



RENr 463

BIOLOGICAL ADAPTATION TO NORTHERN ENVIRONMENTS

In Fall 2020, RENr 463, *Biological Adaptation to Northern Environments*, is being offered at Yukon University as part of the Northern Environmental and Conservation Sciences, B.Sc. Program. All students registered in RENr 463 must adhere to the requirements outlined in this course syllabus. University of Alberta students must also be aware of, and adhere to, the University's Code of Student Behaviour, referenced in the outline.

INSTRUCTOR: Kathryn Aitken, Ph.D.
Adjunct Professor, Dept. of Renewable Resources, U of Alberta,
and
Instructor/Coordinator, Northern Environmental and Conservation
Sciences Program, Yukon University

OFFICE HOURS: By appointment (email to set up; appointments held via
Zoom or phone)

OFFICE LOCATION: A2509 (BUT access to YukonU campus in fall 2020 will be
limited and I will not be available for in-person meetings. Email is
the best way to reach me).

TELEPHONE/E-MAIL: 668-8866 / kaitken@yukonu.ca

CLASS DAYS & TIMES: Thursdays, 10:30-12:00 Yukon time, online via Zoom; other course
material will be delivered asynchronously online on the class site
on YukonU's Moodle system.

COURSE DESCRIPTION:

This course will provide an overview of the study of evolutionary processes, with a focus on examples from northern environments. Topics from evolutionary biology, such as natural selection and adaptation, will be applied to species living in boreal, arctic, and tundra environments. The course will cover the unique challenges faced by animals and plants in these environments, the ways in which they have adapted to deal with these conditions, and the potential effects of climate change on northern species.

STUDENT LEARNING OUTCOMES AND COMPETENCIES:

Upon successful completion of this course, students will:

- Understand the mechanisms of evolution, at a variety of scales.
- Be familiar with the application of concepts and models in evolutionary biology to conservation and management in northern environments.
- Be able to use evolutionary concepts such as natural selection and adaptation to explain the ways in which northern plants and animals may be affected by climate change.

COURSE FORMAT (3-0-0):

The course consists of one 1.5-hour synchronous class per week via Zoom. Other material (recordings, videos, readings, etc.) will be delivered via the class site on YukonU's Moodle system. Synchronous classes will be recorded and links posted on the class site.

COURSE PREREQUISITES AND/OR CO-REQUISITES:

Registration in University of Alberta/Yukon University B.Sc. in Environmental and Conservation Sciences degree program, and successful completion of UAlberta BIOL 208, YukonU BIOL 220 or an equivalent second-year ecology course, or permission of the instructor.

REQUIRED TEXTBOOKS/MATERIALS:

All required readings will be posted on the class site on YukonU's Moodle system.

Not required but a good resource:

Futuyma DJ, Kirkpatrick M. 2017. Evolution, 4th ed. Sinauer Associates, Inc. ISBN 978-1-60535-605-1. The 3rd edition of this book is also good. 4th edition is also available as an ebook at <https://www.vitalsource.com/en-ca/products/evolution-douglas-j-futuyma-v9781605357003?term=futuyma>.

All students must have a valid Yukon University student computing account. Information is available here: <https://www.yukonu.ca/student-life/technical-resources> (scroll down to the

section "Accessing your Office 365 & Moodle account"). Note that YukonU students can download for free the full suite of Microsoft Office applications (Word, Excel, PowerPoint, OneNote, Outlook) and other internet based services (OneDrive, Sway, etc). See information at the YukonU Technical Resources web page linked above.

COURSE WEBSITE

Material for the course will be available on the REN R 463 class site on Yukon University's Moodle system (moodle.yukonu.ca). Lecture recordings, announcements, reading, and other material will be available there for download or viewing.

UNIVERSITY OF ALBERTA ACADEMIC INTEGRITY AND CODE OF STUDENT BEHAVIOUR

Academic Integrity

The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at www.governance.ualberta.ca) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

Code of Student Behaviour

All students at the University of Alberta are subject to the Code of Student Behaviour, as outlined at:

<https://www.ualberta.ca/governance/resources/policies-standards-and-codes-of-conduct/code-of-student-behaviour>. Please familiarize yourself with it and ensure that you do not participate in any inappropriate behavior as defined by the Code. Key components of the code include the following statements.

