



# BIOM\*4150 Cancer Biology

Winter 2020

Section(s): 01

Department of Biomedical Sciences

Credit Weight: 0.50

Version 1.00 - December 03, 2019

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## 1 Course Details

### 1.1 Calendar Description

The main objective of this course is to familiarize students with general concepts in cancer biology. Each topic is presented as an overview, emphasizing recent developments in the field. There is additional focus on developing scientific skills, including critical analysis of current literature and the ability to give logical and concise oral presentations.

**Pre-Requisites:** MBG\*2040, MCB\*2050, (1 of BIOM\*3040, BIOM\*4070, ZOO\*3000)

### 1.2 Course Description

#### **Rationale:**

Cancer is one of the major afflictions of mankind, and causes a significant number of deaths worldwide. In recent years, our knowledge about the origin of cancer and on how it progresses to become life threatening has significantly increased. Descriptive knowledge has been replaced with mechanistic understanding of cancer behavior at the molecular, cellular, organ and organism levels. Concomitant with the development of this extensive body of knowledge has been the development of scientists devoted to elucidate and solve problems in cancer biology. The aim of these scientists is to become allies with the clinical oncology sciences to improve cancer prevention, detection, diagnosis and treatment. The department of Biomedical Sciences wishes to participate in this worldwide initiative by offering students the possibility of learning about cancer biology, thus increasing their interest in the field and the probability of forming professionals dedicated to the study of this discipline.

### 1.3 Timetable

Timetable is subject to change. Please see WebAdvisor for the latest information.

### 1.4 Final Exam

Exam time and location is subject to change. Please see WebAdvisor for the latest information.

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## 2 Instructional Support

### 2.1 Instructional Support Team

**Instructor:** Byram Bridle Dr.  
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**Instructor:** Brenda Coomber Dr.  
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**Course Co-ordinator:** Alicia Viloría-Petit Dr.  
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**Telephone:** +1-519-824-4120 x54925  
**Office:** OVC 3647

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## 3 Learning Resources

### 3.1 Recommended Resources

Weinberg, RA (2014). *The Biology of Cancer*. Garland Science, Taylor & Francis Group, LLC, New York, NY, USA (Textbook)

## 3.2 Additional Resources

**Access to online journals in the cancer and biomedical sciences fields (Website)**

**Additional Resource Readings (Readings)**

Selected readings chosen from cancer research literature on line.

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## 4 Learning Outcomes

The overall aim of this course is to familiarize students with general concepts in cancer biology and how these concepts apply to the clinical definition and management of the disease. By engaging students in the preparation of a seminar and a literature review on a cancer biology topic of current interest, and in the discussion of a variety of cancer biology subjects, this course will ultimately provide students with a critical overview of cancer and its biology, and with an understanding of the relevance of research to the improvement of cancer prevention, diagnosis, prognosis, and treatment.

### 4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. Have a historical perspective and basic general knowledge of the most commonly studied topics in cancer biology.
  2. Know and understand the fundamentals of the most common methodologies currently used in cancer research
  3. Link specific cancer biology topics with clinical aspects of the disease, including prevention, diagnosis, prognosis and treatment.
  4. Provide critical assessments, as a result of your independent research on an assigned cancer biology topic, and by your active participation in weekly tutorial discussions.
  5. Give logical and concise oral presentations.
  6. Write a critical scientific review.
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## 5 Teaching and Learning Activities

**Class location and meeting times:**

Monday and Wednesday 2:30 pm -3:50 pm, Room: ROZH 105

2-hour tutorial on Friday 9:30 am -11:20 am, Room: ROZH 105

Maximum class size: 50 students

**Format and Procedures:**

This is a lecture-based course, with a weekly seminar-based tutorial. Students are expected to participate in tutorial discussions and to conduct themselves in a scholarly and respectful manner at all times.

## 5.1 Lecture

### Mon, Jan 6 - Fri, Jan 10

**Topics:** The Nature and Hallmarks of Cancer

No seminar-based tutorial on this specific week or unit.

Instructor: Alicia Vilorio-Petit

### Mon, Jan 13 - Fri, Jan 17

**Topics:** Control of Cell proliferation, Cell Cycle and Cell Death

Instructor: Brenda Coomber

### Mon, Jan 20 - Fri, Jan 24

**Topics:** Cancer Virology

Instructor: Sarah Wootton

### Mon, Jan 27 - Fri, Jan 31

**Topics:** Growth Factors, Receptors and Cancer

Instructor: Roger Moorehead

### Mon, Feb 3 - Fri, Feb 7

**Topics:** Tumor Immunology

Instructor: Byram Bridle

### Mon, Feb 10 - Fri, Feb 14

**Topics:** Tumor Angiogenesis

Instructor: Jim Petrik

### Mon, Feb 24 - Fri, Feb 28

**Topics:** Tumor Invasion and Metastasis

No seminar-based tutorial this week because of midterm. Seminars on this unit to be presented together with those on cancer stem cells during next week's tutorial.

