

# Marine Ecological Processes

## Synchronous Online

### FAS 6272 (3 credits) Fall 2020

#### Course Description

The course covers the ecological, biological, and environmental processes that drive patterns in productivity, behavior, population dynamics, and community structure in marine and estuarine ecosystems.

**Prerequisite:** Two semesters of Biology (BSC 2010 and 2011) or equivalent; General Ecology (PCB 4043) or equivalent; Graduate student status

#### Instructor

Dr. Donald C. Behringer, Professor

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#### 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 marine ecology
- Examined how the biology and ecology of marine organisms interact
- Developed hypotheses for the outcomes of biotic or abiotic perturbations on populations and communities based on understanding of the ecological principles
- 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
- Lead and moderated discussion of primary literature in marine ecology
- Learned how to develop, organize, and present a field-based lesson to the class via live or distance delivery

**Course Meeting Times** Synchronous T 3-4, R 3 via Zoom

## **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 lead and moderate the discussion of at least two 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:

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 graduate 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 subject area the class will critically discuss primary literature provided by the instructor. Each student will be assigned two weeks to lead and moderate the discussion of the primary literature (see assignment details below).

### **Course delivery:**

This course is co-taught SYNCHRONOUSLY using ZOOM at the undergraduate and graduate levels. Graduate students have additional assignment requirements and are expected to contribute a significantly higher level than undergraduates. Graduate students are also expected to interact with undergraduate students through discussions, presentations, and

guidance that will increase learning for both groups and raise the intellectual caliber of the course.

### **Attendance and Make-up Policy:**

It is the responsibility of the student to access online lectures, readings, quizzes, and exams and to maintain satisfactory progress in the course. Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Computer or other hardware failures, except failure of the UF e-Learning system, will not excuse students for missing assignments. Any late submissions due to technical issues MUST be accompanied by the ticket number received from the Helpdesk when the problem was reported to them. The ticket number will document the time and date of the problem. You MUST e-mail your instructor within 24 hours of the technical difficulty if you wish to request consideration.

For computer, software compatibility, or access problems call the HELP DESK phone number—352-392-HELP = 352- 392-4357 (option 2).

## **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.

### **Group field lesson presentation:**

This assignment will help graduate students learn how to present material to a class in a field setting by requiring them to collaborate in groups (2 – 3) to create and present a field-based lesson to the class. Students must select a topic by September 15<sup>th</sup> and turn in a plan for their presentation by September 24<sup>th</sup>. Group presentation are due November 17<sup>th</sup> and must be 8-10 min in length (no longer!). If a group is not possible and an individual project is approved, it must be 5-8 minutes in length (no longer). Detailed instructions and a grading rubric for the project will be provided online. Each student will be graded individually, and the presentations will be graded as follows:

- Content (20 pts)
- Delivery (20 pts)
- Organization (20 pts)
- Originality (20 pts)
- Overall impression (20 pts)

### Literature Discussion:

Each week we will discuss the 1-2 papers assigned for that week. Each graduate student will lead and moderate the discussion of at least two journal articles. The instructor and course TA will lead the first discussions, so students are aware of what is expected. Students will be evaluated on:

- Preparation and knowledge of the material (12.5 pts)
- Organization and flow of discussion (12.5 pts)

### 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).

Both Exams will require the use of the Honorlock system.

## Evaluation of Student Learning

100 points	Mid-term exam
100 points	Field lesson presentation
100 points	Critical thinking questions (4 @ 25 points each)
50 points	Lead primary literature discussion (2 @ 25 points each)
100 points	Final exam
<b>450 points</b>	<b>TOTAL</b>

## Grading Scale

Grades will be assigned based on the percentage of the total points earned.

<b>A</b>	<b>= 93 – 100%</b>
<b>A-</b>	<b>= 90 – 92%</b>
<b>B+</b>	<b>= 87 – 89%</b>
<b>B</b>	<b>= 83 – 86%</b>
<b>B-</b>	<b>= 80 – 82%</b>
<b>C+</b>	<b>= 77 – 79%</b>
<b>C</b>	<b>= 73 – 76%</b>
<b>C-</b>	<b>= 70 – 72%</b>
<b>D+</b>	<b>= 67 – 69%</b>
<b>D</b>	<b>= 63 – 66%</b>
<b>D-</b>	<b>= 60 – 62%</b>
<b>E</b>	<b>= &lt; 60%</b>

