

**BIOL 462 / MASC 440 (3 credits) University of North Carolina at Chapel Hill
MARINE ECOLOGY**

Instructor: Dr. Sophie McCoy

Office hours: Tuesdays 11am – 12pm

Office: Wilson Hall 334A (walk through the lab to get to my office, back right)

e-mail: sophie.mccoy@unc.edu

Lectures: Wilson Hall 202

Tuesdays and Thursdays 3:30 – 4:45 pm

Zoom link (for use as needed or if specified in the course schedule):

<https://unc.zoom.us/j/95943754207?pwd=Rk14TUh0djhla1QwRy9Yeko5TDRxQT09>

Passcode: MarEcol

This class will not regularly be simulcast online or recorded.

Prerequisites: Biol 201 or 475. Restricted to junior and senior science majors and graduate students, with permission of the instructor.

This syllabus is a living document and is subject to change. Teaching and learning are dynamic processes. So that the course can adjust to the real-time needs of our class, *changes may be made during the semester in the assignments and content of the course.* If this need arises, I will notify you of the changes with a Canvas announcement and class email as soon as possible and update the version date at the top of the document accordingly.

Course description: This course surveys the ecological processes that structure marine communities in a range of coastal and pelagic habitats. Assignments and discussions emphasize classic and modern experimental approaches and techniques to addressing basic and applied problems in marine systems.

Learning objectives: By engaging in this course, you will be empowered to:

- understand the primary ecological processes that structure and offer resilience to marine ecosystems;
- describe large-scale patterns in marine biogeography;
- identify mechanistic links between biological and physico-chemical processes in marine systems and their relationships to ecosystem function and services;
- recognize and critique good experimental design and the relevance of experimental questions and hypotheses to current research goals and applications of marine ecology;
- discuss innovative strategies to address current management and conservation issues in marine systems; and
- develop written and oral skills in presenting scientific arguments in the style of scientific and media reports, using primary sources from the scientific literature.

Required readings: There is no textbook for this course. This course will draw on the primary scientific research literature to help forge links between seminal ecological theories as they were originally proposed and as they are still used today, and to incorporate new and recent research findings into a synthetic understanding of the field. All required readings are available on the course Canvas site and are listed in the course schedule, below.

Schedule:

Week	Date	Topic	Format	Readings	In Class	Assignments Due
1	8/16	Competition	In person	<ul style="list-style-type: none"> • How to read a scientific paper • Scientific Article Review • Paine 1984 	Lecture	
1	8/18	Trophic Interactions	In person	<ul style="list-style-type: none"> • Paine 1966 • McCoy and Pfister 2014 • Wulff 2017 <ul style="list-style-type: none"> ○ Species interactions lectures 	Food web worksheet	Food web worksheet
2	8/23	Disturbance and Stress	In person	<ul style="list-style-type: none"> • Connell 1978 • Wilkinson 1999 	IDH worksheet	IDH worksheet
2	8/25	Physico-chemical Environment & Facilitation	In person	<ul style="list-style-type: none"> • Review media summary examples (Resources module) 	Media summary	Media summary
3	8/30	Flow & Concentration Boundary Layers	In person	<ul style="list-style-type: none"> • Demes et al. 2011 • Martone et al. 2012 	Lecture CBL worksheet	CBL worksheet
3	9/1	Marine Biodiversity	In person	<ul style="list-style-type: none"> • Sala and Knowlton 2006 • Worm et al. 2006 	Lecture	
4	9/6	Wellbeing Day	No class			
4	9/8	Larval Ecology & Dispersal	In person	<ul style="list-style-type: none"> • Jablonski and Lutz 1983 • Carlson 2013 	Marine biodiversity quiz Lecture	
5	9/13	Supply Side Ecology & Metapopulations	In person	<ul style="list-style-type: none"> • Roughgarden 1985 • Grosberg and Levitan 1992 • Carson et al. 2011 • Kritzer and Sale 2004 	Lecture	Science in the News 1
5	9/15	Metabolism & Functional Ecology	In person	<ul style="list-style-type: none"> • Kordas et al. 2011 • Edwards et al. 2012 • Adam et al. 2015 • Ghedini et al. 2018 	Lecture	
6	9/20	Midterm	In person		Midterm	Midterm
6	9/22	Pelagic Ecosystems	In person	<ul style="list-style-type: none"> • Pahlow and Riebesell 2000 • Graham et al. 2007 	Redfield ratios worksheet	Redfield ratios worksheet
7	9/27	Coral Reefs: Natural History	In person	<ul style="list-style-type: none"> • Knowlton 2001 • Buss and Jackson 1979 • Rasher and Hay 2010 	Lecture	
7	9/29	Coral Reefs: Stressors	Asynchronous	<ul style="list-style-type: none"> • Alvarez-Filip et al. 2009 • McWilliam et al. 2020 	Poem assignment	Poem assignment
8	10/4	Experimental Design	In person	<ul style="list-style-type: none"> • Boyd et al. 2015 • MEDDLE resources <ul style="list-style-type: none"> ○ MEDDLE lecture 	Meet with your group – any location.	
8	10/6	Methods in Marine Ecology	In person	<ul style="list-style-type: none"> • Wootton and Emmerson 2005 • Power et al. 1988 	Lecture	
9	10/11	Experimental Design	In person		Experimental design presentations	Peer grading forms
9	10/13	Overfishing	In person	<ul style="list-style-type: none"> • Jackson et al. 2001 <ul style="list-style-type: none"> ○ Overfishing lecture 	Fisheries worksheet	Fisheries worksheet
10	10/18	Marsh and Seagrass Ecosystems	In person	<ul style="list-style-type: none"> • Duffy et al. 2015 • Hughes and Stachowicz 2009 • Fodrie et al. 2010 <ul style="list-style-type: none"> ○ Marsh and Seagrass lecture 	Seagrass worksheet	Science in the News 2 Seagrass worksheet

