



COURSE OUTLINE

1. **Course:** ZOOL 401, An Introduction to Invertebrate Zoology - Winter 2022

Lecture 01 : MWF 15:00 - 15:50 in ST 143

Instructor	Email	Phone	Office	Hours
Dr Mindi Summers	mind.summers@ucalgary.ca	403 220-8761	BI 041	Student hours – After class representative meetings on Wednesdays, Dr. Summers will be available to meet with individuals or groups to discuss any aspect of the course. If you would like to schedule a student hours session outside of these hours with Dr. Summers or another member of the instructional team, please email – we are looking forward to talking with you!

To account for any necessary transition to remote learning in the winter 2022 semester, courses with in-person lectures, labs, or tutorials may be shifted to remote delivery for a certain period of time. In addition, adjustments may be made to the modality and format of assessments and deadlines, as well as to other course components and/or requirements, so that all coursework tasks are in line with the necessary and evolving health precautions for all involved (students and staff).

In Person Delivery Details:

Lecture:	01	MWF	15:00-15:50	ST 143
Labs:	01	T	9:00-11:50	BI 046
	02	T	12:00-14:50	BI 046
	03	Th	9:00-11:50	BI 046
	04	Th	12:00-14:50	BI 046

Re-Entry Protocol for Labs and Classrooms:

To limit the spread of COVID-19 on campus, the University of Calgary has implemented safety measures to ensure the campus is a safe and welcoming space for students, faculty and staff. The most current safety information for campus can be found [here](#).

Course Site:

D2L: ZOOL 401 L01-(Winter 2022)-An Introduction to Invertebrate Zoology

Note: Students must use their U of C account for all course correspondence.

Course Description: Understanding animal biodiversity requires the study and appreciation of invertebrates. Invertebrates are found within every animal phyla and include a far greater number of species and span a broader range of diversity (in morphology, structure, development, reproduction, etc.) than vertebrates (a sub-phylum). Invertebrates are also model organisms for biological study, play both positive and negative roles in human and animal health, and are key indicators of environmental health. Studying invertebrates will broaden your career options in environmental monitoring/management, environmental consulting, environmental toxicology, invasive species monitoring/management, conservation and resource management, fisheries biology, basic research, and graduate studies in ecology, evolution, and organismal biology.

This course will explore the diversity of invertebrates, emphasizing evolutionary, structure-function, and ecological relationships. We will explore the following four themes:

1) Invertebrate diversity is the result of ongoing **evolution**.

2) Observing **structure/function** relationships highlights that the basic requirements for animal life have been met in many different ways.

3) The **ecology** of invertebrates is complex, diverse, and fundamental to many ecosystems.

4) Knowledge of invertebrates has countless **applications** – they are important model organisms, impact human health, provide information on environmental health, and inspire engineering.

Course goals and learning outcomes:

By the end of this course, you will be able to:

1) Communicate verbally and through writing and visuals, your ability to:

2. Identify and explain the morphological characteristics, including synapomorphies, of the major clades of animals (as shown in Dunn et al. 2014) and the well-supported clades of Bilateria, Deuterostomia, Protostomia, Spiralia, and Ecdysozoa.
3. Explain, compare and contrast, and discuss the structure and function relationships found in different invertebrate groups for feeding, mechanics and movement, respiration, excretion, ionic and osmotic regulation, reproduction and lifecycles, and buoyancy, defense, development, and control systems (e.g., nervous systems).
4. Discuss invertebrate biology and ecology in the context of conservation problems, scientific investigation using model organisms, design, and environmental monitoring.
5. Use evolutionary trees to identify the relatedness of different invertebrate taxa, propose hypotheses for the evolution of traits, and discuss taxonomic implications.
6. Find, analyze, interpret, and discuss primary and popular literature, particularly graphs, tables, and figures, on topics in invertebrate zoology

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2) Engage in laboratory and research work with professional skills that include:

- o Scientific observation of live, preserved, and sectioned organisms in the form of scientific drawings and descriptions.
- o Scientific record-keeping (e.g., accurate scalebars, labels, and identifications).
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- o Use of compound and dissecting microscopes, including slide preparation.
- o Animal dissection following provided protocols.
- o Observation and handling of live animals with instruction.
- o Reflective practices for continual improvement and growth (e.g., time management, self-directed learning and inquiry, an understanding of how you learn, confidence in taking risks and embracing challenges, independent problem solving, personal goal setting, collaboration with others, and professionalism).

