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

BIOL 433 – Plant Genetics

General Course Syllabus (as of May 2019)

About the Course:

Course Description: The focus of the course is on how molecular genetic analyses can be used to understand biological processes in plants, although the approaches are relevant to organisms from all kingdoms. Case studies on the analysis of biochemistry, development, and pathogen interacts are used to illustrate the process. A background in plant biology and molecular biology is useful but not essential. Techniques covered include forward and reverse genetics, plant transformation, gene cloning, analysis of gene expression.

Course Format: Lecture and Tutorial
Credits: 4
Prerequisites: BIOL 335

Course Learning Objectives:

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

- Understand how mutants can be used to identify and dissect the molecular mechanisms underlying any biological process.
- Interpret molecular genetic data.
- Select and describe the application of molecular genetic techniques appropriate for a given application.
- Read and understand and present the contents of research papers.

Textbooks and Additional Resources:

Website: http://blogs.ubc.ca/biol433/

Readings:

- Papers and reviews to be downloaded from website
- Westhoff et al. 1998. Molecular Plant Development: From gene to plant. Oxford University Press, Oxford. Selected parts available for purchase at the UBC Bookstore.
- Buchanan et al. 2000. Biochemistry & Molecular Biology of Plants. American Society of Plant Physiologists, Rockville MD. Useful for several topics; selected parts available for purchase at the UBC Bookstore.
- Book chapter on SA and SAR by Terry Delaney

Evaluation:

Assessment	Weight
Final exam	35%
Take-home problem assignments (3)	30%
Tutorial assignments (10)	10%
Tutorial presentation (group presentations of assigned papers, and an individual written report)	20%
Class participation	5%

Take-home assignments
The take-home assignments will be similar in format to final exam problems. Students will be asked to solve a problem and/or evaluate data relevant to material discussed in lectures. There will be one assignment for each of the three lecture sections B1-3 (below). Students are encouraged to work together in groups, and consult any source, but will hand in answers prepared individually. The objectives of these assignments are to help students understand and use the information and experimental approaches presented in class, and to provide practice in answering the type of questions on the final exam. See below for information on tutorial evaluation.

Tutorials
A paper will be assigned for each of 11 tutorials with the topics integrated into lecture material. If students do not have experience reading scientific literature they should read 'Tips for Reading a Paper'. The assignments for individual tutorials will also help direct attention to important points in each paper. All tutorials except for the first one will be student-led.

Assignments:
A short assignment will be due at the beginning of each tutorial except for the tutorial where they help present (for a total of 10% of the course mark). The objective of the assignments is to motivate students to read and think about the tutorial paper before it is discussed.

Group presentations:
Students will be asked to sign up for one of 10 group presentations. Each group will design and deliver an oral presentation (in which all group members will participate) that defines the question addressed by the paper, summarizes the genetic methodology used to address the question, provides a critical analysis of the results of the reported experiments, summarizes the authors' (and the students' own) interpretations of the results, and describes unanswered and/or newly raised questions. Each student will have read the paper, and the ideal presentation will engage the class in an interactive manner.

Students who present should meet with us the week before their presentation to clarify their questions on the content of the research paper!
Students will be evaluated on the quality of the presentation as a group (5%) and individually (10% for oral presentation + 5% for the student's own written summary of the paper for a total of 20% of the course mark.

Accessing tutorial papers:
Tutorial papers will be made available on the course website before each tutorial (http://blogs.ubc.ca/biol433/). If students have difficulty downloading the papers, please let the instructors know.

Schedule of Topics:

Lecture outline:
A. Basic information and methods in plant genetics (8 lectures)

1. Plant genomes and genomics
2. Classical and molecular genetics: mutants; gene mapping, cloning and molecular analysis
3. Gene transfer in plants
4. Reverse genetics

B. Topics in plant genetics (26 lectures)

1. Biochemistry and metabolism (8 lectures)
2. Development (9 lectures)
3. Plant-pathogen interactions (10 lectures)

Tutorial outline:

Tutorial	Topic	Activity	
1	Molecular analysis of plant genes	assignment	class discussion
2	No tutorial		
3	Reverse genetics	assignment	group presentation
4	Plant biochemistry/metabolism	"	"
5	Plant biochemistry/metabolism	"	"
6	Plant biochemistry/metabolism	"	"
7	Plant development	"	"
8	Plant development	"	"
9	Plant development	"	"
10	Plant-pathogen interactions	"	"
11	Plant- pathogen interactions	"	"
12	Plant-pathogen interactions	"	"

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.