Instructor: Alicia Viloría-Petit

**Fri, Feb 28, 9:30 AM - 11:00 AM**

**Topics:** *Midterm Exam*

*Units 1-6*

**Room: ROZH 105**

Instructor: Alicia Viloría-Petit

**Mon, Mar 2 - Fri, Mar 6**

**Topics:** Cancer Stem Cells

Instructor: Alicia Viloría-Petit

**Mon, Mar 9 - Fri, Mar 13**

**Topics:** Carcinogenesis, DNA Damage, and DNA Repair

Instructor: Brenda Coomber

**Mon, Mar 16 - Fri, Mar 20**

**Topics:** Cancer Genetics and Epigenetics

Instructor: Alicia Viloría-Petit

**Mon, Mar 23 - Fri, Mar 27**

**Topics:** Cancer Metabolism

Instructor: Alicia Viloría-Petit

**Mon, Mar 30 - Wed, Apr 1**

**Topics:** Clinical Oncology

No seminar-based tutorial on this specific week or unit.

Instructor: Anthony Mutsaers

**Fri, Apr 3**

**Topics:** TBA

**Invited Speaker:** TBA

**Fri, Apr 17, 2:30 PM - 4:30 PM**

**Topics:** *Final Exam*

**Units 7-12**

**Room:** TBA

Instructor: Alicia Vilorio-Petit

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## 6 Assessments

### 6.1 Assessment Details

#### **Tutorial Participation (10%)**

For 10 of the units covered in the lectures, students will attend a 2-hour tutorial, where up to five students will give oral presentations on an assigned topic, while all the students in the course will participate in discussions.

Due Date: **Friday of each week**, except for holidays and the day assigned to the invited speaker; see below for details.

#### **Tutorial details and evaluation**

1. Each seminar-based tutorial will consist of a maximum of 5 oral presentations and their corresponding discussion, involving presenter and attendant students.
2. The duration of the presentation is 12 minutes, followed by a 5-10 minutes discussion period, depending on the number of students registered in the course.
3. During the discussion period, the attendants will ask questions to the presenters and/or provide comments, and this will be modulated by the course coordinator.
4. Discussion participation will be evaluated by the course coordinator.

#### **Midterm Exam (20%)**

**Date:** Fri, Feb 28, 9:30 AM - , 11:00 AM, ROZH 105

This will cover units 1 to 6. The exam will be written and will consist of a small multiple-choice component, in addition to a significantly larger component where the students will give short- to medium-length answers to specific questions.

**Final Exam (30%)**

**Date:** Fri, Apr 17, 2:30 PM - , 4:30 PM

This will cover units 7 to 12. The exam will be written and will have the same format as the midterm exam, in addition to a bonus question related to the topic covered by the invited speaker.

Room: TBA

**One oral presentation (seminar) on assigned topic (20%)**

Students will be assigned **a topic by alphabetical order and they will give an oral presentation and will write a literature review on this topic.**

The topic will be assigned from the general subjects covered by 10 of the course units, on the last day of the first week of class.

Due Date: **Every Friday, starting on January 24, 2020.** Exact date for each student will depend on the topic (see below for details and guidelines).

**Seminar guidelines** (see evaluation form on page 10)

1. It is strongly advised that students make an appointment with the instructor of the unit of the assigned topic, at least one week before their seminar presentation. An outline of their presentation should be ready for this appointment, which is intended to ensure that the student is approaching the topic as indicated by the title, and to suggest ideas to improve the presentation, as needed.
2. The duration of the seminar is 12 minutes, followed by a 5-10 minutes discussion period.
3. Among the basic features, the power point presentation should:
  - Outline the points to be discussed, which should flow in a logic and cohesive manner
  - Provide an introduction with the conceptual and/or historical basis of the topic
  - Consist of clear, concise and easy to follow slides. This can be achieved by using slide formats with clean color contrasts, visible font sizes and guiding titles, and by avoiding excessive writing or excessive number of figures within a single slide.
  - Present supporting data from original research articles (cited in the same slide where the data is presented).

- Include a summary or conclusion, and future directions.
4. For the actual oral presentation and to facilitate the transmission of information and fairness among speakers, it is encouraged to:
    - Speak with adequate tone and pace of voice (loud enough to be heard by the whole room, and at a rate that allows your audience to understand what you are saying).
    - Use the pointer to guide the audience.
    - Stick to the time limit.
  5. The presentation will be evaluated by two instructors: the course coordinator and another instructor with expertise in the subject area. The final grade will be calculated as follows:
    - If the difference between the two grades is less or equal to 4 marks, the final grade will be the higher of the two independent grades.
    - If the difference between the two grades is higher or equal to 5 marks, the final grade will be the average of the two independent grades.

#### **One literature review on same assigned topic (20%)**

Students will be assigned **a topic by alphabetical order and they will give an oral presentation and will write a literature review on this topic.**

The topic will be assigned from the general subjects covered by 10 of the course units, on the last day of the first week of class.

