BIOL 443/635 Plant Molecular Genetics, Fall 2016

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Time: Tu/Th 11:45-1:00
Classroom: CC-301

Course objectives:
Welcome to Biology 443. This course includes a survey of specialized topics including plant disease resistance, signal transduction, the regulation of flower development, and the use of genetically modified organisms (GMOs) in agriculture. Innovative applications of molecular analysis and genetic engineering in plants have had a dramatic impact on our basic understanding of plant growth and development, and have a strongly influenced plant improvement in modern agriculture through genetic engineering. The course uses original research articles as the primary reading material and enhances the students' skills in the use and analysis of primary literature. Prerequisite: BIOL 367.

Reading:
Papers and reviews to be downloaded from a Moodle web page where announcements, assignments and other supplementary material are posted. The web page can be accessed through MyConcordia portal.

Lecture outline:
A. Basic information and methods in plant molecular genetics
1. Plant genomes and functional genomics

2. Classical and molecular genetic analysis: mutants, cloning, and molecular analysis

3. Forward and reverse genetics

B. Topics in plant molecular genetics
1. Signal transduction

2. Plant development: flower induction, and stomatal patterning

3. Biotic and abiotic stress resistance

4. Plant hormones

5. Genetically Modified Organisms (GMOs) in agriculture

Evaluation:
- Grading will be based on 4 take home exams, one tutorial, and one group presentation.

- Total points for the course will be 500 and the final grade will be calculated as a % of the total.
- You will have two weeks to complete take-home exams and nine days to prepare tutorial. You will be asked to solve a problem and/or evaluate data relevant to material discussed in lectures. You may work together, and consult any source, but will hand in an individual assignment, which will be individually evaluated. The objectives of these assignments are to help you understand and use the information and experimental approaches presented in class.
- There will be two weeks of group presentations in the course and your peers provide part of the evaluation.
- NO FINAL EXAM.

60% Take-home problem assignments (4)
15% Tutorial
20% Presentation (group presentations of papers)
5% Class participation

The course grading scheme is:

$A^+ = \geq 90$	A = 85-90	$A^- = 80\text{-}85$
$B^+ = 77\text{-}80$	B = 74-77	$B^- = 70\text{-}74$
$C^+ = 67\text{-}70$	C = 64-67	$C^- = 60\text{-}64$
$D^+ = 57\text{-}60$	D = 54-57	$D^- = 50\text{-}54$
F = <50		

Presentation:
You group will be asked to choose an up-to-date research article (within 2-3 years).

Descriptive papers that merely characterize morphology, evolution, and ecology of plants without providing "mechanistic insight" will not be considered. For instance, one can present the mechanisms of cell-cell signaling in the Brassica pistil that leads to a rejection of self, and address how disruption of the key genes led to the evolution of selfing in Arabidopsis. But merely presenting the molecular evolution of self-incompatibility locus will not be considered mechanistic. Students may contact the instructor about the choice of their papers.

Your group will design and deliver an oral presentation (in which all group members will participate, 15 min power point presentation) 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 your) interpretations of the results, and describes unanswered and/or newly raised questions.

You will be evaluated on the quality of your presentation as a group (5%) and individually (10% for oral presentation + 5% for your own written summary of the paper) for a total of 20% of the course mark.