

## Department of Biology Course Outline

### SC/BIOL 4010 3.0 Biology of Cancer Winter 2021

#### Course Description

Explores the basic molecular and cellular concepts and principles related to the development of cancer, and medical applications to treatment and prevention of the disease.

#### Prerequisites (strictly enforced)

SC/BIOL 3130 3.00 or SC/BCHM 3130 3.00.

#### Course Instructor and Contact Information

Samuel Benchimol, PhD  
Department of Biology  
Life Sciences Building, Room 429F  
Email: benchimo@yorku.ca

You may contact me by e-mail at: benchimo@yorku.ca  
Include "BIOL 4010" in the subject line and your full name and student number in your e-mail text.

#### Schedule/Course Format

Synchronous Lectures on eClass  
Wednesdays 2:30 pm – 5:30 pm  
Teaching slides will be posted on eClass before each lecture. Slides are meant to enhance the lectures, not replace them. Lectures will be recorded and posted on eClass.

#### Evaluation

The final grade for the course will be based on the following items weighted as indicated:

Mid-term test 1	25%
Mid-term test 2	25%
Final exam (cumulative)	35%
Short quizzes (3) during term	15%

The mid-term tests will take place remotely on eClass on the scheduled dates. The short quizzes (three) will be announced during the lectures and will be on eClass. The final examination will take place remotely on eClass during the scheduled examination period following the end of the term; the date and time will be determined by the Registrar's office. **Proctoring will NOT be used.** Students are required to know and understand the material presented in the lectures and slides, and in the required readings. Final course grades may be adjusted to conform to Program or Faculty grades distribution profiles.

## Important Dates

Mid-term test 1 (February 10, 2021)

Mid-term test 2 (March 17, 2021)

Final exam (cumulative)

Last date to add a course without permission of the course instructor is Jan 25, 2021

Last date to add a course with permission of the course instructor is Feb 8, 2021

**Drop Deadline:** Last date to DROP the course without receiving a grade is March 12, 2021

**Course Withdrawal Deadline:** period during which one may withdraw from a course and receive a grade of "W" on transcript (March 13 – April 12)

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

NOTE: There will not be a class on Wednesday, February 17, 2021 (Reading Week).

## Resources

**Recommended Textbook:** The Biology of Cancer (Second Edition, 2014), by Robert A. Weinberg.  
Publisher: Garland Science

ISBNs: 978-0-8153-4219-9 (hardcover); 978-0-8153-4220-5 (softcover)

Additional reading materials will be posted on the course website on Moodle.

## Learning Outcomes

Upon successful completion of this course, students should be able to:

- Describe basic principles and concepts of cancer biology
- Be familiar with the experimental approaches used in cancer research
- Describe the role of oncogenes and tumour suppressor genes in cancer
- Identify the common signalling pathways that are disrupted in cancer

## Course Content

This course will explore the molecular and cellular mechanisms that underlie the development and progression of cancer. We will examine the genetic basis of cancer and learn fundamental concepts that are common to all forms of human cancer. We will consider how an understanding of cancer informs treatment and prevention strategies. The course will expose students to modern cancer biology and the primary cancer research literature.

Topics to be covered in the course include:

The nature of cancer – key concepts  
Retroviruses and the discovery of oncogenes  
Oncogenes – chromosome translocations, gene amplification, mutational landscape  
Growth factors, receptors and signalling pathways  
Tumour suppressor genes  
Cell cycle regulation  
Apoptosis  
Cellular survival pathways  
Limitless replicative potential  
Human Papilloma Virus and cervical cancer  
Cancer treatment strategies / Breast cancer

A lecture schedule will be posted on eClass.

## Other Information

### Technical requirements for taking the course:

To participate fully in the course you will need a stable, high-speed internet connection. You will need a computer with video and audio capability so that you can see and hear the lectures. The course will consist of synchronous (live) sessions. Lectures will be delivered using Zoom and will be recorded and posted on eClass for those who cannot attend. Reliable access to eClass is required. During the live lectures, you will have the opportunity to ask questions using the Chat function on Zoom.

## Course Policies

### Missed Test, Quiz or Exam:

Students who miss a course test (illness, compassionate grounds) must contact me as soon as possible. There will **NOT** be an opportunity to make up a missed mid-term test. After acceptable justification for a missed test has been received, the percentage value of the missed mid-term test will be added to the final exam (which will be worth 60% of the final grade).

There will **NOT** be an opportunity to make up a missed Quiz. The percentage value (5%) will be added to the final exam.

**Students are required to write at least one mid-term test in order to be eligible to write the final exam.**

If the final exam is missed, the student is required to complete a **Deferred Standing Agreement Form** and request permission from the course director to write a deferred exam. If the course director does not approve the request for deferred standing, the student may petition the Registrar for deferred standing (permission to write a deferred exam).

**Deferred Standing:** <http://myacademicrecord.students.yorku.ca/deferred-standing>

**Review of tests, quizzes and final exam:**

Students will **NOT** have the opportunity to review their tests, quizzes or final exam, and a complete set of answers will **NOT** be posted. Instead, I will provide general feedback that explains common errors and occasionally provide answers to specific questions that presented difficulty to the class. Students with specific questions requiring clarification may contact me by email.

## 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 or using the screen capture function to obtain copies of 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/>  
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. 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/>