

**University of Victoria**  
**Biol 322 - BIOLOGY OF MARINE INVERTEBRATES**  
Jan - Apr 2022 CRN 20395  
**COURSE SYLLABUS**

**Lectures:** COR B108 Mon & Thu 11:30-12:50    **Laboratory:** Petch 109

**Course Instructor:** Dr. Louise R. Page  
email: [lpage@uvic.ca](mailto:lpage@uvic.ca)  
virtual office hour: Wed 12:30 pm – 1:30 pm or by arranged appointment  
Zoom link for office hour:  
<https://uvic.zoom.us/j/86127387918?pwd=aG9nQTF3cUN0bUoxbWdoRUlqdW9lUT09>

**Senior Lab Instructor:** Dr. Katy Hind    email: [khind@uvic.ca](mailto:khind@uvic.ca)  
A Zoom meeting with Katy Hind can be arranged by email

**Accommodations of absence due to COVID-19 illness:**

A document titled “B322 COVID absence plan” has been uploaded to Brightspace within the “Course Information” module. This document explains how absences due to COVID-19 disease will be accommodated. It is important that no one with symptoms of COVID-19 attends lectures or labs at UVic. The instructional teach for BIOL 322 will ensure that no one is penalized for an inability to attend lectures or labs due to COVID-19.

**GENERAL INFORMATION:** This course explores how selected groups of marine invertebrates have responded to challenges imposed by diverse marine environments over the evolutionary history of life on this planet. The result has been an explosion of often ingenious strategies for survival and successful reproduction. Lecture material is organized under themes of adaptation, such as: defensive strategies including transparency, bioluminescence and induced defenses, musculo-skeletal systems including muscular hydrostats, selected feeding systems, nutritional symbioses, reproductive biology, and selected physiological adaptations. Each theme is introduced with important background information, followed by an exploration of specific topics relevant to the theme. Lectures will emphasize studies from the primary research literature. An introductory course in Invertebrate Biology (i.e. BIOL 321 or course equivalent) is a required prerequisite.

**LECTURES:**

Due to the spiking infection rate of the Omicron variant of SARS-CoV-2 occurring during January 2022, the first four lectures of BIOL 322 will be presented on-line via Zoom.

These are lectures scheduled for Mon. Jan 10, Thu. Jan 13, Mon. Jan 17, and Thu. Jan 20. Please enter the lecture using this Zoom link:

<https://uvic.zoom.us/j/89089145952?pwd=K3ZJNUVLUUIQVXBdDR3LzJ5d25qZz09>

Meeting ID: 890 8914 5952

Password: 687867

### **Important info for accessing the Zoom lectures:**

Go to <https://uvic.zoom.us/> and select 'Sign in'. Type in your UVic Netlink ID and Password, press 'Sign in', then click on the Zoom link provided above to join the lecture. If you receive a notice "Please wait for the host to start this meeting", that just means you are early to the session. **If you don't follow these instructions, you will get placed into a waiting room and I will need to admit you manually. I cannot do this after I've begun the lecture!**

In-person lectures are scheduled to begin on Mon January 24, 2022. All students must wear face masks within UVic buildings, including lecture theatres and labs. The in-person lectures, together with the PowerPoint slides, will be recorded in class using Echo 360. All the lectures recorded by Zoom and by Echo 360 will be uploaded to the Brightspace site for BIOL 322.

Biology 322 does not use a published textbook, although a general Invertebrate Biology textbook will be a valuable reference. In lieu of a textbook, notes supplementing the lecture material will be available on the Brightspace site for BIOL 322. **However, all material presented in lecture is examinable, even if not covered in the supplementary lecture notes.**

### **LABORATORY:**

**Note:** The first lab of BIOL 322 will be held Wed Jan 19 or Thu Jan 20, depending on your lab section. This first lab will be an on-line lab. The teaching assistant for your lab section will email to you the Zoom link for attending the online Lab #1. Subsequent labs will be in-person, unless this is modified at a later date.

The lab emphasizes observations on form, function, and behaviour of live animals. Morphological studies will involve dissections of heavily anaesthetized animals; only species that are very abundant in coastal waters around southern Vancouver Island will be used for this purpose.

