

**COURSE SYLLABUS****Instructor:** Catalina Reyes, MSc., Ph.D**E-mail:** [creyesgonzalez@ucsd.edu](mailto:creyesgonzalez@ucsd.edu)**Office hours:** Tuesday 3:30-4:30 PM

Thursday 5-6 PM

Zoom <https://ucsd.zoom.us/j/97151793565>

**IMPORTANT** you can attend any of the office hours, regardless of the class you are enrolled in (A00 or B00)

**Instructional Assistants office hours:** The office hour schedule for IAs is posted on CANVAS.

**ELECTRONIC COMMUNICATION:**

**IMPORTANT:** 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 or discussion sections.

For information on how to learn remotely you can access the following website

<https://digitalllearning.ucsd.edu/learners/learning-remote.html>

**CANVAS site:** [coursefinder.ucsd.edu](http://coursefinder.ucsd.edu)

Pre-recorded lectures, lecture slides, Announcements, quizzes, and grades will be posted here.

**LECTURES:** Pre-recorded lectures will be posted in the Media Gallery folder on CANVAS. PDFs of the lecture slides will be available in the Lectures module on CANVAS. You can also access the lectures posted in the UCSD Google drive folder using the link below.

<https://drive.google.com/drive/folders/1tWrasbo5SzOkxwVpvB01mYIJ1EFbBnc?usp=sharing>

**Discussion sessions:** Discussion sections will take place at the scheduled times. You can attend **ANY** discussion section for that week. Attendance will be taken.

<b>Section A01</b> – Tuesday	9:00-9:50 AM	Yudi Hu	<a href="mailto:yuh232@ucsd.edu">yuh232@ucsd.edu</a>
<b>Section A02</b> – Tuesday	11:00-11:50 AM	Khoa Nguyen	<a href="mailto:kln001@ucsd.edu">kln001@ucsd.edu</a>
<b>Section A03</b> – Tuesday	5:00-5:50 PM	Charles Austria	<a href="mailto:cmaustri@ucsd.edu">cmaustri@ucsd.edu</a>
<b>Section A04</b> – Tuesday	6:00-6:50 PM	Anthony Quach	<a href="mailto:a5quach@ucsd.edu">a5quach@ucsd.edu</a>
<b>Section A05</b> – Wednesday	10:00-10:50 AM	Aman Kaur	<a href="mailto:amkaur@ucsd.edu">amkaur@ucsd.edu</a>
<b>Section A06</b> – Wednesday	11:00-11:50 AM	Justin Lee	<a href="mailto:jjl003@ucsd.edu">jjl003@ucsd.edu</a>
<b>Section A07</b> – Wednesday	1:00-1:50 PM	Jenny Lin	<a href="mailto:jel315@ucsd.edu">jel315@ucsd.edu</a>
<b>Section A08</b> – Wednesday	2:00-2:50 PM	Jenny Lin	<a href="mailto:jel315@ucsd.edu">jel315@ucsd.edu</a>
<b>Section A09</b> – Wednesday	5:00-5:50 PM	Jason Yang	<a href="mailto:jwy008@ucsd.edu">jwy008@ucsd.edu</a>

<b>Section B01</b> – Tuesday	10:00-10:50 PM	Alaa Erras	<a href="mailto:aerras@ucsd.edu">aerras@ucsd.edu</a>
<b>Section B02</b> – Tuesday	12:00-12:50 PM	Ryan Ghassemi	<a href="mailto:rghassem@ucsd.edu">rghassem@ucsd.edu</a>
<b>Section B03</b> – Tuesday	1:00-1:50 PM	Jacqueline Villasenor	<a href="mailto:jvillasenor@ucsd.edu">jvillasenor@ucsd.edu</a>
<b>Section B04</b> – Tuesday	7:00-7:50 PM	Romona Dong	<a href="mailto:rxdong@ucsd.edu">rxdong@ucsd.edu</a>
<b>Section B05</b> – Wednesday	9:00-9:50 AM	Emily Tran	<a href="mailto:e6tran@ucsd.edu">e6tran@ucsd.edu</a>
<b>Section B06</b> – Wednesday	10:00-10:50 AM	Mina Balen	<a href="mailto:mbalen@ucsd.edu">mbalen@ucsd.edu</a>
<b>Section B07</b> – Wednesday	3:00-3:50 PM	Valerie Le	<a href="mailto:v1le@ucsd.edu">v1le@ucsd.edu</a>
<b>Section B08</b> – Wednesday	4:00-4:50 PM	Yudi Hu	<a href="mailto:yuh232@ucsd.edu">yuh232@ucsd.edu</a>
<b>Section B09</b> – Wednesday	6:00-6:50 PM	Seho (Brian) Kim	<a href="mailto:sek016@ucsd.edu">sek016@ucsd.edu</a>

### 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.

### 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 watching the pre-recorded lectures.
4. Take notes while listening to the pre-recorded lectures
5. Attend at least ONE Zoom discussion section per week.

