

DEPARTMENT OF SCIENCE  
COURSE OUTLINE –WINTER 2024

**BI2210 (A3): MECHANISMS OF EVOLUTION – 3 (3-0-0), 45 Hours for 15 Weeks**

Northwestern Polytechnic acknowledges that our campuses are located on Treaty 8 territory, the ancestral and present-day home to many diverse First Nations, Metis, and Inuit people. We are grateful to work, live and learn on the traditional territory of Duncan's First Nation, Horse Lake First Nation and Sturgeon Lake Cree Nation, who are the original caretakers of this land.

We acknowledge the history of this land and we are thankful for the opportunity to walk together in friendship, where we will encourage and promote positive change for present and future generations.

**INSTRUCTOR:** Dr. Jessie Zgurski      **PHONE:** 780-903-6313  
**OFFICE:** J221      **E-MAIL:** JZgurski@nwpolytech.ca  
**OFFICE HOURS:** Monday 1:00 PM – 4:00 PM, Wednesday 11:00 AM – 2:00 PM, Friday  
11:00 AM – 2:00 PM, or by appointment.

**CALENDAR DESCRIPTION:** Discusses the major features of the evolutionary process, including the fossil record, basic population genetics, variation, natural selection, adaptation, and speciation.

**PREREQUISITE(S)/COREQUISITE:** BI1080 and BI1070

**REQUIRED TEXT/RESOURCE MATERIALS:**

- Futuyma, D. J., and Kirkpatrick, M. 2017. Evolution, Fourth Edition. Sinauer Associates, Inc. Sunderland, Massachusetts. (**Recommended Textbook**).
- Other required readings will be placed on the course Brightspace page throughout the semester.

**DELIVERY MODE(S):** Lecture (Tuesday and Thursday 11:30 AM – 12:50 PM in J203).

**COURSE OBJECTIVES:** Upon completion of this course, students should:

- Appreciate the role and importance of evolution within modern biology and within science;
- Understand the different lines of evidence for evolution as well as the areas where more research is needed;
- Understand the various modes of evolution and the mechanisms by which they occur; and
- Read scientific papers in evolutionary biology with a good level of comprehension.

## LEARNING OUTCOMES:

By the end of the course, students should be able to:

1. Describe the history and development of evolutionary thought.
2. List and describe evidence for evolution from various fields of study, including paleontology, genetics, ecology, and developmental biology.
3. Describe the mechanisms by which evolution occurs, and explain the effects of mutation, migration, genetic drift, non-random mating and natural selection on the genetics of a population.
4. Explain the methodologies used to reconstruct phylogenetic trees, and use freely-available software to reconstruct a phylogenetic tree from DNA sequence data.
5. Describe the processes and mechanisms that lead to speciation.

## TRANSFERABILITY:

Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at the Alberta Transfer Guide main page <http://www.transferalberta.ca>.

**\*\* Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability**

**EVALUATIONS:** Midterm – 25% (February 29, 2024)  
Final exam – 30% (Time and date TBA)  
Assignments (X 3) – 30% (Due dates TBA)  
Research Paper – 15% (Due date TBA)

Instructions and due dates for the assignments will be announced in class. The final exam will take place during the scheduled exam period. Failure to write the midterm or final exam will result in a grade of zero unless the exam was missed for a compelling reason (such as an illness). In such a case, the exam will be deferred.

## GRADING CRITERIA:

Please note that most universities will not accept your course for transfer credit **IF** your grade is **less than C-**.

Alpha Grade	4-point Equivalent	Percentage Guidelines	Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	90-100	C+	2.3	67-69
A	4.0	85-89	C	2.0	63-66
A-	3.7	80-84	C-	1.7	60-62
B+	3.3	77-79	D+	1.3	55-59
B	3.0	73-76	D	1.0	50-54
B-	2.7	70-72	F	0.0	00-49

## COURSE SCHEDULE/TENTATIVE TIMELINE:

<b>Topic</b>	<b>Textbook Chapters</b>	<b>Tentative Dates</b>
Introduction to BI2210	N/A	January 9
<b>Topic One:</b> The History and Development of Modern Evolutionary Thought.	Chapter 1	January 9, 11, 16
<b>Topic Two:</b> Taxonomic Practice, Phylogenies and Tree-Thinking.	Chapters 2 & 16	January 16, 18, 23
<b>Topic Three:</b> Natural Selection and Adaptation	Chapter 3	January 25, 30
<b>Topic Four:</b> Mutation and Variation	Chapter 4	February 1, 6
<b>Topic Five:</b> Genetical Theory of Natural Selection (Includes unit on domestication).	Chapters 5 & 6	February 6, 8, 13, 15
<b>Winter Break – No Classes</b>	N/A	February 20, 22
<b>Midterm Exam</b>	Topics 1 - 5	<b>February 29</b>
<b>Topic Six:</b> Species and Speciation	Chapter 9	February 27 and March 5
<b>Topic Seven:</b> Sex and Sexual Selection	Chapter 10	March 7 and 12
<b>Topic Eight:</b> Conflict and Cooperation	Chapter 12	March 14 and 19
<b>Topic Nine:</b> Evolution of Genes and Genomes	Chapter 14	March 21 and 26
<b>Topic Ten:</b> Evolution and Development	Chapter 15	March 28 and April 3
<b>Topic Ten:</b> History of Life on Earth	Chapter 17	April 5, 9, 11

**STUDENT RESPONSIBILITIES:** Students are expected to attend classes and complete all assignments. Refer to the College Policy on Student Rights and Responsibilities at [https://www.nwpolytech.ca/about/administration/policies/#academic\\_policies](https://www.nwpolytech.ca/about/administration/policies/#academic_policies)

Typically, late assignments will be docked 10%. However, if you have a compelling reason for requiring an extension (such as an illness), please contact the instructor and the late penalty will be waived.

### STATEMENT ON PLAGIARISM AND CHEATING:

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, refer to the Student Conduct section of the College Calendar at <https://www.nwpolytech.ca/programs/calendar/or> the College Policy on Student Misconduct: Plagiarism and Cheating at <https://www.nwpolytech.ca/about/administration/policies/>

\*\*Note: all Academic and Administrative policies are available on the same page.

**ADDITIONAL INFORMATION:** Students are expected to frequently check the course website and their college E-mail accounts for announcements regarding the class. Other learning resources, including practice exam questions and supplemental articles to read, will be added to the page during the semester.