SAMPLE COURSE OUTLINE

Course Code, Number, and Title:

BIOL 3315: Evolution and Phylogenetics

Course Format:
[Course format may vary by instructor. The typical course format would be:]

Lecture 4 h + Seminar 0 h + Lab 2 h

Credits: 4 **Transfer credit:** For information, visit bctransferguide.ca

Course Description, Prerequisites, Corequisites:

Students explore the evolution of DNA and proteins and how their historical relationships can reveal their contemporary functions. They investigate the mechanisms and dynamics by which evolution produces gradual change in biological species, traits, functions, systems, and genes. Students learn the major concepts, ideas, and findings that have come from a century and a half of evolutionary study. They use analytical computational tools developed to identify historical phylogenetic relationships as well as leverage those relationships to infer present day functional roles.

Prerequisites: A minimum of C grade in any two of BIOL 2315, BIOL 2415, BIOL 2330 and a minimum of C grade in CPSC 1150 or CPSC 1155

Corequisites: None

Priority registration to students admitted to the BSc Bioinformatics program

Learning Outcomes:
Upon successful completion of this course, students will be able to:

- Describe the core concepts of evolution, and discuss its implications for biology at many different levels of organization
- Execute phylogenetic analyses using different methods, including parsimony, likelihood, and Bayesian approaches
- Evaluate the ways in which evolution produces novelty at the molecular level and explain how that process is connected to larger changes in whole organisms
- Apply common evolutionary computational tools for inferring phylogenetic relationships and for inferring likely gene functions
- Explain how evolution produces new genes, new molecular functions, and new complex biological systems
- Apply evolutionary perspectives and tools when approaching new genomic and other bioinformatics data

Instructor(s): TBA
Office: TBA **Phone: 604 323 XXXX** **Email: TBA**

Office Hours: TBA

Textbook and Course Materials:
[Textbook selection may vary by instructor. An example of texts and course materials for this course might be:}

Zimmer, C and Emlen, D. Evolution: Making Sense of Life, 2nd edition. 2015.

Note: *This course may use an electronic (online) instructional resource that is located outside of Canada for mandatory graded class work. You may be required to enter personal information, such as your name and email address, to log in to this resource. This means that your personal information could be stored on servers located outside of Canada and may be accessed by U.S. authorities, subject to federal laws. Where possible, you may log in with an email pseudonym as long as you provide the pseudonym to me so I can identify you when reviewing your class work.*

Assessments and Weighting:
Final Exam 20%
Other Assessments %
(An example of other assessments might be:) %

Midterm Exam: 20%
Quizzes/Tests: 5%
Assignments: 20%
Lab work: 20%
Project: 10%
Participation: 5%

Participation format: In class assignments

Proportion of individual and group work:
Individual: 80%
Group: 20%

Grading System: Letter grade
Specific grading schemes will be detailed in each course section outline.

Passing grade: D

This generic outline is for planning purposes only.

Topics Covered:
[Topics covered may vary by instructor. An example of topics covered might be:]

- Introduction: What is evolution? What are its basic tenets? How did Darwin and Wallace originally conceive of it?
- How does evolution work? What is the role of natural selection, and what is the role of random chance in determining how species evolve and change?
- Connecting theory to the field. How does evolution play out in real organisms?
- Understanding the historical relationships between species using phylogenetics?
- How does the lifestyle of an organism influence how it evolves? How are new species formed?
- How do populations evolve? Core concepts of population genetics
- Measures and models of molecular evolution, the nearly neutral theory, and the molecular clock
- Adaptive evolution and positive selection
- Linkage, hitchhiking, and background selection
- Evolution of new genes, gene duplication, gene fusion, gene loss
  Evolution of molecular functions and phylogenetic based methods of genome annotation
- Evolution of gene regulation, gene networks, and complex systems

As a student at Langara, you are responsible for familiarizing yourself and complying with the following policies:

College Policies:

E1003 - Student Code of Conduct
F1004 - Code of Academic Conduct
E2008 - Academic Standing - Academic Probation and Academic Suspension
E2006 - Appeal of Final Grade
F1002 - Concerns about Instruction
E2011 - Withdrawal from Courses

Departmental/Course Policies: