

Faculty of Science Course Syllabus
Department of Biology
Biol 2003: Animal Diversity
Fall 2019

Instructors: Dr. Jen Frail- Gauthier (Lecturer) jfrail@dal.ca LSC B 5014
Office hours: By appointment or whenever door is open

Lara Gibson (Laboratory Instructor) ldgibson@dal.ca LSC B 5089
Office hours: At open lab on Friday 2:30-4:30, by appointment,
or whenever door is open.

Please direct all course correspondence to either Jen or Lara. If it is a lab enquiry contact Lara, and if it is a lecture enquiry contact Jen.

Please address us by our first names.

Lectures: Lectures are held in the ROWE Management Building 1028
Mondays, Wednesdays and Fridays, 11:35 am -12:25 pm.
Full schedule is on pg 2

Laboratories: Room 2102, next to the McCulloch Museum. You are expected to attend each lab session in your own lab period. The day and time of each lab are as follows:

Table 1 Animal Diversity Lab section, day, time and teaching staff.

Section	Day	Times	TAs
B01	Tuesday	11:35 am – 2:25 pm	Lara & Andrea
B02	Tuesday	3:05 – 5:55 pm	Lara & Mili
B03	Wednesday	1:35 – 4:25 pm	Lara & Lucy
B04	Wednesday	5:35 – 8:25 pm	Lara & Hilary
B05	Thursday	1:05 – 3:55	Lara & Raphael
B06	Thursday	5:05 – 7:55 pm	Lara & Manuelle

Laboratory sessions are held weekly for 11 weeks of the term, on the following dates:

- 1) Sep 9-13,
- 2) Sep 16-20,
- 3) Sep 23- 27,
- 4) Sep 30- Oct 4,
- 5) Oct 7-11,
- 6) Oct 14-18,
- 7) Oct 21-25,
- 8) Oct 28- Nov 1,
- 9) Nov 4-8,
- 10) Nov 18- 22,
- & 11) Nov 25-29

Tutorials: *N/A*

Table 1 Lecture Schedule and Lab Topics by date. Please note, lecture topics may vary slightly by date but test dates are fixed.

Date	#	Lecture Topic	Laboratory Topic
Sept. 4	1	Class Introduction & Taxonomy	
Sept. 6	2	Biodiversity	
Sept. 9	3	Animal Architecture	1. Introduction & Habitat Biodiversity
Sept. 11	4	Phyla Porifera & Placozoa	
Sept. 13	5	Phylum Cnidaria	Friday Open Lab 2:30-4:30
Sept. 16	6	Phylum Ctenophora & Intro to Bilaterian animals	2. Porifera, Cnidarians, & Ctenophora
Sept. 18	7	Phyla Aceolomorpha & Platyhelminthes	
Sept. 20	8	Annelida- a true can of worms!	Dal BioBlitz
Sept. 23	9	Phylum Mollusca (Part 1)	3. Worms
Sept. 25	10	Phylum Mollusca (Part 2)	
Sept. 27	11	All the small things (Lophotrochozoa)	Friday Open Lab 2:30-4:30
Sept. 30	12	TEST 1	4. Molluscs
Oct. 2	13	Non-Arthropod Ecdysozoans	
Oct. 4	14	Phylum Arthropoda (Part 1)	Friday Open Lab 2:30-4:30
Oct. 7	15	Phylum Arthropoda (Part 2)	5. Arthropods
Oct. 9	16	Phylum Echinodermata (Part 1)	
Oct. 11	17	Phylum Echinodermata (Part 2)	Friday Open Lab 2:30-4:30
Oct. 14		No Class: Thanksgiving	6. Echinodermata
Oct. 16	18	Phylum Hemichordata	
Oct. 18	19	Introduction to Vertebrates	
Oct. 21	20	TEST 2	7. Information Literacy
Oct. 23	21	Phylum Chordata- Tunicates & Cephalochordates	
Oct. 25	22	Vertebrate beginnings & early "fishes"	Friday Open Lab 2:30-4:30
Oct. 28	23	Gnathostomes and cartilaginous fishes	8. Fish & Lissamphibia
Oct. 30	24	Osteichthyes- the bony fishes	
Nov. 1	25	The origin of tetrapods and the move to land	Friday Open Lab 2:30-4:30
Nov. 4	26	Lissamphibia- extant amphibians	9. Amniotes
Nov. 6	27	Introduction to the Amniotes	
Nov. 8	28	The reptiles (part 1)	Friday Open Lab 2:30-4:30
Nov. 11			
Nov. 13			
Nov. 15		STUDY BREAK	
Nov. 18	29	TEST 3	10. Citizen Science & Review
Nov. 20	30	The reptiles (part 2)	
Nov. 22	31	Archosaurs: crocs and dinosaurs	Friday Open Lab 2:30-4:30
Nov. 25	32	Origin of flight	11. Lab Test
Nov. 27	33	Modern birds (part 1)	
Nov. 29	34	Modern birds (part 2)	
Dec. 2	35	Mammals (part 1)	
Dec. 3	36	Mammals (part 2)	

