THE UNIVERSITY OF BRITISH COLUMBIA
Irving K. Barber Faculty of Science
Okanagan Campus

Department of Biology
1177 Research Road
Kelowna, BC V1V 1V7
biology.okanagan@ubc.ca

BIO 205 - 001

Comparative Invertebrate Zoology (3)
2025/26 W T1 (fall 2025)
MW 12:30-2:00pm PST, ART-386

The UBC Okanagan campus is situated on the traditional, ancestral and unceded territory of the Syilx Okanagan Nation and their peoples, who have used this site for millennia to pass on in their culture, history, and traditions from one generation to the next. The relationship between the Syilx Okanagan Nation and UBC Okanagan is an important part of our institution's history, and it's important to respectfully acknowledge that. For more information please see: https://ok.ubc.ca/about/indigenous-engagement/

Lecture Instructor:
Name: Matthew Nelson
Office: SCI 160
Phone: 250.807.9683
matthew.nelson@ubc.ca
http://www.natureboy.com

Office Hours: TTh 10a-11a, SCI 160

Laboratory Coordinator/Instructor:
Name: Tristyn Hay
Office: SCI 155
tristyn.hay@ubc.ca

Course Description:

BIOL 205 (3) Comparative Invertebrate Zoology
Introduction to the invertebrate phyla. [3-3-0]
Prerequisite: Either (a) BIOL 125 or (b) all of BIOL 117, BIOL 122.
This course is a survey of invertebrate phyla, emphasizing the comparative aspects of their anatomy and physiology. Invertebrates are important organisms, comprising (by far) most of the animals both in terms of biomass, number of individuals, and number of species. This will likely be an introduction to a larger world, broadening your knowledge and appreciation of the diversity and scope of the animal kingdom.

Course Objectives:

The main objective of this course is to examine the diversity of the animal kingdom (exclusive of the vertebrates) while discussing taxa and evolutionary trends. Students

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should gain a basic knowledge of the phylogeny of the animals, and an appreciation for the astounding diversity of animal taxa.

Course Learning Outcomes:

Upon successful completion of this course, students will be able to:

1. Construct, understand, and interpret evolutionary trees starting with a simple character matrix and incorporating the following concepts:
   a) evolutionary steps
   b) use of outgroups
   c) primitive vs. derived characters
   d) the importance of monophyletic groupings

2. Identify the currently recognized major branches of the tree of invertebrate animals, describing the derived characters associated with each, including but not limited to:
   a) Bilateria
   b) Deuterostomia
   c) Protostomia
   d) Lophotrochozoa
   e) Ecdysozoa

3. Compare and contrast the various invertebrate phyla, summarizing the current understanding of the relationships among phyla including: Porifera, Ctenophora, Cnidaria, Rotifera, Platyhelminthes, Mesozoa, Nemertea, Annelida, Mollusca, Cycliophora, Brachiopoda, Nemata, Loricifera, Kinorhyncha, Nematomorpha, Arthropoda, Onychophora, Tardigrada, Hemichordata, and Echinodermata

4. Recognize and identify organisms with respect to phylum, class, and order, on the basis of morphological characters.

Course Format:

BIOL 205 has both a lecture and laboratory component. As with all biology courses at UBC, ***students must pass both components to pass the course.***

In order to be successful, I would recommend that you read the material first, and take a few notes. (Basically outline the chapter and make sure you know the words in bold.) In lecture, use your chapter outline and make notes on *your* notes. You should focus on what I am saying, rather than trying to copy down what is on the slide. Then, when it is time to study for the exam, study your notes. (I would not go back and re-read the chapter.)

On Canvas, the home page for the course will have links to most of the important material for the course, including modules, lecture recordings, practice quizzes, and review sheets. You may notice that some material is linked to http://www.natureboy.com, which is my website. Material on Canvas will be updated as we go, so you will need to be sure that you are looking

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at it often. If I need to communicate with you, I will do so using announcements on Canvas, so be sure that you have it set to send you these as emails. If you want to contact me, it is better to email me using actual email, rather than canvas. That way, I can more easily contact you if I need to. (and it is best to use your student email address.)

