

INTEGRATIVE BIOLOGY 123A LECTURE OUTLINE  
EXERCISE AND ENVIRONMENTAL PHYSIOLOGY  
Fall Semester 2014

INSTRUCTOR: **Professor George A. Brooks, Ph.D.**  
GSIs: **Austin Peck, A.B.**  
**Aishwarya Kundu, A.B., MS.**

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

SEMESTER SCHEDULE: Instruction Begins August 29 and Ends December 5

- 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. 29, Sept. 3	Introduction	Ch. 1*
Sept. 5, 8, 10, 12	Metabolic Responses to Exercise	Ch. 4-7 (Review 2-3)
Sept. 15, 17, 19	Conditioning for Endurance	Ch. 21 (Review 10, 14-16)
Sept. 22, 24	Conditioning for Strength	Ch. 19, 20 (Review 17-18)
Sept. 26, 29, Oct. 1	Exercise in the Heat and Cold	Ch. 22
Oct. 3, 6, 8	Exercise at High Altitude	Ch. 23 (Review 11-13)
Oct. 10, 13, 15	Exercise and Coronary Heart Disease	Ch. 24
Oct. 17, 20	Exercise Obesity & Diabetes (Metabolic Syndrome)	Ch. 25
<b>Oct. 27</b>	<b>Midterm Examination</b>	
Oct. 22, 24	Exercise Cancer & Disabilities	Ch. 26
Oct. 29, 31, Nov. 3	Exercise & Nutrition	Ch. 28
Nov. 5, 7	Ergogenic Aids	Ch. 29
Nov. 10, 12, 14	Growth & Development, Aging	Ch. 31
Nov. 17, 19	Gender Differences and Considerations	Ch. 30
Nov. 21, 24, 26	Fatigue From Muscular Exercise	Ch. 33
Dec. 1, 3, 5	Summary	
<b>Dec. 15</b>	<b>Final Examination Group 4 (7:00-10:00 PM)</b>	

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<sup>†</sup>**  
**Fall Semester 2014**

**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:** Laboratory reports will take the format of published articles in peer-reviewed physiological journals. One report will be written per group. All group members will receive the same grade. Grading will emphasize data analysis and interpretation.

**Graduate Student Instructors:**

Aishwarya Kundu  
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Firestone Lab in MCB  
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Austin Peck  
IB Graduate Student in Integrative Biology  
Brooks Lab 642-9560  
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**Materials:** Lab Manual (available at Copy Central 48 Shattuck Square)  
Exercise Physiology Text by Brooks, Fahey, and Baldwin  
Lab Notebook  
Calculator

**<sup>†</sup>IB123AL to be taken concurrently with IB123A**

## *Laboratory Schedule:*

<u>WEEK #</u>	<u>Day</u>	<u>Laboratory Topic</u>	<u>Assignment</u>
1	Aug. 25	No Laboratory	
2	Sept. 1	Orientation	
3	Sept. 8	Resting Metabolic Rate	Discussion Questions
4	Sept. 15	The Balke Treadmill Test	
5	Sept. 22	Determination of Maximum $\dot{V}O_2$	Laboratory Report
6	Sept. 29	ECG & Blood Pressure	
7	Oct. 6	Exercise in the Heat	Discussion Questions
8	Oct. 13	Exercise at Altitude	Discussion Questions
9	Oct. 20	Review for Midterm	
10	Oct. 27	<b>No Lab after Midterm</b>	
11	Nov. 3	Glucose Homeostasis & Exercise	Discussion Questions
12	Nov. 10	Ventilation During Exercise	
13	Nov. 17	Estimation of Cardiac Output	Laboratory Report
14	Nov. 24	<b>No Lab, Thanksgiving</b>	
15	Dec. 1	Lactate Threshold	
16	Dec. 8	<b>Review for Final Exam</b>	

**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 typed (hard copy).

Lab Reports: The typed (hard copy) report should include a brief introduction on background physiology and the purpose of the lab; 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. 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., Parkinson-Cowan gas meter). 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.