

INTEGRATIVE BIOLOGY 123AL LECTURE OUTLINE
EXERCISE AND ENVIRONMENTAL PHYSIOLOGY

INSTRUCTOR:
Lab Instructors:

TIME: M, W, F 8-9 AM **125 Li Ka Shing** (plus laboratory section)

SEMESTER SCHEDULE: Instruction Begins August 23 and Ends December 1
Lab Orientation begins the second week of class

- I. *Objective:* A discussion of the many basic and applied aspects of exercise and an understanding of the effects of exercise, environmental and other stresses on the human body.
- II. *Approach:* A series of lectures, discussions, laboratory exercises and demonstrations on the subject.

III. *Lecture Outline and Examination Schedule:*

<u>DATE</u>	<u>TOPIC</u>	<u>READING*</u>
Aug. 23, 25	Introduction	Ch. 1*
Aug. 28, 30, Sept. 1, 6	Metabolic Responses to Exercise	Ch. 4-7 (Review 2-3)
Sept. 8, 11, 13	Energy Substrate Use in Exercise	Ch. 8-10
Sept. 15, 18, 20, 22, 25	Cardio-Pulmonary Responses to Exercise	Ch. 21 (Review 10, 14-16)
Sept. 27	Muscular Responses to Exercise	Ch. 19, 20 (Review 17-18)
Sept. 29, Oct. 2	Exercise in the Heat and Cold	Ch. 22
Oct. 4, 6, 9	Exercise at High Altitude	Ch. 23 (Review 11-13)

Subject Material for the Midterm Exam will be above the dividing line.

Oct. 11, 13, 16	Exercise Obesity & Diabetes (Metabolic Syndrome)	Ch. 25
Oct. 23	Midterm Examination	
Oct. 18, 20	Exercise Cancer & Disabilities	Ch. 26
Oct. 25, 27, 30	Exercise & Nutrition	Ch. 28
Nov. 1, 3	Ergogenic Aids	Ch. 29
Nov. 8, 13	Gender Differences and Considerations	Ch. 30
Nov. 13, 15, 20	Growth & Development, Aging	Ch. 31
Nov. 27, 29, Dec. 1	Fatigue From Muscular Exercise	Ch. 33
Dec. 11	Final Examination Group 1	(8:00-11:00 AM)

The final examination will cover material from Oct. 11 and afterward, but will be conceptually inclusive of the entire course.

IV. *Grading:*

Midterm	20%
Final Exam	40%
Lab	40%

V. *Lab:* **Lab (IB 123AL) is required concurrently.**

* Reading assignments in: Brooks, G.A., T.D. Fahey, and K.M. Baldwin EXERCISE PHYSIOLOGY: HUMAN BIOENERGETICS AND ITS APPLICATIONS, Fourth Edition, McGraw Hill, 2004.

INTEGRATIVE BIOLOGY 123AL Laboratory Outline
EXERCISE AND ENVIRONMENTAL PHYSIOLOGY[†]
Fall Semester 2016

Objective: To obtain practical experience in the measurement of physiological parameters during rest and exercise and to be able to compile, compare, contrast and interpret physiological data. Laboratory demonstrations and exercises will illustrate concepts presented in lectures.

Mode of Instruction: Labs will involve short lectures and demonstrations by the GSI, followed by student exercises (done in groups) under the supervision of the GSI.

Mode of Evaluation: Many lab exercises will involve individual, written Laboratory Reports or responses to Discussion Questions that are due in lab the following week. Laboratory reports will take the format of published articles in peer-reviewed physiological journals. As described below, grading of Lab Reports will emphasize data analysis and interpretation, but Reports will contain all elements of a scientific paper in physiology. Responses to Discussion Questions will be more straightforward, not containing all elements of the Laboratory Report. Again, emphasis in grading will be on data analysis and interpretation.

Graduate Student Instructors: TBD

Materials: Lab Manual (available at Copy Central 48 Shattuck Square)
Exercise Physiology Text by Brooks, Fahey, and Baldwin
Lab Notebook
Calculator

[†]IB123AL to be taken concurrently with IB123A

Laboratory Schedule:

<u>WEEK #</u>	<u>Week of</u>	<u>Laboratory Topic</u>	<u>Assignment</u>
1	Aug. 22	No Laboratory	
2	Aug. 29	Orientation	
3	Sept. 5	Resting Metabolic Rate	Discussion Questions
4	Sept. 12	The Balke Treadmill Test	
5	Sept. 19	Determination of Maximum VO ₂	Laboratory Report
6	Sept. 26	ECG & Blood Pressure	
7	Oct. 3	Exercise in the Heat	Discussion Questions
8	Oct. 10	Exercise at Altitude	Discussion Questions
9	Oct. 17	Review for Midterm	
10	Oct. 24	No Lab after Midterm	
11	Oct. 31	Glucose Homeostasis & Exercise	Discussion Questions
12	Nov. 7	Ventilation During Exercise	
13	Nov. 14	Estimation of Cardiac Output	Laboratory Report
14	Nov. 21	No Lab, Thanksgiving Holiday	
15	Nov. 28	Lactate Threshold	
16	Dec. 5	Review for Final Exam	

Grading:

	<u>Number</u>	<u>Points</u>	<u>Total</u>
Individual Discussion Questions	4	100 points	400 points
Individual Lab Reports	2	200 points	400 points
GSI Evaluation			<u>100 points</u> 900 points

Discussion Questions are provided in the lab manual, and should be answered in a short essay format. All assignments must be handed in printed hard copy.

Laboratory Reports: Reports are hard copy printouts will take the format of published articles in peer-reviewed physiology journals. Grading will emphasize data analysis and interpretation. As described below, the report should include a brief introduction on background physiology and the purpose of the lab exercise; a methods section describing what you did, the equipment used and calculations; a results section presenting your data in written, table and/or graphical format; a discussion section interpreting your results and answering the discussion questions; and a concluding paragraph summarizing your findings.

GSI Evaluation will be based on attendance, preparation and arrival to lab on time, participation and contribution to the group effort.

NOTE: All assignments (hard copies only; emails not accepted) are due at the beginning of class the week following lab exercises. Late assignments will be marked down 10% each day.

SUGGESTIONS FOR AN IDEAL LAB REPORT

Your report should include six distinct sections (200 points total).

Create a descriptive title for your report. The lab reports are designed to get you used to writing a scientific paper. The lab reports should include all the pertinent information in a concise manner (3-5 pages, double-spaced, including tables and figures, no smaller than Times 12 Font). Write in the past tense since the experiment has already been done. Please read the lab manual thoroughly. It will help you with your presentation of the data. Also, the text and the references at the end of the lab will help answer the questions.

1. Introduction (30):

One to two paragraphs stating the background physiology and purpose of the experiment and what question(s) the experiment hopes to answer.

2. Methods (20):

Include a brief description of the procedures and the precise equipment used (e.g., Tissot Spirometer). Include enough information for someone to repeat the experiment and any calculations performed.

3. Results (50):

Present a summary of the data collected in paragraph form. Only include the data, not your interpretation of the data. Include tables and graphs (number and title and include units).

4. Discussion (80):

Discuss what your data mean and the physiological mechanisms involved, compare and contrast expected and actual results, explain why your results are different from expected, discuss sources of error and suggestions for improving the lab.

5. Conclusion (10):

Briefly recap your observations in a few sentences, and end with a final summarizing statement that wraps up the experiment's findings.

6. References (10):

Include at least one primary reference used in your report. Be sure to cite appropriately in the text.