Laboratory Meeting times:

BIOL 205 labs will be held in-person. Please check your registration to determine your lab section and time.

Note: Attendance at labs is mandatory unless there is a valid medical or compassionate reason. Students who are late and miss the introductory lecture without a valid excuse will not be allowed into the lab, and will receive a mark of zero for that laboratory assignment. Students must pass both the lecture and laboratory part of a course to pass the course; please refer to the Repeat Course Policy.

Required Materials:

Biology of the Invertebrates. 7th Edition. Jan A. Pechenik. McGraw-Hill. 2010 ISBN 978-0-07-302826-2

Course Evaluation:

Midterm #1	20%	**oct 15**
Midterm #2	20%	**nov 19**
Laboratory	30%	
Final	30%	**TBA**
Total	100%	

Final grades will be based on the evaluations listed above and the final grade will be assigned according to the standardized grading system outlined in the UBC Okanagan Calendar.

Grading practices:

Faculties, departments, and schools reserve the right to scale grades in order to maintain equity among sections and conformity to university, faculty, department, or school norms. Students should therefore note that an unofficial grade given by an instructor might be changed by the faculty, department, or school. Grades are not official until they appear on a student's academic record. www.calendar.ubc.ca/okanagan/index.cfm?tree=3,41,90,1014

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Lecture Outline:

TOPIC	Readings	Tentative date
syllabus		sep 3
Natural selection, trees		sep 8
Phylogenetic Analysis and Systematics	Ch. 2	sep 10
Poriferans and Placazoans	Ch 4	sep 15
Hydrostatic Skeleton, Ctenophora, Cnidarians	Ch 5, 6, 7	sep 17
Platyhelminths I (Aceolomates) - Turbellaria	Ch 8	sep 22
Platyhelminths II– Cestoda, Trematoda		sep 24
Mesozoans, rotifers, acanthocephalans	Ch 9, 10	sep 29
Gnathifera		oct 1
Nemerteans, molluscs	Ch 11, 12	oct 6
Molluscs I- smaller groups	Ch 12	oct 8
MIDTERM 1 (ch. 2,4-10)		**oct 15**
Molluscs II - Gastropods, Cephalopoda		oct 20
Annelids - Polychaeta	Ch 13	oct 22
Annelids – Clitellata; "Lophophorates", Ecdysozoans	Ch 17-19	oct 27
Nematodes	Ch 16	oct 29
Nematodes part 2, onychophora, tardigrades	Ch 15	nov 3
Arthropods I - Chelicerates	Ch 14	nov 5
MIDTERM BREAK		***nov 10-14***
Arthropods II - Spiders, Arachnids, Myriopoda		nov 17
MIDTERM 2 (ch. 11-19)		**nov 19**
Arthropods III – crustacea		nov 24
Arthropods IV- hexapods		nov 26
Arthropods V - insect groups		dec 1
Hemichordates, Echinoderms	Ch 20, 21	dec 3
FINAL EXAM (ch. 14, 20, 21, comprehensive)		**TBA**

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Missed Assignments and Exams:

From UBC Okanagan Academic Calendar/Policies and Regulations/Academic Concession

> "Students who, because of unforeseen events, are absent during the term and are unable to complete tests or other graded work, should normally discuss with their instructors how they can make up for missed work, according to **written guidelines given to them at the start of the course**. Instructors are not required to make allowance for any missed test or incomplete work that is not satisfactorily accounted for. If ill health is an issue, students are encouraged to seek attention from a health professional. Campus Health and Counseling will normally provide documentation only to students who have been seen previously at these offices for treatment or counseling specific to conditions associated with their academic difficulties. Students who feel that requests for consideration have not been dealt with fairly by their instructors may take their concerns first to the Head of the discipline, and if not resolved, to the Office of the Dean. Further information can be found at:
> http://www.calendar.ubc.ca/okanagan/index.cfm?tree=3,48,0,0.

Makeup exams: If you have to miss an exam, you need to contact me ***as soon as possible*** to let me know what is going on. When you are able to return to class, we will schedule a makeup exam. It is in your best interest not to miss an exam; students rarely do well on makeup exams. However, if you *are sick* you should not attend an exam or class. If you miss more than one exam, you probably need to drop the course.

