

# Marine Ecological Processes

## FAS 4270 (3 credits) Fall 2018

### Course Description

The course covers the ecology of marine organisms and habitats with focus on how general ecological principles and those unique to the marine environment drive patterns and processes.

**Prerequisite:** Two semesters of Biology (BSC 2010 and 2011) or equivalents

### Instructor

Dr. Donald C. Behringer, Associate Professor

Email: [behringer@ufl.edu](mailto:behringer@ufl.edu)

Office: Aquatic Pathology Laboratory, Emerging Pathogens Institute

Telephone: 352-273-3634

Office hours: Tuesday 1 – 2 pm, or by appointment

Ms. Erica Ross, PhD student (TA)

Email: [epross@ufl.edu](mailto:epross@ufl.edu)

Office hours: Online by appointment

### Student Learning Outcomes

At the end of this course, each student will have:

- Examined how ecological processes operate in the marine environment
- Compared how ecological concepts are unique and similar in the marine environment relative to terrestrial and freshwater ecosystems
- Assessed the function of the environment in the ecology of marine systems
- Developed hypotheses for the outcomes of biotic or abiotic perturbations on populations and communities based on understanding of the ecological processes
- Learned the organisms that represent the trophic levels of a marine food web and their interrelationships.
- Examined the role of time and space in marine ecological processes
- Discussed and debated contemporary issues in marine ecology such as conservation, climate change, and disease.

### Course Meeting Times T 3-4, R 3

### Texts/Readings

1. Primary literature (1 - 2 journal articles) will be assigned to supplement the material presented each week. The literature will be drawn from current or classic papers and be made available by at least the Friday prior to its coverage the following week. All assigned papers must be read and each student will be expected to participate in the discussion of the papers (see below for assignment details).

*Examples include:*

- Hutchinson GE. 1961. The paradox of the plankton. *American Naturalist* 882: 137-145.
- Hughes TP, Tanner JE. 2000. Recruitment failure, life histories, and long-term decline of Caribbean corals. *Ecology* 81: 2250-2263.
- Cowen RK, Paris CB, Srinivasan A. 2006. Scaling of connectivity in marine populations. *Science* 311: 522-527.
- Armstrong JB, Schindler DE. 2011. Excess digestive capacity in predators reflects a life of feast and famine. *Nature* 476: 84-88.

2. Readings from the following texts will supplement the material presented in class and be made available to students:

- a. Nybakken JW, Bertness MD (2005) *Marine Biology: An Ecological Approach*. Benjamin Cummings.

## **Course Format, Policies on Attendance, and Make-up Exams**

### **Course format:**

This course is intended to provide upper division undergraduate students with a broad overview of ecological principles operating in estuarine, nearshore coastal, and open ocean systems. The principles introduced will become increasingly complex and interwoven, highlighting the multiplicity of processes driving the patterns observed.

Students will initially be introduced to important primary producers and secondary consumers in each of these systems. Insights into physiological and population levels of organization will build on these basics. Environmental factors that influence species-specific and population-level interactions will be discussed as a transition to the concepts of community organization. All of this material will form a foundation for explaining how the structure and function of communities is maintained over different temporal and spatial scales.

The course will incorporate multiple modes for presentation of the subject matter with class discussion. Upon conclusion of each chapter or subject the class will critically discuss primary literature provided by the instructor. Students will be assessed on participation.

### **Course delivery:**

This course is co-taught at the undergraduate and graduate levels. Undergraduate students are expected to interact with the graduate students through class discussions and presentations, and are encouraged to seek out graduate students for assistance and guidance. This practice will increase learning for both groups and raise the intellectual caliber of the course.

### **Attendance Policy:**

Regular attendance is expected at all class meetings. Students who miss class are responsible for acquiring the materials and assignments missed.

### **Make-up Policy:**

Students must request permission to make-up an exam *prior* to missing the exam. If prior permission is not granted the student will receive 0 points for the exam. Late assignments **will not** be accepted without prior consent of the instructor. Extenuating circumstances or situations that fall within university policies (see

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) will be addressed on an individual basis.

## Assignments

### Critical Thinking Questions:

Critical thinking questions will be posted on set Fridays and students will be required to answer the questions by the following week (see due dates on schedule below). The questions will be drawn from either the lecture material or the assigned reading from the previous weeks. The nature of the questions will vary, but will take the materials and concepts covered in class and require the students to adapt and apply that knowledge to solve a problem, plan a research/management approach, or provide a detailed answer, but with a system or problem that is different than discussed in class. The use of creativity and abstract reasoning will be expected. Responses must be submitted via Canvas by 5 pm on the due date. See schedule below for due dates.

