IB 132 Survey of Human Physiology
Tuesdays and Thursdays 9:30 to 11:00 am
Weeks 1-2, Synchronous on Zoom with recordings in bCourses:
https://berkeley.zoom.us/j/97807418922?pwd=cDJJS3UrU0h2WGsxWUlBaTJJeTJrZz09
Weeks 3 onwards, in-person instruction:
FI295 – Haas

Course description
From a basis in elementary theories of information and control, we develop an understanding of homeostasis of cellular composition, structure, and energy metabolism. We then study neural and endocrine signaling in humans, and develop the key concepts of control and homeostasis in all the major organ and multi-organ systems, including cardiovascular, respiratory, renal, metabolic, reproductive, and immune systems, growth and development, and sensory and motor systems.

Teaching Team
Instructors: Annaliese Beery (abeery@berkeley.edu), George A. Brooks (gbrooks@berkeley.edu), and José Pablo Vázquez Medina (jpv-m@berkeley.edu)

Student Hours with the Instructors
Annaliese Beery: Fridays 1:30-3:30 (https://berkeley.zoom.us/my/abeery)
George A. Brooks: Mondays and Wednesdays 9:00-10:00 (https://berkeley.zoom.us/j/439495125)
José Pablo Vázquez Medina: Wednesdays 9:00-11:00 (https://berkeley.zoom.us/j/5555375086)
Kelley Power: Wednesdays 3:00-4:00 (https://berkeley.zoom.us/my/kpower)
Casey Curl: Fridays 11:00-12:00 (https://berkeley.zoom.us/j/95643682659)
Robert Leija: Thursdays 11:00-12:00 (https://berkeley.zoom.us/j/91076651598)

Student Learning Objective
To understand the mechanisms by which key physiological priorities are maintained in healthy humans.

Key physiological Priorities
Cell membrane potential: -90 to –55 mV (depending on cell type)
Atkinson Energy Charge: 0.85
Mitochondrial DY: 0.20 V
Blood [glucose]: 100 mg/dl or 5.5 mM
Mean Arterial Pressure: 100 mmHg or Torr
Arterial pH: 7.38
Arterial Oxygen Partial Pressure: 100 Torr
Plasma Osmolality: 282 mOsm
Core Body temperature: 37°C

Course Materials

A) Textbook: Vander’s Human Physiology (any edition)
Although most information to be tested is contained in the book, we present information in lectures that is not contained in the book, and there is often detail in the text that we will not test. Attending lectures allows you to judge how we will weight topics covered in the text, to learn material not covered in the text, and to interact with your classmates instructors and GSIs. To prepare, please read the relevant chapters before class.

B) bCourses site
We will use bCourses to communicate with the class and distribute any relevant class materials. PDFs of Lecture Notes will be available on bCourses. We will try to post Lecture Notes the evening before lectures, but we cannot guarantee that they will always be posted before lecture.

C) Piazza
Piazza is a collaborative tool that promotes interaction among the students and the Instructor. You can access Piazza through bCourses. I encourage you to use Piazza as needed. Posting anonymous questions in Piazza is allowed.

Grade Distribution
All exams will be closed book, closed notes. The course grade will be determined by scores on discussion section work, two midterm exams, and a final exam. The weighting of these five components will be:

- 20% Discussion section participation and in-class quizzes
- 20% Midterm 1 (multiple choice test, in class)
- 20% Midterm 2 (multiple choice test, in class)
- 40% Final exam (multiple choice test, in class, cumulative)

Letter grades

- ≥ 95% A+
- ≥ 83% B+
- ≥ 73% C+
- ≥ 63% D+
- ≥ 90% A
- ≥ 80% B
- ≥ 70% C
- ≥ 60% D
- ≥ 87% A-
- ≥ 77% B-
- ≥ 67% C-
- < 60% F

How to Succeed in this Course
We encourage you to attend and engage in all lectures and discussions and to come prepared by reading the corresponding book chapters before class. Print or download the lecture materials, take notes during class and review/curate them after class. Consult the book for further questions and attend Student Hours with the Instructors. We enjoy interacting with you!

Class Policies
Remote instruction: please note that the class could transition to remote instruction at any time due to COVID or other emergencies in accordance to University policy.

