

University of Victoria
BIOLOGY 321
SURVEY OF INVERTEBRATES
Section A01 2021 CRN 10401

Instructor:

Dr. Louise R. Page

email lpage@uvic.ca

Virtual office hour: Thursday 12:30 to 1:30 pm. Use this Zoom link:

<https://uvic.zoom.us/j/86127387918?pwd=aG9nQTF3cUN0bUoxbWdoRUlqdW9lUT09>

Alternatively, send me an email to set-up a meeting at an alternate time.

Senior Lab Instructor:

Alicia Rippington

Email aliciad@uvic.ca

Laboratory Teaching Assistants:

Names and contact information for your laboratory TA will be provided to you during your first lab period. Labs in BIOL 321 begin the week of Sep. 13, 2021 and will be held in Petch 109.

Prerequisites for BIOL 321: BIOL 184, 186, 225

We acknowledge and respect the lək̓ʷəŋən peoples on whose traditional territory the university stands and the Songhees, Esquimalt and W̱SÁNEĆ peoples whose historical relationships with the land continue to this day.

Covid-19 and In-person Classes: Although course instruction at UVic during Fall 2021 will be in-person within classrooms, we are still in the midst of the Covid-19 pandemic and we must all take special precautions to keep everyone safe. Everyone attending in-person classes and labs must wear a face mask. For further information about Public Health policies relating to return to campus follow this link: <https://www.uvic.ca/return-to-campus/health-safety/index.php>

Course Content:

The ‘invertebrates’ represent 90% or more 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. Biology 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. The biology of invertebrates is rich in fascinating material. As your instructor, my goal is to introduce you to the wonderful world of invertebrates and to encourage enthusiasm for the study of these animals, 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 life at other levels of biological organization - molecular, cellular, ecological.

Terminology:

You will need to learn a number of terms for structures, concepts, and taxa. Nevertheless, I will try to keep this manageable by asking you to learn only terms that are really essential for communicating about the biology of each group of invertebrates that we’ll study. Exactly what terms and definitions will you be expected to know?

- terms for anatomical parts and concepts (and their definition) that I display in writing during lecture (including labels on drawings and text within PowerPoint slides)
- terms given in bold font in ‘Required Readings’ from your textbook (unless otherwise indicated)
- names of upper level taxa. For some of the smaller groups, it will be sufficient to merely know the name of the phylum. For very large groups, such as the Panarthropoda, you will be asked to learn additional taxonomic categories below the level of phylum. These sub-phyletic taxon names will be clearly identified during both lecture and lab.

Textbooks and Supplies:

- Pechenik, J.A. Biology of the Invertebrates, 6th edition or 7th edition (new 7th ed. in UVic Bookstore: \$106.95)
- BIOL 321 Lab Manual - 2021 (UVic Bookstore: \$24.95)
- Dissecting kit (optional). If you plan to take BIOL 322 during the Jan-Apr term, I recommend purchasing a dissection kit from the campus bookstore (\$22.95). Otherwise, some dissection tools will be available in the BIOL 321 lab for student use.

Lecture Recordings:

The in-class lectures in BIOL 321 will be recorded, along with the accompanying PowerPoint slides and anatomical sketches drawn and displayed with the document camera. The recordings will be uploaded to Brightspace within the “Class Lecture Recordings” submodule of “Lecture Material”. The video platform for the lecture recordings will be Echo360.

To access the lecture recordings, you must establish a relationship between you, the Brightspace BIOL 321 course, and Echo360. To do this, enter Brightspace (<https://bright.uvic.ca>) and select ‘Fall 2021 BIOL 321’. From the Course Home page (as shown in the left image panel below), click on “Lecture Material” from the left side bar. Then click on “Join Echo360 for BIOL 321” (as shown in the right image panel below).

Every student MUST enter Echo 360 using this course link at least once. Subsequently, you can just click on the video link for each individual lecture (listed under Class Lecture Recordings) to view the recorded lectures.

