BIOL 200 – Fundamentals of Cell Biology

General Course Syllabus (as of June 2019)

About the Course:

Course Description: BIOL 200 teaches the basic principles of cell biology, experimental design and scientific logic & problem solving. Topics include: structure and function of plant and animal cells; membrane models, cytoplasmic organelles, biological information from gene to protein, the endomembrane system, secretion, intracellular digestion, endocytosis, transport processes, cytoskeleton and cell motility.

Course Format: Lecture and Tutorial
Credits: 3
Pre-requisites: Either

(a) BIOL 112 and one of CHEM 123, CHEM 113; or
(b) SCIE 001; or
(c) 8 transfer credits of first-year BIOL and 6 credits of first-year CHEM or
(d) one of BIOL 112 or BIOL 121 and a corequisite of CHEM 203.

Course Learning Objectives:

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

- Demonstrate understanding of the relationship between structure and function, at every level of cell biology (from individual macromolecules, to the cellular level).
- Recognize that all aspects of protein function (expression, regulation, modification, transport, activation, destruction) are ultimately encoded in its sequence, which itself is encoded in the DNA of the organism.
- Describe and interpret experimental data based on conceptual knowledge of cell biology.
- Formulate a scientific argument and defend it using logical reasoning and experimental evidence.
- Interpret current primary literature in cell biology, and communicate key findings in writing.
- Articulate the importance of cell biology within the context of the 'bigger picture' of everyday life.

Textbooks and Additional Resources:

- **Course Website:** URL http://www.canvas.ubc.ca.
  For Canvas help, please see: https://students.canvas.ubc.ca/help/. Students are expected to check Canvas regularly, and keep abreast of updates. BIOL 200 may make use several features in Canvas that can push notifications to the student's inbox or mobile device. Turning these off may result in missing

important information. This will not be an acceptable excuse for missing important course communications.

- **Clicker classroom response system**: Available at UBC Bookstore.
- **Recommended Textbook:** Alberts, Bray, Hopkins, Johnson, Lewis, Raff, Roberts & Walter - *ESSENTIAL CELL BIOLOGY (An Introduction to the Molecular Biology of the Cell),* 4th ed., 2014, Garland Press.
  There are several options available for accessing this textbook. Please note that we DO NOT require an access code for this textbook. We provide page numbers for both the 3rd and 4th editions.

Evaluation:

The breakdown of your BIOL 200 grade will be as follows:

Examination Component* (Students must achieve 50% = 37.5/75 on this component to pass the course)		
Midterm	**25%**	- 50 minutes – **in class**
Final	**50%**	- 2.5 hr during the UBC exam period.
Other Learning Activities (These will only be applied to the final grade once a 50% is achieved on the Examination Component)		
Pre-Readings (6 x 0.5%)	**3%**	- Online quizzes for each unit, due before class, based on online pre-readings; best 6 of 8 will be counted
Lecture Participation	**4%**	- Based on in-class activities, homework and i>clicker use. More details will be provided by each lecturer.
Tutorial workshops (8 x 1%)	**8%**	- 50 minute weekly workshops. Best 8 of 9 will be counted
Press Release Assignment	**10%**	2 components: - **1%:** Introductory Quiz at the start of term. - **9%:** Final Press Release Writing Assignment, due online.

***IMPORTANT NOTES REGARDING FINAL GRADE CALCULATIONS:**

1. In order to pass this course, students must achieve a passing grade on the Examination Component of the course. If they do not, the Other Learning Activity scores will not be applied to the final grade.
2. No final grades between 45 and 50% will be awarded. The highest failing grade will be 45%.
3. 'Hard work pays off' Policy:

- If the student receives a grade on the final exam that is 20% higher than that which they received on the midterm exam, then the midterm will count for 10% of their final grade, and the final will count for 60%.

