

**MDSC/CMMB 561
Cancer Biology**

Instructors:

Course Coordinator:

Dr. Susan Lees-Miller, Ph.D.

Instructors:

Dr. Susan Lees-Miller, Ph.D.

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Dr. Ebba Kurz, Ph.D.

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Dr. Aaron Goodarzi, Ph.D.

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Dr. Jennifer Corcoran, Ph.D.

Assistant Professor, Microbiology, Immunology and Infectious Disease
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Dr. Franz Zemp, Ph.D.

Postdoctoral Fellow, Alberta Children's Hospital Research Institute
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Time and Location:

Tuesdays and Thursdays 3:30pm – 4:45pm ST 235

Office Hours/Policy on Answering Student Emails

Instructors are available to meet by appointment.

Students contacting the instructors via email can generally expect a response within 48 hours (excluding weekends and statutory holidays). Substantive issues should be addressed in person either after class or by appointment.

Prerequisite/Co-Requisite:

Biochemistry 401 or 443; Medical Science 351 or Biology 331; and Cellular, Molecular and Microbial Biology 411, or consent of the instructor.

Course Description:

Advances in methodology and in theoretical concepts have permitted continuing breakthroughs in our understanding of the organismal, cellular and molecular biology of cancer cells, and in the development of novel strategies for cancer prevention, diagnosis and treatment. These advances will be presented in a comprehensive overview of cancer including issues of demographics and incidence, causation and detection, origins and progression and therapeutics approaches. Emphasis will be placed on the cell and molecular biology of cancer and on the interaction of the cancer cell with the host organism.

Overarching Theme

This course will explore the nature of cancer, including its global burden, the hallmarks that are common among most cancers, how cancer is caused and treated, including an exploration of emerging therapeutics.

Global Objectives

- To gain a comprehensive understanding of cancer – what it is, how it arises and how we treat it.
- To engage students in active discussion of topical issues in cancer biology
- To introduce students to the breadth and excitement of cancer research

Learning Objectives

By the end of this course, students will be able to:

1. Understand the scale of cancer burden globally
2. Describe the hallmarks of cancer and the interplay of them in cancer development, tumour growth and spread.
3. Understand the molecular mechanisms underlying the common causes of cancer, including viruses, environmental toxins, radiation and genetics
4. Define categories of anti-cancer therapies (including chemotherapy, radiotherapy and immunotherapy), their history and emerging therapeutic approaches.

Required Textbooks

There is no required textbook for this course.

Evaluation

The University policy on grading and related matters is described in section F of the 2019-2020 Calendar.

In determining the overall grade in the course, the following weights will be used:

In-class quiz (introductory material; Thurs. Jan 30)	10%
In-class test (theme 1; Thurs. Feb 27)	25%
In-class test (theme 2; Thurs. Mar 26)	25%
Written assignment (take home; due Tues Apr 14)	15%
Registrar-scheduled final exam (theme 3; April 18-29)	25%

All assessments, except the written assignment, will be closed book.

A Note regarding Writing Assignments:

Writing skills are important to academic study in all disciplines. In keeping with the University of Calgary's emphasis on the importance of academic writing in student assignments (section E.2 of 2019-20 Calendar), writing is emphasized, and the grading thereof in determining a student's mark in this course.

The Bachelor of Health Sciences values excellence in writing. Competence in writing entails skills in crafting logical, clear, coherent, non-redundant sentences, paragraphs and broader arguments, as well as skills with the mechanics of writing (grammar, spelling, punctuation).

The University of Calgary offers a number of instructional services through the Students' Success Centre's Writing Support Services (<http://www.ucalgary.ca/writingsupport/>) for students seeking feedback on assignments or seeking to improve their general writing skills. Students are **strongly encouraged** to take advantage of these programs.

Grading Scheme:

Letter Grade	Description	Percentage
A+	Outstanding performance	97-100
A	Excellent performance	90-96
A-	Approaching excellent performance	85-89
B+	Exceeding good performance	80-84
B	Good performance	75-79
B-	Approaching good performance	70-74
C+	Exceeding satisfactory performance	65-69
C	Satisfactory performance	60-64
C-	Approaching satisfactory performance	57-59
D+	Marginal pass	54-56
D	Minimal pass	50-53
F	Did not meet course requirements	0-49

Missed Components of Term Work:

For MDSC/CMMB 561, **late assignments will not be accepted and will automatically receive a mark of zero.**

Students who miss a quiz/test will receive a mark of zero unless the instructor has been notified **prior** to the start of the class. **There will be NO exceptions to this policy.**

It is the agreement of all Faculty involved in MDSC/CMMB 561 that **extensions will NOT be granted.** The only exceptions to this are those in keeping with the University Calendar (debilitating illness, religious conviction, or severe domestic affliction) that are received in writing and with supporting documentation. Traffic jams and late or full buses are common events in Calgary and are NOT acceptable reasons for late arrivals to class or examinations. Please note that while absences are permitted for religious reasons, students are responsible for providing advance notice and adhering to other guidelines on this matter, as outlined in the University Calendar (<https://www.ucalgary.ca/pubs/calendar/current/e-4.html>). In this case, alternative arrangements will be made.