Students may be excused from laboratories only with a physician's certificate verifying illness or other supporting documents for a compassionate leave. If a student is unable to complete a laboratory or a laboratory exam for a good and verifiable reason, the marks may be redistributed. Please talk to your TA or the lab coordinator as soon as possible if ill or if you will be missing a laboratory or a lab exam. (Holidays are not acceptable reasons for missing labs).

Final Examination:

Students are expected to make themselves available to write final exams at the scheduled times. In the event of an exam clash (i.e., two exams schedule at the exact same date and time) students must inform the instructors as soon as possible, so that alternate arrangements can be made. In the event of an exam hardship (i.e., 3 or more exams that start and end in a 27-hour period, must notify the instructor of the second formal examination no later than one month prior to the examination date for courses in the Winter Session (whether in December for Term 1 or April for Term 2), and no later than two weeks prior to the examination date for courses in the Summer Session. For more information, please see the BC Okanagan Academic calendar, regarding exam clashes and hardships.

Note: Any requests for changes to final exams must be sent to the office of the Associate Dean of Students (bsasdeansoffice.ubco@ubc.ca).

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Repeat Course Policy:

Students who fail either the lecture or lab portion of [BIOL/BIOC XXX], receive a 49% as their final grade, and will be required to repeat the course in order to receive credit. Students who wish to repeat the course for a more favorable grade, or a student who wishes to repeat the failed portion of the course may do so, if, and only if, the following requirements are met:

- If the student failed the laboratory portion of the course, but achieved a grade of at least C (60%) in the lecture portion of the course, the student may opt to repeat only the laboratory portion.
- If the student failed the lecture portion of the course, but achieved a grade of at least C (60%) in the laboratory portion of the course, the student may opt to repeat only the lecture portion.
- The course must be taken again within two years of the term in which the student was originally enrolled in the course (e.g., if the course was originally taken in the Fall term of 2021, the last possible term in which the student can repeat the course is Fall of 2023).
- In situations where the weighting of the lab/lecture component changes from year to year (e.g., 30% lab, 70% lecture in one year; 40% lab, 60% lecture in another year), it will be at the discretion of the instructor teaching the course the second time to decide the weighting in the calculation of the new grade.
- The student must complete the "Repeat Course" form, which can be found on the Biology Dept Resources page on their website. The form must be returned to the Department Assistant in SCI 154, or by email to biology.okanagan@ubc.ca by the add/drop deadline.

Please note that the university policy is that the student must register and pay for the complete course, and not just a portion of the course.

Academic Integrity:

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the break-down of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President's Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences.

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A more detailed description of academic integrity, including the policies and procedures, may be found at:
http://okanagan.students.ubc.ca/calendar/index.cfm?tree=3,54,111,0

If you have any questions about how academic integrity applies to this course, please consult with your professor.

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Disability Resource Centre

The Disability Resource Centre (DRC) facilitates disability-related accommodations and programming initiatives that ameliorate barriers for students with disabilities and/or ongoing medical conditions. If you require academic accommodations to achieve the objectives of a course, please contact the DRC at:

UNC 215 250.807.8053
Email: drc.questions@ubc.ca
Web: https://students.ok.ubc.ca/academic-success/disability-resources/

Equity and Inclusion Office

Through leadership, vision, and collaborative action, the Equity & Inclusion Office (EIO) develops action strategies in support of efforts to embed equity and inclusion in the daily operations across the campus. The EIO provides education and training from cultivating respectful, inclusive spaces and communities to understanding unconscious/implicit bias and its operation within in campus environments. UBC Policy 3 prohibits discrimination and harassment on the basis of BC's Human Rights Code. If you require assistance related to an issue of equity, educational programs, discrimination or harassment please contact the EIO.

UNC 325H 250.807.9291

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Email: equity.ubco@ubc.ca
Web: https://equity.ok.ubc.ca/

Resources for Indigenous Students:

Indigenous Programs & Services provides community and culturally appropriate services and support to First Nation, Métis, and Inuit Students. You belong here.
The Indigenous Centre, located on the second floor of the University Centre building (UNC 210), provides a sense of belonging and community to First Nations, Métis, and Inuit students. This home away from home is committed to enriching the quality of the student experience for Indigenous students by promoting access, providing capacity building opportunities, and celebrating success.