The open lab sessions are not intended as a 'make up' lab. Instead it is an opportunity to review, ask questions, or work ahead on any lab material. Open lab is held in LSC- B 2102.

Course Description: Surveys the diversity of forms and function of invertebrate and vertebrate animals. The course takes a phylogenetic approach, exploring the evolutionary relationships and key transitions between metazoan taxa. Examples of the different life forms are introduced.

Course Prerequisites: A grade of C or higher in BIOL 1011.03 or (BIOL 1021.03, BIOL 1031.03, BIOA 1003.03, SCIE 1505.18).

Course Materials

REQUIRED:

Hickman CP Jr, Roberts LS, Keen SL, Larson A, Eisenhour DJ. 2015. Animal Diversity. 8th ed. Boston: McGraw Hill, 479 p.

Note: It is acceptable to use the 7th edition of Animal Diversity.

Gibson L, Corkett C, Chapman L, & Frail-Gauthier J. 2018. Biology 2003 Animal Diversity Laboratory Manual.

Lab Coat: Dalhousie university policy states that all students will wear a lab coat when attending a laboratory session with potential hazards. Lab coats can be transported to and from lab in a plastic bag.

OPTIONAL:

Top Hat Licence. These are available from the bookstore. Jen will be introducing the occasional Top Hat question during lecture. These will not have a grade associated with them.

Other classes (that I know of) which are using Top Hat: Biology 2004 W (for marks), Biology 2020 F/W (for marks), Biol 2030 F/W (for marks), Biol 3301 (for marks), & Biol 3326 (for marks)

Sept JD. 2008. A photographic guide to Seashore Life in the North Atlantic, Canada to Cape Cod. New Jersey: Princeton University Press, 224 p.

Kinsely K. 2005. A student handbook for writing in biology. 4th ed. Sunderland: Sinauer Associates. 237 p. (Dalhousie Killiam call number QL 605 P68 1996)

ON COURSE RESERVE AT KILLIAM LIBRARY: The following items will be placed on course reserve in the library.

- One copy of Hickman et al. 8th ed. On 2 hour reserve
- Two copies of Hickman et al. 7th ed. One on 2 hour reserve, one on 24 hour reserve

Course Assessment: 54% of your grade is from Lectures, 46% from Labs, as follows:

Table 3 Assessment components, value and due dates. ‘*’ indicate assignment has a group work component. If there are marks in brackets, it indicates the proportion of the mark that is a result of (group work + individual work)

Evaluation Component	Weight (% of final grade)	Due Date
Invertebrate Midterm	13.5	September 30 th
Invertebrate Final	13.5	October 21 st
Vertebrate Midterm	13.5	November 18 th
Vertebrate Final	13.5	TBA: During regular exam period
BioBlitz Participation	3	September 20 th
Lab 2 Results	0.5	September 16 th - 20 th
Habitat Biodiversity Project	10.5	October 7 th
Drawing 1: Worms	1	No later than September 27 th
Mollusc Question*	1	September 30 th – October 4 th
Information Literacy *	4 (3+1)	October 28 th - November 1 st
Fish Observations	4	November 4 th - 9 th
Arthropod Project *	3	November 18 th - 22 nd
Natural History Page	1	No later than November 18 th
Citizen Science*	5	November 18 th - 22 nd
Summary Quiz	13	November 25 th - 29 th

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

A+ (90-100)	B+ (77-79)	C+ (65-69)	D (50-54)
A (85-89)	B (73-76)	C (60-64)	F (<50)
A- (80-84)	B- (70-72)	C- (55-59)	

The common grade scale defines achievement of each grade level as follows:

A- to A+: “Considerable evidence of original thinking; demonstrated outstanding capacity to analyze and synthesize; outstanding grasp of subject matter; evidence of extensive knowledge base.”

