BIOL 440/APBI 440 Plant Genomics (term 2, January 3th - April 6th, 2016)
(Concepts, principles, applications, and recent discoveries in plant genomics with a focus on economically important plants)

Time: Tuesdays and Thursdays, 9:30-10:50
Room: 107, SWNG
Instructor: Professor Dr. Xin Li, Department of Botany / Michael Smith Laboratories
Course Website: www.connect.ubc.ca
Office: Rm 317, 2185 East Mall, Michael Smith Building
Office hours: any day by appointment. Please note that many queries about materials in the course can be answered by email.
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BIOL 440 counts as a program elective in the Cell Biology & Genetics option and the Plant Biology option of the Biology major. APBI 440 counts as an elective in the Applied Plant and Soil Science major.

Prerequisites:
BIOL 335 or equivalent

Overview:
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 material will focus heavily on crop plant genomics. We will concentrate on discoveries in fundamental plant science aided by plant genomics, and also on "translational research" (i.e. how fundamental scientific research can be translated into applied benefits). We will not cover applied research *per se*. Emphasis will be on recent discoveries and on reading, comprehending, digesting and presenting primary literature.

Objectives and learning outcomes:
Students will achieve a good working knowledge of concepts, principles, and recent discoveries in genomics and molecular genetics of agricultural and other economically important plants. They will learn to apply their knowledge to ecology, evolution and crop plant improvement. Students will read, discuss and critically evaluate recent research papers and original genomics datasets. Students will also be presenting assigned topics in crop genomics, enjoying a modern **learn-unlearn-relearn** educational process.

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

Grading:

Midterm exam:	20%
Final exam (comprehensive):	40%
Group research and presentation:	25%

Class research project quizzes 5 %
Seminar summary 5 %
Participation: 5 %
[Participation comprises (1) attendance in lectures and group discussions/presentations; (2) active participation in class/group discussions and presentations.]

Reading:
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.
https://connect.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.

Plant genomics group presentations:

You will be asked to sign up for one of 8 group presentations. Your group will design and deliver an oral lecture (**in which all group members will participate**) on a crop genomics topic assigned. As part of your presentation you 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. Your classmates will be learning on the topic from your group, and the ideal presentation will engage the whole class in an interactive manner.

Your presentation will be evaluated by both the teacher and your peer students. You will be evaluated as a group on the quality of your presentation (10%) and individually by your own presentation (10%). Each student will also need to submit a 1-1.5 lane-spaced written summary (5%) on the assigned research papers of less than 2 pages one week after the presentation. The presentation file (in ppt or pdf format) of each group will be posted on the course website and the materials covered in the presentations will be part of the exams. Criteria for evaluation include the following:
1) Understanding of the topic and the research papers related to the crop's genomics research.
2) Effectiveness of presentation (audibility, quality of visual aids, etc.)
3) Interaction with the class.

Tips for your presentation:

In addition to assigned reading papers related to the assigned topic, you may want to consult related text books and/or papers and reviews that explain background information, techniques and directions the field has taken.

Remember that you are teaching the material to the class. To help the other students understand your presentation you will need to include materials, diagrams and pictures, etc., to facilitate your explanation.

Use as many illustrations/animations as possible in your presentation.

Avoid presenting long lists of points without supporting illustrations or explanations.

Your slides/overheads should be attractive and easy to understand. Use large print, limited text, and avoid complexity.

The focus of the presentation is the assigned topic. You should avoid showing large amounts of data and information that are of little value (for example, pure nucleotide sequences of genes).

Involve the students in your presentation. Use questions to make sure that your audience understands the material you present.

Speak slowly, and practice your presentation ahead of time.

In-class research project

A wet-lab plant genomics project will be studied and dissected to learn how to solve real plant genomics problems. Quizzes (5%) will be included during class.

Class policies:

- Exams will be written only on the scheduled dates.
- Class attendance will count towards your participation marks. You must attend both the lectures and student-led group presentations to be counted as present for that day. If you do need to miss a class for a valid reason, please inform the instructor by email or phone before that class.
- Please come to class on time @ 9:30 am. Students who frequently are late will lose participation marks. If you have difficulty arriving to class on time please let the instructor know.