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Instructional Team

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Instructor & course coordinator

Dr. Mindi Summers Email: mindi.summers@ucalgary.ca

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I look forward to discussing and learning about invertebrates with you this term! As the instructor and coordinator for the course, I have designed or co-designed with previous students all of the lectures, labs, assignments, and other components in this course. You will see me in a lead role during the lectures and as a mentor/advisor to the TAs in the lab. Please reach out to ask me any questions that you have regarding the course.

Student hours: I have open, drop-in student hours on Wednesdays from 4:30-5:00pm after class representative meetings. Another good way to introduce yourself, discuss the course, and talk about invertebrates is to meet with me during your laboratory period and immediately after lecture. Please email me if you would like to meet outside of scheduled lab or student hour times.

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GTAs

Elizabeth Gillis (Tuesday labs) Email: elizabeth.gillis@ucalgary.ca

Aphra Sutherland (Thursday labs) Email: aphra.sutherland@ucalgary.ca

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Teaching assistants (GTAs) in Zoology 401 are graduate students who are developing their teaching practice. You will have one GTA that facilitates your work in the lab and you may also see the course GTAs in lectures. Your GTA will evaluate your weekly laboratory exercises, some questions on the midterms, and components of your portfolio assignments. Your GTA will act as a coach to help you achieve and continue improving throughout this course – please ask your GTA for feedback on your progress. Please remember that our GTAs are developing their teaching skills! Please direct feedback to me so that I can best mentor them in developing their teaching practice.

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Peer mentors

Peer mentors are current undergraduates who are enrolled in SCIE 511- Peer Mentoring and Collaborative Learning in Science. As part of this course, students complete a practicum experience in a course that they have previously taken. The practicum in Zoology 401 will include facilitating student learning in lecture, lab, and through drop-in sessions. You will see peer mentors developing their skills at prompting and encouraging discussion, identifying challenging topics on the course, and facilitating discussion and learning. Peer mentors are in the course as coaches and will NOT be involved with any marking or evaluation. If there are areas of confusion or struggle, please mention these to the peer mentors so that they can organize a drop-in session!

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Lab technician

The lab materials you will work with are set-up, monitored, and removed by our course technician – Arminty Clarke. She also ensures that the lab is a safe environment to work. Please follow her advice and recommendations in the lab and ask her questions about general lab safety, proper technique, and working with equipment and specimens. Please also thank her for all of the work that she does each week to make our labs a success!

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Class representatives

Please volunteer to be a class representative! Class reps are currently enrolled students in Zoology 401 who volunteer to collect and share student feedback on Zoology 401 – you can attend any meetings at any time (no commitment is required). Class reps meet with me on Wednesdays from 3:50-4:30pm. During our weekly meeting, class reps first share ideas and comments from students and then we discuss ways to improve the course. Class reps will also lead collection and analysis of mid-semester feedback on the course. You will hear updates from the class reps weekly – please take the time to talk with them so that your experiences and ideas are heard!

Course Organization

Each week, we will discuss a major group of invertebrates in lecture and lab. All lecture, lab, and assignments outside of class are designed to help you more fully understand and apply the material - with the goal being that you can synthesize all of the material at the end of the week. Although hands-on work with animals will be restricted to laboratory sessions, all other techniques to foster learning - peer discussions, reading primary literature, writing, problem-solving, and regular feedback - will be interwoven throughout lecture, laboratory, and assignments. You will teach and learn from each other in all of these settings and your full participation in all of these activities will help you succeed in this course. During the last week of the term, you will be presenting to the class on specific minor phyla.

Recommended time management for a typical week in Zoology 401 (~10 hours)

Zoology 401 is designed so that you are spending **approximately 9 hours per week** engaging as a scientist in lecture, laboratory, and out-of-class assignments.

Discussion of course themes MWF lectures (3 hours). During lecture, you will actively explore the course themes (evolution, ecology, morphology, and functional biology (e.g., development, feeding, movement)) in small learning groups of approximately four to six students. You will be expected to engage in activities and assignments, including but not limited to, responding to writing prompts, answering TopHat questions, engaging in discussion, and completing worksheets and assignments. Typically, when given a problem, you will first work on it on your own, then your group will engage in peer-instruction and collaboration to problem solve and discuss learning strategies, and then we will talk about the problem as a group - a technique that has been shown to increase learning compared to instructor lecture and explanation only (see Smith et al., 2011). You will complete parts of your exams using this peer-instruction format - first individually, and then as a group. As a learning group, you will also synthesize and share knowledge for one invertebrate group during the last week of the term.