B- to B+: “Evidence of grasp of subject matter, some evidence of critical capacity and analytical ability; reasonable understanding of relevant issues; evidence of familiarity with the literature”

C- to C+: “Evidence of some understanding of the subject matter, ability to develop solutions to simple problems; benefitting from his/ her university experience”

Biol 2003 WOW Factor: For each assignment in this course, submitting work which fulfills the requirements of the assignment will earn you a good grade. However, maximum points will only be awarded for exceptional work. Exceptional work can result from presentation, a creative approach, expansion of the content, or linkage of the content to other classes. In short there is no single definable factor that will make your work exceptional, instead it will reflect the criteria outlined in the A- to A+ definition.

When thinking about the ‘WOW factor’, consider the community you are training to be a part of, ie. a biological scientist. This community values characteristics such as building on the work of others, good experimental design, creativity, clear data presentation and analysis, excellent descriptions, thoughtful observations, and a wide variety of other skills. How have you emulated these skills in your work?

When assigning final grades, the first decimal place will be considered.

Course Objectives/Learning Outcomes

The biology department has created a curriculum map of the courses it offers. If you are interested in seeing the map, you can find it at: <https://biology.academics.cs.dal.ca/>

On that page if you click on the courses link, you will come to a list of all the courses offered by the biology department. Clicking on any of the individual classes leads to a class page, with a map for the class, illustrating what classes are needed to take the class and what subsequent classes require the class of interest.

Below the map, you'll find a list of assumed learning outcomes; these are the skills and topics a student is expected to know at the start of the class. Following this list is a second list of student learning outcomes, these are the topics and skills a student is expected to learn during the class of interest.

The assumed learning outcomes, the list of skills and topics we expect you to be familiar with at the start of Biology 2003, include:

- Create scientific questions, propose a written hypothesis as a tentative answer to that question and generate observable predictions consistent with that hypothesis.
- Describe basic animal body plans and identify different tissue types.
- Explain exponential population growth and intraspecific competition.
- Explain why community or food web structure is likely to change if a top predator is removed.
- Explain why small population size is of concern to conservation biologists.
- Provide examples of how biological interactions (competition, predation, mutualism) structure communities.
- Understand the features that allowed transition from aquatic to terrestrial environments.
- Use and know when to make use of common biological research tools such as compound microscopes, gel electrophoresis units, pipettors and micropipettors, bioinformatics tools, and enzyme assays.
- Analyze data using basic statistical techniques (mean, standard deviation, n, chi-square test).
- Collect both quantitative and qualitative data through careful observation.
- Describe early developmental processes in sea urchin, frog and humans.
- Describe the form and function of skeletal muscles and cardiovascular, digestive, endocrine, excretory, immune, and respiratory systems, using the human model as an example.
- Interpret animal social behaviour in light of natural selection (costs and benefits).
- Know main animal diet types and adaptation to those diets.
- Report data using written descriptions, graphs, tables, and sketches.
- Use simple models to describe unlimited (exponential) and limited (logistic) population growth.

The student learning outcomes, the list of skills and topics we expect you to learn during Biology 2003, include:

- Assess credibility of source material
- Manage group work
- Use dissecting and compound microscopes
- Describe conservation issues facing taxonomic and functional groups of metazoans
- Identify major invertebrate and vertebrate taxa
- Use raw data to produce summary statistics and plots
- Use taxonomic keys
- Associate metazoan phyla with the habitats/environments that they occupy
- Compare classification of metazoans into major clades: protostomes/ deuterostomes, ecdysozoans, lophotrochozoans
- Generalize and appreciate animal diversity on a global scale
- Relate changes in animal systems to transition onto land
- Describe the Geologic history and time-scales associated with the evolution of metazoans
- Compare the variety of invertebrate and vertebrate animal body- form, ecologies, life histories, and physiology
- Relate animal phyla to key transitions on a cladogram

Online presence

Brightspace: The course maintains a brightspace page. To access the site start at Dal.ca, click on the brightspace tab on the upper right of the banner. This will bring you to a log on page, which asks for your netID and password. Once you are logged in you should see all pages (links) for any of your classes that have OWL pages.

Twitter: The class maintains a class twitter feed @DalBiodiversity. This account is used to share articles about biodiversity, news from around Dalhousie and the occasional picture. I believe this account is a nice model of how to have a professional social media presence. In the past year I have noted several job ads that required social media skills, so cultivating a professional online persona is something you should consider putting in place.

You are not obliged to sign up to twitter or follow this feed. However this feed is for you if want articles on biodiversity, animals, plants, and the occasional picture. As a general rule we will not follow student accounts (we're sure there are things you want to tell your friends and not us).