Due Date: **Every Friday, starting on January 31, 2020.** Exact date for each student will depend on the topic (see below for details and guidelines).

**Guidelines for preparation and evaluation of literature review** (see evaluation form on page 11)

1. The manuscript should be double-spaced, with 12-point characters, and a one-inch margin on each side of the document.
2. The manuscript should be at least 8 pages long and no more than 10 pages long. The last page should be a full page, and the title page will not be counted as part of the aforementioned page limit.
3. Any discussion of published findings; theories and hypotheses must be accompanied by a citation, regardless of whether or not you quote it directly. At least 10 original sources (references) must be cited. Sixty percent (60 %) of these references must be primary articles (i.e., the original study, no a literature



- review). The course textbook will not be included among the original sources. The reference page will not be counted as part of the 10-page limit.
4. Figures or tables are not necessary but can be included, if they truly improve the thesis of the manuscript. A maximum of 2 items (figures and/or tables) can be included. They should be placed after the main text but before the reference page, and will not be included in the total page count.
  5. Citations should follow the rules from the *Proceedings of the National Academy of Sciences, USA*; which are as follows:
 

“References should be cited in numerical order as they appear in text. Because tables and figures will be inserted in the text where first cited, references in these sections should be numbered accordingly. **Include the full title for each cited article.** Authors must translate foreign language titles into English, with a notation of the original language. All authors (unless there are more than 5) should be named in the citation. If there are more than 5, list the first author's name followed by et al. Provide inclusive page ranges for journal articles and book chapters. **Cite databases in the text or as footnotes.**

**Journal articles are cited as follows:**

10. Neuhaus J-M, Sitcher L, Meins F, Jr, Boller T (1991) A short C-terminal sequence is necessary and sufficient for the targeting of chitinases to the plant vacuole. *Proc Natl Acad Sci USA* 88:10362-10366.

For correct abbreviations of journal titles refer to *Chemical Abstracts Service Source Index* (CASSI).

**Articles or chapters in books are cited as follows:**

14. Hill AVS (1991) in *Molecular Evolution of the Major Histocompatibility Complex*, eds Klein J, Klein D (Springer, Heidelberg), pp 403-420.”
  6. The literature review due date **is one week after the assigned date for oral presentation, on Friday at 5 pm.** Students will upload a PDF version of their review to a Dropbox folder, named with the number and title of the unit corresponding to each week. This folder will become available to authorized students on the Thursday prior to the seminar date, at noon.
  7. The penalty for late reviews is **2 marks per day (including weekends) for a maximum period of one week.** Reviews submitted later than a week after the due date **will not be accepted and will not be evaluated.**

## 6.2 Oral Presentation Evaluation Form

Student name:

Date:

Seminar title:

Evaluation system: a grade of 1 to 5 will be assigned to each of the specified rubrics.

1= Poor

2= Marginally adequate

3= Adequate

4= Good

5= Excellent

Final grade: /100

Insight and ideas	25%	1	2	3	4	5
Quality of the presentation	25%	1	2	3	4	5
Organization of the seminar	25%	1	2	3	4	5
Address of target audience	15%	1	2	3	4	5
Timing	10%	1	2	3	4	5

**Note:** Contribution of each rubric to the final mark is specified as percentage.

Comments:

### 6.3 Literature Review Evaluation Form

Student name:

Date:

Seminar title:

Evaluation system: a grade of 1 to 5 will be assigned to each of the specified rubrics.

1= Poor

2= Marginally adequate

3= Adequate

4= Good

5= Excellent

Final grade:     /100

Insight and ideas	20%	1	2	3	4	5
Choice and use of evidence	20%	1	2	3	4	5
Integration of source material	20%	1	2	3	4	5
Use of presentation formats	20%	1	2	3	4	5
Address of target audience	10%	1	2	3	4	5
Grammar and style	10%	1	2	3	4	5

**Note:** Contribution of each rubric to the final mark is specified as percentage.

Comments:

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## 7 Course Statements

### 7.1 Course Evaluation

Students will be asked to complete a questionnaire on the instructors' teaching abilities. This information is required by the university to evaluate faculty performance for purposes of Tenure, Promotion and Selective Increases. Administered by a third party rather than the instructors, these evaluations will be delivered to the instructors only after the final grades have been submitted to the Registrar's Office. The numerical ratings from the form will be made available to the Chair for administrative purposes. If a student wishes the Chair to see his/her written comments in addition to the scores, he/she must include with those comments his/her name (legibly printed) and signature.

## 8 University Statements

### 8.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

### 8.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

### 8.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

### 8.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

### 8.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

For Guelph students, information can be found on the SAS website

<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website

<https://www.ridgetownc.com/services/accessibilityservices.cfm>

### 8.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

## **8.7 Recording of Materials**

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

## **8.8 Resources**

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>

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