**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** (April 10) to decide if you want to keep access or opt out. If you keep access you will be charged \$42.35 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)

### READINGS

There are recommended readings from the text for each topic. The text is **not required**, and the tests will only include the material seen in class. During the quarter journal articles may be posted as class exercises.

### CLASS EXERCISES

Practice exercises will be posted on CANVAS under the Exercises module. You will be able to answer the exercises after watching the lectures for that week. The answers for the exercises will be discussed during Catalina's Tuesday and/or Thursday office hours. The solutions will be recorded and posted in Media Gallery. You are encouraged to watch the exercise solutions. The time for the assignment solutions has been considered in the weekly lecture time (160 minutes/week). If in a particular week the lecture material takes up the whole 160 minutes, the exercise solution will be given during discussion sections.

Please try to answer the assignments thoroughly as they will prepare you for the quizzes.

### PROBLEM SETS

Problem sets will be posted on Canvas weekly. These questions are intended to give you an idea of the types of questions that may be on a quiz. Problem sets will be covered during discussion sections and the answers will be posted before the biweekly quiz. Problem sets are for practice and you do not need to hand them in.

### DISCUSSION SECTIONS

Discussion sections will take place at the scheduled times using Zoom. **You can attend any of the discussion sections** (notice the schedule for the sections posted on the first page of the syllabus and on CANVAS), but please notify the IA. During discussion sections the IAs will go over the problem sets.

**ATTENDANCE** will be taken in sections. If you attend 8 of the 10 discussion sections in the quarter, you will earn an **additional 1% in the final exam**.

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

### TESTS AND GRADING:

5 Quizzes - 19% each – Total 76%

Final Exam – 24%

**QUIZZES AND FINAL EXAM:** There will be 5 Quizzes delivered through CANVAS. Each quiz will be based on material for that section of the course up to the lecture preceding the quiz. The Final Exam will be cumulative.

There are **NO** make-up quizzes. The **lowest quiz grade will be dropped**. If you miss a quiz due to a family or a medical emergency or technical issues that will be the grade you drop. You **MUST** take the Final Exam and it cannot be dropped.

### QUIZ AND FINAL EXAM SCHEDULE

- Thursday – April 8                      Class A00 4 PM and Class B00 5 PM
- Tuesday – April 20                      Class A00 4 PM and Class B00 5 PM
- Tuesday – May 4                         Class A00 4 PM and Class B00 5 PM
- Tuesday – May 18                        Class A00 4 PM and Class B00 5 PM
- Tuesday – June 1                         Class A00 4 PM and Class B00 5 PM
- **Final Exam – Saturday, June 5 – 8:00 am**

**You will have to attend the lecture time you are enrolled in to be able to take the quiz.**

To complete the quizzes and final exam on Canvas you will need to use Google Chrome, as some of the images do not show in other browsers. Instructor and IAs will be available on Zoom to clarify any questions. Use the same Zoom provided for the lectures

(<https://ucsd.zoom.us/j/97151793565>) or you can join through the Course calendar on Canvas.

### GRADE SCALE

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, omissions or ambiguities occur in a quiz question. If you have a specific issue with a quiz question, please email Catalina within 24 hours of completing the quiz. This will result in either **nothing** or the question being **removed** from the quiz for the whole class.

If you have a specific concern about how an answer to a quiz question was evaluated email your argument to the IA who graded the question, include BIPN 100 in the subject. You must do this within **one week** of the quiz 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 quizzes and Final Exam are **Closed Book**. Time should not be an issue if the tests are taken under the proper conditions. Please refrain from accessing lecture notes, other websites, or resources. That is considered cheating and will be penalized. We can monitor time spent in each question and time not spent on the canvas page per question for each student. So, please be mindful of not using other resources when taking the quizzes, as you will not be able to complete them. We understand that when using Zoom to ask the IAs or instructor questions you will be away from the canvas page, but this should not take as long.

**IMPORTANT** - Please **refrain** from discussing or posting any information regarding the quizzes until the next day, as students overseas will take the quiz at a different time.

