Marine Invertebrates 11:628:340 - Syllabus

January 12-16, 2026

A 2 credit, Spring Semester Interim Course at the Haskin Shellfish Research Laboratory
Class meets daily from 8 am to 5 pm for the entire period, with potential for short evening field trips, weather permitting.

Instructors:

Dr. Daphne Munroe

Dr. Michael Acquafredda

Teaching Assistant:

Sophia Piper

Prerequisite: Minimum grade of "C" in 01:119:115-116 General Biology I, II

ABOUT **Marine Invertebrates 340**

Name 5 animals off the top of your head. Go ahead, any 5, the first 5 that come to mind. Chances are, if you are like most people, your list contains 100% vertebrates – yes, fish are vertebrates. What is interesting is this little pop quiz shows when we say the word "animal" what comes to mind tends to be a poor reflection of the diversity of animals on our planet today. This course aims to show you some of the amazing, diverse, and relatively anonymous animal species alive today.

Around 97% of all known animal species are invertebrates, far too many to cover in one course. In this course we will focus on marine species, and in particular *local* marine species that are farmed and fished for human food. We will learn about some of the major phyla; who they are (identification, physiology and evolutionary relationships) and what they do (their ecological significance). We are lucky enough to be able to offer this course at one of Rutgers' marine field stations, where an abundance of interesting and beautiful marine invertebrates live right on our doorstep! We will take advantage of our location by heading to the field to observe some species in their natural habitats and on shellfish farms.

Course Objectives:

1. Introduce major animal phyla and invertebrate classifications
2. Learn the body plans, reproductive strategies, ecology, and commercial importance of five marine invertebrate phyla: Mollusca, Echinodermata, Arthropoda, Polychaeta, Cnidaria
3. Develop skills in taxonomic species identification and morphological observation

Field Trips:

Weather permitting, we will take occasional field trips to local docks, marshes, and intertidal beaches for specimen collection. Please plan appropriately for outings and bring adequate field gear with you. Recommended items for field trips are: boots, raincoat, warm clothing, hat, gloves, and extra clothing if needed to change out of wet or muddy items.

Reading Materials:

All required reading material for lectures will be provided in class and will come from a variety of sources including text books, primary literature, and invertebrate identification keys. We recommend (but do not require) a copy of 'Biology of the Invertebrates (7th edition), J.A. Pechenik' to supplement core content for the class. This book is an excellent resource for the broad range of topics in the area of Invertebrate Zoology that we will only be covering a sliver of and is very useful to augment your learning in the class.

Fees:
$150 per student to cover dorm ($100) and other course expenses ($50).

Grading:

Your final grade will be determined from results of your participation and discussion (5%), lab drawings (25%), lab exam (25%), and final invertebrate paper (45%). Dates and percentage breakdown of these grade components are listed below. Late submissions will cost you 10% per day and make-up exams will only be granted in special circumstances for which prior permission is granted.

Participation & Discussion	5%	Ongoing
Lab Drawings	25%	Complete Set Due Jan. 19
Lab Exam	25%	Jan. 16
Final Invertebrate Paper	45%	May 1

LECTURE & LAB SCHEDULE

Day**	Topic	Key Learning Objectives	Lab
0 Jan. 11	Dorm Arrival	Plan to arrive at HSRL (6959 Miller Ave, Port Norris, NJ) by 5:00 pm for move in and orientation. Bring: - Groceries (you will have a fully equipped kitchen to cook in). There are limited dining and grocery options nearby. - Sheets/blanket/pillow for a twin bed - Towel and all other bathroom supplies - Field and lab clothing (close-toe shoes required in labs) No pets are allowed in dorms. Clothes washer and dryer available for use.	
1 Jan. 12	General Introduction to Invertebrates & Phylum Cnidaria and Polychaetes	General understanding of what animals and invertebrates are. An understanding of the phylogenic relationships among invertebrates. Introduction of key terms and concepts (eg. Bilateral symmetry).	General microscopy. Cnidaria and polychaeta