The image displays two side-by-side screenshots of the Brightspace course interface for Fall 2021 BIOL 321. Both screenshots show a dark blue navigation bar at the top with the following menu items: Course Home, Content, Classlist, Grades, Quick Eval, Class Progress, Course Tools, and UVic. The main header area features a background image of a beehive and the text "Fall 2021 BIOL 321 A01 - B01 - B04 X".

The left screenshot shows the "Course Home" page. In the left sidebar, the "Lecture Material" option is circled in red. Below the sidebar, the "Content Navigator" section shows "Last viewed - Join Echo360 for BIOL 321". The "Lecture Material" item is highlighted with a red circle and a 100% progress indicator. The "Lab Material" item is shown with a 14.3% progress indicator. The "Announcements" section on the right states "There are no announcements to display."

The right screenshot shows the "Lecture Material" page. The breadcrumb trail reads "Back Fall 2021 BIOL 321 A01 - B01 - B04 X • Lecture Material". In the left sidebar, the "Join Echo360 for BIOL 321" link is circled in red. The "Announcements" section on the right states "There are no announcements to d".

Laboratory:

The laboratory sessions in BIOL 321 were designed to provide students with the opportunity for hands-on examination of selected invertebrates. Lab activities include: 1) observations of external and internal anatomy of organisms representing major invertebrate taxa, occasionally involving dissections, 2) comparative observations to illustrate diversity within major taxa, and 3) observations of animal behaviour to inform about how morphology serves function.

During the 2021 offering of BIOL 321, your personal observations on live invertebrates in the laboratory will be complemented by videos that illustrate selected aspects of structure and behaviour. A number of the dissections will be presented as videos, but one or more pre-dissected specimens will be available in the lab for students to study.

- Labs begin the week of September 13-17, 2021 and will be held in PETCH 109.
- 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.
- **If you are unable to attend the first lab in which you are registered, contact Alicia Rippington (aliciad@uvic.ca) before the day of the lab.**

Assessment of Laboratory Learning:

1) Midterm and Final Lab Exams

A midterm lab exam will be held during the week of Oct 12 – 15, 2021 and is worth 10% of your final grade. It will cover material in Labs #1 – 4. A final lab exam will be held during the week of Nov 30 – Dec 03, 2021 and will be worth 15% of your final grade. It will cover material in Labs #5 – 9.

2) Animal Profile

This lab assignment will provide students with the opportunity for personal discovery about an invertebrate. Each student will study the anatomy and behaviour of a chosen invertebrate living in the ocean, freshwater, or terrestrial habitat. The profile will be based mostly on personal observations. Observations should be documented by images recorded by camera (*e.g.* smart phone camera or camera mounted on a dissecting or compound light microscope in the lab) or by drawings from observations of the chosen animal. The observational data will be incorporated into a report on the biology of the animal. You may also choose to include a short video

(optional) as a component of your Animal Profile. 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 to disseminate the acquired knowledge about diverse invertebrates!

For more information about the Animal Profile see pages 252-257 in the BIOL 321 lab manual.

The grading rubric for the Animal Profile can be accessed from Brightspace: Lab material > Lab Assignments > Animal Profile.

Due date for submission of your Animal Profile is November 1, 2021 at 9:00 AM.

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.

For more information about the Essay Assignment see pages 258-262 in the BIOL 321 lab manual.

The grading rubric for the Essay can be accessed from Brightspace: Lab material > Lab Assignments > Essay

Due date for submission of your Essay is November 15, 2021 at 9:00 AM.

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 personal catastrophe shortly before the submission deadline. Contact Alicia Rippington (aliciad@uvic.ca) for concession requests.

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. Two field trips to intertidal areas within Greater Victoria have been scheduled.

All field trip participants will need to provide their own transportation to the field site.

