# BIOL 485/523 Agriculture and Agri-Food Biotechnology, Winter 2017

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**Office Hours :** by appointment
**Time:** Th 1:15-4:00
**Classroom:** CC-405

**Course objectives:**
This course presents an overview of current biotechnological techniques, including recombinant DNA technique, plant tissue culture, and plant transformation. Theoretical aspects in Plant Molecular Biotechnology with emphasis on the use of genetically modified organisms (GMOs) in agriculture as well as the issues/challenges of their applications in crop production will be introduced. 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:**
1. Introduction in Plant Molecular Biotechnology and general information

2. Model organisms

3. *Agrobacterium*-mediated transformation

   - Review of *Agrobacterium*
   - Binary vectors
   - Plant transgenesis

4. Molecular gene cloning techniques and vector design and construction

5. Plant tissue culture

   - Composition and preparation of media
   - Plant hormones
   - Selection markers

6. Genetically Modified Organisms (GMOs) in agriculture

   - Improvement of tolerance to biotic and abiotic stress
   - Improvement of plant yield
   - Production of recombinant proteins and antibodies
   - Ethical issues of GM plants

7. Development and issue of new techniques in Plant Biotechnology

   - RNAi and VIGS
   - Lox/Cre system
   - Risk assessment

**Evaluation:**

- Grading will be based on 2 take-home exams, 1 project, and 1 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. 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 presentations in the course and your peers provide part of the evaluation.
- NO FINAL EXAM.

40% Take-home problem assignments (4)
20% Project
30% Presentation (oral presentation and written summary of the paper)
10% Class participation (class attendance and discussion)

The course grading scheme is:

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