30.3.2(1) No Student shall submit the words, ideas, images or data of another person as the Student's own in any academic writing, essay, thesis, project, assignment, presentation or poster in a course or program of study.

30.3.2(2) c. No Student shall represent another's substantial editorial or compositional assistance on an assignment as the Student's own work.

COURSE REQUIREMENTS/EVALUATION:

Attendance and Participation

Attendance at synchronous Zoom lectures on Thursdays is not mandatory. However, students are encouraged to attend in order to engage with their instructor and fellow students. Thursday Zoom classes will be recorded, and links to the recordings will be posted on Moodle.

Assignments

Students will write a short species account describing the adaptations of a species (or group of species) to life in northern environments and present these results to the class. Students can choose how they present their species account – it could be a short video or PowerPoint recording (10 minutes, maximum) posted to the class site or YouTube, a research-style poster (pdf uploaded to class site on Moodle), brochure, Wiki, or other options. Please discuss your ideas with the instructor. The written account will be due on 24 Nov, and the presentation (video, PowerPoint, poster, brochure, etc.) will be due on 1 Dec. Detailed instructions on length and format for the written report and presentation will be given in class.

Students must adhere to the citation style used by the Council of Science Editors in all written assignments (<https://guides.library.ualberta.ca/citing/cse>).

Unless otherwise specified, assignments are due by 11:59 pm local time on the date that they are due. Late assignments will lose 5% of their mark per day that they are late, unless the student has received an extension from the instructor in writing.

Exams

There will be two midterm exams and one comprehensive final exam. The midterm exams will be scheduled during synchronous class times on 1 Oct and 5 Nov. The midterms will be delivered online via Moodle, from 10:30-12:00 Yukon time. The final examination will be held on Tuesday, Dec. 15, from 09:00-12:00 Yukon time, during the scheduled Yukon University exam period. The exam will be delivered online via Moodle.

Evaluation

The course grade will be determined as follows:

	Percent
Midterm #1 (1 Oct)	20%
Midterm #2 (5 Nov)	20%
Species account paper (24 Nov)	15%
Species account presentation (1 Dec)	15%
Final exam (15 Dec)	30%
Total	100%

Assignment of grades

The total numerical score will be converted to a grade on the following letter grading system:

Letter grade	Percent
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A+	95-100
A	90-94
A-	85-89
B+	79-84
B	75-78
B-	71-74
C+	67-70
C	64-66
C-	55-63
D	50-54
F	0-49

RECORDING OF LECTURES, LABS, ETC.:

Audio or video recording, digital or otherwise, of lectures, labs, seminars or any other teaching environment by students is allowed only with the prior written consent of the instructor or as a part of an approved accommodation plan. Student or instructor content, digital or otherwise, created and/or used within the context of the course is to be used solely for personal study, and is not to be used or distributed for any other purpose without prior written consent from the content author(s).

Please note that Thursday Zoom lectures will be recorded and links to recordings will be posted on the class website. These will only be accessible to students registered in the course, and will only be available during the fall 2020 term.

YUKON FIRST NATIONS CORE COMPETENCY:

Yukon University recognizes that a greater understanding and awareness of Yukon First Nations history, culture and journey towards self-determination will help to build positive relationships among all Yukon citizens. As a result, to graduate from ANY Yukon University program, you will be required to achieve core competency in knowledge of Yukon First Nations. For details, please see www.yukonu.ca/yfnccr.

ACADEMIC ACCOMMODATION:

Reasonable accommodations are available for students requiring an academic accommodation to fully participate in this class. These accommodations are available for students with a documented disability, chronic condition or any other grounds specified in section 8.0 of the Yukon University Academic Regulations (available on the Yukon

University website). It is the student's responsibility to seek these accommodations. If a student requires an academic accommodation, they should contact the Learning Assistance Centre (LAC): lac@yukonu.ca.

TOPICS:

- What is evolution?
- Patterns of evolution; adaptive radiation
- History of life on Earth
- Geography of evolution
- Genetic and phenotypic variation
- Natural selection
- Evolution of life histories
- Sexual selection
- Species and speciation
- Coevolution
- Plant adaptations in the north
- Animal adaptations in the north
- Climate change and adaptation