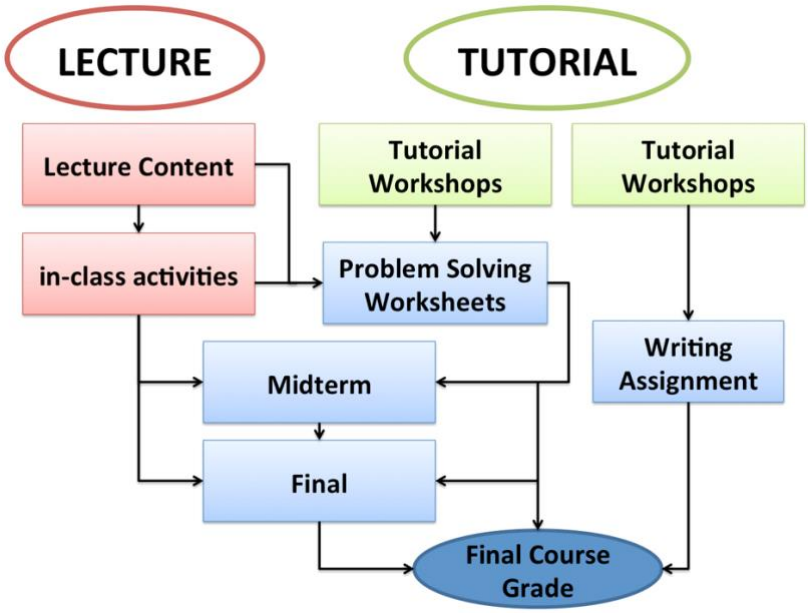
Pedagogical Approach:
This course follows what is known at UBC as a Blended Learning Model. This means that...

- Students attend lecture and have *face-to-face* contact with their instructor, and...
- Students are also expected to extensively *use* the Canvas websites for pre-readings and other activities that will help them engage and succeed.

BIOL 200 Tutorials
The Biology 200 Tutorials are designed to support your learning of important skills in Biology 200. Our goals for the tutorials are two-fold:

1. **To help you achieve some of the more complex skills outlined in the course goals.** Problem-solving is a very difficult skill, but will serve you well beyond Biology 200. The problem-solving workshops are designed to give you practice working through complex problems that use experimental evidence. They are not meant to teach you the course content, but to help you take the information that you've learned and use it to understand the scientific thought process.
2. **To help develop your science writing skills.** Scientists need to be effective communicators in order for their work to be understood by a wide audience, and this means scientists need to know how to write. You will practice this by reading and interpreting a scientific article and then writing a press release about it.

The following infographic was designed to help you visualize how the different course components fit together:



The tutorial component workshop participation marks can only be achieved by attending tutorial. You cannot make up those grades by other means. Worksheets will not be posted online (but the material from the worksheets is accessible in the problem sets). Worksheets also cannot be handed in after the fact. You must hand your worksheet in at the end of your tutorial.

Schedule of Topics:

Note: this is an approximate schedule and the timeline is subject to change depending on the term and lecture section.

Week	Unit	Lecture Topics	Tutorial Schedule
1	Unit 1: Introduction & Microscopy	Introduction & start of Unit 1 Topic 1.1 & 1.2	*No tutorials*
2		1.2: Microscopy	Tutorial 1: Introduction + Experimental Design
	Unit 2: Biological Membranes	2.1: Features of Membranes 2.2: The Lipid Bilayer	
3		2.2: The Lipid Bilayer 2.3: Membrane Proteins	Tutorial 2: Problem-Solving Unit 1 (Online Press Release Quiz)
4		2.3: Membrane Proteins	Tutorial 3: Problem-Solving Unit 2 Essay Outline Practice – Lipids
	Unit 3: Nuclear Structure & Function	3.1: Nuclear structure 3.1: Protein Import into the Nucleus	
5		3.1: Protein Import into the Nucleus 3.2: Chromatin & Chromosomes	Tutorial 4: Problem Solving Unit 2 SDS-PAGE Experiments
6		3.3: Gene Expression	Tutorial 5: Problem Solving Unit 3 Nuclease Digestion Experiments
7		3.3: Gene Expression	*No tutorials – midterm week*
	Unit 4: Endo-membrane System	4.1: Introduction & Protein Import 4.1: Protein Import into ER	
8		4.1: Protein Import into ER 4.2: Vesicle traffic	Tutorial 6: Press Release Workshop

		4.3: Golgi structure, glycosylation	
9		4.4: Post-Golgi Traffic, Secretion 4.4: Post-Golgi Traffic, Lysosomes 4.5: Endocytosis	Tutorial 7: Problem-solving Unit 4 Biochemical Golgi Experiments
10	Unit 5: Mitochondria & Chloroplasts	5.1: Protein Import 5.2: Mitochondria 5.3: Chloroplasts	Tutorial 8: Essay Outline Practice Multiple units covered
11	Unit 6: Cyto-skeleton	6.1: Cytoskeleton, Intermediate Filaments 6.2: Dynamic Instability	*No tutorials*
12		6.2: Microtubules 6.3: Microfilaments	Tutorial 9: Problem Solving Unit 6 Dynamic Instability
	Unit 7: Cell Cycle	7.1: Cell cycle	
13		7.1 & 7.2: Cell cycle control 7.2: Cell cycle control continued 7.3: Mitosis and cytokinesis	Tutorial 10: Problem Solving Unit 7 Cell Cycle & Checkpoints

Course Policies:

In-Class Policies

- During Lecture time, students are expected to come prepared and take notes. Recordings of any kind (audio OR video, including photographs or videos on your phone) are not allowed, unless you have express permission beforehand from your instructor.
- The details of your participation score are at the discretion of your lecturer. At a minimum, it will include your clicker scores, but it may also include worksheets, handouts, homework, and/ or discussion board postings.
    - In general, you participate in at least 85% of classes, you will receive full i>clicker participation marks. After that your grade is pro-rated accordingly, based on the number of classes that you participated in.
- Participation is interpreted as an acceptable level of effort while also allowing the student response to be wrong (unless otherwise specified by your lecturer). Students are expected to give their best effort at all times for in-class activities to be counted.

Examination Policies

- **Exam Format:**
  - Both midterm and final exams will contain a combination of data analysis and short answer questions, as well as a single 'essay outline'.
  - The final exam is cumulative, but there will be a strong emphasis on previously untested material and the second half of the course.
- **Memory aid format:**
  - You may bring a single-page information sheet to the midterm and to the final. These sheets will be handed in with the exam.
  - This memory aid must be 100% hand-written in your own handwriting, on a US Letter-sized paper (8.5 x 11 inches). You may write on both sides, but you may not increase the surface are by adding post-its or other additional notes.
  - Students caught with memory aids that do not conform to these criteria will have their memory aid taken away during the exam, and may not have it returned to them after the exam. Depending on the severity of the infringement, further repercussions may apply.
- **Missing an exam:**
  - Students should make every effort to attend the midterm and final exam at the scheduled exam times.
  - The **midterm exam** is an evening exam. Students with course conflicts or childcare concerns should identify themselves to their lecturer as soon as possible, in order to plan for exam rescheduling.
  - The **final exam** is held during the official exam period at the end of term. Students who miss the final exam must apply for a standing deferral, and will write their final exam with the students taking the course in the following term.
    - **Note:** Exam Hardship is when students have 3 exams that start AND end in a 24h period. An exam clash is when a student has 2 or more exams scheduled at the exact same time. In both of these cases, the student should first contact their lecturer to try and resolve the issue. For more information please see the following link.

Other Policies

- All BIOL200 material that is provided through Canvas and Piazza is for the sole purpose of private study and research by the individual student. It may not be shared or sold for profit to any other individuals, companies, or websites by students. You do not own the copyright to this material, so you do not have the right to distribute it.

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.