

**BIOLOGY 321**  
**SURVEY OF INVERTEBRATES**  
Section A01 2020 CRN 10404

**Lecture:**

- Synchronous Zoom lectures: Tue, Wed, & Fri 9:30-10:20 am
- Use the **recurring Zoom URL** to sign-in for every lecture. Please remember to sign in through the UVic Zoom app., which you have hopefully installed on your electronic device. This will allow you to enter the meeting directly, without being delegated to the waiting room. When Zoom opens, click on “Join” and then click on the Zoom URL that’s given **within the Overview message above**.
- Synchronous Zoom lectures will be recorded and uploaded to Brightspace.
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**Please note:** All course content and materials are made available by instructors for educational purposes and for the exclusive use of students registered in their class. The material is protected under copyright law, even if not marked with a ©. **Any further use or distribution of materials to others requires the written permission of the instructor, except under fair dealing or another exception in the Copyright Act.** Violations may result in disciplinary action under the Resolution of Non-Academic Misconduct Allegations policy (AC1300).

- **Instructor:** Dr. Louise R. Page  
email [lpage@uvic.ca](mailto:lpage@uvic.ca)  
Virtual office half hour: Friday 12:30 to 1:00 pm or by prior arrangement made by email.  
Use the same recurring Zoom URL for the office half hour as for the synchronous lecture. This Zoom URL is given in the Overview blurb above.

## Course Content:

The ‘invertebrates’ represent possibly 90% of all species of multicellular animals. The organisms belonging to this informal grouping are not defined by the possession of any unique characteristic, but only by what they lack – an internal skeleton (cartilage or bone) protecting a brain and dorsal nerve cord. Biol 321 will primarily focus at the level of the whole organism and will be organized by phyla. It will deal with major elements of body plans, functional morphology, behaviour, physiology, reproduction & development, life cycles, evolution, and phylogeny of invertebrates. This is potentially a huge quantity of material, but I will whittle it down to a manageable amount by being highly selective about what I choose to include for each phylum and omitting some of the smaller phyla altogether. Fortunately, the biology of invertebrates is rich in fascinating material. As your instructor, my goal is to encourage enthusiasm for the study of invertebrates, with all their ingenious adaptations and splendid diversity. I hope you will find that information about the structure and biology of invertebrates enriches, extends, and enlightens your understanding of biological organization at other levels (i.e. molecular, cellular, ecological).

## Terminology:

You will be expected to learn a number of technical terms for structures, concepts, and taxa. What terms and definitions are you expected to know?

- terms that I display in writing during lecture (including labels on drawings and text within Power Point slides)
- terms given in bold font in ‘Required Readings’ from your textbook

## Textbooks and Supplies:

- Pechenik, J.A. Biology of the Invertebrates, 6th edition or 7th edition.
- The lab component of Biol 321 will include an “Animal Profile” (more information given below). To complete this project, it is recommended that you purchase a USB dissecting microscope through Amazon. The link to the recommended microscope is:

[https://www.amazon.ca/Plugable-Microscope-Flexible-Observation-Magnification/dp/B00XNYXQHE/ref=sr\\_1\\_6?dchild=1&keywords=usb+microscope&qid=1596739545&sr=8-6](https://www.amazon.ca/Plugable-Microscope-Flexible-Observation-Magnification/dp/B00XNYXQHE/ref=sr_1_6?dchild=1&keywords=usb+microscope&qid=1596739545&sr=8-6)

## Laboratory:

The laboratory sessions in Biol 321 were designed to provide students with the opportunity for hands-on examination of selected invertebrates. Lab activities included: 1) observations of external and internal anatomy of organisms representing major invertebrate taxa, typically involving dissections, 2) comparative observations to illustrate diversity within major taxa, and 3) observations of animal behaviour to inform about how morphology serves function. **In this covid-19 pandemic year, I've attempted to provide you with a virtual experience of these activities by recording videos displaying invertebrate morphology, behaviour, and diversity.** These videos will be accessible via Brightspace.