10	10/20	Fall Break	No class			
11	10/25	Blue Carbon & Carbon Capture and Storage	In person	<ul style="list-style-type: none"> • Connelly et al. 2022 • Filbee-Dexter et al. 2022 	4 case study presentations	Peer grading forms
11	10/27	Polar and High-Latitude Ecosystems	In person	<ul style="list-style-type: none"> • Wiencke and Amsler 2012 • Smetacek and Nicol 2005 • Horton et al. 2016 	Lecture Seasonality worksheet	Seasonality worksheet
12	11/1	North Carolina Coastal Ecosystems	In person	<ul style="list-style-type: none"> • Paerl et al. 1998 • Paerl et al. 2001 ○ NC Coastal Ecosystems lecture 	Ecosystem services worksheet	Ecosystem services worksheet
12	11/3	Algal Blooms & HABS	In person	<ul style="list-style-type: none"> • Huisman et al. 2018 • Cissell and McCoy 2022 	4 case study presentations	Peer grading forms
13	11/8	Marine Diseases & Viruses	In person	<ul style="list-style-type: none"> • Bourne 2009 • Danovaro et al. 2011 	Lecture 2 case study presentations	Peer grading forms
13	11/10	Aquaculture	In person	<ul style="list-style-type: none"> • Gentry et al. 2017 • Jones et al. 2022 	Lecture 2 case study presentations	Peer grading forms
14	11/15	Invasive Species	In person	<ul style="list-style-type: none"> • Molnar et al. 2008 • Clarke Murray et al. 2017 	4 case study presentations	Peer grading forms
14	11/17	Marine Protected Areas	In person	<ul style="list-style-type: none"> • Gaines et al. 2010 • Gill et al. 2017 	Lecture 2 case study presentations	Science in the News 3 Peer grading forms
15	11/22	Plastics & Light Pollution	<i>Asynchronous</i>	<ul style="list-style-type: none"> • Beaumont et al. 2019 • Sordello et al. 2022 	4 case study presentations	Peer grading forms
15	11/24	Thanksgiving	No class			
16	11/29	Seabirds	In person	<ul style="list-style-type: none"> • Parrish et al. 2001 • Neubauer et al. 2014 	Lecture 2 case study presentations	Peer grading forms
16	12/1	Reading Period	No class			
17	12/3	Final Exam	In person	Saturday 12/3 4:00 pm	Final Exam	Final Exam

Grading: I expect you to have a thorough understanding of basic concepts covered in class and empirical studies and management examples that apply those concepts. Your mastery of the material will be evaluated in exams, presentations, and various types of smaller assignments.

