

**PLANT BIOTECHNOLOGY: THE BUSINESS OF SCIENCE**  
**BIOL503**  
**FALL 2019**

**Instructor:** K. Ko

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**Office Hours:** Please schedule by email or through other means

**Course goals and objectives:** The focus of the course is to look at the issues behind plant biotechnology, the steps leading to a transgenic (or non-transgenic) plant/product, and its commercialization. Students will go through the process of developing their own ideas/inventions into a commercially valuable product, plus an assessment of all related social and economic issues. Scientific techniques such as plant cell tissue culture, plant transformation, plant development, genetics, gene expression, bioinformatics, and recombinant DNA techniques may be covered through a series of workshops or case studies, when considered appropriate. The schedule of core activities is given below.

**Summary of learning objectives:** The intention of this course's learning objectives is to give participants a broad exposure to the science behind the business of plant biotechnology and related socio-economic issues. This course gives an alternate view to why we do research, how we do research, and the need to be accountable to the public. Therefore, some of the topics will encompass legal and ethical issues. Students will learn how to extract and evaluate information from the web or other related commerce sources, practice developing commercialization strategies, learn how to prepare technology proposals, business plans and analyst reports, understand the science and implications of biotechnology patents, improve lay communication skills for non-scientists, carry out work as industry consultants, and perhaps learn of different career paths. Biol503 is considered an experiential course and thus provides real-world exercises as evidence of experience for the students to embark on different career paths.

**Intended student learning outcomes:**

Upon completion of this course, students will acquire competence in the business of science and demonstrate their ability to:

1. Invent and commercialize biotechnologies
2. Communicate strategically for the business world
3. Acquire skills used by industrial and business analysts
4. Carry out business consultant work in the plant biotechnology field as a team

**Grading scheme and evaluation vehicles for this course:** Participation (15%), press release (10%), seminar-case study (20%), layperson presentation (the so-called "Sales Pitch") (20%), business plan (20%), and analyst report (15%). Approximate completion dates (due dates are provided in the appended pages). Exact due dates will be decided by consensus early in the course (usually by the end of the first week).

- Sessions may be held twice a week for seven to nine weeks, depending on class size.
- Some slots may be used for discussion, questions, brainstorming, communication workshops, work-flow strategies, patenting workshop, commercialization workshop, etc.
- Press Releases are due late September to early October.
- Email feedback for the Press Releases is due the week after for circulation.
- The case studies-presentations will be scheduled for late October.
- Depending on class size, the last three-four weeks of term will be used for layperson presentations, the "Sales Pitch".
- Feedback for the Sales Pitches is due the week after for circulation.

- Participation includes, but not limited to, attendance, interaction, feedback exercises, and peer review.
- The due date for the remaining two written assignments, business plan and analyst report, will be after the end of the course.

**Grading method:** Assessment during the course will be carried out using numerical grades for each exercise or assignment. The compiled numerical grades are then converted to final letter course grades according to the Queen's University Faculty of Arts and Science Policy on Grading ([http://www.queensu.ca/artsci/sites/default/files/policy\\_on\\_grading.pdf](http://www.queensu.ca/artsci/sites/default/files/policy_on_grading.pdf))

**Textbooks and readings:** No required text for this course. Media articles, financial newspapers, primary literature and research reviews (for example, Nature Biotechnology, Trends in Biotechnology and Current Opinions in Biotechnology), patents, and information available via the Internet. Reference articles may be recommended to facilitate discussion, etc.

**Academic Integrity and Queen's Code of Conduct:** Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments and conduct conform to the principles of academic integrity. Information is available from the instructor of this course and on the Biology Department's website: (<http://biology.queensu.ca/academics/undergraduate/prepare-yourself/>). Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulations on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.

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