LibGuide: The Dalhousie University Science Librarian, Michelle Paon, has put together a subject guide for biology. On this page you will find links to the key databases, relevant books, writing guides, and other useful research tools. You can find the subject guide here: http://dal.ca.libguides.com/biology_2000_level, and as a link on the brightspace page.

Course Policies

Late assignment policy: Unless otherwise stated all assignments are due at the start of your regular lab period, during the appropriate week. Late assignments will be penalized at 10% per day.

If you cannot submit an assignment due to illness or other valid reasons please alert Lara at the time the assignment is due, and the appropriate arrangement will be made. Valid documentation of your situation will be expected.

Absences & the Student Declaration of Absences: It is likely that at some point during the term you will have to miss some instructional time due to illness or other exceptional circumstances. It is your responsibility to contact us as soon as you know you will miss a lab or test. We will accept the Student Declaration of Absence twice in the term, and will make the appropriate accommodations. Please alert us that you have used the SDA by sending Lara an email (ldgibson@dal.ca). If you miss a lab and you are able to attend another lab session in that week, you do not need to submit an SDA.

Past two uses of the Student Declaration of Absence we will make accommodations at our discretion.

For labs, the ideal situation would be to cover the material at a later lab session. However, most lab sections are full, and it will not always be possible to accommodate requests to attend an alternate lab. The appropriate accommodation will be decided on a case by case basis. In all cases you are responsible for the missed material. **Please note:** the Friday Open Lab is not a 'make up' lab.

If you miss a lecture test please contact Lara Gibson (ldgibson@dal.ca) as soon as you know you'll be missing a test, and explain the circumstances. Arrangements will be made with the appropriate documentation.

Cell phones, & Electronic devices: Please be respectful of your fellow students and refrain from using your cell phone, laptops, and tablets/ iPad for reasons other than 1) recording AUDIO of lectures (please ask for permission from Jen before you do this) and, 2) following along with the class powerpoints/ taking notes.

In the past we have watched students play video games, check facebook, and shop for shoes during lecture. These are all examples of activities which should be completed on your own time.

You are encouraged to bring cameras to lab and to share your photos through the OWL discussion board. Having photos of the examined specimens, especially if you review them immediately after lab and add notes, will be beneficial when studying for the summary quiz. In the past students have been fairly successful with taking photos of microscope specimens using their phone's cameras.

Laboratory rules: Since the laboratory room is used every day of the week, we ask you to please observe the following:

1. At the end of the lab wash and put away any shared equipment to the appropriate areas.

Ensure equipment and supplies found at your bench are cleaned and returned to your bench.

Wipe down your bench to make a pleasant working space for the next group (this is especially important on weeks with dissections!!!)

2. Use the appropriate containers to dispose of your waste. There are garbage bins located under each sink on the side benches (This is also where you can find paper towels).

The drains at your benches are not appropriate places to leave waste or to dump liquids. Dispose of liquids in the sinks on the side of the room.

Sharp items should be placed in the yellow buckets (with the biohazard symbol on them) on the side counter, not in the garbage, where they might pose a hazard to our custodial staff.

3. On the weeks where the lab activity has included a dissection, please put the carcasses in the clear bags at the front of the room.

The squid and fish are used to feed the crabs and other critters housed in the seawater tanks throughout the remainder of the year, so no more than 4 squid or 2 fish should be placed in a single bag.

In addition, please ensure that no razor blades or other sharp objects are left/ included in the bags.

Referencing & Photo Credits:

Text: When crediting other people’s work please use the Name-Date system of the Council for Science Editors (CSE) style. There is a link to the style guide on the brightspace website.

In your work, ANY and ALL statements that were not empirically derived for yourself as part of an experiment or study, for that assignment, must be credited to a source. In text citations should be given as (Name Date), and all sources should be collected into a list at the end of your work and presented in CSE style. Your source list should be in alphabetical order.

A skill you should be cultivating throughout your academic career is to determine the credibility of your sources. The peer review process, where the methodology, results and broader context of an experiment are written up and submitted to other researchers in the same field of study are the most credible forms of published work. Books and documentaries often draw their evidence from the peer-reviewed literature and are edited. These make them credible sources. New articles may or may not be based on peer-reviewed sources and so have varying degrees of credibility. Web sources can be very confusing, some are based on the peer reviewed literature, some are based on people’s unsupported opinion or current working theories.

There is a credible checklist flowchart to help you determine the credibility of web sources. A PDF copy of the flowchart document is located on brightspace, under the lab folder. The flow chart was developed based on the criteria outlined by Dalhousie University Librarians.

Please use the flowchart in conjunction with the following table (This will also be posted on brightspace as a word document). As you move through the flowchart add “+” or “-“ to your table. As you increase the number of “-“ signs the credibility of your site decreases. After you have gone through all criteria you can determine if you site is credible, less credible or not credible.

Table 4 Summary of online source credibility

Web Site	1. Authority	2. Purpose/ Objectivity	3. Currency	4. Accuracy	Overall
1.					
2.					

If you are using websites as references, please include the table as an appendix to your report.

Photos: Not all photos presented on the internet are available for use. Some were developed for specific companies or sites and require permission or payments for use. However, if you look around you can often find photos that are published with creative commons or educational use licenses. A good source for useable photos is http://commons.wikimedia.org/wiki/Main_Page

If it unclear under which type of license the photo was posted, you must contact the creator of work to ask permission to use it for your project.

When you present a photo you should place the name of the photographer and the license under which the photo is being used beside the photo. The full reference for where the photo was taken from should be included in your reference list.

For example if you wanted to use this super cute photo of a Tardigrada in a presentation you could include the tag “Bob Goldstein & Vicky Madden, Creative Commons license”, either underneath or beside the photo.



Figure 1: Tardigrada. Bob Goldstein & Vicky Madden, Creative Commons license.

Then in your reference list you would include the full reference of:

Goldstein B, Madden V. 2008. Wikimedia commons [Internet]. USA: UNC Chapel Hill; [2008 May; cited July 30, 2015]. Available from: <https://commons.wikimedia.org/wiki/File:Waterbear.jpg>

At some point you may want to use video in your work. YouTube is a good source, but again you need to watch what type of license the video is published under. If it is the standard YouTube license, you can play the video from the YouTube platform, but cannot download it or embed in your presentation. If it is under a creative commons license, you can download and embed it. One thing to watch for is pirated video, ie, clips from shows like The Blue Planet or Shape of Life. If the clips are hosted on the production companies YouTube channel, chances are you may use them. However, if the clips have been posted by a private individual who has taken the clips from a video, it is not likely posted under fair use.

If you use photos/ video in your work, you must 1) ensure the photo is licensed under a creative commons, public domain, or educational use license, and 2) on or near the photo indicate who the photographer is and the type of license it is used under.

Taxa & Spelling: In all assessments students are expected to know and be able to spell the names of taxa discussed in the class. A full list of the taxa you are expected to know can be found on pages 29-31.

ANIMAL OBSERVATIONS & DISSECTIONS: All animal observations and dissections have been approved by the University Committee on Laboratory Animals at Dalhousie University. Activities are completed under permit number I18-17, valid through August 1st, 2020.

This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate

Accessibility

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).

Information: https://www.dal.ca/campus_life/academic-support/accessibility.html

Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity.

Information: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner—perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution.

Code: https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness

Statement: <http://www.dal.ca/cultureofrespect.html>

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel and support. Visit the office (Rm 3037, McCain Building), e-mail (elders@dal.ca) or leave message (902-494-6803).

Information: https://www.dal.ca/campus_life/communities/indigenous.html

Important Dates in the Academic Year (including add/drop dates)

https://www.dal.ca/academics/important_dates.html

University Grading Practices

https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Student Resources and Support

Advising

General Advising https://www.dal.ca/campus_life/academic-support/advising.html

Science Program Advisors: <https://www.dal.ca/faculty/science/current-students/academic-advising.html>

Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html

Black Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html

International Centre: https://www.dal.ca/campus_life/international-centre/current-students.html

Academic supports

Library: <https://libraries.dal.ca/>

Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html

Studying for Success: https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html

Copyright Office: <https://libraries.dal.ca/services/copyright-office.html>

Fair Dealing Guidelines <https://libraries.dal.ca/services/copyright-office/fair-dealing.html>

Other supports and services

Student Health & Wellness Centrehttps://www.dal.ca/campus_life/health-and-wellness/services-support/student-health-and-wellness.html

Student Advocacy: <http://dsu.ca/dsas>

Ombudsperson: https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html

Safety

Research Lab Safety https://www.dal.ca/content/dam/dalhousie/pdf/dept/safety/lab_policy_manual_2007.pdf

Biosafety: <https://www.dal.ca/dept/safety/programs-services/biosafety.html>

Chemical Safety: <https://www.dal.ca/dept/safety/programs-services/chemical-safety.html>

Radiation Safety: <https://www.dal.ca/dept/safety/programs-services/radiation-safety.html>

Scent-Free Program: <https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html>