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

BIOL 440 / APBI 440 – Plant Genomics

General Course Syllabus (as of January 2020)

About the Course:

Course Description: This course covers the concepts, principles, applications, and recent discoveries in genome structure, genetics, and comparative genomics in plants with a focus on economically important plants.

Plant genomes are being sequenced at an ever increasing rate. All major crops and most minor crops now have genome projects associated with them. There are also genome projects on evolutionary and ecological model organisms such as Physcomitrella patens (moss) and Mimulus guttatus(monkeyflower). The availability of genomic resources is driving an exciting phase of discovery in the plant sciences and this is consequently a very exciting and dynamic research field. Genomics-led discoveries are being made in many fields including stress physiology, speciation and agricultural yield.

Course Format: Lecture: the course will be taught using a hybrid of lectures, group presentations, class discussions, seminars, and in-class research project analysis. Some computer exercises will also be included.

Credits: 3
Pre-requisites: (a) BIOL 233 or BIOL 234, and (b) one of BIOL 335, BIOL 338.

Course Learning Objectives:

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

- Achieve a good working knowledge of concepts, principles, and recent discoveries in genomics and molecular genetics of agricultural and other economically important plants.
- Learn to apply their knowledge to ecology, evolution and crop plant improvement.
- Read, discuss and critically evaluate recent research papers and original genomics datasets.
- Present assigned topics in crop genomics, enjoying a modern **learn-unlearn-relearn** educational process.

Textbooks and Additional Resources:

No textbook. Readings will be literature review articles from scientific journals and primary research papers mentioned in class. They can be found and downloaded from PubMed. Course website: canvas.ubc.ca.

For group presentations, students are encouraged to borrow and read related parts of the textbook “Economic Botany: Plants in our World” from the instructor to prepare for their presentations. Students are responsible for self-learning and researching into the assigned topic and research papers.

Evaluation:

Assessment	Weight
Midterm exam	20%
Final exam (comprehensive)	35%
Group research and presentation	25%
Class research project and quizzes	10%
Seminar summary	6%
Participation	4%

DETAILS ON ASSESSMENTS:

Group presentations: In a group, students will design and deliver an oral lecture (in which all group members will participate) on an assigned crop genomics topic. In the presentation, students should explain the importance of the crop, the domestication history, define current challenges, summarize the recent genomics advances that include the assigned papers, and provide a critical analysis of the current status of the crop. Classmates will be learning on the topic from other groups, and the ideal presentation will engage the whole class in an interactive manner. The presentation will be evaluated by both the teacher and peer students, on the quality of the presentation (10%) and individually by their own presentation (10%).

Each student will also need to submit a written summary (less than 2 pages, worth 5%) on the assigned research papers one week after the presentation. The presentation file of each group will be posted on the course website and the materials covered in the presentations will be part of the exams. More details on the criteria and tips will be provided in-class.

In-class research projects: Wet-lab plant genomics projects will be studied and dissected to learn how to solve real-world plant genomics problems. Quizzes (5%) will be included during class.

Participation. Participation comprises (1) attendance in lectures and group discussions/presentations and (2) active participation in class/group discussions and presentations.

Schedule of Topics:

Sample schedule from 2019W2 (subject to change):

Week	Topic
1	- Course Introduction; course schedules - Why we eat what we eat? The future of our food
2	- Why genomics? Basic features of plant genomes - Why sequence a genome? Genomics
3	- Teacher Presentation: Rice - What is genomics? What can we learn from it?
4	- What is functional genomics? What can we learn from it? - Functional genomics; Class project
5	- Class project - Overexpression and transformation; Plant biotechnology
6	- Knockout - **Midterm exam**
7	- Student Presentation: Group 1 - 1000 genomes/Metagenomics
8	- Student Presentations
9	- Student Presentations
10	- Class project
11	- Student Presentations
12	- Class project - Student Presentations
13	- Student Presentations - Course Review
	Final exam date and time to be announced by the Registrar's office.

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.