In Class Assignments	35%
Experimental Design Presentation	10%
Case Study Presentation	15%
Science in the News	5%
Midterm exam	15%
Final exam	20%

Grade scale:

A	93%
A-	90%
B+	86%
B	83%
B-	80%
C+	76%
C	73%
C-	70%
D	60%
F	<60%

Please note that grades will not round up (i.e. 92.8% is an A-).

Late assignment policy: 10% will be deducted for each calendar day late. This policy applies only to assignments turned in online – other late assignments will not be accepted. The Canvas folder will remain open for late assignments for 10 days (until they are not worth any points). Note that for some assignments, late assignments may affect your ability to receive feedback for your next draft and may disqualify you from participating in peer reviews, which may further affect your grade. I will not send reminders for assignment due dates or for late assignments.

Assignments:

In Class Assignments

35% overall grade

Some days, in class assignments will be graded on participation only and used as a learning tool. Most days, the activity will also be used as a graded assessment method. Your attendance in class will be worth 1 of 10 possible points on the worksheet. Activities will vary from short-answer worksheets to collaborative small projects.

We will occasionally use a flipped classroom design. This means that you should come to class having viewed the appropriate lecture recordings and having done the required readings (listed in the schedule) beforehand.

If you require an accommodation for in class assignments, please see me as soon as possible with appropriate documentation to discuss your needs.

Experimental Design Presentation

10% overall grade

This is a group project and presentation. In small groups, you will design a hypothetical experiment to test one of the ecological theories we have discussed in class so far. You will use the MEDDLE resources and rubrics in experimental design best practices and assigned readings in this module to learn about specific techniques. In class, you will give a 5-min group presentation (with slides) that will include an introduction to the theory you are testing, the system you will test it in, your experimental design and rationale, your measurement or analytical techniques and rationale, and what you expect to find. All group members must contribute to the presentation. Your presentation will be graded according to the provided rubric (on Canvas). Your classmates' assessments will be weighted at 50% and your instructor's assessment will be weighted at 50% to calculate your total score.

Case Study Presentation

15% overall grade

This is a solo project and presentation. Presentations will be given in class and be spread over several topics (applied topics in weeks 11-16). Sign-ups will open on Canvas in Week 3.

Please start reading your chosen article early so that you have time to meet with me about any questions you have about the methodology, analysis, and conclusions prior to your presentation.

Within your chosen topic, you will select one of the papers I have chosen to present to the class. Your presentation will follow the format of a standard scientific conference talk: a 12 minute presentation with slides and 3 minutes for questions. Your presentation will include an introduction and motivation for the case study, with a description of the applied problem at hand. You will then introduce the methods, results, and generalizable conclusions of the case study. You may need to reference additional material within your talk – a good starting place are the references cited in the article you will present. Your classmates' assessments will be weighted at 50% and your instructor's assessment will be weighted at 50% to calculate your total score.

Science in the News

5% overall grade

Find a news article - not an academic article, but something written for the public. Ideally, this is something you come across naturally in a newspaper. If you get desperate, try the science section of the New York Times or National Geographic. The article should be related to class content in some way. You must include a link to the article. These articles can be from any credible news source. These should be 'popular press' news articles and not scientific articles – the point is to translate what you are learning about in class to newsworthy events in the public arena. A rough length guideline is 500-1000 words. Your write up should include:

- an introduction to the topic
- a summary of the news article
- a description of links between what you read and course content

The writing style should be somewhat formal and accessible to readers not in our class. For example, don't say "This related to class material from last week because...".

General Policies

Canvas and email policy: This course will operate on the Canvas platform, where your assignments will be posted and should be turned in electronically. I will communicate with the class as a whole through the Canvas site announcements and course emails. You may set your own notification preferences through Canvas, so please keep in mind how that will affect your notification of any course announcements. Both class emails and Canvas notifications will go to your @unc email address, which you are required to monitor. I receive my own notifications as a daily email digest.

You may also communicate with me directly through email. I do my best to respond to all emails within 36 hours of receiving them. Please be courteous and professional in your emails with me and other class members, for example by using a relevant subject line, beginning with a greeting, and closing with your name. Emails should be sent from your UNC account.

