

**SYLLABUS  
BIOL 600  
FALL 2009  
PHYSIOLOGY AND CELL BIOLOGY OF MARINE ORGANISMS**



Instructor: Lou Burnett  
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 Course Goals: This core course is designed to acquaint the graduate student with the principles governing form and function in marine organisms. This course builds on the background all students have in the areas of cell biology and organismal physiology and integrates this information with other disciplines of marine biology. The laboratory will provide students with skills and approaches necessary to understand, to address, and to solve larger problems in marine biology.

Date	Week	Topic	Lecturer	
Aug	25	1	Introduction; Overview of the use of marine organisms to our understanding of basic biological phenomena.	Lou Burnett
	27	1	Consequences of molecular motion; driving forces for mechanisms at the molecular, cellular, tissue, and organismal levels.	Lou Burnett
Sep	1	2	Consequences of molecular motion.	Lou Burnett
	3	2	Scaling at the cellular level; random walks.	Lou Burnett
	8	3	Communication Across, Between and Within Cells: Mechanisms of membrane permeation.	Lou Burnett
	10	3	Communication Across, Between and Within Cells: Equilibrium potentials; Membrane potentials; Nerves and muscles.	Lou Burnett
	15	4	Communication Across, Between and Within Cells: Nerves and muscles.	Lou Burnett
	17	4	FIRST LECTURE EXAM	
	22	5	Communication Across, Between and Within Cells: Cell Signaling	Karen Burnett
	24	5	Communication Across, Between and Within Cells: Molecular Mechanisms & Techniques in Molecular Biology	Karen Burnett
	29	6	Communication Across, Between and Within Cells: Molecular Mechanisms & Techniques in Molecular Biology	Karen Burnett
Oct	1	6	Interactions with the Environment: Properties of solutes and characteristics of water inside cells. - Volume regulation. Cells can regulate their volume when the osmotic concentration of the ambient medium/bathing medium changes.	Lou Burnett
	6	7	Interactions with the Environment: Water and salt balance.	Lou Burnett
	8	7	Interactions with the Environment: Water and salt balance.	Lou Burnett
	13	8	FALL BREAK	
	15	8	Interactions with the Environment: Water and salt balance - chloride cells and fishes.	Lou Burnett
	20	9	SECOND LECTURE EXAM	

Date		Week	Topic	Lecturer
Oct	22	9	Interactions with the Environment: Respiration and Circulation. Respiratory adaptations of marine organisms. Special consequences of breathing a medium with low O <sub>2</sub> capacitance and low O <sub>2</sub> diffusibility.	Lou Burnett
	27	10	Interactions with the Environment: Respiration and Circulation. Hypoxia, activity, and air exposure.	Lou Burnett
	29	10	Interactions with the Environment: Respiration and Circulation. Hypoxia, activity, and air exposure.	Lou Burnett
Nov	3	11	Interactions with the Environment: Respiration and Circulation. Hemodynamics.	Lou Burnett
	5	11	Interactions with the Environment: Acid-base balance. Hypercapnia, activity, and air exposure.	Lou Burnett
	10	12	Interactions with the Environment: Acid-base balance.	Lou Burnett
	12	12	Interactions with the Environment: Temperature. Estuarine organisms encounter large fluctuations in temperature. What are the implications and the adaptations?	Lou Burnett
	17	13	THIRD LECTURE EXAM	
	19	13	Interactions with the Environment: Temperature.	Lou Burnett
	24	14	Special Topic: Mechanisms of Immunity. Application of molecular biology to a hot topic in estuarine research.	Karen Burnett
	26	14	THANKSGIVING HOLIDAY	
Dec	1	15	Special Topic: Mechanisms of immunity; Signal Transduction.	Karen Burnett
	3	15	Special Topic: Harmful algae, marine phycotoxins, and approaches to their detection.	Greg Doucette
	12	16	FINAL EXAM, 8 a.m.	

