

**MOUNT ROYAL UNIVERSITY
DEPARTMENT OF ENVIRONMENTAL SCIENCE
COURSE OUTLINE – FALL 2019**

**ECOL 2219
AQUATIC ECOLOGY
(3 credits) 3 hours lecture, 3 hours lab**

INSTRUCTOR: Brian Sevick
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Office Hours: Immediately after class or by appointment.

CALENDAR DESCRIPTION:

The study of the structure and function of aquatic ecosystems is undertaken in this course. There is an emphasis on freshwater systems. The goal is to understand how physical, chemical, biological and anthropogenic factors influence population dynamics and community structure in aquatic ecosystems. Laboratory and field research methods used in aquatic ecology are introduced. Current literature and case studies in various areas of aquatic ecology will be critically reviewed. Aquatic biodiversity issues and sustainability issues are emphasized. The interactions and integration of industrial activities with natural aquatic systems will also be reviewed.

RATIONALE:

This course builds upon ecological concepts introduced and developed in ECOL 1111 (Terrestrial Ecology). The course will focus on developing student awareness of how freshwater aquatic ecosystems function. Impacts of human activities on aquatic ecosystems are substantial and require familiarity, attention and response. Understanding the components of freshwater aquatic ecosystems, and how they function, will be the goal of this course. This will serve as a foundation for the development of sustainable aquatic resource management planning.

Population growth, industrialization, agricultural expansion, increased demand for hydroelectric power and many other anthropogenic activities have greatly impacted and increased demand on already degraded aquatic ecosystems. Attention must be drawn to the threats aquatic ecosystems are facing. To protect freshwater ecosystems a comprehensive program of public education, research, monitoring, regulation and enforcement must occur. A rethinking of how we use and manage water and aquatic ecosystems is part of the solution. The sustainability of aquatic resources and ecosystems is the ultimate goal.

PREREQUISITES: None.

CO-REQUISITES: None.

**COURSES LEARNING OUTCOME INTEGRATION WITH
MOUNT ROYAL UNIVERSITY AIMS**

Less ←————→ More

ECOL 2219 Aquatic Ecology

COURSE LEARNING OUTCOMES		Knowledge of Human Cultures and the Physical, Natural and Technological World	Intellectual and Practical Skills	Personal and Social Responsibility	Integrative and Applied Learning	ASSESSMENT
1.	Challenge common misconceptions about the status of water and aquatic resources.	✓	✓	✓		• Exam questions
2.	Perform wetland assessments, fish habitat assessments, assessments of fish assemblage using electrofishing, aquatic macroinvertebrate sampling and analysis.	✓	✓		✓	• Field trips & Lab Assignments
3.	Analyze how aquatic organisms will respond to variable environmental conditions in aquatic ecosystems.	✓	✓		✓	• Exam questions
4.	Employ simple population estimation techniques for aquatic organisms.	✓	✓		✓	• Lab assignments
5.	Describe and differentiate major aquatic organisms and ecosystems.	✓	✓		✓	• Exam questions
6.	Examine the types of interactions that occur between organisms and evaluate their importance to aquatic ecosystem functioning.	✓	✓		✓	• Exam questions
7.	Identify, describe and differentiate between major families of aquatic macroinvertebrates in Alberta using keys.	✓	✓		✓	• Exam questions • Lab assignments
8.	Identify, describe and differentiate between all major sportfish species and any field-encountered non-sportfish species in Alberta.	✓	✓		✓	• Exam questions • Lab assignments
9.	Distinguish the most important fisheries management issues in Alberta and challenge current practices.	✓	✓		✓	• Exam questions
10.	Assess the major anthropogenic impacts on aquatic ecosystems and contribute to the development of mitigation responses.	✓	✓	✓	✓	• Exam questions
11.	Critically examine issues related to biodiversity and aquatic species at risk in Alberta.	✓		✓		• Exam questions
12.	Assist in the development of aquatic resource management plans with goals of sustainability.	✓		✓		• Exam questions • Lab assignments
13.	Retrieve, evaluate and utilize scientific information resources related to aquatic ecology.		✓		✓	• Lab assignments
14.	Write reports about aquatic resource issues using a variety of scientific and consultant formats.		✓		✓	• Lab assignments

RESOURCE MATERIALS:

1. Field Guides

Joynt, A., and M.G. Sullivan. 2003. Fish of Alberta. Lone Pine, Edmonton, Alberta, Canada. *Currently out of print.*

- i. MRU Library (Reserve Collection) and Keyano College have copies available
- ii. Also available at Apple Books.

<https://itunes.apple.com/ca/book/fish-of-alberta/id1248966195?mt=11>

- iii. Call customer service for Canada Book Distributors (the distribution arm of Lone Pine) at 1-800-661-9017 to order the pdf for Fish of Alberta ISBN 978-1-177213-024-9 and ask for proof of purchase to be emailed to you. Email this proof of purchase to Faye Boer fayeb@booklogic.ca and she will send you a pdf copy.

Voshell, J.R. 2002. A guide to common freshwater invertebrates of North America. McDonald and Woodward. Blacksburg, Virginia. U.S.A.

- i. Information coming soon.

2. Courseware/Blackboard web site - <https://courseware.mymru.ca>

CONDUCT OF COURSE:

The course consists of three hours of lecture per week and a three-hour lab. Lectures will be utilized to introduce core aquatic ecology concepts and theory. Labs will be utilized to supplement lectures with hands-on experience and have an emphasis on techniques and analysis. Some lab, lecture and exam activities will occur outside of normally scheduled hours.

Relevant Calendar Information

Students are responsible for familiarizing themselves with general information and college policies regarding their conduct in courses provided in the Introduction, Academic Regulations & Academic Status sections of the [2019-2020 Mount Royal University Calendar](#).

Please take note of the following sections and pages:

Academic Regulations	37-44
Attendance Policy	37
Examination and Grades Policies	23-26
Student Conduct	26
Academic Standing	45-46
Academic Status & Grading System	47-50

Students should also familiarize themselves with the role of Mount Royal University's Office of Student Conduct and the Student Conduct Guide.

<http://www.mtroyal.ca/CampusServices/CampusResources/StudentConduct/index.htm>

http://www.mtroyal.ca/cs/groups/public/documents/pdf/student_conduct_guide.pdf

Please take note the following dates:

Last day to adjust registration (Drop/Add/Cancel)	14 September
Thanksgiving Day	14 October
Fall 2019 Semester Reading Break	15-18 October
Remembrance Day	11 November
Last day to WITHDRAW from a course/program	15 November
Last Day of Fall 2019 Semester Classes	9 December

Final Examination Period	December 11-21
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EVALUATION PROCEDURES:

Guidelines for assignments and tests will be posted on the Courseware website. For exams, you are responsible for all material presented in lectures and directed readings. The midterm and final exam format will include short essay and multiple-choice questions. Anyone who fails the midterm exam should meet with their professor to review their performance. Students are encouraged to contact instructors regarding problems related to any part of the course. Courses/Workshops offered by Student Learning Services may be useful to some students in developing study skills and test-writing strategies. The final lecture exam will be comprehensive. The [2019-2020 Mount Royal University Calendar](#) (page 9) advises students that they must be available for final examinations up to the last day of the examination period (December 21, 2019).

Assessment Schedule (tentative) and Grading Scheme

Fish assemblage report.	28 October	20%
Wetland assignment.	11 October	5%
Invertebrate species/family profile.	18 November	5%
Report appendix - water quality	9 December (last day of classes)	5%
Field work & equipment assistance. Data input and reporting.	throughout the semester	5%
Midterm exam	31 October	20%
Final lab exam	6 December	15%
Final exam	scheduled by Registrar (11-21 Dec.)	25%

Standard Grading System

A+	95-100%	Excellent. Superior performance, showing comprehensive understanding of subject matter.
A	85-94%	
A-	80-84%	
B+	77-79%	Good. Clearly above average performance with knowledge of subject matter generally complete.
B	73-76%	
B-	70-72%	
C+	67-69%	Satisfactory. Basic understanding of subject matter.
C	63-66%	
C-	60-62%	
D+	55-59%	Marginal performance. (Generally insufficient preparation for subsequent courses).
D	50-54%	
F	Below 50%	Fail. Unsatisfactory performance or failure to meet course requirements.

ATTENDANCE:

Classes and tests will begin promptly at scheduled times. Please be punctual for both. You are expected to review assigned textbook and web site material prior to lectures and labs. You are expected to attend all lectures and labs. Attendance will not be recorded at lectures, but please see page 37 of the [2019-2020 Mount Royal University Calendar](#) about your responsibilities. In the past, success in this course has been strongly related to attendance. Attendance will be taken at labs. Any lab activities that are missed without a valid excuse cannot be made up. Several course activities will take place in the field and outside of regularly scheduled hours.

