

Biology of Organisms
Bio 207

Syllabus



Spring 2008
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Lab Instructors

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Lab Design and Development

The lab component of this course was developed and designed by Rochelle Buffenstein, Jess Hanks, John Lee, Daniel Lemons, and Jonathan Levitt from the department of Biology.

We hope you will find it stimulating and enjoyable.

Course objectives

1. Increase your ability to compare and contrast the different strategies organisms use to deal with a range of environmental challenges
2. Increase your understanding of the role and regulation of water and solutes in a number of different organisms found in a range of environments
3. Increase your understanding of energy acquisition and utilization and why plants play an integral role
4. Increase your ability to describe mechanistically several regulatory processes and to predict their responses under a range of conditions
5. Increase your ability to carry out scientific experiments
6. Increase your ability to use techniques for computerized data collection, analysis and presentation
7. Increase your ability to read and write a scientific research paper
8. Increase your ability to work collaboratively in groups
9. Increase your ability to solve problems related to organismic function

Bio 207 Lecture Schedule

Week	Topics	Chapter in Hill
<u>1</u> Jan. 28	Introduction to course: Life, physiology, regulation, homeostasis	1
<u>2</u> Feb. 4	Water and solute movements: Diffusion, osmosis, ionic gradients, active transport	3
<u>3</u> Feb. 11	Water and salt balance in aquatic and terrestrial environments: Kidneys, gills, etc.	26-27
<u>4</u> Feb. 25	Circulatory systems: Hearts and other pumps	23
<u>5</u> Mar. 3	<u>Test 1: Lectures 1-3, and tutorial materials</u>	
<u>6</u> Mar. 10	Gas transport: Breathing, organs and processes that transport gases	21-22
<u>7</u> Mar. 17	Plant Energy Acquisition: Photosynthesis, light capture, energy transduction	TBA
<u>8</u> Mar. 26	(WEDNESDAY) Animal Energy Acquisition: Nutrients, Digestion and absorption	4
<u>9</u> Mar. 31	Metabolism: Role of oxygen, effect of activity and body size	5
<u>10</u> Apr. 7	<u>Test 2: Lectures weeks 5-8, and tutorial materials</u>	
<u>11</u> Apr. 14	Temperature regulation: Mechanisms of heat exchange, adaptations to extreme conditons	8-9
<u>12</u> Apr. 28	Nervous System I: Neurons, nerve impulses and synapses	11-12
<u>13</u> May 5	Nervous System II: Sensory systems and beyond	13
<u>14</u> May 12	Muscles and physiological adaptations for movement (running, migration, etc)	17
	<u>Final exam: Comprehensive, Lectures 1-12, Lab weeks 1-14</u>	