Observation and examination of animals and completion of laboratory notebook in T or Th lab (3 hours). During lab, you will carefully observe the form and consider the function of anatomical features, identify the diagnostic morphology of groups, observe developmental stages, and develop skills in scientific drawing, slide preparation, microscope use, and observation. You will also practice and perform dissections on select invertebrates.

You will record and communicate your observations during each laboratory section in a laboratory notebook. During each lab, you will discuss the laboratory exercises with your team and GTA. You will submit your laboratory notebook for evaluation on the day of your scheduled lab.

Review and synthesis of lecture and lab through assignments (~3 hours). During each week, you will compile and summarize the material from lecture, lab, and the textbook, and conduct your own reading and exploration to complete a D2L quiz and D2L discussion board post. When reviewing material, I recommend that

you particularly focus on being able to answer the learning objectives for each week. Assignment instructions will be posted on D2L one week before the due date so that you can complete the assignment activities at a time that works best for you. The D2L quiz questions will guide you through reviewing information about the animals and the discussion board provides you with opportunities to read about and share articles and videos with classmates on the week's organisms.

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You are encouraged to review material with other students in the class and these assignments are open-book and open-internet. When completing the quiz and discussion board, you should work alone and all answers should be your own.

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Other time commitments during the term

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Preparation for exams. If you continue to review and synthesize your notes and work throughout the term, you should not need to spend much time reviewing content (be sure to check that you are comfortable with all of the week's learning outcomes). You will want to spend time practicing the type of questions that you will see on the quizzes. Use the questions given in lecture (TopHat, quick-writes, drawings) as example exam questions. Without looking at the answers, try to answer these questions again. Also, take the time to write and answer your own sets of questions similar to those posed for each of the learning outcomes.

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Preparation for minor phyla talk. You will be given time during lecture to prepare your minor phyla talk. You may wish to spend a minimal amount of time outside of class looking up information and practicing your presentation.

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Laboratory notebook submissions & critical reflections (~5 hours).

At the start, mid-point, and end of term, you will compile and reflect on your learning through generating a portfolio. Your final portfolio will include highlights, personal reflections, and a scan of your laboratory notebook.

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(Optional) Invertebrate book club. If you are interested, you can read a book on invertebrates during the first half of the course and discuss your reading with others during week 7.

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Questions, Feedback & Communication Policy

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D2L Q&A discussion board

If possible, please bring forward questions and ideas in person during and after class and laboratories, and during student hours. Being able to ask you follow-up questions in real time helps us to make sure that we are answering your questions and providing helpful support.

For general questions about the course, we will be using a D2L Q&A Discussion Board. This board allows you post and respond to other students' questions, and receive input from the instructional team. To ensure that all students have access to the same information, all general questions should be posted here. The instructional team will respond to posts M-W within 24 hours.

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Course feedback and suggestions

Please provide feedback and suggestions on the course to our **class representatives** (and please join class

representative meetings at anytime!). Class representatives will also organize anonymous mid-semester feedback that will be provided to the instructional team. Class representative contact information will be posted on D2L.

Course communication policy

We will reply to the discussion board, post notices, and send emails between 8:30am-4:30pm Monday-Friday. We will do our best to read and respond to discussion board posts/emails within 24 hours Monday-Friday, and those received during the weekend by the following Tuesday. If you do not receive a response within the time-frame, please follow-up in email (sometimes emails or discussion posts are lost in spam filters or mistakenly overlooked!).

Equity Diversity & Inclusion:

The University of Calgary is committed to creating an equitable, diverse and inclusive campus, and condemns harm and discrimination of any form. We value all persons regardless of their race, gender, ethnicity, age, LGBTQIA2S+ identity and expression, disability, religion, spirituality, and socioeconomic status. The Faculty of Science strives to extend these values in every aspect of our courses, research, and teachings to better promote academic excellence and foster belonging for all.

