

Fall 2019
BIO 351 Invertebrate Zoology
Department of Biology
University of Southern Maine

Instructor contact information and office hours:

Assistant Professor **Rachel Lasley-Rasher**, Ph.D.
476B Science Building (C wing), rachel.lasleyrasher@maine.edu
Office hours: T 12:00 – 2:00 pm, Th 12:00 – 4:00 pm
Feel free to drop in or book a specific slot at <https://rachellasley-rasher.youcanbook.me>

Class Meeting Times

Monday, 1:15 – 5:05 pm (lab), Science Building (old Wing) room 403
Tuesday, Thursday 10:15 – 11:45 am, Science Building Room (old Wing) room 7

Course Description:

In this course, we will explore the diversity of invertebrate organisms with a focus on evolutionary relationships between taxa. We will observe organisms in their natural habitat and in a laboratory setting. We will discuss current progress towards understanding how major invertebrate phyla are related to each other.

Course's Role in the Curriculum:

- This course fulfills the lecture/lab requirement for an Area 1 (Organismal Biology)
- 5 Credits
- *Prerequisites:* Grade of C- or higher in BIO 107

Learning Outcomes:

In this class, you will

1. Gain a deep understanding of the morphology, physiology, ecology, and evolution of invertebrate animals.
 2. Become proficient in understanding, interpreting, and explaining information from scientific literature.
 3. Combine careful observations with course content to develop and answer thoughtful questions.
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Course Materials:

REQUIRED:

Pechenik, J.A., 2015. Biology of the Invertebrates. McGraw-Hill Education, New York, NY.
Seventh Edition

Lab Manual – A custom lab manual that can only be purchased through the bookstore. Order immediately as there will be a time lag due to printing.

Virtual Bookstore URL: <https://usm.ecampus.com/>

eCampus Online Customer Service URL: <https://usm.ecampus.com/help/contact-us>

Class Schedule:

Wk	Date	Lecture	Lab	Assignments Due
1	Sept 2 - 6	Sept 3 Tu: Course Introduction & Ch. 1 INTRODUCTION AND ENVIRONMENTAL CONSIDERATIONS	Sept 2 M: No lab	Tues: Favorite invertebrate animal – why?
		Sept 5 Th: Ch. 2 INVERT CLASSIFICATION AND RELATIONSHIPS		
2	Sept 9 - 13	Sept 10 Tu: <i>Paper discussion 1</i> : Dunn et al. 2014 – Find on Blackboard Discussion Lead - Kevin McGann	Sept 9 M: Inverts in the environment: Rocky intertidal & soft sediment (field trip)	Tues: Worksheet for paper discussion
		Sept 12 Th: Ch. 3 THE PROTISTS Species of the Day - Kevin McGann		
3	Sept 16 - 20	Sept 17 Tu: Guest lecture by Dr. Nicole Poulton, Bigelow Lab for Ocean Sciences	Sept 16 M: Unicellular Eukaryotes	Th - Q & A Doc. Check #1 due by midnight
		Sept 19 Th: Ch. 4 THE PORIFERANS & PLACOZOANS Species of the Day –		
4	Sept 23 - 27	Sept 24 Tu: Ch. 5 INTRO TO HYDROSTATIC SKELETON & Ch. 6 THE CNIDARIANS Species of the day –	Sept 23 M: Sponges & Radiate Animals	
		Sept 26 Th: Ch. 8 THE PLATYHELMINTHS Species of the day –		
5	Sept 30 – Oct 4	Oct 1 Tu: <i>Paper discussion 2</i> : Sears et. al 2012 – Find on Blackboard Discussion Leader –	Sept 30 M: The Flatworms	Tues: Worksheet for paper discussion
		Oct 3 Th: Exam Review & Ch. 12 THE MOLLUSCS		