Spring 2008 Lab Schedule

Tues.	Wed.	LABORATORY ACTIVITIES	QUIZ	WRITING ASSIGNMENTS <i>Assignments are due at the next tutorial session</i>
Jan. 29	<u>1</u> Jan. 30	Laboratory Exercise 1: Introduction to the Laboratory; Prepare for field trip; environmental osmotic concentrations		
Feb. 5	<u>2</u> Feb. 6	Tutorial 1: Solutes, solutions and osmolality. Aquatic environments. Writing: How to write an Introduction	Tutorial Q1	• Introduction to Cell Volume experiment (not graded)—Hand in Week 4
Feb. 19	<u>3</u> Feb. 13	Laboratory Exercise 2: Osmotic regulation of cell volume.	Lab Q1	
Feb. 26	<u>4</u> Feb. 20	Tutorial 2: Organismic responses to fluctuations in water salinity. Writing: Peer-edit the Introduction section How to write a Methods section	Tutorial Q2	• Re-write Introduction (graded) Methods section for Cell Volume experiment (not graded)—Hand in Week 6
Mar. 4	<u>5</u> Feb. 27	Laboratory Exercise 3: Digestive and vascular system of rats	Lab Q2	
Mar. 11	<u>6</u> Mar. 5	Tutorial 3: Transport systems and kidney function. Writing: Peer edit the Methods section How to write a Results section	Tutorial Q3	• Re-write Methods section (graded) • Results for cell volume experiment (not graded)—Hand in Week 8
Mar. 18	<u>7</u> Mar. 12	Laboratory Exercise 4: Data analyses from field trip and Effect of light intensity on photosynthesis	Lab Q3	
Mar. 25	<u>8</u> Mar. 19	Tutorial 4: Photosynthesis Writing: Peer edit Results How to write a Discussion section	Tutorial Q4	• Re-write Results section (graded) • Discussion for cell volume experiment (not graded)—Hand in Week 10
Apr. 1	<u>9</u> Apr. 5 or 12	Laboratory Exercise 5: Field trip to Salt Marsh at Marshlands Conservancy		
Apr. 8	<u>10</u> Apr. 9	Tutorial 5: Energy acquisition and nutrition Writing: Peer edit Discussion Discuss the links between the sections of a research paper; writing a full paper and need for References , how to cite references.	Tutorial Q5	• Re-write Discussion and reference section (graded) 1 st draft of full paper on metabolism (not graded... peer edit with your group during tutorial # 6)—Hand in Week 13
Apr. 15	<u>11</u> Apr. 16	Laboratory Exercise 6: Temperature and metabolic rate in ectotherms and endotherms	Lab Q4	
Apr. 29	<u>12</u> Apr. 30	Laboratory Exercise 7: Completion of group designed experiment.	Lab Q5	
May 6	<u>13</u> May 7	Tutorial 6: Gases, Temperature and Metabolism: Poikilotherms and homeotherms. Writing: Peer edit Full paper	Tutorial Q6	• Re-write full paper
May 13	<u>14</u> May 14	Laboratory Skills Examination- Practical and written sections. Tutorial 7 Final presentations		Complete paper on group experiment (Graded) hand in no later than the day of final; earlier preferred.

Aims of this course

Bio 20700 is a Core Biology Course that is designed to give an overview of how organisms, both plant and animal, solve some of the fundamental challenges to sustaining themselves in their varying environments. It is also designed to build skills in experimental design, modern methods of measurement, data analyses and communicating about experiments both in writing and orally. All of these aspects of the course are important for success in subsequent Biology Core and elective courses as well as being an important background for future careers. The course consists of a series of lectures, laboratory exercises, readings, writing and tutorials. Most of this course addresses “how” and “why” questions and the solutions to these. A large component of the course depends upon **your** input. For you to get the most out of this course, you **must come to class prepared**, and complete preparatory reading. This is especially true of the laboratory and tutorial sessions.

By the end of this course you will have:

- gained a basic understanding of the role and regulation of water and solutes in a number of different organisms found in a range of environments.
- gained a basic understanding of energy acquisition and utilization and why plants play an integral role.
- gained a basic understanding of how nerve cells receive and transmit information
- received a general introduction to how nerve cells in the brain relate to perception and cognition
- gained a basic understanding of how muscles work
- learned to describe mechanistically several regulatory processes and to predict their responses under a range of conditions.
- learned how to carry out scientific experiments
- learned techniques for computerized data collection, analysis and presentation.
- learned how to read and write a scientific research paper.
- learned to work collaboratively in groups.
- learned how to solve problems related to organismic function.

Components of the course

This course consists of 14, four-hour laboratory/tutorial sessions, and 14 two-hour class sessions. These sessions will include a combination of experimental exercises, presentation of material, problem solving tasks, analysis of writing and discussion groups related to the topics under study.

Laboratory and Tutorial Sessions

Laboratory and tutorial sessions are interleaved through the course. Tutorials are problem-solving sessions that you prepare ahead of time and sometimes lead. They cover topics that are included in lecture, reading and laboratories. They give you an opportunity to learn the material in greater depth, practice quantitative problems and review. At the beginning of each tutorial you are expected to hand in a copy of the written answers to all of the questions. Keep a second copy for your use in class discussion. When you are presenting, you will receive up to 20 points for the quality of your work. You can download the tutorial questions from the Blackboard web site if you wish to write the answers on a computer. You will also get a tutorial participation grade. At the beginning of each laboratory exercise you will take a quiz that covers the material from the preceding two weeks, including material covered in tutorials. Because the weekly lab quizzes cover both the previous lab and the current lab exercise, you are expected to come to lab having reviewed the background material of the current day's lab and having read the laboratory

handout. These quizzes will be graded and each quiz will contribute towards the final course grade.

If you miss more than one laboratory and/or one tutorial session you will be dropped from the course.

