

Marine Ecological Processes

FAS 4270 (3 credits) Fall 2024

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. Robert W. Lamb, Research Assistant Professor

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

Mr. Lucas Jennings, PhD candidate (TA)

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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 (you do not need to purchase a textbook):

- 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 10 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:

Exam 1 will cover all of the material presented to that point.

Exam 2 will cover all of the material presented in the course (~75% post-Exam 1).

Evaluation of Student Learning

100 points	Exam 1
100 points	Critical thinking questions (4 @ 25 points each)
50 points	Participate in primary literature discussion (10 @ 5 points each)
100 points	Exam 2
350 points	TOTAL

Grading Scale

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

A = 93 – 100%
A- = 90 – 92%
B+ = 87 – 89%
B = 83 – 86%
B- = 80 – 82%
C+ = 77 – 79%
C = 73 – 76%
C- = 70 – 72%

D+ = 67 – 69%
D = 63 – 66%
D- = 60 – 62%
E = < 60%

For additional information on the university grading policy please see:
<http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>

Schedule of Class Topics

Week 1: Course Introduction, Scheduling, and other Logistics	Aug 22
Week 2: Ocean Properties, Primary Producers, and Primary Production	Aug 27 & 29
Week 3: Primary Production (continued)	Sep 3 & 5
Week 4: Introduction to Consumers and Consumer Dynamics	Sep 10 & 12
Week 5: Resources and Competition (Weeks 2/3/4 Questions due Sep 19)	Sep 17 & 19
Week 6: Feeding, Food selection, and Responses to Food	Sep 24 & 26
Week 7: Energy and Production Nutrient Cycles (Weeks 5/6 Questions due Oct 3)	Oct 1 Oct 3
Week 8: Larval Ecology, Recruitment, and Succession Midterm exam review	Oct 8 Oct 10
Week 9: MIDTERM EXAM Literature discussion	Oct 15 Oct 17
Week 10: Community Structure, Trophic Webs, and Biodiversity	Oct 22 & 24
Week 11: Spatial Structure Connectivity (Weeks 8/9/10 Question due Oct 31)	Oct 29 Oct 31
Week 12: Climate Change Marine Disease	Nov 5 Nov 7
Week 13: Biological Invasions (Weeks 11/12 Question due Nov 14)	Nov 12 & 14
Week 14: View and evaluate graduate student presentations Conservation and Restoration	Nov 19 Nov 21

Week 15: Contemporary Issues in Marine Ecology
No Class (Thanksgiving)

Nov 26
Nov 28

Week 16: Final Exam Review

Dec 3

FINAL EXAM 10:00 am – 12:00pm

Dec 13

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=

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

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

Other Information

POLICIES AND REQUIREMENTS

This syllabus represents current plans and objectives for this course. As the semester progresses, changes may need to be made to accommodate timing, logistics, or to enhance learning. Such changes, communicated clearly, are not unusual and should be expected.

ABSENCES AND MAKE-UP WORK

It is the responsibility of the student to access on-line 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).

SEMESTER EVALUATION PROCESS

We are always looking to improve the course experience and student assessments of instruction is an important part of our efforts to improve teaching and learning. We want to ensure your ideas are heard, so please be encouraged to fill out the student assessments offered for the course.

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 AND STUDENT CONDUCT

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."* The principles guiding the UF honor and conduct codes are guided by principles of respect for people, property, fairness, laws, regulations, and academic 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 to 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 process, please see <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code> and for the most up-to-date version of the student honor code and student conduct code, please see <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>.

NETIQUETTE (COMMUNICATION COURTESY): All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats, guided by the UF principles of respect. Failure to do so may result in loss of participation points and/or referral to the Dean of Students' Office.

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. Misuse of software is outlined in the student conduct code found here <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>

SERVICES FOR STUDENTS WITH DISABILITIES

If you have any kind of disability, whether apparent or non-apparent, learning, emotional, physical, or cognitive, and you need some accommodations or alternatives to lectures, assignments, or exams, please reach out to the Disability Resource Center to discuss reasonable accommodations for your access needs. 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 instructors when requesting accommodation. You are also encouraged to reach out to the instructors to discuss ideas for reasonable accommodations for your access needs.

0001 Reid Hall, 352-392-8565, <https://disability.ufl.edu/>

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 | (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>

INCLUSIVE LEARNING ENVIRONMENT

We strive to develop and maintain a classroom that values and includes people with diverse backgrounds, beliefs, and life experiences, promote equitable opportunities through the work we conduct, and make continuous efforts to review, self-critique, adapt, and improve. 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 an inclusive learning environment, please speak with any of the instructors or TA or refer to the Office of Multicultural & Diversity Affairs website: <http://multicultural.ufl.edu>.

LAND ACKNOWLEDGMENT

This course is taught in the historic territories of the Timucua, Seminole, and crossroads of the Native American peoples who long inhabited this land. We honor and acknowledge the land and waters themselves as well as the people who have stewarded it for generations. We are called to continue to learn about the history of the systems we study as well as consider their future.

STUDENT LIFE, WELLNESS, AND COUNSELING HELP

We encourage students to take care of their health and wellness. Mental health and wellness can affect how we think, feel, and act as we cope with life and may impact success as a student. Struggles with mental health are common—more than half of all Americans will be diagnosed with a mental disorder at some time in their life. 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, Wellness Coaching
- U Matter We Care, www.umatter.ufl.edu/
- *Career Resource Center, First Floor JWRU, 392-1601, www.crc.ufl.edu/*
- Student Success Initiative, <http://studentsuccess.ufl.edu>.

STUDENT COMPLAINT PROCESS

The School of Forest Fisheries & Geomatics 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/>