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.**

Assessment of Learning: Distribution of marks to calculate final grade

Lecture

Midterm Exam (Oct 08, 2021).....20%
(lectures 1-13 inclusive + required readings)

Final Exam.....35%
(lectures 1-34 + required readings;
emphasis on material following Midterm)

Laboratory

Midterm Lab Exam..... 10%
week of Oct 12 - 15, 2021; labs 1 to 4

Final Lab Exam..... 15%
week of Nov 30 - Dec 03, 2021; labs 5 to 9

Animal Profile 10%
(due Nov 01, 2021 at 9 am)

Essay Assignment.....10%
(due Nov 15, 2021 at 9 am)

Total

55%

45%

PLEASE NOTE THAT THE FACULTY OF SCIENCE REQUIRES THAT STUDENTS RECEIVE A PASSING GRADE (50%) IN THE LABORATORY SECTION OF A SCIENCE COURSE FOR PERMISSION TO WRITE THE FINAL LECTURE EXAM.

Missed Exams. 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.

Grade Assessment when one or more exams are missed:

- If a student misses any one of: the lecture midterm exam, the lab midterm exam, or the lab final exam, the student's final grade will be calculated on the basis of all the other course work that was completed, without penalty.
- If a student misses two or more of the above listed exams, an alternative one or two exams will need to be completed at a later date.
- 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.
- **Completion of the final lecture exam is a required component of BIOL 321.**

Final Exam Period. The final exam for Biol 321, Fall term 2021, will be scheduled sometime between **Thu. Dec 9 and Mon. Dec 20, 2021**. Do not make plans to travel elsewhere during the final exam period, until the final exam schedule is posted.

Late submission of 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 completion of these projects to the last minute.

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. Grades that end with a decimal point of xx.5 or higher will be rounded to the next higher whole number; grades that end with a decimal point below xx.5 will be rounded to the next lower whole number. 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

Biology 321 - 2021 - Survey of Invertebrates - Schedule of Lectures, Labs, and Exams

DATE	Lect No.	LECTURE	READINGS Pechenik ed 7 (<i>ed 6</i>) S = suggested R = required	LABORATORY laboratory activity during the week of the Tuesday lecture
Sep 08 W	1	Introduction to Course	S Ch1 pp.1-6 (<i>1-6</i>)	
Sep 10 F	2	Phylogeny Choanoflagellates; Intro to Porifera	R Ch2 pp.18-30 (<i>16-32</i>) * S Ch4 pp.77-89 (<i>79-91</i>)	
Sep 14 T	3	Porifera		LAB INTRO & PORIFERA
Sep 15 W	4	Cnidaria I	R Ch5 pp. 95-97 (<i>97-99</i>) S Ch6 pp.99-126 (<i>101-125</i>)	
Sep 17 F	5	Cnidaria II		
Sep 18 Sat				Intertidal Field Trip TBA
Sep 21 T	6	Cnidaria III		CNIDARIA
Sep 22 W	7	Internal Compartments, Bilateria, 'Superphyla', Animal Skeletons	S Ch2 pp.7-17 (<i>7-15</i>) R Ch4 pp.89-90 (<i>91</i>) Placozoa	
Sep 24 F	8	Acoelomorpha, Platyhelminthes I	S Ch8 pp.147-168 (<i>149-170</i>)	
Sep 28 T	9	Platyhelminthes II		PLATYHELMINTHES & ROTIFERA
Sep 29 W	10	Annelida I	S Ch13 pp.295-328 (<i>295-328</i>)	
Oct 01 F	11	Annelida II		
Oct 05 T	12	Annelida III		ANNELIDA