Absences: if you cannot attend a lecture or exam due to illness or other circumstances beyond your control, please contact the Instructors and explain the circumstances beforehand (when possible). Please provide documentation of the circumstances (e.g., a doctor’s note in the case of illness). There will be no makeup examinations but we will consider the possibility of alternative assessment under justified circumstances.

Accommodations: please contact the Instructors as soon as possible if you have a disability (see below), sports conflict or religious need, so that we can plan the necessary accommodations.

Students with Disabilities: UC Berkeley is committed to creating a learning environment that meets the needs of its diverse student body including students with disabilities. If you anticipate or experience any barriers to learning in this course, please feel welcome to discuss your concerns with me. If you have a disability, or think you may have a disability, you can work with the Disabled Students' Program (DSP) to request an official accommodation. DSP is the campus office responsible for authorizing disability-related academic accommodations, in cooperation with the students themselves and their instructors. You can find more information about DSP, including contact information and the application process at https://dsp.berkeley.edu/. If you have already been approved for accommodations through DSP, please meet with me so we can develop an implementation plan together.

Class materials: all class materials are the property of the Instructors and The Regents of the University of California. They shall not be posted on Course Hero or any other website.
Academic Integrity: The student community at UC Berkeley has adopted the following Honor Code: “As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others”. You are required to abide to the Code of Student Conduct at all times. Please refer to this link for more resources: https://conduct.berkeley.edu/code-of-conduct/

Collaboration and Independence: reviewing lecture materials and studying for exams can be enjoyable and enriching things to do with fellow students. This is recommended. However, assignments should be completed independently and all materials submitted should be the result of one’s own independent work.

Cheating: A good lifetime strategy is always to act in such a way that no one would ever imagine that you would even consider cheating. Anyone caught cheating will receive a failing grade and will be reported to the University Center for Student Conduct. To guarantee that you are not suspected of cheating, please keep your eyes on your own materials and do not converse with others during the quizzes and exams. Cheating is a common example of dishonest, unethical behavior. Honesty and integrity are of great importance in all facets of life. They help to build a sense of self-confidence, and are key to building trust within relationships, whether personal or professional. There is no tolerance for dishonesty in the academic world, for it undermines what we are dedicated to doing – furthering knowledge for the benefit of humanity.

Labs: IB 132L, the laboratory course corresponding to IB 132, is synchronized with the lecture class, and is best taken concurrently. However, lab enrollment is severely limited by constraints on space, equipment and time. If you are one of those with a seat in a lab, please make use of it, or drop the lab early in the semester so that another student has the opportunity. Transfers between sections will not be allowed. Lab grades are determined by work in the lab, and are independent of lecture class grades.

Discussion Groups: 1 hour/week **REQUIRED**
You need to be enrolled and attending one of the nine sessions. Classroom: 3019 VLSB

**DIS 102**  W 10:00-AM-10:00 AM (Casey Curl)
Zoom Link: https://berkeley.zoom.us/j/95643682659

**DIS 103**  TH 12:00-1:00 PM (Robert Leija)
Zoom Link: https://berkeley.zoom.us/j/91076651598

**DIS 104**  TH 1:00-2:00 PM (Robert Leija)
Zoom Link: https://berkeley.zoom.us/j/91076651598

**DIS 105**  TH 2:00-3:00 PM (Robert Leija)
Zoom Link: https://berkeley.zoom.us/j/91076651598

**DIS 106**  TU 12:00-1:00 PM (Kelley Power)
Zoom Link: https://berkeley.zoom.us/my/kpower

**DIS 107**  TU 1:00-2:00 PM (Kelley Power)
Zoom Link: https://berkeley.zoom.us/my/kpower

**DIS 108**  F 9:00-10:00 AM (Kelley Power)
Zoom Link: https://berkeley.zoom.us/my/kpower

**DIS 109**  F 10:00-11:00 AM (Casey Curl)
Zoom Link: https://berkeley.zoom.us/j/95643682659
### Spring 2022-Class Schedule