### Literature Discussion:

We will dedicate 20 – 30 minutes during most class meetings to group discussion of the primary literature assigned for that week. Students will be expected to have read the literature and participate in discussions. Students will be expected to participate actively (e.g., comment, question, or answer) in at least 10 discussions and will receive 5 points per discussion for a maximum of 50 points.

### Exams:

The mid-term exam will cover all of the material presented to that point.

The final exam will cover all of the material presented in the course (~75% post-midterm).

## Evaluation of Student Learning

100 points	Mid-term exam
100 points	Critical thinking questions (4 @ 25 points each)
50 points	Participate in primary literature discussion (10 @ 5 points each)
<u>100 points</u>	<u>Final exam</u>
<b>350 points</b>	<b>TOTAL</b>

## Grading Scale

Grades will be assigned based on the percentage of the total points earned. There will be no plus or minus grades assigned in this course.

- A = 90 – 100% = 315 – 350 points**
- B = 80 – 89% = 280 – 314 points**
- C = 70 – 79% = 245 – 279 points**
- D = 60 – 69% = 210 – 244 points**
- E = < 60% = < 210 points**

For additional information on the university grading policy please see:

<http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>

## Schedule of Class Topics

<b>Week 1:</b> Course Introduction, Scheduling, and other Logistics	Aug 23
<b>Week 2:</b> Ocean Properties Primary Producers and Primary Production	Aug 28 & 30
<b>Week 3:</b> Primary Production	Sep 4 & 6
<b>Week 4:</b> Primary Production and Introduction to Consumers (Dr. Frazer – guest lecture on Springs, Nutrients, and Seagrasses) <i>(Weeks 1/2/3 Questions due Sep 13)</i>	Sep 11 & 13
<b>Week 5:</b> Consumers and Consumer Dynamics	Sep 18 & 20
<b>Week 6:</b> Resources and Competition <i>(Weeks 4/5 Questions due Sep 27)</i>	Sep 25 & 27
<b>Week 7:</b> Feeding, Food selection, and Responses to Food Mid-term Review	Oct 2 Oct 4
<b>Week 8:</b> Mid-term exam Energy and Production	Oct 9 Oct 11
<b>Week 9:</b> Production (cont) and Nutrient Cycles	Oct 16 & 18
<b>Week 10:</b> Larval Ecology, Recruitment, and Succession	Oct 23 & 25
<b>Week 11:</b> Community Structure, Trophic Webs, and Biodiversity Field trip to Cedar Key (optional) <i>(Weeks 8/9/10 Question due Nov 1)</i> <i>(NOTE: there is <b>no class Thursday</b> due to Cedar Key trip)</i>	Oct 30 Nov 1
<b>Week 12:</b> Spatial Structure and Connectivity	Nov 6 & 8
<b>Week 13:</b> Climate Change Conservation and Restoration <i>(Weeks 11/12 Question due Nov 15)</i>	Nov 13 Nov 15
<b>Week 14:</b> View and evaluate graduate student presentations	Nov 20 <sup>a</sup>
<b>Week 15:</b> Biological Invasions (Guest lecture) Marine Diseases	Nov 27 Nov 29
<b>Week 16:</b> Exam Review and Current Issues in Marine Ecology	Dec 4

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<sup>a</sup> No class November 22<sup>nd</sup> (Thanksgiving)

## Additional References

### Web Sites :

Growth, competition, and predator-prey models  
<http://www.blackwellpublishing.com/townsend/models/index.html>

### Other literature sources:

Web of Knowledge  
[http://apps.isiknowledge.com/UA\\_GeneralSearch\\_input.do?product=UA&search\\_mode=GeneralSearch&SID=4C5mNGg@8e3@GGm611N&preferencesSaved=](http://apps.isiknowledge.com/UA_GeneralSearch_input.do?product=UA&search_mode=GeneralSearch&SID=4C5mNGg@8e3@GGm611N&preferencesSaved=)

Townsend CR, Begon M, Harper JL (2003) Essentials of Ecology (2<sup>nd</sup> Edition). Blackwell Publishing, Oxford.

Real LA, Brown JH (1991) Foundations of Ecology. The University of Chicago Press, Chicago.

## 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, college dean or Student Honor Court.

*(Source: 2010-2011 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/)