Reading

The text for the course is Eckert's Animal Physiology. The CCNY Bookstore also has the Animal Physiology text by Hill, Wyse & Anderson, which you might find easier to read. Some people like the book "Animal Physiology: Adaptation and Environment" by K. Schmidt-Nielsen. I encourage you to look through these or other physiology texts and to use whichever one seems best to you. We will not ask questions about material that only appear in Eckert, unless there is Study Question that directs you to a particular point. The publisher of the text also has a website with study aids and other material for each chapter. There will also be additional reading material handed out throughout the term, and you will also need to consult an introductory level biology text occasionally. Reading assignments will be given ahead of time and you are expected to keep up with them so you are prepared to actively participate in class sessions.

Written assignments

Writing in a format typical of scientific papers is significant component of the course. There will be six writing assignments in the term. In five of these assignments you will be asked to write one of the major sections of a published research report according to the current scientific writing style. A significant amount of class time will be devoted to preparing for, discussing and analyzing this writing. **All assignments must be typed** (use a computer). **Handwritten work will not be accepted.** Papers in their first version must be turned in at the beginning of class on the day they are due. There will be an automatic **five point deduction** for late papers either when the first, ungraded version is due or when the final, graded version is due. Revised papers must be submitted via email, with a copy sent to both your lab instructor and myself and are due by midnight on the due date. Your instructors will use websites that check for plagiarized material.

Plagerism

The academic world, like the scientific and medical communities, has no tolerance for presenting the words of others as your own. This could be simply lifting sections from texts; copying work off the internet, copying answers from previous years' classes or copying your fellow classmate's work. We will adopt the following standard: It is plagerism if you copy more than a sentence without having it in quotation marks with the original source indicated, or if you paraphrase a paragraph or more without indicating what the source is. Please do not plagiarize work, for we will be forced to fail you or make you drop the course and report you to the College disciplinary authorities.

Tests and Exams

There will be two tests and one final exam. The final is comprehensive and integrates material from the entire term. These exams will consist of multiple choice, matching and true/false questions. A laboratory skills exam will be given in the lab; it will cover all aspects of the lab exercises including: your ability to use the computer and various sensors, to make measurements, and to do calculations like the ones performed in the laboratory. It is important

that every member of the class become competent in all of the skills required for doing experiments, and therefore, the tasks performed within lab groups need to be rotated among group members from week to week so everyone gains the needed experience and is prepared for the practical exam.

How do you know what you are really supposed to learn?

Since you will learn material in reading, lecture, lab and out-of-class problem sets, you are no doubt going to wonder what you are really expected to learn. To help you answer that question, you will have a guide for every part of the course that spells out clearly what you are expected to learn. Attached to this document is a list of **Benchmarks** for each unit that indicate specifically what level of detail you should know and what you should be able to do to demonstrate that you have mastered the material. The reading in particular contains a great deal of detail, and you can use the Benchmarks to guide you in deciding which details to devote your attention to when preparing for quizzes and exams. You will notice that the laboratory exercises also have Benchmarks that will be covered in laboratory quizzes.

Assessment

Your grade will include 2 tests, a final exam, written and presentation tutorial assignments, and laboratory quizzes and skills exam. All material handed out during the course and all material covered in class is examinable. Your best guide for knowing what you must be able to do for each exam will be the unit benchmarks that are at the back of this document and your own list of key principles that you discuss in the tutorial sessions.

Assessment breakdown

<u>Assignment</u>	<u>Grade per assignment</u>	<u>Total</u>
Laboratory Quiz	20 points each (5)	100
Tutorial Quiz	10 points each (5)	50
Tutorial Presentation	20 points each (2)	40
Tutorial write-up & study questions	12 points each (5)	60
Tutorial participation	4 points each (5)	20
Lab Skills exam	50 points	90
Tutorial exam presentation (Tutorial # 7)	25 points	
Tutorial write up (only your chosen presentation topic)	15 points	
Writing	10 points/section (4) 100 points for final full report	140
Tests (including clicker quizzes)	Test 1, 100; Test 2, 160	260
Final Exam (including clicker quizzes)		240
Total points for course:		1000

At the end of the term, you will have accumulated a total number of points based on all the components outlined above, If you divide your total number of points by 1000 (the total number of points possible) and multiply by 100 you will have determined your percentage score for the term. For example if you obtained 870 points, your percentage grade would be calculated as follows: $870 / 1000 = 0.87$

$$0.87 \times 100 = 87\%$$

Grades will be determined *very approximately* according to the following guidelines:

A = 93% or above, A- =90-92%, B+ =87-89, B = 83-86%, B- = 80-82%, C+ = 77-79%, C = 73-76%, C- =70-72%, D = 55-69%, F = 54% or lower.

