Department of Biology Course Outline

SC/BIOL 4290 4.00 Biotechnology
Fall 2022

Course Description

This laboratory course covers some of the methods currently in use in biotechnology research in industry and academia. Emphasis is placed on methods for transforming eukaryotes with marker genes. Advanced methods used in molecular biology are also covered. Two lecture hours, six laboratory hours per week. One term. Four credits.

Prerequisites (strictly enforced)

SC/BIOL 3110 3.0 or SC/BCHM 3110 3.0

Course Instructor(s) and Contact Information

Dr. Mike Gadsden
Room 213 Lumbers Bldg.
mgadsden@yorku.ca
OFFICE HOURS: Please e-mail mgadsden@yorku.ca to make an appointment for a Zoom or office meeting.

Schedule/Course Format

Lectures: In person, Wednesdays and Fridays 10:30am -11:30am. Starting

- Recorded Zoom Sessions Sept 7th
- In Person class sessions Sept 21st

Student presentations: In person, Wednesdays and Fridays 10:30am -11:30am
Labs: In person; Tuesday/Thursday 2:30pm-5:30pm OR Wednesday/Friday 2:30pm-5:30pm; LSB 223
starting Sept 15th or 16th depending on your schedule

Technology Requirements

Ability to use Powerpoint on existing classroom computer. **Please bring a cell phone with camera to labs.** This will be used to record data as pictures.

It is essential that you keep up with the work and do not fall behind. I suggest you develop a personal schedule that permits you to complete all aspects of the course within the recommended time-lines and/or deadlines.

- Refer to the Lecture and Lab eClass sites daily.

This course runs on Toronto time (Eastern Time Zone). Accommodations for other time zones unfortunately are not possible.

Evaluation

Presentation (20%)
Participation (10%)
Lab reports (40%)
Lab 2 quiz (10%)
Final Exam (20%)

Detailed information for Grading can be found under 'Course Content'

Important Dates

First remote (recorded – not live!) lecture: September 7th, 2022.
First In person Lecture: September 21st LSB 101
First in person lab session: Sept. 15 or 16 2022 (depending on your section)

Reading Week: Oct. 8 - 14 (no lectures or labs)
Last day to Drop the course: There are 2 dates – the first is November 11th and you will not receive a grade or note on your transcript. After that you have until the last day of classes (Dec. 7th). This part is new "*You may withdraw from a course using the registration and enrolment system after the drop deadline until the last day of class for the term associated with the course. When you withdraw from a course, the course remains on your transcript without a grade and is notated as "W". The withdrawal will not affect your grade point average or count towards the credits required for your degree*."

For additional important dates such as holidays, refer to the "Important Dates" section of the Registrar's Website: https://registrar.yorku.ca/enrol/dates/fw20

Resources

No Required Textbook. There will be readings that you will need to access through the library or internet. May require a subscription (free) in some cases.

Student papers and Powerpoint slides will be posted on eClass.

Lab manual and a notebook (must purchase) are required. **Personal lab coat and safety glasses are required.**
Attend labs with a cell phone (or small device that takes photos).

Learning Outcomes

• Knowledge of current biotechnology topics and applications
• Critical evaluation of primary literature
• Experience with performing challenging lab experiments; collecting and analyzing data, trouble-shooting mistakes
• Experience with writing full-length lab reports
• Verbal and written presentation of primary literature as well as your own collected data and fielding questions from the class/TA/Professor

- Demonstrated hands on proficiency and theoretical knowledge of all techniques taught in lab

Course Content

LECTURE TOPICS:
Agricultural Biotechnology (GM foods, transgenic plants, limiting transgene spread)
Industrial and Environmental Biotechnology (Biocatalysis, novel compounds, bioremediation)
Medical Biotechnology (Cloning, stem cells, gene editing, gene therapy)

