

**IB 132 Human Physiology  
Lecture Outline Spring 2015**

**Instructors:** George A. Brooks ([gbrooks@berkeley.edu](mailto:gbrooks@berkeley.edu)) and Natalia Caporale ([caporale.n@berkeley.edu](mailto:caporale.n@berkeley.edu))

**Head GSI:**

**Aim: To Understand Mechanisms of Maintaining Homeostasis of Key Physiological Priorities**

<u>Topic</u>	<u>Chapter</u>	<u>week</u>	<u>Date</u>	<u>Lecturer</u>
1. Homeostasis and control in physiology	Brooks	1	1/20	GB, NC
ATP homeostasis	1, 3		1/22	GB
2. Signaling, homeostasis and control in the whole human				
Membranes	4, 5	2	1/27	NC
Nervous system	6	2/3	1/29, 2/3	NC, NC
Sensory Physiology	7	3	2/5	
Skeletal muscle	9	4	2/10	GB
Motor Control	10	4	2/12	GB
Brain & Behavior	8	5	2/17	NC
<i>MIDTERM 1</i>		6	2/24	
3. Endocrine control systems	11	5/6	2/19, 2/26	NC, NC
4. Control of Body Water and ion composition (Renal physiology)	14	7	3/3, 3/5	NC, NC
5. Control of Blood Pressure (Cardiovascular physiology)	12	8	3/10, 3/12	GB, GB
		9	3/17, 3/19	GB, GB
<i>SPRING BREAK</i>		10	3/23-3/29	
6. Control of O <sub>2</sub> and CO <sub>2</sub> (Respiratory Physiology)	13	11	3/31, 4/2	GB, GB
<i>MIDTERM 2</i>		12	4/7	
7. Nutrition, Digestion	15	12	4/9	GB
8. Control of blood glucose, energy balance (Metabolism)	16	13	4/14, 4/16	GB, GB
9. Homeostasis of the genome: Reproduction	17	14	4/21, 4/23	NC, NC
10. Special Topics in Integrative Physiology (Brain, Behavior and life in the 21 <sup>st</sup> Century) (Exercise Physiology)	18	14	4/28	NC
			4/30	GB
<i>FINAL EXAMINATION</i>		<i>Thursday</i>	<i>5/14 7-10 PM</i>	

\* Assigned Readings are in Vander's HUMAN PHYSIOLOGY, 13th Edition, McGraw Hill, 2014

**Course objective:** Understanding mechanisms by which key physiological priorities are maintained in healthy humans. 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, sensory and motor systems.

**Key physiological Priorities:**

Cell membrane potential: -90 to -55 mV (depending on cell type)

Atkinson Energy Charge: 0.85

Mitochondrial  $\Delta\Psi$ : 0.22 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 Text:** Vander's HUMAN PHYSIOLOGY, 13th Edition, McGraw Hill, 2014

The text contains questions at the end of each section and chapter for you to test your comprehension of the main topics. The following chapters from the book will be part of the examinations:

Midterm 1: chapters 1-10

Midterm 2: chapters 11-14

Final exam: All of the above plus chapters 15-17

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 us and your classmates. To prepare, please read the relevant chapters before class.

**Grading:**

All exams will be closed book, closed notes. No electronic devices will be necessary or allowed during exams. 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 and us. To prepare, please read the relevant chapters before class.

**DSP students:** please contact one of the Profs or your GSI at least 2 weeks before the first midterm, so that we can plan the necessary accommodations.

**Absence from exams:** If you cannot attend an exam due to illness or other circumstances beyond your control, you must contact one of the instructors and explain the circumstances **before** the exam. You will need to provide documentation of the circumstances (in the case of illness, a doctor's note specifying why you could not attend the exam). There will be no makeup examinations, but we will consider the possibility of alternative assessment under justified and documented circumstances.

**Honor Code:** You will be asked to sign an Honor Code statement at each exam, stating that you will not give or receive aid in the examination. We will manifest our confidence in you by refraining proctoring examinations or taking unusual precautions to prevent cheating. The penalty for violating the Honor Code will be failing the course. A complete statement of our Honor Code is available under 'Resources' on the course bSpace or bCourse site.

## **Grading**

The course grade will be determined by scores on in-class quizzes, homework assignments two midterm exams, a final exam. The weighting of these five components will be:

**5%** - Prior to class homework on Connect

**5%** - Quizzes in class (using iClickers).

**10%** - Discussion section participation and homework assignments

**20 %** Midterm 1 (multiple choice test, in class)

**20 %** Midterm 2( multiple choice test, in class)

**40%** Final exam (multiple choice test, cumulative)

**Quizzes:** A quiz on the previous lecture and day's assigned reading, using iClickers, will precede most lectures (starting in the second week of course instruction). There will be 19 in class quizzes. Your quizzes grade will be based on the best 16. Missed quizzes will receive 0%.

**Discussion section participation and Discussion Section work sheet assignments:** Discussion sections will include group work analyzing case studies and solving problems. Some written assignments will be completed during sections and others will be assigned as homework. There will be 12 section meetings; the grade will be determined from participation and homework from 10 of them. Missed discussion section work cannot be made up.

**Midterm exams:** Midterms will be multiple choice exams administered in class on the date listed in the lecture schedule. Midterms will be scored by Scantron.

**Final exam:** The final will be a cumulative multiple choice exam, scored by Scantron.

## **Letter grades:**

If your final course score is: Your final letter grade will be:

≥ 95% A+

≥ 90% A

≥ 87% A-

≥ 83% B+

≥ 80% B

≥ 77% B-

≥ 73% C+

≥ 70% C

≥ 67% C-

≥ 63% D+

≥ 60% D

<60% F

**Absence from exams:** If you cannot attend an exam due to illness or other circumstances beyond your control, you must contact one of the instructors and explain the circumstances **before** the exam. You will need to provide documentation of the circumstances (in the case of illness, a doctor's note specifying why you could not attend the exam). There will be no makeup examinations, but we will consider the possibility of alternative assessment under justified and documented circumstances.

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**DSP students:** please contact head GSI Sean Gross ([seanmgross@gmail.com](mailto:seanmgross@gmail.com)) at least 2 weeks before the first midterm, so that we can plan the necessary accommodations.

**Office Hours:**

**George A. Brooks**

5101 VLSB

Monday and Friday 8-9 am

**Natalia Caporale**

308 Barker

Tuesday and Thursday 10-11

**Head GSI:**

Days and hours to be determined

**iClickers:** We will use iClickers for class quizzes.

**McGraw-Hill Connect:** We will use McGraw-Hill Connect for homework assignments prior to class.

**Lecture Notes:** PDFs of Lecture Notes will be available on the class bSpace or bCourse sites. We will try to post Lecture Notes the evening before lectures, but we cannot guarantee that they will always be posted before lecture.

**Piazza:** Questions posted on Piazza will be answered by GSIs.

**Electronic Mail Policy:** Questions on lecture material will be answered in class and during office hours. Email is reserved for emergency purposes.

**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 GSI time, so the lab seats are available to only 176 students per term. 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.