Students suspected of academic integrity violations on quizzes will be asked to join a Zoom meeting and will be asked to justify their answers. If the instructor and an IA are not convinced during the meeting, or the student refuses to participate, the incident will be reported to the Academic Integrity Office.

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

Date	Topic	Problem sets
March 30	<ul style="list-style-type: none"> <li><b>ONLY SYNCHRONOUS CLASS</b> – Syllabus and introduction</li> </ul>	Problem set 1
Week 1	<ul style="list-style-type: none"> <li>Background, membranes, membrane transport</li> </ul>	
March 30- April 1	<ul style="list-style-type: none"> <li>RMP, Ohm's law, Nernst equation, Goldman-Hodgkin-Katz equation</li> <li>Neuron structure and function, channels</li> </ul>	
Week 2 Apr 6-8	<p><b>Apr. 6 Class exercise 1 Equilibrium potentials and AP</b></p> <ul style="list-style-type: none"> <li>Action potentials, signal transmission along axons</li> <li>Synaptic transmission, neurotransmitters</li> <li>Central nervous system components, functional anatomy of the brain</li> </ul> <p><b>Apr. 8 - QUIZ 1 – Class A00 at 4 pm and Class B00 at 5 pm</b></p>	
Week 3 Apr 13-15	<ul style="list-style-type: none"> <li>Functional anatomy of the spinal cord, reflex arcs</li> <li>Motor pathways, sensory physiology</li> <li><b>Apr. 15 Class exercise 2 NMJ and Spinal cord injury</b></li> </ul>	Problem set 2
Week 4 Apr 20-22	<p><b>Apr. 20 - QUIZ 2 – Class A00 at 4 pm and Class B00 at 5 pm</b></p> <ul style="list-style-type: none"> <li>Efferent division of the peripheral nervous system</li> <li>Endocrinology, signal transduction, homeostasis, feedback loops</li> <li>Endocrinology continuation (<b>Class exercise 3 in Discussion</b>)</li> </ul>	Problem set 3
Week 5 Apr 27-29	<ul style="list-style-type: none"> <li>Guest lecture</li> <li>Striated skeletal muscle – molecular mechanisms that generate force, contraction-relaxation cycle</li> <li>Motor units, mechanics of body movement, fiber types</li> <li>Smooth muscle</li> </ul> <p><b>Apr. 29 Class exercise 4 Muscle</b></p>	Problem set 4
Week 6 May 4-6	<p><b>May 4 - QUIZ 3 – Class A00 at 4 pm and Class B00 at 5 pm</b></p> <ul style="list-style-type: none"> <li>Introduction to the cardiovascular system, cardiac anatomy</li> <li>Cellular cardiac physiology, myogenic contraction, electrophysiology</li> <li>Electrocardiogram</li> </ul>	Problem set 5
Week 7 May 11-13	<ul style="list-style-type: none"> <li>Cardiac mechanics</li> <li>Regulation of heart function by the ANS</li> <li><b>May 13 Class exercise 5 Vectorcardiograms and PV loops</b></li> </ul>	Problem set 6
Week 8 May 18-20	<p><b>May 18 - QUIZ 4 – Class A00 at 4 pm and Class B00 at 5 pm</b></p> <ul style="list-style-type: none"> <li>Hemodynamics: systemic and pulmonary loops, Ohm's law</li> <li>Hemodynamics: material exchange between blood and tissues</li> <li>Regulation of the cardiovascular system: CO and BP</li> </ul>	Problem set 7
Week 9 May 25-27	<p><b>May 25 Class exercise 6 Wigger's diagram</b></p> <ul style="list-style-type: none"> <li>Osmolarity, body fluid compartments: kidney anatomy and function</li> <li>Renal cortex: filtration and reabsorption</li> </ul> <p><b>May 27 Class exercise 7 Osmolarity and Tonicity</b></p>	Problem set 8
Week 10 June 1-3	<p><b>June 1 - QUIZ 5 – Class A00 at 4 pm and Class B00 at 5 pm</b></p> <ul style="list-style-type: none"> <li>Renal medulla: gradients, water permeability, Vasopressin</li> <li>Renal medulla: Vasopressin</li> </ul>	Problem set 9
<b>June 5</b>	<b>Final Exam – CUMULATIVE – Class A00 and B00 at 8:00 AM</b>	

**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
• Renal medulla: Vasopressin	644-677

<b>Topic</b>	<b>Silverthorn, 8<sup>th</sup> edition</b>
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