- Laboratory Sections: B01 to B04
  - The Zoom URLs (recurring) for the synchronous lab sections will be posted on Brightspace under “General Lab Information
  - **Senior Lab Instructor & Lecture Moderator:** Alicia Rippington; email [aliciad@uvic.ca](mailto:aliciad@uvic.ca)
  - Virtual office hours and contact information for TAs will be given during your first synchronous lab session.
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- Labs begin the week of September 14-18, 2020
  - There are a total of nine laboratory exercises; one per week except for Reading Week and the weeks for the midterm and final lab exams.
  - Each lab will involve both an asynchronous and a synchronous component.
  - The **asynchronous lab component** will be a set of 3 or 4 videos (submodules) for each lab, which will be available from Brightspace. You must view all the videos for a given lab before your scheduled, synchronous lab session for that week. Viewing of the lab videos will be an asynchronous activity. Total viewing time for all videos provided for a given week will be 50 to 80 min.
  - The **synchronous lab sessions** will be on Wed & Thu 2:30-4:00 pm. You must attend the synchronous lab session in which you are registered. The synchronous lab sessions will involve discussion of information provided in the lab videos (submodules) for that week.
  - It is important to attend every synchronous lab session because each will require submission of a completed assignment that will be graded.
  - **If you are unable to attend the first synchronous lab in which you are registered, or if you are unable to register in the synchronous lab session that you require for a compelling reason, please contact Alicia Rippington (aliciad@uvic.ca).**

## **Laboratory Activities for Assessment:**

### **1) Participation in weekly synchronous labs and submitted reports based on lab discussions**

During each synchronous lab, students will be assigned to “break out rooms” to discuss questions relating to material provided in the lab videos that were viewed prior to the synchronous lab. **Each student will then compile brief written answers to each question and submit these for grading.** Answers will be due by 11 pm on the day of the student’s lab section. A drop box within Brightspace will be set-up to allow students to upload their answers to the lab discussion questions.

### **2) Animal Profile**

This major lab assignment has been incorporated into the Biol 321 lab to provide students with the opportunity for personal discovery about an invertebrate, despite the pandemic-forced cancellation of in-person labs. Each student will find an invertebrate living in the ocean, freshwater, or terrestrial habitat and study its anatomy and behaviour from personal observations. Data should be documented by images recorded by camera (cell phone or other), USB microscope, or drawings from observations of specimens. These data will be incorporated into a report on the biology of the animal. Although personal observations should form the major part of the project report, it is expected that information from the literature will also be included in the report. You should try to identify the specimen to the level of genus and possibly even species. If this is not possible, don’t get too stressed and don’t let it get in the way of your enjoyment of the project. Talk to your TA about difficulties with genus/species identification; it may be sufficient to identify just the family placement. Submitted “Animal Profiles” will be made available to other students in each lab section. Spread the acquired knowledge about diverse invertebrates!

**More information about the “Animal Profile” is provided in a document that can be accessed within the “Assignments” module of the Content page of Brightspace.**

### **3) Essay**

A second major assignment within the lab of Biol 321 will be an **essay on a topic relating to invertebrate biology**. You will select a topic from three that will be provided during your first lab session. This assignment will require you to read scientific literature relating to the topic, write an essay outlining important information and major issues relating to the topic, and provide a critical assessment of controversies or a prospectus of possible future directions for research.

**More information about the essay assignment is provided in a document that can be accessed within the “Assignments” module of the Content page of Brightspace.**

**Late submission of the “Animal Profile” and the “Essay” will be penalized at 20% per day, except in cases of a prolonged debilitation during the term or a catastrophe shortly before the submission deadline.**

### **Field Trips:**

A great advantage of studying Invertebrate Biology at the University of Victoria is the close proximity to an exceedingly rich fauna of marine invertebrates. During this time of the covid-19 pandemic, I've obtained permission from the University of Victoria to hold one or two intertidal field trips, provided they are conducted within the guidelines issued by the BC Provincial Health Officer. I believe that these field trips will be rewarding – worth the extra effort that will be needed to adhere to the public safety guidelines.

All field trip participants will need to provide their own transportation to the field site (a coastal location within Greater Victoria). We must try to maintain a 2 m. distance between participants, but because this may not always be possible, facemasks must be worn.

