



Genetics - BIOL 203

University Studies Program

Course Outline

COURSE IMPLEMENTATION DATE: Pre 1998
OUTLINE EFFECTIVE DATE: September 2021
COURSE OUTLINE REVIEW DATE: April 2026

GENERAL COURSE DESCRIPTION:

Genetics is the study and understanding of inheritance and development of organisms. This course will provide an introduction to genes and gene function. Mendelian and extra-mendelian genetics and molecular genetics review and expand on these topics as explored in first year biology. Topics in transmission, molecular and quantitative genetics will also be discussed. Lab material will include descriptive aspects, techniques, data analysis and experimentation.

Program Information: This course is required as part of the core courses for a science degree in biology, microbiology, biochemistry, and other related fields. This course prepares students for related third- and fourth-year courses at the university level. The topics covered in genetics make this course useful for students who are considering applying to medical school or a career in biotechnology, molecular biology, microbiology or other related fields.

Delivery: This course is delivered face-to-face.

COTR Credits: 3

Hours for this course: 90 hours

Typical Structure of Instructional Hours:

Instructional Activity	Duration
Lecture Hours	45
Seminars / Tutorials	
Laboratory / Studio Hours	45
Practicum / Field Experience Hours	
Other Contact Hours	
Total	90

Practicum Hours (if applicable):

Type of Practicum	Duration
On-the-job Experience	N/A
Formal Work Experience	N/A
Other	N/A
Total	

Course Outline Author or Contact:

Lynnette Kuervers, Ph.D.

Signature

APPROVAL SIGNATURES:

Department Head
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Department Head Signature

Dean Signature

EDCO

Valid from: September 2021- April 2026

Education Council Approval Date

COURSE PREREQUISITES AND TRANSFER CREDIT:

Prerequisites: BIOL 101 and BIOL 102 or the equivalent

Corequisites: None

Flexible Assessment (FA):

Credit can be awarded for this course through FA

Yes No

Learners may request formal recognition for flexible assessment at the College of the Rockies through one or more of the following processes: External Evaluation, Worksite Assessment, Demonstration, Standardized Test, Self-assessment, Interview, Products/Portfolio, Challenge Exam. Contact an Education Advisor for more information.

Transfer Credit: For transfer information within British Columbia, Alberta and other institutions, please visit <http://www.cotr.bc.ca/Transfer>.

Students should also contact an academic advisor at the institution where they want transfer credit.

Prior Course Number: N/A

Textbooks and Required Resources:

Textbook selection varies by instructor and may change from year to year. At the Course Outline Effective Date the following textbooks were in use:

Essentials of Genetics, 2015, Klug, Cummings, Spencer and Palladino, 11th Ed, Pearson

Lab Outlines – Biology 203

Please see the instructor's syllabus or check COTR's online text calculator

<http://go.cotr.bc.ca/tuition/tCalc.asp> for a complete list of the currently required textbooks.

LECTURE LEARNING OUTCOMES:

Upon the successful completion of this course, students will be able to

- Critically assess information on transmission, molecular, quantitative and evolutionary genetics at an introductory collegiate level as well as use and appreciate techniques involved in modern genetic research.
- Determine the benefits of using model organisms and choose appropriate model organisms based on questions explored in genetic research.
- Calculate the map unit distance between two or more loci on a single chromosome.
- Categorize chromosomes based on the location of their centromere and find chromosomal abnormalities in given human cell samples.
- Describe the mechanisms of creating mutations in the genome via external mutagens and DNA replication errors.
- Evaluate the severity of genetic mutations based on the resulting gene product.
- Describe the types of repeat sequences in the genome and evaluate the differences between DNA samples of individuals using current molecular techniques.
- Estimate allelic frequencies in a population using the Hardy-Weinberg Law.
- Describe current genetic techniques such as Sanger sequencing, Next Generation Sequencing, cloning using prokaryotic and eukaryotic vectors, creating genetically modified organisms, DNA fingerprinting, restriction enzyme digests, and site-directed mutagenesis including using CRISPR-Cas9.
- Communicate the significance of scientific findings to the general public.

LAB LEARNING OUTCOMES

- Perform genetic crosses in a model organism to evaluate linkage and mendelian inheritance.
 - Extract DNA from cells.
 - Perform modern molecular genetic techniques such as PCR, restriction digest analysis, cloning, CRISPR-Cas9 gene editing and/or genetic sequence analysis.
 - Connect the concepts of mutation, evolution, and genetic drift. Use the Hardy-Weinberg equation to calculate allelic frequencies and compare frequencies between populations.
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COURSE TOPICS:

- Mitosis and Meiosis
- Basic Mendelian Genetics
- Transmission Genetics

- Molecular Genetics
- Quantitative and Evolutionary Genetics
- Special Topics – Epigenetics – DNA Forensics – Genomics and Personalized Medicine – Stem Cells

See instructor's syllabus for the detailed outline of weekly readings, activities and assignments.

EVALUATION AND ASSESSMENT:

Assignments	% Of Total Grade
LECTURE	
Assignments	10%
Midterm Exam(s)	25%
Final Exam	30%
LAB	
Lab Assignments/Exams	<u>35%</u>
Total	100%

Please see the instructor syllabus for specific classroom policies related to this course, such as details of evaluation, penalties for late assignments, and use of electronic aids.

EXAM POLICY:

Students must attend all required scheduled exams that make up a final grade at the appointed time and place.

Individual instructors may accommodate for illness or personal crisis. Additional accommodation will not be made unless a written request is sent to and approved by the appropriate Department Head prior to the scheduled exam.

Any student who misses a scheduled exam without approval will be given a grade of "0" for the exam.

COURSE GRADE:

Course grades are assigned as follows:

Grade	A+	A	A-	B+	B	B-	C+	C	C-	D	F
Mark (Percent)	≥ 90	89-85	84-80	79-76	75-72	71-68	67-64	63-60	59-55	54-50	< 50

A grade of "D" grants credit, but may not be sufficient as a prerequisite for sequential courses.

ACADEMIC POLICIES:

See www.cotr.bc.ca/policies for general college policies related to course activities, including grade appeals, cheating and plagiarism.

COURSE CHANGES:

Information contained in course outlines is correct at the time of publication. Content of the courses is revised on an ongoing basis to ensure relevance to changing educational, employment, and marketing needs. The instructor will endeavour to provide notice of changes to students as soon as possible. The instructor reserves the right to add or delete material from courses.