The lab manual for BIOL 322 will be available as a pdf from the Brightspace site for BIOL 322. There will not be a hard copy lab manual.

In brief, the laboratory section of BIOL 322 involves three components:

- 1) **Discussion Groups.** Groups of 4-5 students will discuss a research paper. Each group will submit a single report of written answers to questions about the paper. Student grades will be based on the best 3 of 4 reports. **(marks: 3x3% = 9%)**
- 2) **Lab Notebook.** All observations made in the laboratory on the morphology and behaviour of various marine invertebrates will be recorded in a lab notebook. The notebook will be submitted for grading at the end of lab #9. **(marks: 20%)**
- 3) **Comparative Anatomical Study.** Students will work in groups of two to study the comparative structure & function of homologous structures in two invertebrates related at a taxonomic rank below the level of phylum. Each student will submit a 'proposal' (marks: 4%), which will outline their intended project, and then a formal report (marks: 17%) after both dissections have been completed. Pairs of animals available for study will be posted on Brightspace. **(total marks: 21%)**

#### **Materials for lab:**

1. Lab Manual – bring a digital copy of the lab manual to each lab or just a print-out of the specific lab exercise that will be undertaken during a given lab session.
2. Lab Notebook. Soft or hard cover notebook; lined or blank paper. Binders or file folders containing loose pages are unacceptable.
3. Dissecting Kit. Purchase from the UVic Bookstore; should include fine forceps.

#### **Discussion Groups**

Discussion groups can be an effective way of developing and practicing critical thinking skills. You will be assigned to a discussion group consisting of 4 or 5 individuals. The first 45 minutes of four lab periods will be devoted to a group discussion of an assigned research paper. A link to a pdf copy of this paper from the UVic libraries will be available from the Brightspace site for BIOL 322. You must read this paper **prior** to your lab and bring it to lab as a hard copy or a digital copy on your laptop or other device. Discussion will focus on assigned questions and your group's responses to these questions will be submitted as a single report (no more than 2 pages) compiled by a designated secretary. The secretary's job will rotate among group members. **Due dates for each Discussion Group Report are given in the Lecture & Lab Schedule on the last page of this Syllabus.**

### Lab Notebook

Most of the laboratory sessions for BIOL 322 will provide you with the opportunity to observe morphological features and behaviour of marine invertebrates. You will be expected to record notes on these observations in a lab notebook. These notes should take the form of written descriptions and sketches on animal morphology and behaviour. Don't worry if your entries are not recorded in some sort of logical order; simply record your observations as you work through the lab material in whatever order you do so. You should not be adding entries to your lab notebook outside of lab time; your notes and sketches should be recorded as you examine material while working in the lab.

The sketches of animals or animal components that you include in your lab notebook should each include a figure caption, neat labels, and a scale bar.

### Comparative Anatomical Study

Information about what will be involved with the Comparative Anatomical Study is provided in detail within the lab manual for BIOL 322.

### GRADING:

<b>Lecture:</b>	Midterm Exam – <b>MONDAY FEB 14, 2021</b> (lectures 1-10 inclusive)	20%
	Final Exam (emphasis on material since Midterm Exam)	30%
	<b>TOTAL LECTURE:</b>	<b>50%</b>
<b>Lab:</b>	Discussion Group Reports	9%
	Anatomical Study Proposal (due at start of lab #3 Feb 02 & 03)	4%
	Anatomical Study Report (due at start of lab session Mar 23 & 24)	17%
	Lab Notebooks (due at end of lab #9 Mar 30 & 31)	20%
	<b>TOTAL LAB:</b>	<b>50%</b>

- **Late submission of the Comparative Anatomical report will be deducted 10% per day late.**
- **If the midterm lecture exam is missed, the final grade will be calculated by proportional averaging of all other grades.**

- **The University of Victoria has waived the requirement for a note from a medical professional in the event that illness, emotional trauma or mental health issues prevent a student from writing an exam.**
- **Completion of the final lecture exam is a required component of BIOL 322. Failure to write the final lecture exam will result in a grade of “N” regardless of the cumulative percentage on other elements of the course. N is a failing grade and factors into GPA as a value of 0.**

If a student misses the final lecture exam and cannot write it before final grades are submitted for the course, they will need to submit a formal request for concession using a Request for Academic Concession form

(<https://www.uvic.ca/registrar/assets/docs/record-forms/rac.pdf> ).