The Biological Sciences Equity Committee acknowledges there are persistent barriers that prevent such accessibility and hinder our progress towards EDI. Our representatives (faculty, staff, postdocs, graduate and undergraduate students) are committed to addressing any concerns and work towards proactive solutions that enact necessary change within the department. To submit anonymous questions, comments or concerns regarding EDI related issues, please reach out to our Chair, Constance Finney (constance.finney@ucalgary.ca), or a committee representative of your choice at <https://science.ucalgary.ca/biological-sciences/about/equity-diversity-and-inclusion>

7. **Requisites:**

See section 3.5.C in the Faculty of Science section of the online Calendar.

Prerequisite(s):

Biology 371. Also known as: (formerly Zoology 375)

8. **Grading:**

The University policy on grading and related matters is described in F.1 and F.2 of the online University Calendar.

In determining the overall grade in the course the following weights will be used:

Course Component	Weight	Due Date (duration for exams)	Modality for exams	Location for exams
Lab Exercises (10) ¹	20%	Ongoing		
Assignments (8) ²	16%	Ongoing		
Portfolio Assignments (2) ³	3.5%	Ongoing		
Surveys and course intro activities ⁴	0.5%	Ongoing		
Lab/Lecture Exam 1 ⁵	28%	Feb 14 2022		
Lab/Lecture Exam 2 ⁶	30%	Mar 29 2022		
Minor Phyla Presentation ⁷	2%	Apr 05 2022		

¹ due during scheduled labs

² due Fridays by 23:59 on D2L

³ due Mar 2; April 12 by 23:59 on D2L

⁴ due Jan 14; April 12 by 23:59 on D2L

⁵ This timed assessment will be available on D2L on Monday, February 14 at 8:30 am and will be available for 24 hours. The assessment is designed to take you 60 minutes of writing time with 30 minutes of buffer time. It must be completed and submitted by 8:30am on Tuesday, February 15. Your instructor will be available to answer questions live through Zoom or email from 3-4pm on Monday, February 14 (during the regularly scheduled lecture time), and will not be able to respond to questions outside of this window. If you experience an issue that affects your ability to complete the online assessments, which can include (but is not limited to) issues with technology, time zone issues, caregiving responsibilities, or distractions within your test-taking environment, you will need to contact your instructor as soon as possible.

⁶ in scheduled lab March 29 or 31

⁷ team submit on D2L April 5 by 23:59; present in lecture April 6 & April 8

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Minimum % Required	95 %	90 %	85 %	80%	75%	70 %	65 %	60%	55%	50 %	45 %

* In the lecture component of the course for weeks 1-10, we will use the TopHat classroom performance system, where you will be asked to use a cell phone or other device to text answers to questions during class. The use of the TopHat system is optional, but highly recommended to enhance learning in the classroom. If you answer 85% or more of the in-class questions, up to 0.5% will be added to your final grade. If you answer less than 85% of the in-class questions, a grade of 0 will be assigned for this course component, and your final grade will not be modified. It is your responsibility to ensure that your participation is being properly recorded by the TopHat system. In the event of any discrepancy, you must contact the administrators of the TopHat system to have them corrected. Correction of any discrepancies must be done prior to 23:59 on April 12, 2022. If you are unable to use the TopHat system, please contact Dr. Summers within the first week of class to make alternate arrangements.

* Throughout the term, you will have five opportunities to make a meme that aligns with the content covered in the course (see assignment information and deadlines on D2L). For each complete meme, you can earn 0.25% onto your final grade, up to a maximum of 1% added to your final grade.

* If you experience an issue that affects your ability to complete the online assessments, which can include (but is not limited to) issues with technology, time zone issues, caregiving responsibilities, or distractions within your test-taking environment, you will need to contact your instructor as soon as possible.

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Assignments & Activities

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Lecture/lab exam 1

This exam will cover material discussed in the course (in lecture, lab, assignments, and readings) during weeks 1-5. The midterm can consist of multiple choice, written fill-in questions, and short answer questions. This timed assessment will be available on D2L on Monday, February 14 at 8:30 am and will be available for 24 hours. The assessment is designed to take you 60 minutes of writing time with 30 minutes of buffer time. It must be completed and submitted by 8:30am on Tuesday, February 15. I will be available to answer questions live through Zoom or email from 3-4pm on Monday, February 14 (during the regularly scheduled lecture time), but I will not be able to respond to questions outside of this window.

You may use your class notes and laboratory notebook during the exam, but not outside resources. You may not consult other individuals during the exam, and all work should be your own.

If you experience an issue that affects your ability to complete the online assessments, which can include (but is not limited to) issues with technology, time zone issues, caregiving responsibilities, or distractions within your test-taking environment, you will need to contact your instructor as soon as possible.

