

MECHANICS OF ORGANISMS LABORATORY COURSE SYLLABUS

1. Professors:

R. Full

Office hours: Tues., Thurs., 11:00 AM - 12:00 PM, 5128 VLSB
e-mail: rjfull@berkeley.edu; phone: 642-9896

M. Koehl

Office hours: Wed. & Fri., 11:00 am - noon, 4116 VLSB
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R. Dudley

Office hours: Tues., Thurs., 1:00 - 2:00 PM, 5018 VLSB
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2. Graduate Student Instructors:

TBA

Office hours:

e-mail:

TBA

Office hours:

e-mail:

3. **Text:** NONE required. **Biomechanics: Structures and Systems: A Practical Approach (Practical Approach Series)** by A. A. Biewener (Editor). **Paperback:** 312 pages, **Publisher:** Oxford University Press, USA (1992). **ISBN-10:** 0199632677, **ISBN-13:** 978-0199632671.

4. **Laboratories:** Tuesday and Thursday, 2:00-5:00 PM in 1099 VLSB.

5. **Discussion section:** One hour a week, To be arranged.

6. **Pre-requisite:** Mechanics of Organisms (IB135) taken previously or by consent of instructor.

7. **Grading:** Grades will be based on: 1) laboratory reports (30%), 2) laboratory participation (10%), 3) in-class presentations and discussions (20%) and 4) an independent research project (40%).

8. Web Site:

We will use a bCourses site for the syllabus, homework, reading assignments, announcements and lab data. You may access the site by going to:
<http://bCourses.berkeley.edu>, login through CalNet and then to Integbi 135L

Integrative Biology 135L
MECHANICS OF ORGANISMS LABORATORY

8. **Rationale:** This course will examine how animals and their parts function. We will focus on demonstrating how general principles of biomechanics are discovered. Students will learn state-of-the-art **biomechanical techniques** to answer challenging problems by **hands-on experience** with the **most modern equipment available to researchers** in the field. In addition, we will discuss basic principles of experimental design. Laboratories will not be the typical “cookbook” variety. Students will have the opportunity to critically analyze data and then follow-up their ideas with new experiments. Students will conduct original research projects in groups at the end of the course.

**COMPARATIVE BIOMECHANICS AND PHYSIOLOGY LAB
TENTATIVE SCHEDULE**

DATE	LABORATORY
January 22/24	Introduction
FIRST ROTATION	
Jan 29 – Feb 21	<ol style="list-style-type: none">1. Energetics of locomotion – treadmill & O₂ analyzer2. Control of locomotion (measuring muscle activation; EMG equipment)3. Properties of biomaterials (materials testing instrument)4. Flight mechanics (wind tunnel and hummingbird)
SECOND ROTATION	
Feb. 26 – March 21	<ol style="list-style-type: none">1. Muscle function (work loops) or Muscle computer simulation2. Kinematics of locomotion (high-speed cameras)3. Fluid dynamics (dynamically-scaled physical modeling; drag and lift; water flume)4. Dynamics of terrestrial locomotion (force platform)

THIRD ROTATION

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Note: March 25 – 29 Spring Recess – no labs

- April 2 – April 18
1. Flow visualization in air, water and sand (particle-image velocimetry, infrared imaging)
 2. Gecko and Gecko-inspired Adhesion
 3. Field Biomechanics

STUDENT RESEARCH PROJECTS

- April 23
1. Research questions and groups chosen
- April 30
2. Experimental design and initial measurements
- May 7
3. Final measurements and analysis
- May 13
4. Student presentations and discussion of projects