ELECTRONIC DEVICE POLICY:

Students are expected to respect the classroom environment in their use of technology and electronic devices. The inappropriate use of technology and other electronic devices in class is prohibited. Any use of technology or electronic devices that is distracting and disruptive to students or the instructor is not permitted. All devices should be silenced during lecture and lab.

Audio visual recording of lectures or labs is not allowed without the expressed consent of the instructor.

ANIMAL USE:

This course involves the use of animals to provide authentic learning experiences. Our use of animals is guided by best practices and oversight by the Mount Royal University Animal Care Committee. All animal use activities will be explained to students and any student not wishing to participate will be offered alternate learning activities without any academic repercussions.

YOUR MENTAL HEALTH:

Are you feeling overwhelmed, stressed and anxious? Finding it hard to be motivated, meet deadlines or attend class? Having a hard time sleeping, concentrating or retaining information no matter how much you study? Help is available! See the MRU Mental Health Services Website for all resources.

<http://www.mtroyal.ca/CampusServices/WellnessServices/MentalHealthServices/index.htm>

CAMPUS EQUITY & MEANINGFUL INCLUSION:

You are encouraged to find general information as well as information on how to address issues related to diversity, inclusion, discrimination, harassment, accommodation, healthy relationships and dating, domestic and sexual violence. See the MRU Campus Equity & Meaningful Inclusion Website for resources.

<http://www.mtroyal.ca/CampusServices/CampusResources/CampusEquityMeaningfulInclusion/index.htm>

TENTATIVE LECTURE COURSE UNITS AND SCHEDULE

Day(s)	Topic(s):
September 5	Introduction to course. Field trip orientation.
September 10, 12	Introduction to freshwater ecosystems. Introduction to watersheds. Introduction to streams.
September 17,19	Introduction to streams (cont.).
September 24, 26	Introduction to wetlands.
October 1, 3	Introduction to lakes.
October 8, 10	Chemical features of freshwater ecosystems. Field Trip 2 preparation.
October 14, 15-18	Thanksgiving Holiday, Fall Reading Break (MRU).
October 22, 24, 29	Introduction to freshwater aquatic biota. Introduction to freshwater invertebrates.
October 31	Midterm Exam.
November 1	Introduction to freshwater invertebrates (cont.).
November 5, 7,12	Introduction to freshwater fishes.
November 14	Other freshwater aquatic biota.
November 19, 21	Biodiversity issues. Aquatic species at risk. Aquatic invasive species.
November 26,28	Introduction to fisheries management.
December 3	Introduction to fish habitat management.
December 5	Anthropogenic impacts on aquatic ecosystems. Introduction to watershed management. Final exam guidance (last class).
December 11-21	Final exam period (scheduled by Registrar).

MRU TENTATIVE LAB COURSE UNITS AND SCHEDULE (F 8-10:50, 11:00-1:50)

Day	Topics
September 6	Electrofishing orientation. Wildlife safety. Field trip preparation.
September 13-15	Fish inventory field trips (Dogpound Creek) – no regularly scheduled labs.
September 20-22	Fish inventory field trips (Dogpound Creek) – no regularly scheduled labs.
September 27	Wetlands field trip (tentative).
October 4	Fisheries report assistance. Wetland field trip follow-up.
October 11	No regularly scheduled lab.
October 25, 26	Benthic macroinvertebrate sampling, fish habitat assessment, redd count field trip (Dogpound Creek) – no regularly scheduled labs.
November 1	Invertebrate sample preparation and introduction to identification (MRU).
November 8	Invertebrate analysis (MRU).
November 15	Invertebrate analysis (MRU).
November 22	Bow Habitat Station/Sam Livingston Fish Hatchery field trip (tentative).
November 29	Fish taxonomy. Fish anatomy. Aging fish.
December 6	Final Lab Exam

KEYANO TENTATIVE LAB COURSE UNITS AND SCHEDULE (M 2-4:50 pm)

Day	Topics
September 9	Electrofishing orientation. Wildlife safety. Field trip preparation.
September 16	No regularly scheduled lab.
September 19-22	Fish inventory field trips (Dogpound Creek) – no regularly scheduled labs.
September 30	Wetlands field trip (tentative).
October 7	Fisheries report assistance. Wetland field trip follow-up.
October 14	Thanksgiving Holiday
October 21	No regularly scheduled lab.
October 28	Invertebrate sample preparation and introduction to identification (Brian).
November 4	Invertebrate analysis (Keyano lab).
November 11	Remembrance Day
November 18	Invertebrate analysis (Keyano lab).
November 25	Fish taxonomy. Fish anatomy. Aging fish.
December 2	Final Lab Exam