

**Invertebrate Zoology (BI451/551, 8 credits)**  
Tuesdays and Thursdays (8:30 am - 5:30 pm)  
Earlier than 8:30 am on many morning field trips

Spring Quarter 2016 (ver 2-18-2016)

Instructors: Richard Emlet ([remlet@uoregon.edu](mailto:remlet@uoregon.edu))

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**Class Schedule**

**Week 1**

**3/29 10:57/ +0.93 ft. LL**

08:30 Introduction to class  
9:30 Field Trip – South Cove  
RE 13:15 Lecture: Phylum Porifera  
14:30 Set up scopes  
15:00 Lab: Porifera

**3/31 12:55/ +0.97 ft. (LL)**

MW 08:30 Lecture: Phylum Cnidaria Intro. and Anthozoa  
10:00 Docks  
13:15 Lab: Anthozoan diversity  
RE 15:30 Lecture: Class Hydrozoa

**Week 2**

**4/5 05:14/ +1.02ft. (sunrise 6:50am); 17:36/-0.04 ft. LL**

08:30 Lab: Hydrozoan diversity  
RE 10:30 Lecture: Classes Scyphozoa, Cubozoa & Staurozoa  
13:15 Lab: Scyphozoans + Jellies video  
15:30 Field trip – Southside Sunset Bay

**4/7 06:53/ -0.52 ft. LL (sunrise 6:47am)**

06:15 Field trip – South Cove (Notoplana, Tubulanus, Tetrastemma, urchins)  
MW 10:30 Lecture: Ctenophora  
MW 13:15 Lecture: Phylum Platyhelminthes (Turbellarians)  
14:30 Lab: Platyhelminthes Lab (Turbellarians)

**Turn in Lab Notebooks and Sign Up for Student Lectures**

### Week 3

#### 4/12 11:12/ -0.58 ft. LL

- MW 08:30 Lecture: Platyhelminthes (Parasitic Classes)  
+ (NPR Radiolab "Parasite" Podcast)  
10:00 Field trip: Middle Cove  
RE 13:15 Lecture: Nemertea  
15:00 Lab: Nemertea

#### 4/14 13:22/ +0.26 ft. LL

- MW 8:30 Lecture: Phylum Annelida I – intro  
MW 9:30 Lecture: Annelida II  
12:30 Fieldtrip to Portside Mudflat  
15:00 Lab: Annelida Dissection

### Week 4

#### 4/19 05:36/ +1.08 ft. LL (sunrise 6:27am)

- 08:30 Midterm Exam I (through Platyhelminthes)  
MW 11:00 Lecture: Annelida III  
13:15 Lab: Annelida Diversity

#### 4/21 06:48/ +0.39 ft. LL

- RE 08:30 Lecture: "Phylum" Sipunculida  
10:00 Laboratory – Sipunculids – peanut worms  
RE 13:15 Lecture: Phylum Mollusca Intro + Class Polyplacophora  
15:30 Lab: Chiton Diversity

### Week 5

#### 4/26 09:44/ +0.06 ft. LL

- 08:15 Field trip to Domehouse Mudfla  
MW 11:00 Lecture: Class Gastropoda  
13:15 Lab: Gastropod Diversity  
MW 15:30 Lecture: Mollusca, Class Bivalvia + Class Scaphopoda

#### 4/28 11:17/ +0.32 ft. LL

- 08:30 Lab: Bivalve Diversity, Behavior and Dissection  
10:00 Field trip OR Student Lectures  
MW 13:15 Lecture: Mollusca, Class Cephalopoda  
14:30 Lab: Squid Dissection and Video

## Week 6

**5/3 16:10/ +0.6 ft. LL**

- 08:00 Boat trip  
MW 13:15 Lecture: Phylum Arthropoda + Chelicerata  
RE 15:00 Lecture: Arthropoda, Crustacea I (Class: Branchiopoda)  
**Student Lectures in afternoon if no boat trip**

**5/5 05:49/ -0.75 ft. LL (sunrise 06:04am)**

- 06:00 Field trip TBA  
10:30 Lab: Crustacea I, Branchiopoda (Artemia, Cladocera)  
MW 13:15 Lecture: Arthropoda, Crustacea II - Intro. Malacostracans + Decapods (Chapter 14, pgs. 373-379)  
14:30 Lab: Crab Dissection