Oct 06 W		13	Nemertea, Rotifera	S Ch11 pp.203-212 (203-211) S Ch 10 pp.183-196 (183-196)	
Oct 08 F		**	MIDTERM LECTURE EXAM LECTURES 1-13 INCLUSIVE		
Oct 12 T		14	Bryozoa	S Ch 19 pp. 480-488 (480-488)	MIDTERM LAB EXAM Week of Oct 12 – Oct 15 will cover labs 1 to 4
Oct 13 W		15	Mollusca I - Polyplacophora	S Ch12 pp.215-271 (215-271) R Ch12 pp.254-255 (255) Scaphopoda	
Oct 15 F		16	Mollusca II - Gastropoda		
Oct 19 T		17	Mollusca III - Gastropoda		MOLLUSCA-I
Oct 20 W		18	Mollusca IV – Bivalvia		
Oct 22 F		19	Mollusca V - Cephalopoda		
Oct 26 T		20	Ecdysozoa: Nematoda	S Ch16 pp.431-445 (431-445)	MOLLUSCA-II
Oct 27 W		21	Arthropoda I: Introduction	S Ch14 pp.341-397 (341-396)	
Oct 29 F		22	Arthropoda II: Chelicerata-1		
Nov 02 T		23	Arthropoda III: Chelicerata-2		ECDYSOZOA-I ANIMAL PROFILE DUE MON. NOV 01, 2021 at 9 am
Nov 03 W		24	Arthropoda IV: Mandibulata-1 Myriapoda, Pancrustacea		
Nov 04 Thu					Intertidal Field Trip TBA
Nov 05 F		25	Arthropoda V: Mandibulata-2 Pancrustacea - Malacostraca		
Nov 09 T		26	Arthropoda VI: Mandibulata-3 Pancrustacea - Cirripedia		
Nov 10-12			READING BREAK		READING BREAK
Nov 16 T		27	Arthropoda VII: Mandibulata-4 Pancrustacea - Copepoda		Lab: Ecdysozoa-II ESSAY DUE MON. NOV 15, 2021 at 9 am

Nov 17 W		28	Arthropoda VIII: Mandibulata-5 Pancrustacea - Hexapoda		
Nov 19 F		29	Arthropoda IX: Mandibulata-6 Pancrustacea - Hexapoda		
Nov 23 T		30	Echinodermata I	S Ch20 pp.497-520 (497-520)	ECHINODERMATA & UROCHORDATA
Nov 24 W		31	Echinodermata II		
Nov 26 F		32	Echinodermata III		
Nov 30 T		33	Hemichordata & Urochordata	S Ch23 pp.539-548 (539-548)	
Dec 01 W		34	Ctenophora		
Dec 03 F		35	Review	S Ch 7 pp. 135-144	FINAL LAB EXAM week of Nov 30 - Dec 03 will cover labs 5 to 9

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 may not be covered in lecture.

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

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

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

OTHER UNIVERSITY POLICIES

Medical documentation for absences

No medical documentation for short-term absences is required for the Fall 2021 term (approved by Senate).

Copyright

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. [Resolution of Non-Academic Misconduct Allegations policy \(AC1300\)](#).

Mental Health and Wellbeing

A note to remind you to take care of yourself. Diminished mental health can interfere with optimal academic performance. Do your best to engage in self-care and maintain a healthy lifestyle this semester. This will help you achieve your goals and cope with stress. All of us benefit from support during times of struggle. You are not alone. The source of symptoms might be related to your course work; if so, please speak with me. However, problems with other parts of your life can also contribute to decreased academic performance. The **UVic Student Wellness Centre** <https://www.uvic.ca/student-wellness/> provides cost-free and confidential mental health services to help you manage personal challenges that impact your emotional or academic well-being.

Student Learning Support services

[Learn Anywhere](#) is the student support portal for a full range of student academic and support services. Services include: Centre for Academic Communication, Math & Stats Assistance Centre, Health Services, Library, and Computer Help Desk.

Centre for Accessible Learning

Students with special needs will be welcomed and accommodated in classes at UVic, provided those needs are registered through the Centre for Accessible Learning <https://uvic.ca/services/cal> (Campus Services Building, rm 150; phone 250-472-4947)