<table>
<thead>
<tr>
<th>Topic</th>
<th>Chapter</th>
<th>Week</th>
<th>Date</th>
<th>Lecturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Homeostasis and Control in Physiology</td>
<td>1</td>
<td>1</td>
<td>1/18</td>
<td>JVM (GB, AB)</td>
</tr>
<tr>
<td>ATP homeostasis</td>
<td>2, 3</td>
<td>1</td>
<td>1/20</td>
<td>GB</td>
</tr>
<tr>
<td>2. Signaling, Homeostasis and Control in the Human Membranes</td>
<td>4, 5</td>
<td>2</td>
<td>1/25</td>
<td>JVM</td>
</tr>
<tr>
<td>Nervous System</td>
<td>6</td>
<td>2/3</td>
<td>1/27, 2/1</td>
<td>AB, AB</td>
</tr>
<tr>
<td>Sensory Physiology</td>
<td>7</td>
<td>3/4</td>
<td>2/3, 2/8</td>
<td>AB, AB</td>
</tr>
<tr>
<td>Brain &amp; Behavior</td>
<td>8</td>
<td>4/5</td>
<td>2/10, 2/15</td>
<td>AB, AB</td>
</tr>
<tr>
<td>Muscles</td>
<td>9</td>
<td>5</td>
<td>2/17</td>
<td>GB</td>
</tr>
<tr>
<td>Motor Control</td>
<td>10</td>
<td>6</td>
<td>2/22</td>
<td>GB</td>
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</table>

**MT 1 Material Delineation**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Chapter</th>
<th>Week</th>
<th>Date</th>
<th>Lecturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Endocrine Control Systems</td>
<td>11</td>
<td>6,7</td>
<td>2/24, 3/1</td>
<td>JVM, JVM</td>
</tr>
<tr>
<td><strong>MIDTERM 1</strong></td>
<td>7</td>
<td>3/3</td>
<td></td>
<td></td>
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<tr>
<td>4. The blood</td>
<td>12</td>
<td>8</td>
<td>3/8</td>
<td>JVM</td>
</tr>
<tr>
<td>Blood Pressure Control: Heart and Circulation</td>
<td>12</td>
<td>8,9</td>
<td>3/10, 3/15, 3/17</td>
<td>GB, GB, GB</td>
</tr>
<tr>
<td><strong>SPRING BREAK</strong></td>
<td>10</td>
<td>3/21-3/25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Control of Body Water and Ion Composition</td>
<td>14</td>
<td>11</td>
<td>3/29, 3/31</td>
<td>JVM, JVM</td>
</tr>
<tr>
<td>6. Control of Blood O₂ and CO₂</td>
<td>13</td>
<td>12</td>
<td>4/5, 4/7</td>
<td>GB, GB</td>
</tr>
</tbody>
</table>

**MT 2 Material Delineation**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Chapter</th>
<th>Week</th>
<th>Date</th>
<th>Lecturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Nutrition, Digestion and Energy Balance</td>
<td>15, 16</td>
<td>13</td>
<td>4/12</td>
<td>GB</td>
</tr>
<tr>
<td><strong>MIDTERM 2</strong></td>
<td></td>
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<tr>
<td>9. Homeostasis of the Self: Reproduction</td>
<td>17</td>
<td>14</td>
<td></td>
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<tr>
<td>Male Reproductive Physiology</td>
<td></td>
<td></td>
<td>4/19</td>
<td>AB</td>
</tr>
<tr>
<td>Female Reproductive Physiology</td>
<td></td>
<td></td>
<td>4/21</td>
<td>AB</td>
</tr>
<tr>
<td>10. Homeostasis of the Self: Immune Response</td>
<td>18</td>
<td>15</td>
<td></td>
<td></td>
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<tr>
<td>Innate Immune System</td>
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<td></td>
<td>4/26</td>
<td>JVM</td>
</tr>
<tr>
<td>Adaptive Immune System</td>
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<td></td>
<td>4/28</td>
<td>JVM</td>
</tr>
<tr>
<td><strong>FINAL EXAMINATION</strong></td>
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<td>5/11 11:30 AM-2:30 PM</td>
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</tbody>
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**Closing words**

This class will provide you with a foundation to understand how the human body works. **We are very excited to share this learning experience with you!** We sincerely encourage you to interact with your fellow students, the GSIs and the Instructors.