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Lecture/lab exam 2

This exam will be held during your regularly scheduled lab time during week 11. This exam will cover material discussed in the course (in lecture, lab, assignments, and readings) throughout the term, with a focus on material covered during weeks 6-10. The midterm can consist of multiple choice, written fill-in questions, and short answer questions. The midterm will consist of stations where you will have a set amount of time to respond to each set of questions.

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Optional group component: If you would like to re-take a subset of the multiple choice and fill-in responses with your group, you can do so after completion of the individual exam. For questions that you take both individually and as a group, your mark for these questions will be split 90% (individual score) and 10% group score. If your individual score is higher than the group score, your individual score will be 100% of your mark for these questions. In other words, participating in the group component can only improve your mark.

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Laboratory exercises

You will record and communicate your observations during each laboratory section in a laboratory notebook. You are encouraged to work with your team as you complete the exercises (observing multiple specimens and slides is important to see all of the important components), but all work in your laboratory notebook should be your own and in your own words.

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After you have completed the laboratory exercises, you will discuss your laboratory notebook with your GTA. After discussion and the opportunity for improvement, you will receive a mark based on your effort and accurate completion of the exercises. **All laboratory exercises will be completed and evaluated before the end of your laboratory session.**

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Assignments

There will be eight assignments in this course. **All assignments must be submitted on D2L before 23:59 on Fridays.** Assignments are intended to allow you to synthesize and apply lecture and laboratory activities and will consist of two parts:

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1) D2L Quiz: questions are provided to guide your reading and review of the textbook, lecture, and laboratory activities. You may use any and all resources to answer the questions. You are encouraged to work with others to prepare, but you must complete the quiz on your own and without consultation with others. A time-limit is given and you will have two attempts to answer the quiz questions.

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2) D2L Discussion Board: for each week, you will respond to the question "Why should we care about [specific

phylum], and how can we do so?" by finding at least one of the following: a video, a newspaper report or popular science article (not encyclopedia, Wikipedia, or study notes page), or a peer-reviewed scientific article (a primary research or review article) that describes applications of and/or conservation issues (including bio-inspired design) related to the phylum. You will post links to the source(s) with a short paragraph (3-5 sentence) description and discussion, along with discussion questions. You will also briefly respond to at least three other student's posts on the discussion forum.

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Portfolio Assignments

Over the term, you will generate and compile a portfolio of your work. Your portfolio assignments will include surveys, preparatory materials, and components that will be integrated into a final course portfolio. Your final portfolio will be a way to synthesize and reflect on your learning in the course and will include a short biography, highlights, critical reflections, and a scan of your laboratory notebook. You will complete sections of your portfolio as part of Portfolio Assignment 1 (due on D2L before 23:59 on March 2), and submit your entire Portfolio as Portfolio Assignment 2 (due on D2L before 23:59 on April 12).

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Minor phyla presentation

During the last two weeks of class, your group will prepare and present to the class for approximately five-minutes on an assigned group of invertebrates. Your presentation is an opportunity to be creative and have fun discussing invertebrates – the only requirement is that you talk about your group! Possible ideas to discuss include: current scientific research, biomimicry or design related to the group, conservation implications, creation of a song, video, etc. You will have time during lecture to prepare your presentation. **Your team must submit your presentation materials (e.g., Powerpoint, handout, poster, videos, interactive poster) on D2L before 23:59 on April 5.** Your presentation will be marked during the lecture period based on effort, accuracy, and clear communication.

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Optional Invertebrate Book Club

There are many non-fiction and fiction works that star invertebrates! You have the option of choosing a book that features invertebrates (>200 pages) AND participating in a discussion held outside of class during week 7. Participating in the invertebrate book club is optional and is not associated with any marks in this course, but highly recommended as a fun way to expand your thinking about invertebrates. A sign-up sheet will be available on D2L if you are interested in joining.

The University of Calgary offers a [flexible grade option](https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade), Credit Granted (CG) to support student's breadth of learning and student wellness. Faculty units may have additional requirements or restrictions for the use of the CG grade at the faculty, degree or program level. To see the full list of Faculty of Science courses where CG is not eligible, please visit the following website: <https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade>

9. **Missed Components Of Term Work:**

The university has suspended the requirement for students to provide evidence for absences. Please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations.

