduled by the registrar and the policy is not to change the day or time of the final exam. **Everyone must take the final exam**; it cannot be dropped. If there is an exceptional circumstance, or you are sick, please contact me as soon as possible. We will likely schedule an oral exam.

The final exam is scheduled for **SATURDAY, JUNE 10, 8 - 11 AM**

- The final exam will be cumulative and in-person.
- 35% of the final grade

Please bring a **photo ID** to the midterms and final exam as we will be checking it. Students who do not have photo ID, will not be able to take the exam.

**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:
  - 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.

- 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.

IMPORTANT - Please note that UCSD's policy is that "Vaccinated students who have been exposed [to COVID-19] are allowed to attend class and move about campus masked" which includes attending in-person exams. This does not include people who have COVID symptoms or a positive test result. You can find an up-to-date policy and more details here:

<https://returntolearn.ucsd.edu/return-to-campus/exposure-contact-tracing/index.html>

### GRADE SCALE

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

The final grade will follow the table below. 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

### COURSE POLICIES

#### 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>

All academic work you submit for this course should be your own new original work. Exams are closed book and you must complete these exams without access to other resources or the person seating next to you. If we suspect you are cheating, we will remove your exam and submit your case to academic integrity.

Assignments are open book, but you must explain your answers in your **own** words. Assignments are to be completed **individually**, if we see two students with the same answers your case will be sent to academic integrity.

**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.

### **STUDENTS WITH DISABILITIES**

If you have a disability that might affect attendance or performance in the class, contact your IA or instructor as soon as possible, so that we can work with you in providing reasonable accommodations. To ensure proper support, anyone who requests accommodations due to a disability must get a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD). To contact OSD, use the student portal <https://academicaffairs.ucsd.edu/sso/osdsp/home>, or email the Biology OSD liaison at [bioosd@ucsd.edu](mailto:bioosd@ucsd.edu), or call 858-534-4382.

**HELPFUL RESOURCES AT UCSD**

If you are feeling overwhelmed, experiencing anxiety, depression or other condition please let us know as soon as possible. We can support you and give you some guidance on what resources are available at UCSD to ensure you can succeed during difficult times.

Academic Support	Psychology & Physical Safety*	Basic Needs
<p><b>OASIS (<a href="http://oasis.ucsd.edu">http://oasis.ucsd.edu</a>)</b> The Office of Academic Support &amp; Instructional Services (OASIS) offers math and science tutorial Programs for everyone. They also have services and scholarships for those of you who have overcome significant obstacles to become successful (like being first in your families to go to college).</p> <p><b>Teaching + Learning Commons (<a href="http://commons.ucsd.edu">http://commons.ucsd.edu</a>)</b> The Teaching + Learning Commons offers tutoring, consultations, and workshops on learning strategies as well as assistance with writing in the Writing + Critical Expression Hub.</p> <p><b>Educational Technology (<a href="https://digitalllearning.ucsd.edu/learners/learning-remotely/tools.html">https://digitalllearning.ucsd.edu/learners/learning-remotely/tools.html</a>)</b> EdTech has resources for understanding educational technologies like Zoom and Canvas.</p>	<p><b>CAPS (<a href="http://caps.ucsd.edu">http://caps.ucsd.edu</a>)</b> CAPS offers free, confidential counseling. They can help with urgent crises, such as an assault or thoughts of self-harm. They can also talk if you are worried about a friend or classmate.</p> <p><b>CARE at SARC (<a href="http://care.ucsd.edu">http://care.ucsd.edu</a>)</b> Campus Advocacy, Resources, and Education at the Sexual Assault Resource Center (CARE at SARC) offers support for those of you who have experienced sexual violence or violence from a partner. They have free confidential counseling, including on nights and weekends.</p>	<p><b>Triton Food Pantry (<a href="http://basicneeds.ucsd.edu/triton-food-pantry/">http://basicneeds.ucsd.edu/triton-food-pantry/</a>)</b> The Triton Food Pantry discreetly offers food for current UCSD students to ensure each of you has enough nutrition to get through the day.</p> <p><b>The Hub (<a href="https://basicneeds.ucsd.edu">https://basicneeds.ucsd.edu</a>)</b> The Hub serves those of you who have trouble accessing basic needs, including food or stable housing, or who have financial emergencies. They can help you connect with a variety of on- and off-campus programs, including the Food Pantry, CalFresh, emergency loans, emergency housing, or changes to your financial aid.</p>

**Reading list**

<b>Topic</b>	<b>Silverthorn 8<sup>th</sup> ed</b>
• 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
• CNS 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