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 Ocean Properties	Sep 1 & 3
<b>Week 2:</b> Primary Producers and Primary Production	Sep 8 & 10
<b>Week 3:</b> Primary Production (continued) (Dr. Savanna Barry – guest lecture <b>Sept 15</b> on Springs, Nutrients, and Seagrasses) (Group field lesson <b>topic idea</b> due Sep 15)	Sep 15 & 17
<b>Week 4:</b> Introduction to Consumers and Consumer Dynamics (Weeks 1/2/3 Questions due Sep 24) (Group field <b>lesson plan</b> due Sep 24)	Sep 22 & 24
<b>Week 5:</b> Competition	Sep 29 & Oct 1
<b>Week 6:</b> Feeding, Food selection, and Responses to Food (Weeks 4/5 Questions due Oct 8)	Oct 6 & 8
<b>Week 7:</b> Energy and Production Midterm Review	Oct 13 Oct 15
<b>Week 8:</b> Midterm exam Production (continued)	Oct 20 Oct 22
<b>Week 9:</b> Larval Ecology, Recruitment, and Succession	Oct 27 & 29
<b>Week 10:</b> Community Structure, Trophic Webs, and Biodiversity	Nov 3 & 5
<b>Week 11:</b> Climate Change (Weeks 8/9/10 Questions due Nov 12)	Nov 10 & 12
<b>Week 12:</b> Biological Invasions (Guest lecture – Dr. Jeff Hill) Conservation and Restoration (Group field lessons due Nov 17)	Nov 17 Nov 19
<b>Week 13:</b> Spatial Structure and Connectivity Thanksgiving (NO CLASS)	Nov 24 Nov 26
<b>Week 14:</b> Marine Diseases Contemporary Issues in Marine Ecology (Weeks 11/12/13 Questions due Dec 3)	Dec 1 Dec 3
<b>Week 15:</b> Exam Review	Dec 8
<b>Week 16:</b> Final Exam 5:30pm – 7:30pm	Dec 16

## 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

### Communication Courtesy and Professionalism

Just as in any professional environment, meaningful and constructive dialogue is expected in this class and requires a degree of mutual respect, willingness to listen, and tolerance of opposing points of view. **Respect for individual differences and alternative viewpoints will be maintained in this class at all times.** All members of the class are expected to follow rules of common courtesy, decency, and civility in all interactions. Failure to do so will not be tolerated and may result in loss of participation points and/or referral to the Dean of Students' Office.

### Semester Evaluation Process

Student assessment of instruction is an important part of efforts to improve teaching and learning. **At approximately the mid-point of the semester**, the School of Forest Resources & Conservation will request anonymous feedback on student satisfaction on various aspects of this course. These surveys will be sent out through Canvas and are not required but encouraged. This is not the UF Faculty Evaluation!

**At the end of the semester**, students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

### Academic Honesty Policy

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following 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."*

You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment."*

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct or appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated.

Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see:

<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

### **Inclusive Learning Environment**

This course embraces the University of Florida's Non-Discrimination Policy, which reads, *The University shall actively promote equal opportunity policies and practices conforming to laws against discrimination. The University is committed to non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information and veteran status as protected under the Vietnam Era Veterans' Readjustment Assistance Act.*

If you have questions or concerns about your rights and responsibilities for inclusive learning environment, please see the instructor or refer to the Office of Multicultural & Diversity Affairs website: <http://multicultural.ufl.edu>.

### **Services for 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. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation. 0001 Reid Hall, 352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)

### **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**

For issues with technical difficulties for e-learning in Canvas, please post your question to the Technical Help Discussion in your course, or contact the UF Help Desk at:

- [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu) | (352) 392-HELP - select option 2 | <http://elearning.ufl.edu>

- Library Help Desk support <http://cms.uflib.ufl.edu/ask>
- SFRC Academic Hub <https://ufl.instructure.com/courses/303721>

### **Student Life, Wellness, and Counseling Help**

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.

- Counseling and Wellness resources <http://www.counseling.ufl.edu/cwc/>
- U Matter, We Care <http://www.umatter.ufl.edu/>
- Career Connections Center <http://career.ufl.edu/>
- Other resources are available at <http://www.distance.ufl.edu/getting-help> for online students.

### **Student Complaint Process**

The School of Forest Resources & Conservation cares about your experience and we will make every effort to address course concerns. We request that all of our online students complete a course satisfaction survey each semester, which is a time for you to voice your thoughts on how your course is being delivered.

If you have a more urgent concern, your first point of contact should be the SFRC Academic Coordinator or the Graduate/Undergraduate Coordinator for the program offering the course. You may also submit a complaint directly to UF administration:

- Students in online courses: <http://www.distance.ufl.edu/student-complaint-process>
- Students in face-to-face courses: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>