		General characters of cnidarians, nematocysts, life cycle, hydrozoans, schyphozoans, anthozoans. General polychaete characteristics including body segmentation, chaetae.	dissection and drawing.
2 Jan. 13	Phylum Mollusca	The general mollusc features (shell, mantle cavity, gas exchange, circulation, respiration, gill structure, foot, excretion, reproduction, larval development. Key examples from shellfishery in NJ.	Fundamentals of species id. Mollusc dissection and drawing
3 Jan. 14	Phylum Echinodermata	General features of Echinoderms (example of radial symmetry). Key example from invertebrate aqauculture is Holothuroidea (cucumbers).	Echinoderm and Cnidaria dissection and drawing
4 Jan. 15	Phylum Arthropoda	General characteristics of arthropods, with focus on crustacean examples. Key examples of crustaceans from shellfisheries in NJ.	Arthropod dissection and drawing.
5 Jan. 16	Course Review Lab Exam	Review of key concepts and features of focus phyla.	Review – lab and lecture. Lab Exam in afternoon.
Jan. 17 - 18	Dorm Move-out		
Jan. 19	Lab Notebooks Due	Five final lab drawings due 5:00 pm EST. Details below.	
May 1.	Final Paper	Due by 5:00 pm EST on May 1. Details below.	

**schedule may be subject to change

ATTENDANCE:

Course participation in person is required for this course. The course is offered at the field station and each day includes in person lectures and labs beginning at 8:30 am each day. You are expected to fully participate and engage in all aspects of the course; 5% of your grade is derived from this participation.

LAB DRAWINGS:

You will be required to take detailed notes and draw the physiology and characteristics of 5 representative groups (eg. 1 mollusc, 1 echinoderm, 1 arthropod, 1 polychaete, 1 cnidarian). Drawings should make note of key features of the physiology and separate notes about the ecology and behaviour. Information concerning where the animal was collected (location, date, crew if known) and what resources were used to identify it should be included. Basically, the more information you can include, the better. Make sure your drawings and notation are clear and legible. Provide each animal on a separate sheet of paper; do not put all five on one page. An example will be provided in class. You will hand in 1 drawing (one animal only) by the morning of January 12th for which

you will receive feedback to improve subsequent drawings through the week. You can re-draw this same animal and hand it in again with your full set of lab drawings.

INVERTEBRATE PAPER:

You can write on any topic you choose provided it is focussed on invertebrate biology and is based on true scientific research. Write as if your reader is a general audience with some background in general invertebrate biology; this means it will be important to use accurate and intentional terminology. Some fun and exciting topics may be similar to the Amazing Inverts intro, or you may want to write about conservation issues concerning a particular species, climate change impacts on invertebrates, human health developments from invertebrate sources, a particularly interesting invertebrate fishery or aquaculture strategy, invertebrates in the news etc. The breadth of possible topics is large; pick your topic early so you don't get bogged down later. The paper should be 1000 – 1500 words and must include reference to original resources (scientific research papers or technical reports) and one associated original lab drawing.

TIPS FOR SUCCESS:

We will cover an enormous amount of material in a very short time. Your notes will be your key for studying, take accurate notes and keep up with the workload. Missing even half a day will leave you far behind. To excel in this course, I recommend being very engaged in labs, using lab time efficiently and thinking of the concepts presented instead of just learning vocabulary. And most importantly, if you find yourself struggling with the material, seek help early.

ACCOMMODATIONS:

Please see me or email me in advance of class if you require special accommodations due to language issues, learning disabilities, religious practices, physical requirements, medical needs, or any other reasons.

ACADEMIC INTEGRITY POLICY:

The rules are simple: don't cheat, don't plagiarize. Plagiarism, cheating, or any other manner of academic fraud will not be tolerated. It is your responsibility to read the Rutgers University Academic Integrity Policy, on the web at http://academicintegrity.rutgers.edu/. Also all should be warned, I use all available plagiarism software, so if you cheat, you unfortunately will be caught. The consequences are not good, so be proud of your thoughts and use your own words. Please see me if you have any questions or concerns.

STUDENT-WELLNESS SERVICES:

Do something to help - Share a concern:
health.rutgers.edu/wp-content/uploads/sites/57/2015/01/concerned.html
Access helpful mental health information and resources for yourself or a friend in a mental health crisis on your smartphone or tablet and easily contact CAPS or RUPD.
Counseling, ADAP & Psychiatric Services (CAPS)
(848) 932-7884; 17 Senior Street, New Brunswick, NJ 08901/ www.rhscaps.rutgers.edu/
CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.
Violence Prevention & Victim Assistance (VPVA)
(848) 932-1181; 3 Bartlett Street, New Brunswick, NJ 08901 / www.vpva.rutgers.edu/

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932- 1181.

Disability Services

(848) 445-6800; Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / https://ods.rutgers.edu/

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: https://ods.rutgers.edu/students/documentation-guidelines. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: https://ods.rutgers.edu/students/registration-form.