BIOE 131: Animal Physiology
UCSC Spring 2012
Instructor: Nicole Thometz
Course Logistics

• Lecture:
  Tues/Thurs 8:00-9:45am - Kresge Hall 321

• Required Text:

• Office Hours:
  Tues/Thurs 10am-11am (Owl’s Nest)
  or by appointment at Long Marine Lab
Course Logistics – Teaching Assistants

- **Jen Maresh**
  - Lab Section: Tuesday 10:30am-1:30pm
  - Office Hours: Wed 10am-12pm (COH 152A)

- **Holly MacCormick**
  - Lab Section: Thursday 10:30am-1:30pm
  - Office Hours: Wed 2-4pm (COH 251)

- **Maya Friedman**
  - Lab Section: Friday 9am-12pm
  - Office Hours: Fri 1-3pm (COH 255)

- **Chandra Goetsch**
  - Lab Section: Friday 12pm-3pm
  - Office Hours: Tues/Thurs 1-2pm (COH 149)
Classroom Accommodations

- If you qualify for classroom accommodations, please submit your Accommodation Authorization from the Disability Resource Center (DRC) to me within the first two weeks of the quarter.

- You must submit your DRC forms on time to ensure that the appropriate arrangements can be made.

- If you have questions about the DRC, please contact their office.
Course Website

- http://bio.classes.ucsc.edu/bio131/

- Find syllabus, course schedule, lectures, handouts, updates, and information for both BIOE 131 and BIOE 131L
### Enrollment

- Students can enroll in the lecture course (BIOE 131) without the lab (BIOE 131L), but cannot enroll in the lab without concurrent (or previous) enrollment in the lecture course.
BIOE 131 Laboratory

- Long Marine Lab: Center for Ocean Health – Room 118
  - Tues: 10:30-1:30
  - Thurs: 10:30-1:30
  - Fri: 9-12 & 12-3

- YES we have labs this week

- What should I bring the first day?
  - Laptop (if you have one, otherwise there are laptops you can use.)
  - Handouts printed out from website
BIOE 131 Laboratory

- Need volunteers to switch from Tuesday (10:30-1:30) and Friday (9-12) lab sections into the Thursday (10:30-1:30) lab!!!!!

- Need about 9-10 volunteers from Tues and 7-8 volunteers from Friday am.  
  ◦ Those in Friday pm lab cannot switch.

- See me at break or after class for permission codes
I want you to walk away with a strong understanding of:

- Large concepts in physiology / big picture
- Diversity of species & strategies within the context of their environments
- Importance of studying animal physiology
Lecture Format

- Power Points
- Chalk Board Notes
- Handouts

- There will be a lot of information covered during each lecture. COME TO CLASS!
Lecture Format

- Power points will be posted online.
- Chalkboard notes will not be posted online.
- It is your responsibility to come to class or get notes from another student, not your TA’s or mine.
Lecture Format

- There is a lot of tough material presented in this class, you will need to STUDY.

- I am here to help, your TAs are here to help, but you need to put in the effort and WORK.

- I don’t know everything, but I will help you find the answer.

- If you choose to skip classes, not put in the effort, and/or not study you will not have positive results.
Lecture Format

- Turn off your cell phones in class.
- NO texting in class, it’s RUDE.
Exams

- Quizzes + 2 Exams + Cumulative Final
  - Multiple Choice
  - True/False
  - Fill in the Blank
  - Diagrams
  - Short Answer
    - ie. something for everyone!

- Cheating will NOT be tolerated and will result in an automatic ZERO on the exam and possible failure of the course.
## Evaluation Criteria

<table>
<thead>
<tr>
<th>Percentage of Grade:</th>
<th>Date:</th>
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<tbody>
<tr>
<td>Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Exam 1</td>
<td>20% April 26&lt;sup&gt;th&lt;/sup&gt;</td>
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<tr>
<td>Exam 2</td>
<td>20% May 22&lt;sup&gt;nd&lt;/sup&gt;</td>
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<tr>
<td>Final</td>
<td>40% June 13&lt;sup&gt;th&lt;/sup&gt;</td>
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What is Animal Physiology?

“The study of how animals work.”
– Knut Schmidt-Nielsen
What type of things are we going to be discussing?
Animal Energetics
Nervous Systems

(a) Cnidarian (jellyfish)
(b) Platyhelminth (planarian)
(c) Annelid (earthworm)
(d) Arthropod (crab)
(e) Mollusc (limpet)
(f) Cephalopod mollusc (squid)
(g) Echinoderm (sea star)
(h) Chordate (alligator)
Muscles & Movement
Circulation
Osmoregulation
Themoregulation
Sensory Systems
Animal Physiology

• Linking Structure & Function

• How do parts work together to allow animals to perform normal behaviors & respond to their environment?

• CANNOT SEPARATE ANIMALS AND THEIR ENVIRONMENT.
Chordata
Prior to 20th century there was little distinction between medical physiology and animal physiology.

- Per Scholander (1905-1980):
  - Comparative physiology: diving physiology of vertebrates

- Knut Schmidt-Nielsen (1915-2007):
  - Comparative physiology: how animals live in harsh and unusual environments.
Short History of Animal Physiology

- George Bartholomew (1923-2006):
  - Ecological physiology: thermoregulation and organisms interactions with their environments.

- Gerry Kooyman (SCRIPPS)
  - Diving Physiology of Marine Animals
  - Aerobic Dive Limits
Current Sub-Disciplines

- By Level of Organization:
  - Cell & Molecular Physiology
  - Systems Physiology
  - Organismal Physiology
  - Ecological Physiology
  - Integrative Physiology

- By Processes that Generate Variation:
  - Developmental Physiology
  - Environmental Physiology
  - Evolutionary Physiology
Comparative Physiology

- Organisms face mild to extreme changes in environmental conditions on varying time scales.

- **Conformers:**
  Allow internal conditions to change with variation in environmental conditions

- **Regulators:**
  Maintain relatively constant internal conditions regardless of external conditions
Comparative Physiology

- Endotherm v. Ectotherm
- Temperate v. Tropical v. Arctic
- Freshwater v. Saltwater
- Mammals v. Birds v. Reptiles v. Amphibians v. Fish
Comparative Physiology

AIR v. WATER
Comparative Physiology

- How are these animals adapted to their environment? How do they interact with it?

- What is necessary for these animals to survive within their environment?

- Will they be able to respond to changes within their environment? To what degree?
Welcome to Animal Physiology!!
Attention Biology Majors: Interested in gaining high-level research experience in marine ecology this Spring?

I am looking for 5 highly motivated undergraduate volunteers for help with stable isotope lab work pertaining to my PhD thesis.

The Project: Marine birds deposit thousands of pounds of nutrient-rich feces (guano) on tropical islands, and these islands are often adjacent to nutrient-poor coral reef ecosystems. Do these nutrients make their way into coral reef waters? If so, do they affect recipient algae and animals living in the delicate coral reef ecosystem? I am currently asking this question using several seabird and non-seabird islands off of Oahu, Hawaii. I am looking for volunteers to help me analyze nitrogen isotope samples of algae, sea urchins, and bivalves from coral reefs next to these islands to help answer this question. Interested?

Requirements:

- Available to volunteer at least 3 hours a week this quarter
- Dedicated, High Attention to Detail
- Able to work independently and follow protocols

How to Apply: Please email me the following materials:

- A paragraph describing why you want to volunteer
- A resume listing your previous research or job experience
- A personal reference (phone number and email contact information)

Email Susy Honig  honig@biology.ucsc.edu