Absences from tests and exams

Unless your instructor is provided with a medically certified reason or official notification of death in the family, and/or police report of car accident there will be **no opportunities** to reschedule tests nor will there be any retakes if you miss a quiz, practical, test or exam. You may go to a different lab section to catch up, provided there is one and you obtain permission from the instructor.

Grades obtained are final and not negotiable!

If you have an average below 40 % at the time of the first test, you may want to consider withdrawing from the course. If you are concerned about your grades, please see your instructor to discuss how you might adapt your studying to improve them. If you get grades less than 60% for any test, please make an appointment to see me.

Incompletes and other contingencies

Incompletes will **not** be given for any reason except the documented inability to finish one part of the course such as an exam. This is the College's policy. If documentation of illness or other serious situation is presented, an Incomplete may be given, and when the missing material is completed a final grade will be assigned. An Incomplete does not allow you to retake the entire course; you will only make up the part that you have missed. Do not ask for an incomplete unless you have a very good reason; it will not be given as an alternative to a failing grade or a withdrawal.

Biology Resource Center (Room J502)

A resource center in J502 is maintained by the Biology department. There, useful tools for self-study are available, including video tapes, books, tutorial services, computer programs, internet access and laboratory material. Students are urged to avail themselves of this resource. There are a number of networked computers in the Resource Center.

Office hours

The teaching staff is available during specific times which will be announced, should you have problems or questions you wish to discuss with them outside of class. You are encouraged to come frequently to see your instructors during those hours. If you cannot come during office hours, please phone or email your instructor to make an appointment. Although your instructor may be available should you stop by during times other than announced office hours, frequently your instructors are involved in other work commitments and will have difficulty sparing the time outside office hours. Please direct to your lab instructor questions related to the laboratory and tutorial assignments.

Laboratory maintenance

The laboratory is managed by Mr. Vitaly Zyhadlo. He will ensure that all the materials for the laboratory exercises are available and that the lab is clean and ready for each session. For your

part, on completion of laboratory exercises, please wash all glassware you may have used, put equipment away and leave the laboratory clean and tidy. **No food or drink is allowed in the lab.**

If you want to complete your laboratory project outside class time, please make the necessary arrangements with Mr. Zyhadlo or your lab instructor.

Getting Organized

Many of the materials for the course will be handed out on a weekly basis. We recommend you obtain a three-ring binder and two packs of five tab dividers to organize the course materials. You should bring these binders to class every week to be sure you have the materials you need.

Enjoy the Course! We hope you enjoy this course as much as the Biology Department faculty and staff have enjoyed developing and teaching it. Every course is a work in progress and your suggestions are sincerely welcomed and invited; they will be taken very seriously.

Academic Integrity

The CUNY Policy on plagiarism says the following about plagiarism (the CUNY Policy can be found in Appendix B.3 of the CCNY Undergraduate Bulletin 2007 -2009):

“Plagiarism is the act of presenting another person’s ideas, research or writings as your own. The following are some examples of plagiarism, but by no means is it an exhaustive list:

1. Copying another person’s actual words without the use of quotation marks and footnotes attributing the words to their source.
2. Presenting another person’s ideas or theories in your own words without acknowledging the source.
3. Using information that is not common knowledge without acknowledging the source.
4. Failing to acknowledge collaborators on homework and laboratory assignments.
5. Internet plagiarism includes submitting downloaded term papers or parts of term papers, paraphrasing or copying information from the internet without citing the source, and “cutting and pasting” from various sources without proper attribution.

The City College Faculty Senate has approved a procedure for addressing violations of academic integrity, which can also be found in Appendix B.3 of the CCNY Undergraduate Bulletin.”

Be aware that if we suspect plagiarism **we will follow this procedure, no exceptions made;** i.e. we will report you to the Academic Integrity Official. Disciplinary sanctions range from failing the class to expulsion from the college