BIOL 340 – Introductory Cell Biology Laboratory

General Course Syllabus (as of January 2020)

About the Course:

Course Description: This course covers experiments using unicellular eukaryotes or prokaryotes with emphasis on techniques in microscopy and cell biology.

This course is designed to provide students with the kind of working experience they would get in a real research lab. There are two main sections to BIOL 340:

A. **Learning, practicing, and troubleshooting background techniques:** During the first eight weeks, students will be conducting preliminary research on a given yeast mutant cell line to familiarize themselves with common cell biology techniques. Simultaneously, students will research and propose novel experiment(s) that will increase current understanding of the yeast mutant, and develop their analytical and critical thinking skills.
B. **Proposing and then conducting a novel independent experiment:** During the remainder of the labs (weeks 9-12), students will be conducting their proposed experiments. Students will then communicate their findings both in written (journal style) and oral (conference style) formats.

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:

- **Execute** basic cellular biology techniques.
    - For example: Pipetting, practicing sterile techniques, proper use/care of microscopes both light and florescent, correctly performing Köhler illumination, cell turbidity analysis, protein concentration analysis, run SDS PAGE, master immunoblotting, culture of the unicellular eukaryote (Saccharomyces cerevisiae), ...
- **Execute** and **analyze** basic bioinformatics searches and **compare** mutant and wild type Saccharomyces cerevisiae clones.
- **Design** and implement methods to identify yeast genotype and phenotype.
- **Design** an experiment to investigate an aspect of yeast cell biology and **analyze** the results from these experiments.
- **Interpret**, **evaluate** and **explain** the theory behind the experimental techniques, and apply this knowledge to troubleshooting efforts.
- **Interpret** and **analyze** raw data, and present data in a meaningful form.
- **Create** and present research in the context of the broader field.
- **Present** work in both journal style article and oral proposal presentation.
- **Compare** and **analyze** novel data to current research.
- **Maintain** proper lab note keeping aligned to industry standards.
- **Value** scientific integrity (scientist mindset).

Textbooks and Additional Resources:

No textbook. Course materials will be posted on Canvas (canvas.ubc.ca). Always check the course page on Canvas for assignment due dates.

Evaluation:

Assessment	Weight
Professional behaviour • Includes lecture attendance and lab participation, reflection assignments, arriving on time, being prepared, working effectively as a member of a group; timely notice of absences, timely effort to make up missed work, courtesy to others, tolerance, enthusiasm, etc.	10%
In-class quizzes (weekly, 10%), and lab final exam (10%) • The lowest quiz mark is dropped (no makeups for absences)	20%
Lab notebook (see guidelines on how to keep a proper lab notebook) • Includes all procedures, results, conclusions, troubleshooting exercises and explanations to improve failed or incomplete experiments. • Includes all calculations for the solutions that are used in the labs. • Includes all pre-lab questions/work (done on-line, worth 20% of notebook mark). • Includes appropriate reflection for each lab session (done on-line, worth 20% of notebook mark). • Handed in twice; 5 marks for first marking, 5 marks for the second marking.	10%
Reports • Yeast Cell Density report (5%) • Protein Analysis report (5%)	10%
Other written assignments • Literature review on mutant (10%) • Independent experiment proposal (10%)	20%
Group presentation on independent experiments	10%
Final report on independent experiments	20%

Schedule of Topics:

Below is a sample simplified schedule from 2019W (subject to change):

Week	Topic
1	Introduction, Laboratory Safety, and Yeast Culture
2	Microscopy and Auxotrophy
3	Fluorescence Microscopy, Ploidy, and Auxotrophy
4	Cell Density and Mating Type Determination
5	Protein Extraction and Quantification
6	Protein Analysis (SDS-PAGE)
7	Protein Analysis (Western blot)
8	Protein analysis (Western blog development)
9	Independent Experiments
10	Independent Experiments
11	Oral presentations
12	Wrap-up-Lab clean up

Course Policies:

- Students must score 100% on the first quiz, on lab safety, in order to gain access to lab materials and remaining quizzes.
- Students must pay attention to all safety instructions, and observe all safe lab practices. Students who endanger themselves and others by unsafe behaviours will be removed from the lab. Removal from the lab for unsafe behaviour will not be considered a valid reason for late or missed work.
- Further details on student- and instructor expectations will be provided in class.

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.