

## Department of Biology Course Outline

### SC/BIOL 2070 3.0 Research Methods in Cell and Molecular Biology Fall 2019

#### Course Description

This course focuses on laboratory techniques in the life sciences. Practical research skills are developed through experiential learning using current biochemistry, cell and molecular biology techniques. Research skills include scientific writing, data analysis/interpretation, experimental design and hypothesis testing.

#### Prerequisites (strictly enforced)

(1) Both SC/BIOL 1000 3.00 and SC/BIOL 1001 3.00, or SC/ISCI 1110 6.00, or both SC/ISCI 1101 3.00 and SC/ISCI 1102 3.00

(2) both SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00, or both SC/ISCI 1201 3.00 and SC/ISCI 1202 3.00, or SC/ISCI 1210 6.00

#### Course Instructor(s) and Contact Information

Course Director: Dr. Christopher Jang ([jangc@yorku.ca](mailto:jangc@yorku.ca))  
Course Coordinator: Mr. Ryan Siu  
Teaching Assistants: TBA

#### Schedule

Six laboratory/practical hours per week.

Please consult the complete schedule and logistical details on the laboratory Moodle page and laboratory manual.

## Evaluation

The course is organized into four major modules and a final examination. The modules and grade breakdown are below. Your understanding of the material will be assessed by quizzes, laboratory work, written assignments, and the final examination. Please note that the grade distribution is subject to slight adjustments at the discretion of the Course Director.

Module 1: Scientific Writing – 20%  
Module 2: Genetics – 20%  
Module 3: Biochemistry – 20%  
Module 4: Cell Biology – 20%  
Final Examination – 20%

## Important Dates

First day for students with M/W labs: September 9, 2019

First day for students with T/R labs: September 10, 2019

Last day to switch lab sections: September 20, 2019 (please contact [biol2070@yorku.ca](mailto:biol2070@yorku.ca) for switches)

Drop Deadline: November 8, 2019

Withdrawal Deadline: December 3, 2019

Final Exam: Scheduled and published by the Registrar's Office

## Resources

### Required Resources

- BIOL 2070 Laboratory Manual (available in the bookstore)
- Hardcover lab notebook with numbered pages
- Laboratory coat and safety goggles
- Reed, et al. (2016) Practical Skills in Biomolecular Sciences, 5<sup>th</sup> ed. Pearson Education
  - ISBN 978-1-2921-0073-9
- The laboratory Moodle page (<https://moodle.yorku.ca>)

### Recommended Resources

- McMillan, V.E. (2012) Writing Papers in the Biological Sciences. Bedford Books.
  - ISBN 978-1-3190-4713-9

A more exhaustive list of optional resources can be found in the laboratory manual.

## Learning Outcomes

- Experimental design and hypothesis testing
- Data interpretation, including standard curve interpolation (graphing) and determining molecular weight of an unknown protein or genotype
- Critical thinking and assessment of current scientific publications
- Scientific writing of results and data analysis
- Use of model organism(s)
- Genetic engineering in microorganisms (e.g., bacteria, yeast)
- DNA analysis, including DNA extraction, use of restriction enzymes, polymerase chain reaction and gel electrophoresis
- Identification of genetic inheritance patterns based on genotype and phenotype including sex-linked traits
- Bright field, phase contrast and fluorescence microscopy, and identification of cellular components
- Spectrophotometry, chromatography and enzymatic assays
- Making dilutions and buffers
- Protein analysis via SDS-PAGE

## Course Content

The course is organized into four modules. Lab groups rotate through the four modules, which are held either in a classroom (Scientific Writing) or in laboratories in the Farquharson Life Sciences Building (FRQ). Different lab groups follow a different order of modules. Each module has 5 lab days.

The four modules touch on different important aspects of contemporary molecular biology. They are:

1. Scientific Writing (TBA)
2. Genetics (FRQ 122)
3. Biochemistry (FRQ 124)
4. Cell Biology (FRQ 120)

## Experiential Education and E-Learning

Elements of Experiential Education

- Laboratory work

Elements of E-Learning

- Online assessments administered through the lab Moodle page
- Supplemental videos and presentations for laboratories

## Other Information

- Note that all lab groups will be taking the scientific writing module first
- There will be a laboratory orientation for each lab group, prior to the start of the wet lab work

## Course Policies

### Personal Protective Equipment

**You must bring a laboratory coat and safety goggles to each wet lab including the lab orientation** (these are the labs that occur in FRQ 120, 122 and 124). These can be obtained at the York University Bookstore. If you lack one or more of these items, you will not be permitted to remain in the labs and no makeup will be granted.

### Turnitin Assignment Submission

This course uses Turnitin for all major and many minor assignments. Additional information regarding this can be found on the laboratory Moodle page and the lab manual.

### Missed Labs

You can only miss labs for valid reasons (please consult the list on the Biology Undergraduate website). If you miss a lab, immediately notify your TA and the Course Coordinator. If you miss a lab due to illness, you must see a physician within 24 hours of the missed lab and have the physician complete an "Attending Physician's Statement". Further details can be found in the lab manual.

### Late Assignment Policy

There is a 10% penalty, per day, for late assignments. Further details can be found in the lab manual.

### Grade Reappraisals

All reappraisal requests must be submitted to the Course Coordinator or Course Director within one week of the work being made available to you. You must obtain a Lab Reappraisal form from the Course Director for this purpose. Further details can be found in the lab manual.

### E-mail Policy

We will try to respond to email (biol2070@yorku.ca) within two working days, but this is not always possible. In order to ensure a prompt answer please follow the following guidelines. E-mail messages not meeting these guidelines may not be answered.

- Use your York email address when emailing us. E-mail from other sources may be filtered out and not reach the intended recipient
- Include the course code, lab section and brief indication of topic in the subject line so that we can route your e-mail effectively
- Identify your lab group to ensure the appropriate TA and instructor receive your message
- Include your name and student number at the end of each e-mail so we can access your information internally
- Before mailing us, please ensure that you've looked through and consulted other resources first, such as the laboratory manual and Moodle page
- Please keep your e-mail correspondence with us concise, proper, and professional.

### 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/>

Note that 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.

Students 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 [http://www.registrar.yorku.ca/pdf/exam\\_accommodation.pdf](http://www.registrar.yorku.ca/pdf/exam_accommodation.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/>