In the event that a student legitimately fails to submit any online assessment on time (e.g. due to illness etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date. Absences not reported within 48 hours will not be accommodated. If an excused absence is approved, one possible arrangement is that the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course. This option is at the discretion of the coordinator and may not be a viable option based on the design of this course.

10. **Scheduled Out-of-Class Activities:**

There are no scheduled out of class activities for this course.

11. **Course Materials:**

Required Textbook(s):

Pechenik, *Biology of the Invertebrates*. McGraw-Hill.

Required supplies

Drawing sketchbook or binder with blank pages (physical or digital). Minimum size of 8.5 by 11 inches.

(Optional) Drawing pencils; set of 12 colored pencils or fine-tipped colored markers.

Required and recommended texts

There are many resources available to complete the weekly assignments and supplement your learning in lecture and lab. I recommend using textbook and internet websites as resources to answer questions that you have, rather than as something to read cover-to-cover. Information on invertebrates is mostly incomplete and spread across many resources – as a result there is no one textbook or site that will give you all of the information you would like on a topic.

Required textbook: Biology of the Invertebrates, Pechenik, McGraw-Hill, 7th edition. ISBN: 0073524182.

Biology of the Invertebrates provides a concise overview of the different groups. I provide the chapters that correspond to each week in the tentative schedule below. This text unfortunately does not cover everything that you might want to know about a group or the material covered in lab. Please be aware that the text is also not free of errors; I will try to address these during lecture.

Other recommended resources for information on invertebrates:

1) Textbooks and books:

a) Invertebrate Zoology - A laboratory manual -Wallace & Taylor, 6th ed. ISBN: 0130429376.

b) Invertebrates - Brusca, Moore, & Shuster. ISBN: 978-1605353753.

c) Invertebrate zoology: a functional evolutionary approach - Edward E. Ruppert, Richard S. Fox, and Robert D. Barnes. ISBN: 978-0030259821.

d) The invertebrates: a synthesis - R.S.K. Barnes, Peter P. Calow, P.J.W. Olive, D.W. Golding, J.I. Spicer . ISBN: 978-0632047611.

e) General Zoology Laboratory Guide, Lytle & Meyer. McGraw-Hill. 16th edition. ISBN: 9781259938405.

f) The zoology coloring book -Lawrence M. Elson. ISBN: 978-0064603010 - includes some of the groups we cover in this class.

2) Websites:

a) YouTube!

b) The Encyclopedia of Life (EOL - <http://eol.org/>) gives descriptions for many groups.

c) Tree of life project (tolweb.org)

d) Wikipedia

e) Paleos for information on extinct invertebrates (<http://palaeos.com/>).

f) AskNature is a website that provides biomimicry examples (<https://asknature.org/>).

3) Search engines and databases:

a) Web of Science, Scopus, and Google Scholar are an excellent search engines to find primary articles in invertebrate zoology.

b) The World Register of Marine Species (WoRMS - <http://www.marinespecies.org/>) provides updated taxonomic information.

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam/Camera (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Stable internet connection.

For more information please refer to the UofC [ELearning](#) online website.

12. **Examination Policy:**

Examination Policy:

For lecture/lab exam 1, you may use your class notes and laboratory notebook during the exam, but not outside resources. You may not consult other individuals during the exam, and all work should be your own. Students should also read the Calendar, Section G, on Examinations.

Prior to lecture/lab exam 2, you may create one-page **ofhand-written notes**. The maximum size of the notes is standard letter size (8.5 x 11”), and one side only. The page of notes should be entirely your own work and your name must be on the page. No other materials will be allowed during the examination. Calculators, rulers, and other devices will be available at any stations where these tools are required. Students should also read the Calendar, Section G, on Examinations.

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Assignments & Portfolio Exercises: You are encouraged to discuss course material and study together during lectures and laboratories, and outside of class. You will then complete the assignments in this course on your own. Assignments and portfolio assignments are open-book, open-note, and you can consult outside resources to complete the assignments (other than other students).

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Laboratory Exercises: You are encouraged to share observations and materials during laboratories, and to work with your team to understand the concepts and develop the skills required to complete each laboratory exercise. The work that you present in your laboratory notebook, should be entirely your own. Sharing of laboratory notebooks or work conducted during laboratory sessions is not permitted.