Website: https://students.ok.ubc.ca/indigenous-students/

Office of the Ombudsperson for Students

The Office of the Ombudsperson for Students is an independent, confidential and impartial resource to ensure students are treated fairly. The Ombuds Office helps students navigate campus-related fairness concerns. They work with UBC community members individually and at the systemic level to ensure students are treated fairly and can learn, work and live in a fair, equitable and respectful environment. Ombuds helps students gain clarity on UBC policies and procedures, explore options, identify next steps, recommend resources, plan strategies and receive objective feedback to promote constructive problem solving. If you require assistance, please feel free to reach out for more information or to arrange an appointment.

UNC 217 250.807.9818
Email: ombuds.office.ok@ubc.ca, Web: www.ombudsoffice.ubc.ca

Student Learning Hub

The Student Learning Hub is your go-to resource for free math, science, writing, and language learning support. The Hub welcomes undergraduate students from all disciplines and year levels to access a range of supports that include **tutoring in math, sciences, languages, and writing, as well as help with academic integrity, study skills and learning strategies**. Students are encouraged to visit often and early to build the skills, strategies and behaviours that are essential to being a confident and independent learner. For more information, please visit the Hub's website.

LIB 237 250.807.8491
Email: learning.hub@ubc.ca
Web: https://students.ok.ubc.ca/academic-success/learning-hub/

Student Wellness

At UBC Okanagan health services to students are provided by Student Wellness. Nurses, physicians and counsellors provide health care and counselling related to physical health, emotional/mental health and sexual/reproductive health concerns. As well, health promotion, education and research activities are provided to the campus community. If you require

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assistance with your health, please contact Student Wellness for more information or to book an appointment.

UNC 337 250.807.9270
Email: healthwellness.okanagan@ubc.ca
Web: https://students.ok.ubc.ca/health-wellness/

Independent Investigations Office (IIO):

If you or someone you know has experienced sexual assault or some other form of sexual misconduct by a UBC community member and you want the Independent Investigations Office (IIO) at UBC to investigate, please contact the IIO. Investigations are conducted in a trauma informed, confidential and respectful manner in accordance with the principles of procedural fairness. You can report your experience directly to the IIO (investigationsoffice.ubc.ca):

Email: *director.of.investigations@ubc.ca*
Telephone: 604.827.2060

SAFEWALK

Don't want to walk alone at night? Not too sure how to get somewhere on campus? Call Safewalk at ***250-807-8076.***

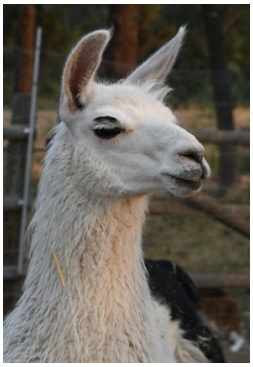
For more information, see: https://security.ok.ubc.ca/safewalk/

Biology Laboratory Manager and Outreach Coordinator

Biology Laboratory Manager: Dr. Tristyn Hay. See Canvas Lab Website for contact information, or follow hyperlink to find my departmental page.

About Me: I love anything related to animals! If I am not working at UBCO I am off campus teaching marine biology to children ages K-12 or working on my farm with my 3 dogs, 7 cats, 28 chickens, 17 goats, 3 sheep, 1 gorgeous llama (named Elliot – see pics below), 2 emus and 7 rabbits.

Office Hours: You can make an appointment via email tristyn.hay@ubc.ca.



Handsome Elliot

Peanut on driveway

Foebe wearing my hat

My Role

As the biology program manager my role is to ensure that the labs are run in a safe and engaging manner. I will be sending out regular announcements through Canvas with information regarding lab expectations, assignments and last-minute changes that may need to be made, so it is important that you check your Canvas emails daily. When you are ill or have a scheduling conflict, I am the one you want to contact. If you are having any issues or concerns regarding; your lab, your TA, grades or if you simply need to reach out and send me an email. In order to better help answer your question in a timely manner please ensure that you have provided your **full name, the course you are registered in, the lab section number and your TA's name**.