## Week 7

**5/10 09:55/ -1.42 ft. LL**

- 08:30 Field trip to Squaw Island  
13:15 **Midterm II**

**5/12 11:43/ -0.27 ft LL**

- 08:00 Lab: Decapod diversity  
10:15 Field Trip – Charlie’s Grotto  
RE 13:15 Lecture: Arthropoda IV: (Classes Copepoda, Ostracoda, Cirripedia)  
15:15 Laboratory: Cirripedia + crustaceans in plankton  
**Lab Notebooks due (II)**

## Week 8

**5/17 16:15/ +1.76 ft. HL**

- 08:00 Boat Trip (alternative)  
RE 13:15 Lecture: Phylum Echinodermata Intro.  
RE 15:00 Lecture: Echinodermata, Classes: Stellerioidea and Ophiuroidea  
**Student Lectures in afternoon if no boat trip**

**5/19 05:49/ +0.27 ft. LL (sunrise 05:48am)**

- 08:30 Laboratory: Asteroid and Ophiuroid Diversity  
RE 10:30 Lecture: Echinodermata, Classes Echinoidea & Holothuroidea  
13:15 Lab: Echinoidea and Holothuroidea Diversity, Holothurian Dissection  
MW 15:30 Lecture: “Lophophorates” Intro. and Bryozoa

## Week 9

**5/24 08:44/ -0.61 ft. LL**

- 07:30 Field trip- Lighthouse
- 10:30 Laboratory: Bryozoa
- RE 13:15 Lecture: Phyla Phoronida and Brachiopoda
- 14:00 Lab: Phoronida (1 or 2 species)
- 15:00 **Student Lectures**

**5/26 10:05/ -0.41 ft. LL**

- 08:00 Field trip to North Cove at Cape Arago
- RE 11:00 Lecture: Phylum Hemichordata
- 13:15 Lab: Hemichordate (draw one ☺)
- MW 15:00 Lecture: Phylum Nematoda
- 16:00 **Student Lectures**

## Week 10

**5/31 14:34/ +1.0 ft. LL**

- RE 8:30 Lecture: Phylum Chordata, Subphylum Tunicata (=Urochordata)
- 10:00 Lab: Ascidian diversity
- RE 13:15 Lecture: Chordata, Subphylum Cephalochordata
- 14:30 **Student Lectures**

**6/2 16:29/ +1.5 ft HL**

- 13:00 Midterm III**
- 16:00 Lab cleanup**
- Notebooks due**

## Week 11 (Finals Week)

**6/7 12:09/ 0.13 ft.**

- no class, no final

## **Syllabus for INVERTEBRATE ZOOLOGY (BI 451/551, 8 credits), Spring 2016**

### **COURSE GOALS/LEARNING OUTCOMES**      Student will:

- 1) Learn to use marine invertebrates as models to understand general biological processes
- 2) Develop an understanding of the unifying features across organisms while appreciating the unique morphological, physiological and ecological diversity of organisms.
- 3) Learn to evaluate relationships between structure and function by examining how organisms accomplish activities such as locomotion, feeding, growth, respiration, excretion and reproduction.
- 4) Develop working knowledge of Oregonian and northeastern Pacific marine invertebrates accessible in their local habitats and environments.

**Required Textbook** = R.C. BRusca, W. Moore, and S.M. Shuster 2016.  
Invertebrates, 3<sup>rd</sup> edition. Sinauer Publisher.

You will have access to the lab 24/7. We will be in the lab Tuesdays and Thursdays and likely on other occasions as well. You are welcome to drop by our offices/labs (Richard in Tyler lab and Maya in library beside Barb) if you have questions. If we are unavailable at that time, we can make an appointment to meet you. We will have field trips to local habitats, often starting early in the morning depending on the tides.

### **Course Requirements and Evaluations:**

Your final grade will be determined by a combination of three midterm exams, your laboratory notebook, and a presentation on a phylum or class of invertebrates that Richard and Maya are unable to cover this term (see attached list of potential phyla/classes and further discussion below). Material covered on midterms will include lectures, lab materials, and assigned readings (see above schedule). Attendance on all field trips, in all laboratory sessions, and all lectures and student talks is required.