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Electronic Devices & Photography In Laboratories: You are welcome to bring electronic devices into laboratory sessions to display the laboratory exercises and look up information when needed using the internet. You may not take photographs of any specimens, or share photographs of specimens or your laboratory notebook with others.

Students should also read the Calendar, [Section G](#), on Examinations.

13. **Approved Mandatory And Optional Course Supplemental Fees:**

There are no mandatory or optional course supplemental fees for this course.

14. **Writing Across The Curriculum Statement:**

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section [E.2](#) of the University Calendar.

15. **Human & Living Organism Studies Statements:**

If you agree, your course work may be used for research purposes. Your responses will remain anonymous and confidential. Grouped data (no individual responses) may be used in academic presentations and publications. Participation in such research is voluntary and will not influence grades in this course. Students' signed consent forms will be withheld from instructors until after final grades are submitted. More information will be provided at the time student participation is requested.

See also [Section E.5](#) of the University Calendar.

STUDIES IN THE BIOLOGICAL SCIENCES INVOLVE THE USE OF LIVING AND DEAD ORGANISMS. Students taking laboratory and field-based courses in these disciplines can expect involvement with and experimentation on such materials. Students perform dissections on dead or preserved organisms in some courses. In particular courses, students experiment on living organisms, their tissues, cells, or molecules. Sometimes field work requires students to collect a variety of living materials by many methods, including humane trapping.

All work on humans and other animals conforms to the Helsinki Declaration and to the regulations of the Canadian Council on Animal Care. The Department strives for the highest ethical standards consistent with stewardship of the environment for organisms whose use is not governed by statutory authority. Individuals contemplating taking courses or majoring in one of the fields of study offered by the Department of Biological Sciences should ensure that they have fully considered these issues before enrolling. Students are advised to discuss any concern they might have with the Undergraduate Program Director of the Department.

Students are expected to be familiar with [Section SC.4.1](#) of the University Calendar.

16. **Reappraisal Of Grades:**

A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See [Section I.3](#) of the University Calendar.

- a. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **ten business days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work form to the department in which the course is offered within **2 business days** of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections [I.1](#) and [I.2](#) of the University Calendar
- b. **Final Exam:** The student shall submit the request to Enrolment Services. See [Section I.3](#) of the University Calendar.

17. **Other Important Information For Students:**

- a. **Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, [Mental Health Services Website](#)) and the Campus Mental Health Strategy website ([Mental Health](#)).
- b. **SU Wellness Services:** For more information, see www.ucalgary.ca/wellnesscentre or call [403-210-9355](tel:403-210-9355).
- c. **Sexual Violence:** The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email ([svsa@ucalgary.ca](mailto:svs@ucalgary.ca)) or phone at [403-220-2208](tel:403-220-2208). The complete University of Calgary policy on sexual violence can be viewed at (<https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-Violence-Policy.pdf>)
- d. **Misconduct:** Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. Research integrity, ethics, and principles of conduct are key to academic integrity. Members of our campus community are required to abide by our institutional [Code of Conduct](#) and promote academic integrity in upholding the University of Calgary's reputation of excellence. Some examples of academic misconduct include but are not limited to: posting course material to online platforms or file sharing without the course instructor's consent; submitting or presenting work as if it were the student's own work; submitting or presenting work in one course which has also been submitted in another course without the

instructor's permission; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. Please read the following to inform yourself more on academic integrity:

- [Student Handbook on Academic Integrity](#)
- [Student Academic Misconduct Policy and Procedure](#)
- [Research Integrity Policy](#)

Additional information is available on the [Student Success Centre Academic Integrity page](#)

e. Academic Accommodation Policy:

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf>

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf>.

Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, by filling out the [Request for Academic Accommodation Form](#) and sending it to Lisa Gieg by email imgieg@ucalgary.ca preferably 10 business days before the due date of an assessment or scheduled absence.

f. Freedom of Information and Privacy: This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see [Legal Services](#) website.

g. Student Union Information: VP Academic, Phone: [403-220-3911](tel:403-220-3911) Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: [403-220-3913](tel:403-220-3913) Email: sciencerep@su.ucalgary.ca. Student Ombudsman, Email: ombuds@ucalgary.ca.

h. Surveys: At the University of Calgary, feedback through the Universal Student Ratings of Instruction (USRI) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.

i. Copyright of Course Materials: All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or [non-academic misconduct](#), in addition to any other remedies available at law.