Brightspace by Desire2Learn (D2L)

Brightspace (by D2L) is located on the University of Calgary server and will be used extensively for communication with students. It is the student's responsibility to ensure that they receive all posted communications and documents and that they receive emails sent by instructors or fellow students through D2L. Only your @ucalgary.ca email address may be linked to D2L. Please ensure that you are regularly checking your @ucalgary.ca account.

A laptop, desktop, tablet or mobile device is required for D2L access. If you need help accessing or using D2L, please visit the Desire2Learn resource page for students: <http://elearn.ucalgary.ca/d2l-student/>.

Policies Governing the Course:**Attendance**

Students are expected to attend all lectures, quizzes, mind-terms and examinations.

Conduct During Lectures

The classroom should be respected as a safe place to share ideas without judgement - a community in which we can all learn from one another. Students are expected to conduct themselves in a mature and courteous manner during ALL lectures. Students are expected to frame their comments and questions to lecturers in respectful and appropriate language, always maintaining sensitivity towards the topic.

Students are expected to take notes during class and should not rely solely on material supplied by the instructors.

Electronic Devices

The Bachelor of Health Sciences program aims to create a supportive and respectful learning environment for all students. The use of laptop and mobile devices is acceptable when used in a manner appropriate to the course and classroom activities. However, research studies have found that inappropriate/off-topic use of electronic devices in the classroom negatively affects the learning of both the user and those sitting nearby. Students are to refrain from accessing websites that may be distracting for fellow learners (i.e. personal email, Facebook, YouTube).

Students are responsible for being aware of the University's Internet and email use policy, which can be found at <https://www.ucalgary.ca/policies/files/policies/electronic-communications-policy.pdf>

Cell phones (or similar devices) should **be turned off** (not merely silent) upon entering the classroom. Sending/receiving text messages or leaving the class to take calls is disruptive to the entire class and will not be tolerated unless absolutely necessary. Students who disregard this rule during lectures or tutorials will be asked to leave. These items are not permitted under any circumstance during exams/quizzes, etc.

Copyright

It is the responsibility of students and professors to ensure that materials they post or distribute to others comply with the Copyright Act and the University's Fair Dealing Guidance for Students (library.ucalgary.ca/files/library/guidance_for_students.pdf). Further information for students is available on the Copyright Office web page (<http://library.ucalgary.ca/copyright>)

A Note Regarding Instructor Intellectual Property

Generally speaking, course materials created by professor(s) (including course outlines, presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the professor(s). These materials may **NOT** be reproduced, redistributed or copied without the explicit consent of the professor. **The posting of course materials to third party websites such as note-sharing sites without permission is prohibited.** Sharing of extracts of these course materials with other students enrolled in the course **at the same time** may be allowed under fair dealing.

Academic Accommodations Based on Disability or Medical Condition

Students seeking an accommodation based on disability or medical concerns should contact Student Accessibility Services; SAS will process the request and issue letters of accommodation to instructors. For additional information on support services and accommodations for students with disabilities, visit www.ucalgary.ca/access/.

Accommodations on Protected Grounds other than Disability

Students who require an accommodation in relation to their coursework based on a protected ground other than disability, should communicate this need, preferably in writing, to their instructor or to the designated BHSc program contact, Mrs. Jennifer Logan (jljlogan@ucalgary.ca), or to Dr. Ebba Kurz, Associate Dean, Undergraduate Health and Science Education, Cumming School of Medicine. The full policy on Student Accommodations is

available at <http://www.ucalgary.ca/policies/files/policies/student-accommodation-policy.pdf>.

Academic Misconduct

The University of Calgary is committed to the highest standards of academic integrity and honesty. The University of Calgary has created rules to govern all its members regarding the creation of knowledge and the demonstration of knowledge having been learned. For information on academic misconduct and its consequences, please see the University of Calgary Calendar at <http://www.ucalgary.ca/pubs/calendar/current/k.html>. Students are expected to be familiar with these standards and to uphold the policies of the University in this respect. Please know that the University and the Cumming School of Medicine take these rules seriously. **All incidences of academic dishonesty in this course, such as cheating and plagiarism, will be reported to the Associate Dean for investigation;** infractions will be noted on the record of a student found to be guilty.

Recording of Lectures

Audio or video recording of lectures is prohibited except where explicit permission has been received from the instructor.

Other Important Information

Freedom of Information and Protection of Privacy Act

Student information will be collected in accordance with typical (or usual) classroom practice. Students' assignments will be accessible only by the authorized course faculty. Private information related to the individual student is treated with the utmost regard by the faculty at the University of Calgary

Appeals

If there is a concern with the course, academic matter or a grade, first communicate with the instructor. If these concerns cannot be resolved, students can proceed with an academic appeal, as per Section I of the University Calendar. