



**DEPARTMENT OF SCIENCE**  
**COURSE OUTLINE –WINTER 2021**

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

**INSTRUCTOR:** Dr. Jessie Zgurski                      **PHONE:** 780-903-6313  
**OFFICE:** J221    **E-MAIL:** JZgurski@gprc.ab.ca  
**OFFICE HOURS:** Due to the COVID-19 pandemic, I cannot hold in-person office hours.  
However, please feel free to contact me via E-mail or phone if you have que  
would like to arrange a meeting through Zoom, please contact me to set  
up an appointment.

**WINTER 2021 DELIVERY:** Remote Delivery. This course is delivered remotely. There are no face-to-face or onsite requirements. Students must have a computer with a webcam and reliable internet connection. Technological support is available through [helpdesk@gprc.ab.ca](mailto:helpdesk@gprc.ab.ca)

Note: GPRC reserves the right to change the course delivery.

**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):** Lectures, Wednesday and Friday, 1:00 – 2:20 PM. Lectures will be via Zoom.

**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 – 20 % (February 24, 2021)  
Final exam – 30 % (Time and date TBA)  
Online Quizzes (X 5) – 10%  
Assignments (X 3) – 25%  
Research Paper – 15%

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                 |

| Alpha Grade | 4-point Equivalent | Percentage Guidelines | Alpha Grade | 4-point Equivalent | Percentage Guidelines |
|-------------|--------------------|-----------------------|-------------|--------------------|-----------------------|
| B-          | 2.7                | 70-72                 | F           | 0.0                | 00-49                 |

### COURSE SCHEDULE/TENTATIVE TIMELINE:

| Topic  | Textbook Chapters             | Dates                     |
|--|-------------------------------|---------------------------|
| Introduction to BI2210   | N/A                           | January 6                 |
| <b>Topic One:</b> The History and Development of Modern Evolutionary Thought.              | Chapter 1                     | January 6, 8              |
| <b>Topic Two:</b> Taxonomic Practice, Phylogenies and Tree-Thinking.                       | Chapters 2 & 16               | January 13, 15, 20.       |
| <b>Topic Three:</b> Natural Selection and Adaptation                                       | Chapter 3                     | January 20, 22            |
| <b>Topic Four:</b> Mutation and Variation  | Chapter 4                     | January 27, 29            |
| <b>Topic Five:</b> Genetical Theory of Natural Selection (Includes unit on domestication). | Chapters 5 & 6                | January 29, February 3, 5 |
| <b>Topic Six:</b> Genetic Drift and Evolution in Space                                     | Chapters 7 & 8 (Partial)      | February 10, 12           |
| <b>Midterm Exam</b>  | All material covered to date. | <b>February 24</b>        |
| <b>Topic Seven:</b> Species and Speciation   | Chapter 9                     | February 26, March 3      |
| <b>Topic Eight:</b> Sex and Sexual Selection   | Chapter 10                    | March 5, 10               |
| <b>Topic Nine:</b> Conflict and Cooperation  | Chapter 12                    | March 12, 17              |
| <b>Topic Ten:</b> Evolution of Genes and Genomes   | Chapter 14                    | March 19, 24              |
| <b>Topic Eleven:</b> Evolution and Development   | Chapter 15                    | March 26, 31              |
| <b>Topic Twelve:</b> History of Life on Earth  | Chapter 17                    | March 31, April 7 & 9.    |

**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.gprc.ab.ca/about/administration/policies/#academic\\_policies](https://www.gprc.ab.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 <http://www.gprc.ab.ca/programs/calendar/> or the College Policy on Student Misconduct: Plagiarism and Cheating at <https://www.gprc.ab.ca/about/administration/policies>

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

**ADDITIONAL INFORMATION:** Copies of the lecture Powerpoint presentations will be made available on D2L. I recommend printing out copies of the Powerpoint files prior to class and writing additional notes on them during lecture. Other learning resources, including practice exam questions and supplemental articles to read, will be added to the page during the semester.

**ACCESSIBILITY SUPPORTS AND DISABILITY SERVICES:** If you require disability-related accommodations and support, please contact the Accessibility Supports and Disability Services office. Their Email address is [asds@gprc.ab.ca](mailto:asds@gprc.ab.ca) and their website is <https://libguides.gprc.ab.ca/learningcommons/AccessibilityServices>

**MENTAL HEALTH SUPPORTS:** GPRC students have access to mental health counselling services. Please do not hesitate to seek help if you are suffering from issues such as anxiety, depression, trauma, grief, or any coping-related concerns. Go to <http://www.mystudentsupport.com/> or call 1-855-849-8641 to speak to a counsellor. The GPRC website also has mental health supports available. Please visit [https://www.gprc.ab.ca/services/mental\\_health/](https://www.gprc.ab.ca/services/mental_health/) for more information.