If the concession is granted, arrangements will be made for the student to write a final lecture exam at a later time. A grade of N will be assigned until the final lecture exam is completed and the final grade calculated, at which time the N grade will be changed to the grade achieved for all completed course components.

Marks will be converted to letter grades according to the following table:

A+	90 – 100%	B+	77 - 79%	C+	65 - 69%
A	85 – 89%	B	73 - 76%	C	60 - 64%
A-	80 – 84%	B-	70 - 72%	D	50 - 59%

Grades will be rounded-off to the nearest whole number percentile (xx.5 will be rounded up)

No supplemental exams are offered in the Biology Department

**Please note that the final exam period for the Jan-Apr term 2022 extends from Mon Apr 11 to Fri Apr 29, 2022, inclusive. Do not make travel plans until after the final exam timetable has been posted!**

### Biology 322 – 2022 Biology of Marine Invertebrates – Lecture and Laboratory Schedule

DATE	LECT. NO.	LECTURE TOPIC	LAB EXERCISES & DISCUSSION GROUPS
Mon Jan 10	1	Introduction to course; begin suspension feeding	---
Thu Jan 13	2	Nutrition – suspension feeding	
Mon Jan 17	3	Nutrition – uptake dissolved organic matter	---
Thu Jan 20	4	Nutrition – animal-bacterial symbioses	#1 Suspension Feeding – I <b>(Discussion #1)</b> Choose partner & animals for Comp. Anatomy Project
Mon Jan 24	5	Nutrition – animal-bacterial symbioses; sulfide tolerance	---
Thu Jan 27	6	Nutrition – animal-algal symbioses	#2 Suspension Feeding – II <b>Group report for Discussion #1 due</b> Final decision on animals for Comp. Anatomy Project
Mon Jan 31	7	Nutrition – animal-algal symbioses; UV tolerance	---
Thu Feb 03	8	Musculoskeletal systems – introduction	#3 Symbioses <b>(Discussion #2)</b> <b>Proposal for Comparative Anatomy Project due</b>
Mon Feb 07	9	Musculoskeletal systems – skeletal and muscle materials	---
Thu Feb 10	10	Musculoskeletal systems – rigid skeletons	#4 Size and Shape <b>(Discussion #3)</b> <b>Group report for Discussion #2 due</b>
Mon Feb 14		<b>MIDTERM LECT. EXAM – lectures 1-10 inclusive</b>	---
Thu Feb 17	11	Musculoskeletal systems – hydrostatic skeletons	#5 Comparative Anatomy Project – study animal #1
Feb 21-25		<b>READING BREAK</b>	<b>READING BREAK</b>
Mon Feb 28	12	Musculoskeletal systems – pliable skeletons	---
Thu Mar 03	13	Defense – structural defenses	#6 Comparative Anatomy Project – study animal #2 <b>Group report for Discussion #3 due</b>
Mon Mar 07	14	Defense – chemical defenses	---
Thu Mar 10	15	Defense – behavioural defenses	#7 Muscle & Skeletal Systems <b>(Discussion #4)</b>
Mon Mar 14	16	Biomineralization	---
Thu Mar 17	17	Ocean acidification	#8 Biomineralization <b>Group report for Discussion #4 due</b>
Mon Mar 21	18	Defense – induced defences	---
Thu Mar 24	19	Transparency & Bioluminescence	<b>Comp. Anatomy Project reports due at beginning of lab</b> No lab exercise scheduled for this week
Mon Mar 28	20	Reproduction – external & internal fertilization	---
Thu Mar 31	21	Reproduction – protection & provisioning of offspring	#9 Reproduction & Development <b>Submit lab notebooks for grading at end of lab</b>
Mon Apr 04	22	Reproduction – settlement & metamorphosis	---
Thu Apr 07	23	Reproduction – dispersal & delay of metamorphosis	