

**PLANT BIOTECHNOLOGY: THE BUSINESS OF SCIENCE**  
**BIOL503**  
**FALL 2021**

**Instructor:** K. Ko

**Instructor Contact Information:** [kok@queensu.ca](mailto:kok@queensu.ca)

**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.

The following statement on academic integrity builds on a definition approved by Senate and is designed to inform students about the importance of the concept and the potential consequences of departing from the core values of academic integrity. It is highly recommended that this statement be considered.

Queen's students, faculty, administrators and staff all have responsibilities for supporting and upholding the fundamental values of academic integrity. Academic integrity is constituted by the five core fundamental values of honesty, trust, fairness, respect and responsibility (see [www.academicintegrity.org](http://www.academicintegrity.org)) and by the quality of courage. These values and qualities are central to the building, nurturing and sustaining of an academic community in which all members of the community will thrive. Adherence to the values expressed through academic integrity forms a foundation for the "freedom of inquiry and exchange of ideas" essential to the intellectual life of the University.

Students are responsible for familiarizing themselves with and adhering to the regulations concerning academic integrity. General information on academic integrity is available at Integrity@Queen's University, along with Faculty or School specific information. Departures from academic integrity include, but are not limited to, plagiarism, use of unauthorized materials, facilitation, forgery and falsification. Actions which contravene the regulation on academic integrity carry sanctions that can range from a warning, to loss of grades on an assignment, to failure of a course, to requirement to withdraw from the university.

### **Accommodation Policy and Other Conflicts**

Students who feel they need accommodations for disabilities or extenuating circumstances, or have a conflict between exams or other commitments should consult the Biology Department's website for details about how to proceed (<http://biology.queensu.ca/academics/undergraduate/prepare-yourself/>). In general, the earlier your instructor is apprised of an extenuating circumstance, the more likely an accommodation can be made. Students are encouraged to be proactive in anticipating difficulties, when it is possible to do so.

The Queen's University Equity Office has the following statement on their webpage for your consideration <http://www.queensu.ca/equity/accessibility/policystatements/accommodation-statement>

Queen's University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact Student Wellness Services (SWS) and register as early as possible. For more information, including important deadlines, please visit the Student Wellness website at: <http://www.queensu.ca/studentwellness/accessibility-services/>

### **Late Policy**

Late assignments will be penalized at 5% per day.

## **Copyright**

Course material for Biol503 is copyrighted and is for the sole use of students registered in Biol503.

The material used in this course arises from two main sources, the course instructor and the registered students in the course. This material is thus designed for use as part of Biol503 at Queen's University and is the property of the instructor and students unless otherwise stated. Third party copyrighted materials (such as book chapters and articles) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law.

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<http://library.queensu.ca/copyright>