Participating in the class learning environment: The in-class components of this course depend on your participation and collaboration with classmates – just like in a professional research setting. Some guidelines for expectations are below:

- We can only have interesting and productive class discussions if you share your thoughts and ideas. Please speak up! This requires some self-awareness. If you struggle with speaking in class, set goals for yourself. If you tend to talk a lot, look around at your classmates before raising your hand to make sure you give them space to speak up.

- Pay attention during class with your mind and your body language.
- Engage in creating the learning environment you need. Make an effort to get to know your classmates and to conduct group work with different people during the semester. Introduce yourself and gently correct the pronunciation of your name or pronouns. Listen respectfully to other ideas and learn from those with different approaches.

Zoom etiquette: Zoom will be used for synchronous online classes. While no classes are planned to occur this way, it is likely that illness or weather will move an in person class to this format. Please treat Zoom class the way you would treat an in person class.

If you do not know how to do the following, please seek assistance from a classmate or instructor in the first week of class.

- Know how to turn the camera on/off, mute/unmute yourself.
- Enable a virtual background if you wish.
- Upload a profile picture so we have a visual to associate with you if you are not able to turn on your camera.
- Accept a breakout room assignment.
- Share your screen.
- Know how to turn out subtitles and download a transcript of the meeting:
<https://digitalaccessibility.unc.edu/resources/video/zoom-live-transcripts/>

I expect you to:

- Turn the camera on during class discussions so that you can engage as you would during an in person class. This helps us build a sense of community and engage collaboratively together.
- Edit your name as it appears in Zoom to how you would like to be addressed. This should be professional (aka, “Richard,” “Ringo,” or “Starr,” and not “BeatleMania”).
- Refrain from sharing Zoom meeting links and passwords with anyone who is not in our class.
- Participate professionally and appropriately in the Zoom chat.
- Refrain from other activities (including computer and phone based distractions) during class time.

Missed class: Students are expected to borrow notes from a classmate to catch up on missed classes. I will not hold a repeat class session for those who have missed class. Make-up missed in-class assignments, including presentations, will be issued only for University-approved absences.

Re-grade policy: If you feel that you have not been graded fairly on an assignment, please detail your objections *in writing* and hand in this explanation, together with your corrected assignment, to your instructor *within five days* after your assignment has been returned. Please be specific: I expect a discussion of the scientific point(s) at issue and not merely a request for an answer to be re-evaluated. Only work written in pen or provided as an original printout with our grade and comments on it will be considered for re-grading. I will re-grade the entire assignment upon receiving it, so be aware of the possibility that some scores could be lowered. Mistakes in adding points may be brought to the attention of the instructors for immediate correction.

Academic integrity and plagiarism: I take academic integrity very seriously. All activities and homework in the class are expected to conform to the standards summarized by the UNC Honor System and explained by the UNC Office of Student Conduct:

<https://studentconduct.unc.edu/>

I expect each student's work to be his/her own unless the assignment is explicitly a group assignment. Absolutely all group work must be acknowledged; if an assignment was completed by a group, you must write the names of your collaborators on your assignment. Please do not copy other people's words or use material from another source without attribution.

If you are confused about anything regarding academic integrity and plagiarism, I am here to be a resource. Please ask for help. <https://writingcenter.unc.edu/tips-and-tools/plagiarism/>

I am required to file a formal report to the University Honor Court if your work is suspected to have violated Honor System standards or if you are suspected to have assisted another student in violation of those standards. Your doing so will result in a grade of 0 for the assignment(s) in question and may result in a disciplinary action by the University.

<https://studentconduct.unc.edu/report-incident/>

Appointments and questions: I make myself available to answer any questions you have about the course or about ecology and evolution in general. I encourage questions during or after class but am also available for longer discussions during my office hours or by appointment.

I am also here as a resource if you are struggling with class material and study skills. You and you alone stand to benefit from holding yourself to high standards in this class, and you alone are responsible for your success. However, please reach out to me if you feel that you are having trouble keeping on track so that I may help you plan for success and find the on campus resources to help you.