Notebooks – 30% (10% each time hand in)

Midterms – 60% (3 midterms at 20% each)

Student presentation – 10%

### **You need to have:**

- 1) textbook (specifics above)
- 2) A lecture notebook
- 3) A separate lab notebook – loose leaf notebook with unlined paper in 3-ring binder.
- 4) Rite-n-Rain notebook for field notes (in office)
- 5) Dissecting tools – forceps, scissors, scalpel, disposable blades, probe, plastic ruler
- 6) Memory stick
- 7) Full raingear and rubber boots

## Lab Notebook

We will not have a formal lab manual that guides you through each lab but will typically have a lab handout to give some guidance (e.g. helpful diagrams for dissections, recommendations for organisms to look at). You will be drawing a diversity of organisms for most taxonomic groups, combined with notes on any exercises we do in lab. You don't have to draw everything you see in lab but drawing thorough examples of different groups for each phylum is important.

### Your lab notebook should include:

1. Drawings, descriptions, and notes on observations of animals you examine in lab
2. Accurate labeling of anatomy of live and dissected animals
3. Classification for each animal (starting with Phylum and working down to Genus and species)
4. Some indication of size scale for each drawing (field of view and magnification)
5. Notes on lab exercises
6. Field information for the organisms you describe (e.g. habitat, ecological associations etc.)

Jenna Valley's (former invert zoo student) lab notebook is on display in the back of the lab as an A+ sort of notebook. But note, artistic ability is not graded, just thoroughness!

### The notebook will be graded on:

1. Number of animals drawn (a representative number for each taxonomic group available in lab)
2. Description of organism/correct anatomical labeling
3. Classification and scale for each specimen drawn
4. Observations (e.g. ecology, habitat collected from, lifecycle, if pertinent)
5. Detailed notes on all fellow student talks

## Student Interest Lecture

Invertebrates represent 97% of all animal species on the planet. In this course we will focus on local marine invertebrates. Luckily for us, there is an amazing diversity in local habitats. Even so, there are many phyla and large classes of invertebrates that we will not be able to cover given time constraints. With that said, many of the taxonomic groups are awesome, unique, and exciting and we would like to know which of these interests you. With that in mind, we are asking you to find a phylum, class or other group we are not covering this term (see attached list of possibilities or run another group by us) and give an 8 min. (ca. 5 slide maximum) presentation on the group. We will have a sign-up sheet in the lab so each person will cover a different group of inverts.

These talks should include:

1. Taxonomic placement (brief mention so we know possible relationship to other groups)
2. Important morphological characteristics
3. Important systems (e.g. digestive, reproductive etc.)
4. Whatever 3 to 4 things you find most interesting about the group of inverts (e.g. lifecycle, feeding, locomotion, ecology, symbiotic relationships, whatever).

Your talk will be evaluated based on the average scores of your peers, combined with instructor scores.

### Potential Taxa for Student Presentations

- I. Phylum Placozoa
- II. The Mesozoans
- III. Phylum Rotifera
- IV. Phylum Acanthocephala
- V. Phylum Gnathostomulida
- VI. Phylum Micrognathozoa
- VII. Phylum Mollusca, Class Aplacophora
- VIII. Phylum Mollusca, Class Monoplacophora
- IX. Phylum Arthropoda – any small groups we don't get to cover (e.g. marine insects, stomatopods, krill)
- X. Phylum Tardigrada
- XI. Phylum Onychophora
- XII. Phylum Nematomorpha
- XIII. Phylum Priapulida
- XIV. Phylum Kinorhyncha
- XV. Phylum Loricifera
- XVI. Phylum Gastrotricha
- XVII. Phylum Chaetognatha
- XVIII. Phylum Cycliophora
- XIX. Phylum Xenoturbellida
- XX. Phylum Chordata, Subphylum Urochordata, Class Larvacea

A fossil group of rank similar to above, but not currently living – e.g. there are many classes of extinct echinoderms, a number classes/orders of extinct mollusks, etc.)