

Marine Adaptations: Invertebrate Physiology

FAS 6154 section 07D6 (DE) (3 credits) Fall 2015

Course Description

This course will examine and compare the physiological adaptations of marine, coastal, and estuarine invertebrates 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
Email: sbaker25@ufl.edu
Telephone: 352-273-3627 (office)
Office: Fisheries and Aquatic Sciences, 7922 NW 71st St
Office hours: By appointment at Millhopper or main campus

Teaching assistant

Erica Ross
Email: epross@ufl.edu

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 invertebrate phyla
- Compare the physiology of invertebrate 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 9 (4:05-4:55), R 8-9 (3:00-4:55)

Location Distance

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*, 2nd Edition. Wiley-Blackwell.

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

Class Format, Policies on Attendance and Assignments

Course format:

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

Late assignments:

Late materials will have 10% of the total possible points deducted for every day late.

Quiz policy:

Quizzes are open for a generous amount of time. Once a quiz closes, it will not be reopened.

Assignments

Introduction: 1 @ 5 points each. Distance students will introduce themselves to the class by asynchronously sharing an audio/video file on *VoiceThread*. Further details and *VoiceThread* instructions will be provided. Introduction will be due by the 2nd day of class.

Literature review: 8 @ 5 points each. A written review of the assigned literature will be due at 12pm on *Literature discussion* days (see schedule). Further details and a rubric will be provided.

Discussion participation: 8 @ 10 points each. Approximately every two weeks (see schedule), the class will discuss papers from the primary literature. Readings will be posted on *Canvas*. Distance students may select from two participation options:

Synchronous – Students will join the Face-to-Face classroom discussion via *LiveStream* and *Today's Meet*.

Asynchronous – DE students will discuss the literature with the instructor and TA via “Discussions” on *Canvas*. Further details and a rubric will be provided.

Assignments: 6 @ 20 points each. Students will develop a “**Species Profile**” over the course of the semester. Each of six assignments must be submitted to Canvas by 11:59pm on the due date (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. Primary scientific literature must be cited; no web sites may be used. Further details and a rubric will be provided.

- Assignment #1: Species selection justification
- Assignment #2: Species description and habitat
- Assignment #3: Reproduction and life history strategies
- Assignment #4: Energy acquisition
- Assignment #5: Respiration and oxygen transport
- Assignment #6: Thermal adaptations or salinity adaptations or global change impacts

Quizzes: 5 @ 20 points each. Quizzes will be administered through Canvas (see schedule). Quizzes will consist of multiple choice, short answer, and short essays. Questions will be “open notes” but will require critical thinking, integration, and application of interdisciplinary concepts. Quizzes will open at 8am and close at 11:59pm on the dates noted.

Grad only - Species profile PowerPoint: Graduate students will develop their Species Profile into a PowerPoint presentation. Both a draft (**1 @ 5 points**) and the final product (**1 @ 20 Points**) will be graded. Further details and rubrics will be provided.

Grad only – Species profile presentation: 1 @ 30 points each. Graduate students will present their Species Profile to the class as a audio/video file via *VoiceThread*. Presentations must be at least 20 minutes in length. Students may respond to class questions **synchronously**, via *LiveStream* and *Today’s Meet*, or **asynchronously** via “Discussions” in *Canvas*. Further details and rubrics will be provided.

Evaluation of Student Learning

Introduction, 1 @ 10 points each	10 points
Literature reviews, 8 @ 5 points each	40 points
Discussion participation, 8 @ 10 points each	80 points
Assignments, 6 @ 20 points each	120 points
Quizzes, 5 @ 20 points each	100 points
Species profile PowerPoint draft, 1 @ 5 points	5 points
Species profile PowerPoint final, 1 @ 15 points	15 points
<u>Species profile presentation, 1 @ 30 points</u>	<u>30 points</u>
TOTAL	400 points

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%	= 360-400 points
B+	= 85-89%	= 340-359 points
B	= 80-84%	= 320-339 points
C+	= 75-79%	= 300-319 points
C	= 70-74%	= 280-299 points
D	= 60-69%	= 240-279 points
F	= < 60%	= <239 points

Schedule			
Week	Date	Topic	Assignments
1	25 August	Course introduction and expectations	
	27	Invertebrate physiology in context	VoiceThread Intro <i>Due noon</i>
2	1 September	Invertebrate Phyla	
	3	Phyla (continued) & Habitats <i>Literature discussion #1</i>	Literature review #1 <i>Due noon</i>
3	8 September	Life in fluid	Assignment #1 <i>Due 11:59pm</i>
	10	Life in fluid <i>Literature discussion #2</i>	Quiz #1 <i>Opens 8 am</i> Literature review #2 <i>Due noon</i>
4	15 September	Sensory adaptations	Quiz #1 <i>Closes 11:59 pm</i>
	17	Metabolism	
5	22 September	Temperature	Assignment #2 <i>Due 11:59pm</i>
	24	Thermal adaptations <i>Literature discussion #3</i>	Literature review #3 <i>Due noon</i>
6	29 September	Thermal adaptations	
	1 October	Reproduction	Quiz #2 <i>Opens 8am</i>
7	6 October	Life history strategies	Quiz #2 <i>Closes 11:59pm</i>
	8	Energy acquisition <i>Literature discussion #4</i>	Literature review #4 <i>Due noon</i>
8	13 October	Symbioses	Assignment #3 <i>Due 11:59pm</i>
	15	Symbioses	
9	20 October	Nitrogen excretion	

	22	Osmoregulation <i>Literature discussion #5</i>	Quiz #3 <i>Opens 8am</i> Literature review #5 <i>Due noon</i>
10	27 October	Salt & water balance	Quiz #3 <i>Closes 11:59pm</i> Assignment #4 <i>Due 11:59pm</i>
	29	Respiration	
11	3 November	Ventilation & Circulation	
	5	Respiratory pigments <i>Literature discussion #6</i>	Literature review #6 <i>Due noon</i>
12	10 November	Oxygen limitation	
	12	Extremophiles	Draft PowerPoint <i>Due noon</i> Quiz #4 <i>Opens 8am</i>
13	17 November	Deep sea	Quiz #4 <i>Closes 11:59pm</i> Assignment #5 <i>Due 11:59pm</i>
	19	<i>Grad student presentations</i> <i>Literature discussion #7</i>	Final PowerPoint and VoiceThread video <i>Due noon</i> Literature review #7 <i>Due noon</i>
14	24 November	<i>Grad student presentations</i>	
	26	<i>Thanksgiving</i>	
15	1 December	Invertebrate health	
	3	Global change <i>Literature discussion #8</i>	Quiz #5 <i>Opens 8am</i> Literature review #8 <i>Due noon</i>
16	8 December	Course summary	Quiz #5 <i>Closes 11:59pm</i> Assignment #6 <i>Due 11:59pm</i>

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*, 3rd Edition. Oxford University Press.
2. Nybakken, James W. and Mark D. Bertness. 2005. *Marine Biology; An Ecological Approach*, 6th 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/*
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/*

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/