If you are affected by illness, emergency, or other circumstances that affect your ability to complete your coursework on time, reach out to me immediately so we can discuss your options. I cannot support you if you do not clearly and promptly communicate with me.

Please note that I have been designated as a **mandatory reporter**. This may differ from some of your other instructors. I am here to help and advise you, but I may be required to report certain situations to UNC's Title IX office.

Letters of recommendation: A good reference writer is someone who can comment on concrete strengths and examples and who knows you well from a professional or academic context. Before asking me for a letter, please ask yourself if you can identify several specific aspects of your development as a scholar that I have uniquely been able to observe and can comment on your relevant strengths. If the answer is yes, then please ask.

I require at least one month's notice and weekly reminders until you have confirmation that my letter has been submitted. You must furnish me with details of the position you are applying for, the deadline, to whom the letter should be addressed, your updated resume or CV, and details for how to submit the letter. I will not provide a non-specific letter directly to a student.

University Policies

Absence, grading, and examination:

UNC policies can be found here.

<https://catalog.unc.edu/policies-procedures/attendance-grading-examination/#text>

Support for anxiety and stress: UNC provides a wealth of student wellness offerings and resources that you can find here: <https://studentwellness.unc.edu/about-us/dimensions-wellness>. Counseling and Psychological Services (CAPS) is strongly committed to addressing the mental health needs of a diverse student body through timely access to consultation and connection to clinically appropriate services. Go to their website: <https://caps.unc.edu/> to learn more or call 919-966- 3658 (available 24/7). Resources are also available through the National Suicide Prevention Lifeline (1-800-273-8255) and the Crisis Text Line (Text START to 741-741).

Supporting Fellow Students in Distress: As members of the UNC community, we each share a personal responsibility to express concern for one another and to ensure that our course meetings and the campus as a whole remain a healthy environment for learning. Occasionally, you may become worried or concerned about a fellow classmate's well-being. When this is the case, I would encourage you to share these concerns with the professionals at either the Office of the Dean of Students (<https://odos.unc.edu/carereferral>) or CAPS.

As always, if you think there is immediate danger call 9-1-1.

Policy on Non-Discrimination: The University is committed to providing an inclusive and welcoming environment for all members of our community and to ensuring that educational and employment decisions are based on individuals' abilities and qualifications. Consistent with this principle and applicable laws, the University's Policy Statement on Non-Discrimination offers access to its educational programs and activities as well as employment terms and conditions without respect to race, color, gender, national origin, age, religion, creed, genetic information, disability, veteran's status, sexual orientation, gender identity or gender expression. Such a policy ensures that only relevant factors are considered and that equitable and consistent standards of conduct and performance are applied.

If you are experiencing harassment or discrimination, you can seek assistance and file a report through the Report and Response Coordinators (see contact info at safe.unc.edu) or the Equal Opportunity and Compliance Office, or online to the EOC at <https://eoc.unc.edu/report-an-incident/>.

Title IX Resources: Any student who is impacted by discrimination, harassment, interpersonal (relationship) violence, sexual violence, sexual exploitation, or stalking is encouraged to seek resources on campus or in the community. Reports can be made online to the EOC at <https://eoc.unc.edu/report-an-incident/>. Please contact the University's Title IX Coordinator (Elizabeth Hall, interim-titleixcoordinator@unc.edu), Report and Response Coordinators in the Equal Opportunity and Compliance Office (reportandresponse@unc.edu), Counseling and Psychological Services (confidential), or the Gender Violence Services Coordinators (gvscc@unc.edu; confidential) to discuss your specific needs. Additional resources are available at safe.unc.edu.

Accessibility Resources: The University of North Carolina at Chapel Hill facilitates the implementation of reasonable accommodations, including resources and services, for students with disabilities, chronic medical conditions, a temporary disability or pregnancy complications resulting in difficulties with accessing learning opportunities. It is your own responsibility to get the appropriate documentation filed and to approach me about your needs. All accommodations are coordinated through the Accessibility Resources and Service Office. See the ARS Website for contact information: <https://ars.unc.edu> or email ars@unc.edu. Relevant policy documents

as they relate to registration and accommodations determinations, as well as the student registration form, are available on the ARS website under the About ARS tab.

Thanks to Drs. Marchetti and Zwemer for developing some of the policies in this syllabus.