Low tides during the fall and winter are always after dark, so everyone will need a flashlight. Warm clothing and suitable footwear (rubber or sturdy boots) are also essential and rain gear may be necessary. Date, time, and location of the field trips will be announced well in advance, along with a map indicating location. **Field trips are an optional activity.**

**See next page for schedule of lectures, labs, exams and due dates for major assignments**

**Biology 321 - 2020 - Survey of Invertebrates - Schedule of Lectures, Labs, and Exams**

<b>DATE</b>	<b>Lect No.</b>	<b>LECTURE</b>	<b>READINGS</b> <b>Pechenik ed 7 (ed 6)</b> <b>S = suggested</b> <b>R = required</b>	<b>LABORATORY</b> <b>laboratory activity during the</b> <b>week of the Tuesday lecture</b>
Sep 09 W	1	Introduction to Course	S Ch1 pp.1-6 (1-6)	
Sep 11 F	2	Phylogeny Choanoflagellates; Intro to Porifera	R Ch2 pp.18-30 (16-32) * S Ch4 pp.77-89 (79-91)	
Sep 15 T	3	Porifera		PORIFERA
Sep 16 W	4	Cnidaria I	R Ch5 pp. 95-97 (97-99) S Ch6 pp.99-126 (101-125)	
Sep 18 F	5	Cnidaria II		
Sep 22 T	6	Cnidaria III		CNIDARIA
Sep 23 W	7	Internal Compartments, Bilateria, 'Superphyla', Animal Skeletons	S Ch2 pp.7-17 (7-15) R Ch4 pp.89-90 (91) Placozoa	
Sep 25 F	8	Acoelomorpha, Platyhelminthes I	S Ch8 pp.147-168 (149-170)	
Sep 29 T	9	Platyhelminthes II		PLATYHELMINTHES
Sep 30 W	10	Annelida I	S Ch13 pp.295-328 (295-328)	
Oct 02 F	11	Annelida II		
Oct 06 T	12	Annelida III		ANNELIDA
Oct 07 W	13	Nemertea, Rotifera	S Ch11 pp.203-212 (203-211) S Ch 10 pp.183-196 (183-196)	
<b>Oct 09 F</b>	<b>**</b>	<b>MIDTERM LECTURE EXAM</b> <b>LECTURES 1-13 INCLUSIVE</b>		
Oct 13 T	14	Bryozoa	S Ch 19 pp. 480-488 (480-488)	
Oct 14 W	15	Mollusca I - Polyplacophora	S Ch12 pp.215-271 (215-271) R Ch12 pp.254-255 (255) Scaphopoda	<b>MIDTERM LAB EXAM</b> <b>(Oct. 14/15; labs 1 to 4)</b>
Oct 16 F	16	Mollusca II - Gastropoda		
Oct 20 T	17	Mollusca III - Gastropoda		MOLLUSCA-I

Oct 21 W	18	Mollusca IV – Bivalvia		
Oct 23 F	19	Mollusca V - Cephalopoda		<b>ANIMAL PROFILE DUE SAT. OCT 24, 2020 at 11 pm</b>
Oct 27 T	20	Ecdysozoa: Nematoda	S Ch16 pp.431-445 (431-445)	MOLLUSCA-II
Oct 28 W	21	Arthropoda I: Introduction	S Ch14 pp.341-397 (341-396)	
Oct 30 F	22	Arthropoda II: Chelicerata-1		
Nov 03 T	23	Arthropoda III: Chelicerata-2		ECDYSOZOA-I
Nov 04 W	24	Arthropoda IV: Mandibulata-1 Myriapoda, Pancrustacea		
Nov 06 F	25	Arthropoda V: Mandibulata-2 Pancrustacea - Malacostraca		
Nov 09-11		<b>READING BREAK</b>		<b>READING BREAK</b>
Nov 13 F	26	Arthropoda VI: Mandibulata-3 Pancrustacea - Cirripedia		<b>ESSAY DUE SAT. NOV 14, 2020 at 11 pm</b>
Nov 17 T	27	Arthropoda VII: Mandibulata-4 Pancrustacea - Copepoda		ECDYSOZOA-II
Nov 18 W	28	Arthropoda VIII: Mandibulata-5 Pancrustacea - Hexapoda		
Nov 20 F	29	Arthropoda IX: Mandibulata-5 Pancrustacea - Hexapoda		
Nov 24 T	30	Echinodermata I	S Ch20 pp.497-520 (497-520)	ECHINODERMATA
Nov 25 W	31	Echinodermata II		
Nov 27 F	32	Echinodermata III		
Dec 01 T	33	Hemichordates & Urochordata	S Ch23 pp.539-548 (539-548)	
Dec 02 W	34	Ctenophora	S Ch 7 pp. 135-144	<b>FINAL LAB EXAM (DEC 02/03; labs 5 to 9)</b>
Dec 04 W	35	Review – last day of course		

