UNIVERSITY OF THE FRASER VALLEY

ORIGINAL COURSE IMPLEMENTATION DATE: January 2008
REVISED COURSE IMPLEMENTATION DATE: September 2022
COURSE TO BE REVIEWED (six years after UEC approval)**:** January 2028
Course outline form version: 05/18/2018

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: BIO 414	**Number of Credits:** 3 Course credit policy (105)

Course Full Title: Genomics
Course Short Title:
(Transcripts only display 30 characters. Departments may recommend a short title if one is needed. If left blank, one will be assigned.)

Faculty: Faculty of Science	**Department (or program if no department):** Biology

Calendar Description:

Examines how genetic information is encoded, ordered, and expressed in whole organisms. Methods for obtaining, assembling, and annotating genomic sequences are explored. Students gain hands-on computer experience using various bioinformatics tools to handle and interpret genomic sequence data.

Note: This course is offered as BIO 414 and BIOC 414. Students may take only one of these for credit.

Prerequisites (or NONE):	BIO 201, BIO 202, and BIO 220.
Corequisites (if applicable, or NONE):	
Pre/corequisites (if applicable, or NONE):	

Antirequisite Courses *(Cannot be taken for additional credit.)*
Former course code/number:
Cross-listed with: **BIOC 414**
Dual-listed with:
Equivalent course(s): **BIOC 414**
(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar hours	25
Tutorials/workshops	20
Supervised laboratory hours	
Experiential (field experience, practicum, internship, etc.)	
Supervised online activities	
Other contact hours:	
Total hours	**45**

Labs to be scheduled independent of lecture hours: ☒ No ☐ Yes

Special Topics *(Double-click on boxes to select.)*
This course is offered with different topics:
☒ No ☐ Yes *(If yes, topic will be recorded when offered.)*

Independent Study
If offered as an Independent Study course, this course may be repeated for further credit: *(If yes, topic will be recorded.)*
☒ No ☐ Yes, repeat(s) ☐ Yes, no limit

Transfer Credit
Transfer credit already exists: *(See **bctransferguide.ca**.)*
☒ No ☐ Yes
Submit outline for (re)articulation:
☒ No ☐ Yes *(If yes, fill in transfer credit form.)*

Grading System
☒ Letter Grades ☐ Credit/No Credit

Maximum enrolment (for information only): 24

Expected Frequency of Course Offerings:
annually *(Every semester, Fall only, annually, etc.)*

Department / Program Head or Director: Gregory Schmaltz	**Date approved:**	September 2021
Faculty Council approval	**Date approved:**	October 8, 2021
Undergraduate Education Committee (UEC) approval	**Date of meeting:**	January 28, 2022

Learning Outcomes:

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

1. Fully describe methods used in the cloning and sequencing of DNA.
2. Discuss the challenges and strategies associated with the sequencing of whole genomes.
3. Construct alignment files for DNA sequences as assemble these into contiguous segments.
4. Describe the use of microarrays for examining proteomes and transcriptomes.
5. Discuss the use of comparative methods of linking genes to disease states or biological processes.
6. Explain how changes in the metabolic signatures of cells can lead to greater understanding of cell function.
7. Discuss the application of genomics in modern biological research.

Prior Learning Assessment and Recognition (PLAR)

☒ Yes ☐ No, PLAR cannot be awarded for this course because

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion.)*

Lectures, in-class discussions and computer-based activities, sequence retrieval and analysis and other computer-based assignments, presentations.

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Text(s) and Resource Materials *(If more space is required, download Supplemental Texts and Resource Materials form.)*

	Author (surname, initials)	Title (article, book, journal, etc.)	Current ed.	Publisher	Year
1.	A. Lesk	Introduction to Genomics, 3rd ed.	☒	Oxford Univ. Press	2017
2.			☐		
3.			☐		
4.			☐		
5.			☐		

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

Part of the course would need to be offered in a computer lab.

Typical Evaluation Methods and Weighting

Final exam:	40%	Assignments:	15%	Field experience:	%	Portfolio:	%
Midterm exam:	20%	Term paper	15%	Practicum:	%	Oral presentation:	10%
Quizzes/tests:	%	Lab work:	%	Shop work:	%	Total:	100%

Details (if necessary):

Typical Course Content and Topics

Week 1-2	Introduction to genomics and genomic research
Week 3-5	Mapping, sequencing, annotation, and databases
Week 6-7	Comparative genomics
Week 8	Evolution and genomic change
Week 9	Microarrays and transcriptomics
Week 10	Proteomics
Week 11	Metabolomics
Week 12-13	Presentations