		Species of the Day –		
6	Oct 7 - 11	Oct 8 Tu: EXAM 1 (Ch. 1 – 8), excluding Ch. 7	Oct 7 M: The Molluscs	Th - Q & A Doc. Check #2 due by midnight
		Oct 10 Th: Ch. 12 THE MOLLUSCS Species of the Day –		
7	Oct 14 - 18	Oct 15 Tu: Fall Break, No lecture	Oct 14 M: Fall Break, No lab	Th - Worksheet for paper discussion
		Oct 17 Th: <i>Paper Discussion 3: Amodio et al. 2019</i> – Find on Blackboard Discussion Leader –		
8	Oct 21 - 25	Oct 22 Tu: Ch. 13 THE ANNELIDS Species of the Day –	Oct 21 M: The Annelids	
		Oct 24 Th: Ch. 14 THE ARTHROPODS Species of the Day –		
9	Oct 28 – Nov 1	Oct 29 Tu: Guest lecture by Dr. Joseph Staples, Dept. of Env. Sci. & Policy, USM	Oct 28 M: The Chelicerates & Crustaceans	Th - Q & A Doc. Check #3 due by midnight
		Oct 31 Th: Ch. 14 THE ARTHROPODS Species of the Day –		
10	Nov 4 - 8	Nov 5 Tu: Exam Review & <i>Paper Discussion 4: Waller et al. 2017</i> Discussion Leader –	Nov 4 M: The Insects	Tu - Worksheet for paper discussion
		Nov 7 Th: Exam 2 (Ch. 12 – 14)		
11	Nov 11 - 15	Nov 12 Tu: Ch. 16 THE NEMATODES Species of the Day –	Nov 11 M: No lab	
		Nov 14 Th: Ch. 19 THE LOPHOPHORATES & Ch. 20 THE ECHINODERMS Species of the Day –		
12	Nov 18 - 22	Nov 19 Tu: <i>Paper Discussion 5</i> Discussion Leader –	Nov 18 M: The Echinoderms	Tu - Worksheet for paper discussion
		Nov 21 Th: Ch. 20 THE ECHINODERMS Species of the Day –		Th - Q & A Doc. Check #4 due by midnight
13	Nov 25 - 29	Nov 26 Tu: Guest lecture by Dr. Doug Rasher,	Nov 25 M: Lab Practical	

		Bigelow Laboratory for Ocean Sciences		
		Nov 28 Th: Thanksgiving Break		
14	Dec 2 - 6	Dec 3 Tu: <i>Paper Discussion 6</i> Discussion Leader –	Dec 2 M: Field Trip to Seacoast Science Center	M – Notebooks due at the end of lab
		Dec 5 Th: Ch. 21 NONVERTEBRATE CHORDATES Species of the Day –		Tu - Worksheet for paper discussion Th – Final paper due by midnight
15	Dec 9 – 13	Dec 10 Tu: Ch. 24 INVERTEBRATE REPRODUCTION AND DEVELOPMENT Species of the Day –	Dec 9 M: Presentations	Th – Worksheet for paper discussion/ Q & A Doc. Check #5 due by midnight
		Dec 12 Th: <i>Paper Discussion 7</i> Discussion Leader –		
16	Dec	Final Exam		

Student Assessment and Deadlines:

Tests

Your knowledge will be assessed with three tests (each worth 15%). Each test may include a combination of question types, including multiple choice, matching, short answer, graph interpretation, diagramming, graphing, and applying concepts learned to new situations. You will display your comprehension of material, but more importantly, your ability to interpret, synthesize, apply, and evaluate information based on that comprehension.

Paper Discussion (Presentation & Leading Discussion)

We will have paper discussions periodically throughout the semester. Depending on the number of students in the class, you will each lead a paper discussion (solo or in pairs). Your tasks will be to give a slide presentation (maximum 15 min) providing necessary background information for the paper and outlining major points. You will also be in charge of facilitating the class discussion by asking questions. On Blackboard, you will find a signup sheet, assignment information, along with a rubric. ***Note, that there will be no make up for missing your discussion lead day.

Paper Discussion (Worksheet & Participation)

When you are not leading a paper discussion, you are still expected to fully participate. That means having thoroughly read the paper ahead of time and having completed the worksheet. On the day of the paper discussion, you will bring a printed (or hand-written) copy of the completed worksheet to be used during discussion and handed in at the end of class. Additionally, you will each be assigned a particular portion of the paper to explain (i.e.

explaining a figure, or describing a technique). Your verbal participation as well as the worksheet will be graded. ***Note, that if you miss a paper discussion (on a day when you aren't leading) your overall grade will be reduced by 2%. Under very rare circumstances, you may reduce or avoid this penalty by 1) sending your discussion answer to the discussion leader before class, 2) sending your completed worksheet to Dr. Lasley-Rasher and 3) completing an additional makeup assignment that is due one week after your missed class. It is your responsibility to reach out to Dr. Lasley-Rasher about completing this assignment.

Species of the Day

In almost every class, one student will present a 5-minute presentation on a particular species belonging to the phyla covered in lecture that day. This presentation will occur at the beginning of the class and is meant to be a fun assignment where you get to tell us about an organism that you find interesting. Your slides (maximum of 5!) should be emailed or shared with Dr. Lasley-Rasher the night before class, by midnight. When it is your day to present, you will 1) describe some basic information about this species such as where it is found, what it eats, and its major predators. and 2) why you find it so interesting. It can be that it has a really unique behavior, morphological feature, or that it has an interesting biomedical or industrial application. On Blackboard, you can find a signup sheet, assignment information sheet, along with a rubric for this assignment.

Question & Answer Document

A big part of this class is coming up with insightful questions and practicing your research skills. Throughout the semester, we will build a shared Q & A document. On this document, you will each ask questions and contribute thoughtful answers in your own words (and provide references). There will be 5 due dates for these questions throughout the semester Each checkpoint is worth 1% of your grade. There is no makeup for this assignment. On Blackboard, you can find a link to the shared document along with instructions.

Lab Practical

There will be one lab practical worth 10% of your grade. You will be allowed to use your lab notebook during the practical, so it is in your best interest to make careful observations and detailed drawings and notes. During each lab period, I will indicate what portion of the material is fair game for the practical. The practical is cumulative and there will be points taken off for spelling.

Notebook check

Near the end of the semester, you will turn in your notebook for grading. Overall points will be awarded for being detailed, neat, and well-organized. Additionally, I will randomly select lab exercises to grade thoroughly. At the beginning of each lab, you will receive a guide to inform you what content needs to be in your notebook. On Blackboard, you can find more information about keeping laboratory notebook.

Grade Determinations:

Tests (3)	45%
Paper Discussions	15%
○ Presentation (1)	3%
○ Leading discussion (1)	3%
○ Worksheet & participation (6)	9%
Species of the day (2)	5%
Questions document (5 checks)	5%
Lab Practical (1)	10%
Final Paper (1)	10%
Notebook Check (1)	10%

The letter grades for the class will be awarded using the following scale:

A= Excellent 90-100%	(A- = 90-92.9%)
B= Above average 80-89%	(B- = 80-82.9%, B+ = 87-89.9%)
C= Satisfactory 70-79%	(C- = 70-72.9%, C+ = 77-79.9%)
D= Unsatisfactory 60-69%	(D- = 60-62.9%, D+ = 67-69.9%)
F= Failing, below 60%	Plus and minus grades will also be given.

*Attendance, participation and effort will also be considered with borderline grades.

Course Evaluations:

At the end of each semester every student has the opportunity to provide constructive feedback on the course. It is important to me that you take the time to let me know your thoughts about the course. I use your feedback to make improvements in the course materials, assignments, and outcomes.

Attendance Policy:

I do not take attendance during lecture. However, if you miss a class on a day when you are supposed to present or lead a discussion, this will result in a zero for the missed assignment(s). Additionally, there are times when your participation is critical for the overall class dynamic such as in paper discussions, guest lectures, and labs. Missing a paper discussion will result in an automatic 2% reduction in your overall grade (see above 'Worksheet and Participation' for important details). Missing a lab or guest lecture will result in an automatic 3% reduction in your overall grade. Under very rare circumstances, you may reduce or avoid a penalty by completing a makeup assignment due one week after the missed class/lab. It is your responsibility to reach out to Dr. Lasley-Rasher about completing this assignment. These requests will be considered on a case-by-case basis. Note that you will be asked to drop the class if you miss more than two labs.

Technology in the Classroom:

If you have a situation that necessitates you answering a (silenced!) call or texting during class, please notify me prior to class. Otherwise, please refrain from talking, texting, and otherwise using phones during the lectures. Use of devices and talking during a lecture or student presentation disturbs others and is disrespectful to the presenter. If you must take

notes using a laptop, please sit in the back so that your screen does not disturb other students.