Our Technician

Sunil Kainth, our course technician, supports all on-campus aspects of the lab. He manages the setup and takedown of materials and will also help you navigate Canvas. He'll post a video tutorial and hold office hours during the first week—details will be shared on Canvas.
When contacting Sunil, please include your full name, course, lab section, and TA's name. You can reach him at **sunil.kainth@ubc.ca** or in **SCI 103**.

Teaching Assistants

While Sunil and I will be available, your primary point of contact will be your teaching assistant (TA). They'll support you throughout the lab—during sessions, office hours, and via email—to ensure a positive experience.

For questions about assignments, grading, due dates, or upcoming work, please reach out to your TA. You'll meet your TA and classmates during your first lab session, starting the week of the 8th.

Modules:

All assignments must be submitted through Canvas. While your TAs may remind you of upcoming deadlines, staying on top of your work is your responsibility. Please review the lab outline and materials on Canvas.
Best of luck this term—and enjoy the experience!

Required Materials

- Hickman, C. P., Jr., Kats, L. B., Keen, S. L., & Eisenhour, D. J. (2024). *Laboratory studies in integrated principles of zoology* (19th ed.). McGraw Hill LLC.
- Access to Canvas is required as all relevant materials for the lab will be available here. It is the responsibility of the student to ensure they have access to their canvas course lab shell. Any issues please contact CTL (Centre for Teaching and Learning) at ctl.helpdesk@ubc.ca.

Missed Laboratory Sessions

Attendance of labs is mandatory, and students **must** attend **only** the lab section they are registered in.

Regular Labs/Assignments:

Students who miss more than **2 labs/assignments** will fail the lab component of the course. For missed labs/assignments (not including lab reports or exams), Canvas will automatically exclude the lowest two marks. Lab section switches and/or extensions will NOT be permitted for these labs.

Lab Report Submission and Lab Exams:

Students are NOT permitted to miss any lab exams. Students who miss a lab exam, will fail the lab component of the course. Lab section switches may be available assuming the student has contacted the lab manager within 24 hours of the absence and provided the appropriate documentation.

Students are solely responsible for tracking their own absences. Your laboratory manager will only notify students about any failures due to missed labs/assignments at the end of term.

Lab Schedule

Date (week of)	Module	Description	Format	Expected Assignments
Sep 08-12	1	Orientation/Porifera	In-person	8 Exercise/Report
Sept 15-19	2	Cnidarian	In-person	9 Exercise/Report
Sept 22-26	3	Platyhelminthes	In person	10 Exercise/Report
Sept 29-Oct 03	4	Nematoda/Rotifera/Acanthocephala/ Gastrotricha/Nematomorpha	In person	11 Exercise/Report
Oct 6-10	5	Mollusca	In person	12 Exercise/Report
Oct 13-17	6	Annelida	In person	13 Exercise/Report
Oct 20-24	7	Midterm Lab Exam	In person	Exam
Oct 27-31	8	Arthropoda Chelicerata & Crustacea	In person	14 & 15 Exercise/ Report
Nov 3-7	9	Arthropoda Myriapoda & Hexapoda	In person	16 Exercise/Report
Nov 10-14		**NO LABS – READING BREAK**		
Nov 17-21	10	Echinodermata	In person	17 Exercise/Report
Nov 24-28	11	Cumulative Final Lab Exam	In person	Exam

Grading Breakdown

Description	Value	Due Date (Week of)
Orientation/Porifera	1%	September 8th
Cnidarian	1%	September 15th
Platyhelminthes	1%	September 22nd
Nematoda/Rotifera/Acanthocephala/ Gastrotricha/Nematomorpha	1%	September 29th
Mollusca	1%	October 6th
Annelida	1%	October 13th
Midterm Lab Exam	6%	October 20th
Arthropoda Chelicerata & Crustacea	1%	October 27th
Arthropoda Myriapoda & Hexapoda	1%	November 3rd
Echinodermata	1%	November 17th
Cumulative Final Lab Exam	15%	November 24th
	30% of course grade	