

# *Aquatic Invertebrate Ecological Physiology*

## *(Marine Adaptations)*

*FAS 6154 (3 credits) Fall, 2014*

### **Course Description**

This course will examine and compare the physiological adaptations of marine, coastal, and estuarine organisms to environmental conditions. The processes examined will span several levels of organization, from ecological and organismal to cellular and molecular. Examples will be drawn from rocky intertidal, salt marsh, coral reef, and deep sea habitats, among others.

**Prerequisites:** BSC 2010 and 2011 or equivalent; courses in animal physiology and ecology are recommended.

### **Instructor**

Dr. Shirley Baker

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Office: Fisheries and Aquatic Sciences, 7922 NW 71<sup>st</sup> St

Office hours: By appointment at Millhopper or main campus

### **Teaching assistant**

Ken Black

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### **Student Learning Outcomes**

At the end of this course, each student will be able to:

- Describe the basic principles and key mechanisms of physiological adaptation in a variety of phyla
- Compare the physiology of organisms adapted to marine, coastal, and estuarine environments
- Apply critical thinking in evaluating literature of the discipline
- Analyze the underlying importance of physiology in ecological patterns observed in communities and ecosystems

**Course Meeting Times** T 7-8 (1:55-3:50), R 8 (3:00-3:50)

## Required Texts/Readings

1. There is no required textbook for this course. However, the following textbook is highly recommended; reading appropriate sections before the corresponding lecture will help clarify the topics discussed. This book can be purchased new, used, as an e-book, or as a rental, from a variety of online vendors.

Willmer, Pat, Graham Stone, and Ian Johnston. 2005. *Environmental Physiology of Animals*, 2<sup>nd</sup> Edition. Wiley-Blackwell.

2. Relevant readings from journals or other media will be posted for discussion.

## Class Format, Policies on Attendance and Make-up Exams

### Course format:

This course will consist primarily of lecture and discussion periods. Students are expected to have read assigned materials prior to corresponding class sessions.

### Attendance policy:

Regular attendance and participation in lecture and discussion periods is expected. Absent students are responsible for acquiring missed lecture notes.

### Make-up policy:

Make-up exams will be considered on a case-by-case basis and will only be given under exceptional circumstances. Students must request permission to make up an exam *prior to* the exam date, with no exceptions. Without prior permission, a missed exam will receive a score of "0". *Late assignments will have 10 points deducted for every day late.*

## Assignments

**Literature Discussion & Participation:** During most Thursday class sessions, the class will discuss papers from the primary literature. Students will be expected to actively participate in *every discussion*. Unexcused absences will result in a score of zero for that day's discussion session.

**Discussion Leadership:** Twice during the semester, individuals will be expected to lead the class discussion session. Literature will be related to that week's topic. Two papers will be discussed: One will be chosen by Dr. Baker, the other will be chosen by the student. The selected article must be provided one week prior to the session.

**Assignments:** Students will develop a “**Species Profile**” over the course of the semester. Each of six assignments must be submitted to the e-learning platform by 6 pm on specific Sundays (see schedule). The assignment will be graded, edited, and returned. When submitting the next assignment (e.g., Assignment #2), students are expected to submit the new section as well as correct the previous section (e.g., Assignment #1). Each assignment will add one (or more) paragraphs to the Species Profile. Scientific literature must be cited; no web sites may be used.

- Assignment #1: Species description and habitat
- Assignment #2: Reproduction and life history strategies
- Assignment #3: Feeding and digestion
- Assignment #4: Salt and water balance
- Assignment #5: Respiration, oxygen transport, and circulation
- Assignment #6: Thermal adaptations

**Exams:** Each of two exams will *primarily* cover the material since the last exam. Exams will consist of short answer questions and short essays. Questions will require critical thinking, integration, and application of interdisciplinary concepts. Sample exams will be provided.

**Graduate student presentations:** Graduate students will present their Species Profile to the class as a lecture of at least 20 minutes, followed by a question and answer period.

### Evaluation of Student Learning

Exams, two @ 100 points each	200 points
Assignments, six @ 50 points each	300 points
Presentation, one @ 100 points each	100 points
Leadership, two discussion sessions @ 50 points	100 points
<u>Participation, 13 discussion periods @ 10 points each</u>	<u>130 points</u>
<b>TOTAL</b>	<b>830 points</b>

### Grading Scale

Final grades will be assigned based on the percentage of total points earned. For additional information on UF grading policies, see <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

- A = 90-100% = 747-830 points
- B+ = 85-89% = 705-746 points
- B = 80-84% = 664-704 points
- C+ = 75-79% = 623-663 points
- C = 70-74% = 581-622 points
- D = 60-69% = 498-580 points
- F = < 60% = <497 points