Class Cancellation:

Be sure that you have enrolled in the campus notifications services, so that you are aware of any closures due to inclement weather. From time to time USM will close the University due to inclement weather. If campus is closed **during class**, I will post that day's lecture and activity on Blackboard, so that we can stay on track with our schedule. I live an hour away from campus and there may be times in which I am unable to make it to campus even when USM is open. If this occurs, I will send an email by 8 am the day of class to alert you. Again, I will post that day's lecture and activity on Blackboard.

Academic Integrity:

Everyone associated with the University of Southern Maine is expected to adhere to the principles of academic integrity central to the academic function of the University. Any breach of academic integrity represents a serious offense. Each student has a responsibility to know the standards of conduct and expectations of academic integrity that apply to academic tasks. Violations of student academic integrity include any actions that attempt to promote or enhance the academic standing of any student by dishonest means. Cheating on an examination, stealing the words or ideas of another (*i.e.*, plagiarism), making statements known to be false or misleading, falsifying the results of one's research, improperly using library materials or computer files, or altering or forging academic records are examples of violations of this policy which are contrary to the academic purposes for which the University exists. Acts that violate academic integrity disrupt the educational process and are not acceptable. Evidence of a violation of the academic integrity policy will normally result in disciplinary action. A copy of the complete policy may be obtained from the Dean of Students Office, online at www.usm.maine.edu/deanofstudents or by calling and requesting a copy at (207) 780-5242.

Americans with Disabilities (ADA) Notification/ Accommodations:

The university is committed to providing students with documented disabilities equal access to all university programs and services. If you think you have a disability and would like to request accommodations, you must register with the Disability Services Center. Timely notification is essential. The Disability Services Center can be reached by calling 207-780-4706 or by email at dsc-usm@maine.edu. If you have already received a faculty accommodation letter from the Disability Services Center, please provide me with that information as soon as possible. Please make a private appointment so that we can review your accommodations.

Learning Commons and Tutoring:

Tutoring services include writing, critical reading, academic coaching, study skills and time management. Walk-in tutoring is available at the Glickman Library in Portland, the Gorham Library, and the LAC Writing Center. For best service, we recommend making an

appointment at <https://usm.maine.edu/learningcommons/schedule-tutoring-appointment>. Questions about tutoring should be directed to Paul Dexter at 207-780-5577.

Counseling:

Counseling is available at USM. The best way to schedule an appointment is to email usm.health@maine.edu. More information is available at <https://usm.maine.edu/uhrs>.

Nondiscrimination Policy:

The University of Maine System does not discriminate on the grounds of race, color, religion, sex, sexual orientation, including transgender status and gender expression, national origin, citizenship status, age, disability, genetic information or veteran's status in employment, education, and all other programs and activities. Please contact Lynda Dec, CHRO & Affirmative Action, Equal Opportunity, and Title IX support for USM 45 Exeter Street, Portland, ME, 207.262.7911, Email: lynda.dec@maine.edu with questions or concerns.

Statement on Religious Observance for USM Students:

Absence for Religious Holy Days: The University of Southern Maine respects the religious beliefs of all members of the community, affirms their rights to observe significant religious holy days, and will make reasonable accommodations, upon request, for such observances. If a student's religious observance is in conflict with the academic experience, they should inform their instructor(s) of the class or other school functions that will be affected. It is the student's responsibility to make the necessary arrangements mutually agreed upon with the instructor(s).

Title IX Statement:

The University of Southern Maine is committed to making our campuses safer places for students. Because of this commitment, and our federal obligations, faculty and other employees are considered mandated reporters when it comes to experiences of interpersonal violence (sexual assault, sexual harassment, dating or domestic violence, and stalking). Disclosures of interpersonal violence must be passed along to the University's Deputy Title IX Coordinator who can help provide support and academic remedies for students who have been impacted. More information can be found online at <http://usm.maine.edu/campus-safety-project> or by contacting Sarah E. Holmes at sarah.e.holmes1@maine.edu or 207-780-5767.