Biology 362 – Techniques in Molecular Biology

COURSE OUTLINE - Spring 2022

(Lecture: Wed, 1:30-2:20PM, CLE A326; Lab: Thu, 2:30-5:20PM, CUN116 or CLE A035

+++ UVic is moving online until Jan. 24th 2022. All BIOL362 classes and labs up until this date will be held at the scheduled time through Zoom. Please log in to Zoom with your UVic Netlink ID +++

BIOLOGY 362 online classroom:
https://uvic.zoom.us/j/86203862235?pwd=NjFpc3FpdEtobEJZRWMrVDFuak54UT09

Zoom Meeting ID: 862 0386 2235, Password: 710295

Course Instructors:	**Dr. Ryan Gawryluk**	**Dr. Jürgen Ehlting**
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Lab Coordinator and Instructor: **Maggie Lawton** (e-mail: maggielawton@uvic.ca)
Office hours by inquiry, please email to make an appointment.

Course Description (in calendar): An introduction to basic techniques in molecular biology. Course includes nucleic acid (DNA) isolation, polymerase chain reaction (PCR), gel electrophoresis, molecular cloning, computer-based analysis of nucleotide sequence data, including BLAST searches, multiple sequence alignment, and phylogenetic analyses. This is a single term-long project where new student-collected data are incorporated into a final report written as a scientific manuscript.

Course Description (proposed changes): An introduction to basic techniques in molecular biology and genomics. Course includes nucleic acid (DNA) isolation, polymerase chain reaction (PCR), DNA quality control, next generation DNA sequencing, computer-based analysis of large-scale nucleotide sequence data, including DNA sequence assembly and mapping, BLAST searches, multiple sequence alignment, and phylogenetic analyses. This is a single term-long project where new student-collected data are incorporated into a final report written as a scientific manuscript.

DATE		LECT/*LAB*	TITLE (tentative)
Jan	12-W	Lec.1. (JE)	Course introduction
	13-Th	**Lab 1**	**Introduction / Experimental Design / Safety**
			Assignment 1 due: Project proposal
	19-W	Lec. 2. (JE)	Sampling details

	20-Th	**Lab 2**	**Student organized sampling**
	26-W	Lec. 3. (JE)	Nucleic acid extraction methods
	27-Th	*Lab 3*	**DNA extraction and quality control (Nanodrop)**
Feb	2-W	Lec. 4. (JE)	Polymerase Chain Reaction (PCR) techniques
	3-Th	**Lab 4**	**DNA quality control (Qubit) and PCR**
	9-W	Lec 5. (JE)	Next generation sequencing: Background and applications
	10-Th	**Lab 5**	**Gel electrophoresis, Tutorial: How to write an introduction (JE)**

	16-W	Lec.6 (JE)	Illumina DNA sequencing I (library production)
	17-Th	**Lab 6**	*Illumina library production*

Assignment 2 due: Annotated bibliography of five sources

	22-W and **23-Th**		*Reading Break: no lecture, no lab*
Mar	2-W	Lec 7 (RG)	Next generation DNA sequencing II (quality control methods)
	3-Th	**Lab 7**	**Library quality control: Experion. Tutorial: Scientific figures (RG)**

Assignment 3 due: 2-3 page introduction

	9-W	Lec. 8 (RG)	Next generation DNA sequencing III (sequencing proper)
	10-Th	**Lab *8***	**MiSeq DNA sequencing. Tutorial: Material and Methods writing (?)**

Assignment 4 due: Figure for Experion, Qubit,
and Nanodrop results

	16-W	Lec. 8 (RG)	DNA sequence data formats and raw data manipulations
	17-Th	**Lab 9**	**Sequence analysis: Data quality control and cleanup**
	23-W	Lec. 10 (RG)	Next gen. sequence data analysis
	24-Th	*Lab 10*	*Clustering of Operational Taxonomic Units* **(OTU)**

Assignment 5 due: Experimental Materials + Methods (M+M)

	30-W	Lec 11 (RG)	Sequence similarity search tools
	31-Th	**Lab 11**	*Quantification and identification of OTUs*
Apr	6-W	Lec. 12 (RG)	Phylogenetic reconstruction methods
	7-Th	**Lab 12**	*Phylogenetic reconstructions*

	14-Th		*Assignment 6 due: M+M for bioinformatics, results*
	28-Th		***Final paper due***

Requirements: | Assignments (5) | 50% (best 5 out of 6 counted, 10% each)
| **Final paper*** | 25%
| Practical Skills/Participation | 5%
| Quizzes (10) | 20%

*Final paper is a course requirement. Failure to submit will result in an F in the course.

Grading system: Percentages converted to letter grades

A+ 90-100	A 85-89	A- 80-84	B+ 77-79	B 73-76
B- 70-72	C+ 65-69	C 60-64	D 50-59	F 0-49

Please note – You need to provide acceptable rational (e.g. health problems) to be granted an extension to assignment due dates. We assign an incomplete (not a zero) for any elements missed with excuse and your final mark will be calculated on the basis of the other completed components of the course, and you will not incur any penalty. However, failure to complete too many important parts of the course (missed labs, quizzes, or assignments) will result in being banned from submitting the final paper; see lab manual introduction for details.

Students must abide by academic regulations as set out in the university calendar. They must observe standards of scholarly integrity with regards to plagiarism and cheating. Please refer to UVic Academic Calendar.

Students must abide to current COVID19 regulations, please check https://www.uvic.ca/return-to-campus regularly.

We are committed to promoting, providing and protecting a supportive and safe learning and working environment for all. UVic is committed to upholding the values of equity, diversity, inclusion and human rights in our living, learning and work environments.

Consistent with UVic's values, we acknowledge with respect the Lekwungen peoples on whose traditional territory the University of Victoria stands and the Songhees, Esquimalt and WSÁNEĆ peoples whose historical relationships with the land continue to this day.