DALHOUSIE UNIVERSITY

Faculty of Science Course Syllabus
Department of Biology
BIOL 3079 and MARI 3076
Animal Physiology and Marine Animal Physiology, Part II
Winter, 2019

Instructor(s): Dr. Alan Pinder; alan.pinder@dal.ca; room 4130

Dr. Nancy McAllister-Irwin; irwinn@dal.ca; room 6130, 494-3818

Lectures: M, W, F; 8:35 – 9:25 LSC 236

Laboratories: Room 7009, 3 hours

BIOL 3079

B01: Monday, 2:30-5:30pm, Room 7009, Biology Department.
B02: Tuesday, 2:30-5:30pm, Room 7009, Biology Department.

MARI 3076

B01: Wednesday, 1:30-4:30pm, Room 7009, Biology Department.
B02: Thursday, 10:00-1:00pm, Room 7009, Biology Department.

Course Description

This course is a continuation of a discussion of the mechanisms which coordinate the activities of cells within multicellular organisms which began in BIOL 3078.03/MARI 3074.03. This term emphasizes the urinary, cardiovascular and respiratory systems. The laboratories reflect the approaches taken to study these systems in a variety of organisms.

LECTURE HOURS PER WEEK: 3
LAB HOURS PER WEEK: 3
PREREQUISITES: BIOL 3078.03 or MARI 3074.03
CROSS-LISTING: MARI 3076.03
EXCLUSIONS: BIOA 3005.03

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Course Objectives/Learning Outcomes

Skills in BIOL 3078/79 and MARI 3074/76

Communication skills

- Writing of formal laboratory sections – better understanding of grammatical rules
- Oral communication skills using various media (Powerpoint, videos, etc) of an article from the primary literature
- Discussion skills obtained in seminars

Critical thinking

- Critical analysis of scientific journal paper
- Analysis/interpretation of scientific journal papers for experimental exercises
- Analysis and interpretation of data from experimental exercises and computer simulations

Library/web search skills

- Conduct literature and online searches of primary and secondary sources using electronic data bases and online search tools

Computer skills

- Use of computer software for word processing and data analysis
- Use of interactive simulations to integrate physiological concepts

Statistical/data analysis

- Use of statistical packages to display graphs and charts for assignments

Teamwork skills

- Work in pairs or small groups to develop data for assigned experiments

Problem solving

- Problem solve in many laboratory and simulation exercises

Practical skills

- Basics – dissection, microscopy, micrometers, pipetting, spectrophotometry, chemical dilutions, titrations, animal handling, chemical and laboratory safety concepts
- Specific – electro-physiological transducers, recording oscillographs, pulse stimulators
- Digital plethysmographs, blood pressure cuff, ECG
- Human sensory physiology systems for vision (Snellen, astigmatism, Ichikawa, blind spot charts), hearing activity, touch, taste and smell tests
- Reflexes (patella, corneal, papillary, ciliospinal, consensual, vestibular
- Human renal recording (osmometers, specific gravity meters, chloride ion titrations
- Circulatory physiology – identification of blood vessels and cells, hematocrit determinations, haemoglobin measurements
- Respiratory and exercise physiology – spirometers, dissolved oxygen meters

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Course Materials

Hill, R., G. Wyse and M. Anderson. *Animal Physiology.* Third edition. 2012.

Knisely, K. *A Student Handbook for Writing in Biology.* Fourth edition. 2004.

Course Assessment

Problem sets	20%
Laboratory assignments (reports, quizzes, exam)	40%
1 Final lecture exam	40%
Total	100%

The Final exam and Laboratory exam will be combined and written together during the regular examination period scheduled by the Registrar's office during the official examination time at the end of the term. **Please ensure your travel plans do not overlap with the examination period, as this is not a valid excuse for deferring or advancing a final examination.**

Laboratory assignments and evaluation information are given in the laboratory manual. This class subscribes to a Brightspace Learning web-based service that checks for originality in submitted papers.

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)	

Course Policies

Dalhousie students are asked to take responsibility for their own short-term absences (3 days or less) by contacting their instructor by phone or email prior to the academic requirement deadline or scheduled time and by submitting a completed Student Declaration of Absence to their instructor in case of missed or late academic requirements (marks will still be deducted for missing or late assignments). Only 2 separate Student Declaration of Absence forms may be submitted per course during a term.

Please inform us in advance if you are unable to attend your final exam (a Student Declaration of Absence will NOT cover final exams). It will normally only be rescheduled for illness, and we will require a medical certificate from your doctor. Make up exams will be given **within one week** of the scheduled exam date at a mutually convenient time.

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Course Content

Tentative Lecture Schedule BIOL 3079 and MARI 3076, Winter 2018

Week of	Day	Lec. #	Topic
Jan 7 - 11	Mon		Introduction & Administration
	Wed		Water and Salt Physiology: Intro and Mechanisms
	Fri		
Jan 14 - 18	Mon		Ionic and Osmotic Adaptation (freshwater, estuaries and shorelines)
	Wed		Ionic and Osmotic Adaptation (marine)
	Fri		Water Conservation in Terrestrial Animals
Jan 21 - 25	Mon		Excretory Organs
	Wed		Regulating Filtration and Countercurrent Exchange
	Fri		Renal Ion and pH Regulation
Jan 28 – Feb 1	Mon		Energy Metabolism: Intro
	Wed		Metabolic rate 1
	Fri		Munro Day – no classes
Feb 4 - Feb 8	Mon		Metabolic Rate 2
	Wed		Aerobic and Anaerobic Forms of Metabolism
	Fri		The Energetics of Aerobic Activity
Feb 11 - 15	Mon		Temperature and its effects
	Wed		Thermal relations - Ectothermy
	Fri		Thermal relations - Homeothermy
Feb 18 - 22			Spring Break - no classes
Feb 25 – Mar 1	Mon		Warm-bodied fish and Insects
	Wed		Life in the cold - Thermal adaptations
	Fri		Oxygen and Carbon Dioxide Physiology
Mar 4 - 8	Mon		External Respiration: Intro
	Wed		Breathing by Aquatic Invertebrates and Fish
	Fri		Breathing by Terrestrial Animals other than Mammals
Mar 11 - 15	Mon		Breathing by Mammals
	Wed		Blood gas transport: blood pigments
	Fri		Carbon Dioxide Transport and Acid-Base Balance
Mar 18 - 22	Mon		Circulation: Myogenic and Neurogenic Hearts
	Wed		Principles of Pressure, Resistance, and Flow in Vascular Systems
	Fri		Circulation in Mammals and Birds
Mar 25 - 29	Mon		Circulation in Fish
	Wed		Circulation in Invertebrates
	Fri		Depth problems, Buoyancy, and Locomotion
Apr 1 - 5	Mon		Diving by Marine Mammals
	Wed		TBA
	Fri		TBA
Apr 8 -12	Mon		TBA
	Tues		TBA

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University Policies and Statements

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

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

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

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 or e-mail the Indigenous Student Centre (1321 Edward St) (elders@dal.ca).

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

Missed or Late Academic Requirements due to Student Absence (policy)

https://www.dal.ca/dept/university_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html

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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 Students 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 Centre: https://www.dal.ca/campus_life/health-and-wellness/services-support/student-health-and-wellness.html

Student Advocacy: https://dsu.ca/dsas

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

Safety

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