Tentative Course Schedule

Week	Lecture Topic	Lab Topic	Assignments & Due Dates
1 Jan 10-14	M - Course Introduction W - Porifera I F - Porifera II	NA	F: Survey 1 & Course Intro Assignment (by 23:59)
2 Jan 17-21	M - Evolutionary Trees W - Cnidaria I F - Cnidaria II	Porifera	T/Th: Porifera Lab Assignment 1 (in lab) F: Porifera Assignment 1 (by 23:59)

3 Jan 24- 28	M - Cnidaria III W - Platyhelminthes I F - Platyhelminthes II	Cnidaria	T/Th: Cnidaria Lab Assignment 2 (in lab) F: Cnidaria Assignment 2 (by 23:59)
4 Jan 31- Feb 4	M - Platyhelminthes III W - Annelida I F - Annelida II	Platyhelminthes	T/Th: Platyhelminthes Lab Assignment 3 (in lab) F: Platyhelminthes Assignment 3 (by 23:59)
5 Feb 7- 11	M - Annelida III W - Annelida IV F - Parasites	Annelida	T/Th: Annelida Lab Assignment 4 (in lab) F: Annelida Assignment 4 (by 23:59)
6 Feb 14-18	M - Lecture/Lab Exam Q&A W - Mollusca I F - Mollusca II	Parasites	M/T: Lecture/Lab Exam 1 (60 minute exam with 30 minute buffer available starting at 8:30am on February 14 and ending at 8:29am February 15)
Winter Break			
7 Feb 28-Mar 4	M - Mollusca III W - Mollusca IV F - Minor Phyla V	Mollusca	T/Th: Mollusca Lab Assignment 5 (in lab) W: Portfolio Assignment 1 (by 23:59) F: Mollusca Assignment 5 (by 23:59)
8 Mar 7- 11	M - Minor Phyla II W - Arthropoda I F - Arthropoda II	Minor Phyla	T/Th: Minor Phyla Lab Assignment 6 (in lab) F: Minor Phyla Assignment 6 (by 23:59)
9 Mar 14-18	M - Arthropoda III W - Arthropoda IV F - Arthropoda V	Arthropoda	T/Th: Arthropoda Lab Assignment 7 (in lab) F: Arthropoda Assignment 7 (by 23:59)
10 Mar 21-25	M - Echinodermata I W - Echinodermata II F - Echinodermata III	Echinodermata	T/Th: Echinodermata Lab Assignment 8 (in lab) F: Echinodermata Assignment 8 (by 23:59)
11 Mar 28-Apr 1	M - Synthesis & Minor Phyla I W - Minor Phyla II F - Minor Phyla III	Lab/Lecture Exam 2	
12 Apr 4- 8	M - Bio-inspired design W - Minor Phyla Presentations F - Minor Phyla Presentations	Bio-inspired design	T/Th: Bioinspired Design Lab Assignment 9 (in lab) T: Minor Phyla Presentations (by 23:59)
13 Apr 11- 12	M - TBD	NA	T: Survey 2 & Portfolio Assignment 2 (by 23:59)

Optional activities:

Wednesdays 15:50: Class representative meetings - Please volunteer to be a class representative! Class

reps are currently enrolled students in Zoology 401 who volunteer to collect and share student feedback on the course - you can attend any meetings at any time (no commitment is required). During our weekly meeting, class reps first share ideas and comments from students and then we discuss ways to improve the course. Class reps will also lead collection and analysis of mid-semester feedback on the course. If you can't attend the meetings yourself, please take the time to talk with the class reps so that your experiences and ideas are heard!

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Wednesdays 16:30 and by appointment: Student hours - After class representative meetings on Wednesdays, Dr. Summers will be available to meet with individuals or groups to discuss any aspect of the course. If you would like to schedule a student hours session outside of these hours with Dr. Summers or another member of the instructional team, please email - we are looking forward to talking with you!

Week 7: Invertebrate Book Club - There are many non-fiction and fiction works that star invertebrates! You have the option of choosing a book that features invertebrates (>200 pages) AND participating in a discussion held outside of class during week 7. Participating in the invertebrate book club is optional and is not associated with any marks in this course, but highly recommended as a fun way to expand your thinking about invertebrates. More information on joining will be available on D2L.

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I am looking forward to learning together this term!

Electronically Approved - Jan 21 2022 10:14

Department Approval

Electronically Approved - Jan 22 2022 21:21

Associate Dean's Approval