GRADING FOR TERM
PRESENTATION (20%)
You will be expected to give a very concise and well-organized oral presentation on a subject that is related to this biotechnology course. Based on your choice of a single recently published paper (choice must be approved by course director from provided list), give a 10 minute presentation on the paper, followed by 5 minutes for questions. Your answers to class questions will be used to evaluate your background knowledge and understanding of the work (methods used, potential applications, ethical issues).
PARTICIPATION (10%)
This grade will be based on your participation in both the laboratory exercises and the presentations. This means you have to ask questions in both environments!
Your participation in the oral presentations; i.e., your attendance and questions asked during the discussions will be assessed by the course director.
The lab performance grade is based on your laboratory technique, how well prepared you are for the lab, your lab cleanup, your attitude in the lab, and on your laboratory notebook (which will be reviewed periodically by the teaching assistants). The grade for lab performance is determined by all of those involved in running the lab: the course director, the teaching assistants and the lab technician.
LAB REPORTS (40%)
Laboratory 1, PLANT BASED – Transient transformation and RT-PCR 12%
Laboratory 3, MAMMALIAN CELL BASED - Immunoprecipitation of Activated MAP Kinase 12%
Laboratory 4, MICROBE AND IN VITRO BASED - Protein Expression and Purification, In Vitro Transcription and Translation 16%
LAB QUIZ (10%)
Laboratory 2, YEAST BASED – Genome editing with CRISPR-Cas9 10% - May require an oral examination
FINAL EXAM (20%)
This exam will be based on the lecture material and fellow student presentations and will be held in person during the normal exam period.

Other Information

Detailed information for in-person labs and safety will be posted on eClass. Labs begin Sept 15th or 16th (Thursday/Friday) depending on section.

Course Policies

Switching lab sections is not permitted.

Late lab reports will be penalized 10% each day. Late Powerpoint submissions for presentations will be penalized 10% each day. The grade value of a missed quiz for Lab #2 will be added to the final exam. A missed final exam will be rescheduled as an oral examination (Zoom).

University Policies

Academic Honesty and Integrity

York students are required to maintain the highest standards of academic honesty and they are subject to the Senate Policy on Academic Honesty (http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/). The Policy affirms the responsibility of faculty members to foster acceptable standards of academic conduct and of the student to abide by such standards.

There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve students' research and writing skills, and cope with University life. Students are expected to review the materials on the Academic Integrity website at - http://www.yorku.ca/academicintegrity/

Important A note from the Faculty of Science Committee on Examinations and Academic Standards: Numerous students in Faculty of Science courses have been charged with academic misconduct when materials they uploaded to third party repository sites (e.g. Course Hero, One Class, etc.) were taken and used by unknown students in later offerings of the course. The Faculty's Committee on Examinations and Academic Standards (CEAS) found in these cases that the burden of proof in a charge of aiding and abetting had been met, since the uploading students had been found in all cases to be wilfully blind to the reasonable likelihood of supporting plagiarism in this manner. Accordingly, to avoid this risk, students are urged not to upload their work to these sites. Whenever a student submits work obtained through Course Hero or One Class, the submitting student will be charged with plagiarism and the uploading student will be charged with aiding and abetting.

Note also that exams, tests, and other assignments are the copyrighted works of the professor assigning them, whether copyright is overtly claimed or not (i.e. whether the © is used or not). Scanning these documents constitutes copying, which is a breach of Canadian copyright law, and the breach is aggravated when scans are shared or uploaded to third party repository sites.

Access/Disability

York University is committed to principles of respect, inclusion and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University.

Student's in need of these services are asked to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with disabilities services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs.

Additional information is available at the following websites:

Counselling & Disability Services - http://cds.info.yorku.ca/

Counselling & Disability Services at Glendon - https://www.glendon.yorku.ca/counselling/

York Accessibility Hub - http://accessibilityhub.info.yorku.ca/

Religious Observance Accommodation

York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents. Should

any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for you, contact the Course Director within the first three weeks of class. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course director immediately. Please note that to arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete and submit an Examination Accommodation Form at least 3 weeks before the exam period begins. The form can be obtained from Student Client Services, Student Services Centre or online at https://secure.students.yorku.ca/pdf/religious-accommodation-agreement-final-examinations.pdf

Student Conduct in Academic Situations

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. The policy and procedures governing disruptive and/or harassing behaviour by students in academic situations is available at - http://secretariat-policies.info.yorku.ca/policies/disruptive-andor-harassing-behaviour-in-academic-situations-senate-policy/