<b>Schedule</b>			
<b>Week</b>	<b>Date</b>	<b>Weekly Topic</b>	<b>Assignments</b>
<b>1</b>	26 August	<b>Overview, expectations, introductions</b>	
	28	<b>Habitats</b>	
<b>2</b>	2 September	<b>Phyla</b>	
	4	<i>Literature Discussion</i>	<i>Assignment #1</i> Due Sunday 6pm
<b>3</b>	9 September	<b>Biomechanics and life in fluid</b>	
	11	<i>Literature Discussion</i>	
<b>4</b>	16 September	<b>Reproduction and life history strategies</b>	
	18	<i>Literature Discussion</i>	
<b>5</b>	23 September	<b>Energy metabolism</b>	
	25	<i>Literature Discussion</i>	<i>Assignment # 2</i> Due Sunday 6pm
<b>6</b>	30 September	<b>Feeding and digestion</b>	
	2 October	<i>Literature Discussion</i>	
<b>7</b>	7 October	<b>Symbioses</b>	
	9	<b>EXAM I</b>	<i>Assignment # 3</i> Due Sunday 6pm
<b>8</b>	14 October	<b>Salt and water balance</b>	
	16	<i>Literature Discussion</i>	
<b>9</b>	21 October	<b>Respiration</b>	
	23	<i>Literature Discussion</i>	
<b>10</b>	28 October	<b>Oxygen transport and circulation</b>	
	30	<i>Literature Discussion</i>	<i>Assignment # 4</i> Due Sunday 6pm
<b>11</b>	4 November	<b>Oxygen limitation</b>	
	6	<i>Literature Discussion</i>	
<b>12</b>	11 November	<b>Diving physiology</b>	
	13	<i>Literature Discussion</i>	<i>Assignment # 5</i> Due Sunday 6pm
<b>13</b>	18 November	<b>Thermal adaptations</b>	
	20	<i>Literature Discussion</i>	

14	25 November	<b>Graduate student presentations</b>	
	27	<i>Thanksgiving</i>	
15	2 December	<b>Deep sea &amp; Polar seas</b>	
	4	<i>Literature Discussion</i>	<i>Assignment #6</i> Due Sunday 6pm
16	9 December	<b>EXAM II</b>	

**Additional References**

Background material for two of the lectures, *Life in Fluid* and *Symbioses*, is not available in the recommended Willmer et al. text book. Therefore, it is suggested that the following materials be read before the corresponding lectures to help clarify the topics. These books can be purchased new, used, as an e-book, or as a rental, from a variety of online vendors. Older editions may be available in the UF library.

1. Levinton, Jeffrey S. 2009. *Marine Biology; Function, Biodiversity, Ecology*, 3<sup>rd</sup> Edition. Oxford University Press.
2. Nybakken, James W. and Mark D. Bertness. 2005. *Marine Biology; An Ecological Approach*, 6<sup>th</sup> Edition. Pearson Benjamin Cummings.

**Other Information**

**Academic Honesty, Software Use, UF Counseling Services, Services for Students with Disabilities**

In 1995 the UF student body enacted an [honor code](#) and voluntarily committed itself to the highest standards of honesty and integrity. When students enroll at the university, they commit themselves to the standard drafted and enacted by students.

In adopting this honor code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the university community. Students who enroll at the university commit to holding themselves and their peers to the high standard of honor required by the honor code. Any individual who becomes aware of a violation of the honor code is bound by honor to take corrective action. The quality of a University of Florida education is dependent upon community acceptance and enforcement of the honor code.

**The Honor Pledge: We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.**

On all work submitted for credit by students at the university, the following pledge is either required or implied: "**On my honor, I have neither given nor received unauthorized aid in doing this assignment.**"

The university requires all members of its community to be honest in all endeavors. A fundamental principle is that the whole process of learning and pursuit of knowledge is diminished by cheating, plagiarism and other acts of academic dishonesty. In addition, every dishonest act in the academic environment affects other students adversely, from the skewing of the grading curve to giving unfair advantage for honors or for professional or graduate school admission. Therefore, the university will take severe action against dishonest students. Similarly, measures will be taken against faculty, staff and administrators who practice dishonest or demeaning behavior.

Students should report any condition that facilitates dishonesty to the instructor, department chair, Student Honor Council, or Student Conduct and Conflict Resolution in the Dean of Students Office.

*(Source: 2011-2012 Undergraduate Catalog)*

It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor.

This policy will be vigorously upheld at all times in this course.

### **Software Use:**

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

### **Campus Helping Resources**

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, [www.counseling.ufl.edu/cwc/](http://www.counseling.ufl.edu/cwc/)*  
Counseling Services  
Groups and Workshops  
Outreach and Consultation  
Self-Help Library  
Training Programs  
Community Provider Database
- *Career Resource Center, First Floor JWRU, 392-1601, [www.crc.ufl.edu/](http://www.crc.ufl.edu/)*

## **Students with Disabilities**

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues.

0001 Reid Hall, 352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)