**S** - 'Suggested Reading'. This material will be examined only if it was also given in lecture.

**R** - 'Required Reading'. All material in these readings is examinable; this material will not be covered in lecture.

## Assessment of Learning: Distribution of marks to calculate final grade

<b>Lecture</b>		<b>Laboratory</b>	
Midterm Exam (Oct 09, 2020).....	20%	Midterm Lab Exam.....	7%
(lectures 1-13 inclusive + required readings)		Oct 14/15, 2020; labs 1 to 4	
Final Exam.....	30%	Final Lab Exam.....	8.5%
(lectures 1-37 + required readings; emphasis on material following Midterm)		(Dec 02/03, 2020; labs 5 to 10)	
		Participation in Synchronous Labs ....	4.5%
		(9 labs X 0.5 marks/lab)	
		Responses to Discussion Questions ..	9%
		(9 labs X 1 marks/lab)	
		Animal Profile .....	11%
		(due Oct 24, 2020 at 11 pm)	
		Essay Assignment.....	10%
		(due Nov 14, 2020 at 11 pm)	
<b>Total</b>	<b>50%</b>		<b>50%</b>

**Missed Exams.** The University of Victoria has waived the requirement for a note from a medical professional in the event that illness prevents a student from writing an exam. This is also extended to requests for accommodation due to emotional trauma or mental health issues. Absence from scheduled exams due to UVic sporting events has traditionally been a third valid excuse for missing an exam, but this will not be an issue in light of the cancellation of UVic sporting events during the Fall of 2020.

**Final Exam Period.** The final exam for Biol 321, Fall term 2020, will be scheduled sometime between Mon. Dec 7 and Mon. Dec 21, 2020. Do not make plans to travel somewhere that does not allow dependable access to the internet during this interval when the final exam may be scheduled.

If a student misses the lecture or lab midterm exam, the student's final grade will be calculated on the basis of all the other course work that was completed. If a student misses more than one exam, an alternative assessment will be necessary in the form of a substitute exam or a submitted essay on an assigned topic.

**Late submission of a major lab assignment, the "Animal Profile" or "Essay".** A valid excuse for late submission of these assignments would need to involve a debilitating issue that extended over a prolonged time period during the term. Both these assignments will be given during early September. An illness or mishap during the day or two before the submission deadline will not be considered a valid excuse for late submission. Please don't leave the assembly of these projects to the last minute.

**Please note that the Faculty of Science requires that students receive a passing grade in the laboratory section of a Science course for permission to write the final lecture exam. A passing grade in the lab is required to receive a passing grade for the course.**

**Course Grade and Academic Transcript:** Grades for all UVic courses are submitted as percentiles. A student's academic transcript will include the percentile grade and a letter grade plus the class average and the number of students registered in the course at the time of the final exam. Percentiles will be rounded to the nearest whole number; a grade of xx.5 will be rounded up. Percentile grades will be converted to letter grades on the student's academic transcript according to the table given below.

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%

**F (Fail) is a grade less than 50%**  
**No supplemental exams will be offered for this course**

## Academic Integrity

You are responsible for academic work that you submit or work on with others. We expect you to adhere to the ethical values of honesty, trust, fairness, respect and responsibility. This means not cheating, plagiarizing, or acting in other academically dishonest ways.

### What is academic dishonesty?

It's difficult to name every single kind of academic dishonesty, but here are a few examples:

- hiring an editor for your written assignments without your instructor's approval. Different departments have different policies on this, so it's best to ask your instructor.
- sending a file you know is corrupt so you have more time to hand in an assignment.
- submitting a paper from the Internet
- having someone else write your paper or parts of it
- using someone else's writing as your own, even just parts of it
- patch-writing: using pieces of different articles and joining the pieces with some of your own words
- intellectual dishonesty, like cheating on a test or sharing your answers
- having someone extensively revise your paper without prior permission from your instructor
- failing to properly cite ideas or excerpts from the work of others
- failing to indicate a paraphrase of someone else's words
- copying answers and/or ideas from a classmate
- self-plagiarism: using something—or even parts of something—that you wrote for one course in another course

**The following is the link to UVic's Policy on Academic Integrity.**

[https://www.uvic.ca/calendar/undergrad/index.php#/policy/Sk\\_0xsM\\_V](https://www.uvic.ca/calendar/undergrad/index.php#/policy/Sk_0xsM_V)

**The following is the link to the UVic Libraries' plagiarism guide.**

<https://www.uvic.ca/library/research/citation/plagiarism/>