**Grading policy:**

There will be three lecture exams and a cumulative final examination. The lecture portion of the course will count for 75% of the final grade and the laboratory 25%. Approximately one half of the final exam will count as the fourth lecture exam and the remainder will cover the entire course. Since the final exam covers material representing the breadth of the course, an excellent performance on the final can boost a student's grade higher than the raw score would dictate. On the other hand, an excessively poor performance on the final exam could cause a student's final grade to be lower than the raw score would dictate.

**Policy on viewing previous exams:**

- I allow students to view their exams when I hand them back and to learn from their mistakes. Any student may view his or her exam at any time, but this will be under supervised situations.
- **Exams may not be copied under any circumstances.**
- A student may take personal notes on specific questions, but **these notes may not be shared with other students at any time.** To do so is a violation of the College of Charleston honor code.
- **A student may not view exams that may have been improperly copied by graduate students in previous years.** To do so is a violation of the College of Charleston honor code.

Grade Distribution		Percent
Lecture	9% lowest lecture exam grade 14% middle lecture exam grade 20% highest lecture exam grade 22% final exam (cumulative)	65
Class Assignment		10
Laboratory	Lab Performance - 5% Notebook - 2% Reports - 18%	25
		100

The grading scale will be approximately as follows.

A = 85 - 100 %

B = 75 - 84%

C = 65 - 74%

F = <65%

Laboratory Schedule		
Week	Laboratory	Assignment
1	• Safety Training	• None
2	• Introduction to the lab and the Ammonia Assay	• Record unknown in lab notebook
3	• Ammonia Excretion in Marine Organisms	• Report excretion data to professor
4	• Ammonia Excretion in Marine Organisms	• Write Title Page, M&M, Results, Discussion, Literature Cited
5	• Phenoxidase Activity in Crustaceans	• Report data to professor
6	• Phenoxidase Activity in Crustaceans	• Report data to professor
7	• Writing Workshop	• None
<b><i>From this point forward, make all your final graphs using SigmaPlot!</i></b>		
8	• Osmoregulation	• Record data, plot graphs using SigmaPlot, post in lab notebook
9	• Osmoregulation	• Write Title Page, M&M, Results, Discussion, Literature Cited
10	• Oxygen Uptake	• Report data to professor
11	• Oxygen Uptake	• Write Title Page, M&M, Results, Discussion, Literature Cited
12	• Hemocyanin Function	• Report data to professor
13	• Hemocyanin Function	• Write Title Page, M&M, Results, Discussion, Literature Cited
14	• Hemocyanin Function	
15	• No formal lab; work on papers	

## Students with Disabilities

If there is a student in this class who has a documented disability and has been approved to receive accommodations through SNAP Services, please feel free to come and discuss this with me during my office hours.

## Honor Code and Academic Integrity

Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified, are investigated. Each incident will be examined to determine the degree of deception involved.

Incidents where the instructor determines the student's actions are related more to a misunderstanding will be handled by the instructor. A written intervention designed to help prevent the student from repeating the error will be given to the student. The intervention, submitted by form and signed by both the instructor and the student, will be forwarded to the Dean of Students and placed in the student's file.

Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive a XF in the course, indicating failure of the course due to academic dishonesty. This grade will appear on the student's transcript for two years after which the student may petition for the X to be expunged. The student may also be placed on disciplinary probation, suspended (temporary removal) or expelled (permanent removal) from the College by the Honor Board.

Students should be aware that unauthorized collaboration--working together without permission-- is a form of cheating. Unless the instructor specifies that students can work together on an assignment, quiz and/or test, no collaboration during the completion of the assignment is permitted. Other forms of cheating include possessing or using an unauthorized study aid (which could include accessing information stored on a cell phone), copying from others' exams, fabricating data, and giving unauthorized assistance.

Research conducted and/or papers written for other classes cannot be used in whole or in part for any assignment in this class without obtaining prior permission from the instructor.

Students can find the complete Honor Code and all related processes in the *Student Handbook* at <http://www.cofc.edu/generaldocuments/handbook.pdf>