This syllabus is a general representation of the course as previously offered and is subject to change.

BIOL 341 – Introductory Molecular Biology

General Course Syllabus (as of September 2019)

About the Course:

Course Description: A course on the use of recombinant DNA techniques. Students will learn technical skills in the context of projects that will allow them to develop their analytical skills, critical thinking skills, and communication skills. These skills and techniques will be the basis for many research fields.

Course Format: Lecture and Laboratory
Credits: 2
Prerequisites: BIOL 200 (and at least third-year standing in Science)

Course Learning Objectives:

By the end of this course, students should be able to:

- Maintain proper lab note keeping aligned to industry standards.
- Execute basic molecular biology techniques used in cloning (for example: pipetting, PCR, transformation, culturing, screening clones, run agarose gel).
- Design, evaluate, and use PCR primers.
- Interpret, evaluate, and explain the theory behind the experimental techniques, and apply this knowledge to troubleshooting efforts.
- Interpret, evaluate, and explain data generated through both experimentation and bioinformatics searchers.
- Compare and use basic Bioinformatics tools to analyze nucleotide and protein sequence for structural and functional domains.
- Value scientific integrity (scientist mindset).
- Create and present research in the context of the broader field.
- Present work in both journal style article and an oral presentation.

Textbooks and Additional Resources:

No textbook. Course materials will be posted on Canvas (canvas.ubc.ca).

Evaluation:

Assessment	Weight
Professional behavior: lecture participation and lab preparation	4%
Lab notebook and good lab citizen: guidelines will be provided	8%
Preliminary work for Bioinformatics report: group work	10%
Final presentation for Bioinformatics project: individual and group work	22%
Technical skills: for Cloning experiments; Best 5 of 6	5%
Preliminary work for Cloning report: individual work unless otherwise stated	23%
Final draft of Cloning report & **Address reviewer comments**: individual work	28%

DETAILS ON ASSESSMENTS:

Labs and Lectures:
Labs run every week, and there are pre-lab questions to be answered prior to attending labs. ALL information must be recorded in the student's LAB NOTEBOOK. Note: students are expected to score 100% on a safety quiz in order to gain access to the lab

Open Labs will also be scheduled, where the purpose is to set up or catch up on experiments, and to have extra time to ask TA(s) questions. Attendance is not mandatory.

Lectures cover material from the following week's lab. Each lecture contains lecture activities that must be handed in at the end of class.

Technical marks:
There are 6 technical marks that are associated with the success of experiments. These are based mainly on having clear results that should be as predicted (e.g. control samples). If the experimental results are not optimal, students may repeat the experiment in question one time in an effort to improve their technical mark, or they may choose to move on to the next experiment with TA- or instructor-generated materials.

Bioinformatics research project:
This group project is designed to introduce students to bioinformatics, and to allow them to be more creative in their research findings and synthesis of ideas. Students will use online tools and databases to analyze poorly characterized gene sequences. These sequences have been identified as having some role in some process through genome-wide experiments, but do not have much published about them. Based on their findings, student groups will propose a function for their gene, suggest how they might test for this function, and predict what they should see as a result of their proposed experiments.

Cloning Project (plasmid construction):
This is a term-long project to analyze, construct, and screen a plasmid. This project showcases restriction analysis, ligation, transformation, bacterial culture, and PCR. While the instructors will guide students through the overall project, students will design some aspects of their experiments. Students will also have the opportunity to repeat some of the experimental steps as necessary.

Schedule of Topics:

Below is a sample simplified schedule from 2018W2 (subject to change):

Lab no.	**Topics**
1	Intro (Big Picture) Lab Safety, pipetting, solutions, and restriction analysis
2	Restriction Analysis PCR primer design
3	Restriction analysis and gel electrophoresis Bioinformatics **PCR primer design due (5%)**
4	PCR reactions and pGFP-S12 digests Bioinformatics II **Restriction analysis due (3%)** **Lab notebook check (2%)**
5	Clean and digest PCR product Bioinformatics proposals **Bioinformatics results due (5%)**
6	Ligation and transformation **Bioinformatics proposals due (5%)**
7	Transformation efficiency
8	Draft Introduction, Material & Methods **Bioinformatics presentation due (22%)**
9	Small-scale plasmid preps; Discussion **Draft PCR and Transformation Results due (5%)**
10	Screening recombinant plasmids Introduction, Material & Methods **Draft Introduction, Material & Methods due (5%)**
11	Screening recombinant plasmids II **Draft Discussion due (5%)**
12	Revising your final report Last week to complete experiments
13	**Final cloning report due (28%)** **Hand in lab notebook (6%)**

University Policies:

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence.

UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom.

UBC provides appropriate accommodation for students with disabilities and for religious, spiritual and cultural observances.

UBC values academic honesty and students ae expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions.

Details of the policies and how to access support are available on the UBC Senate website.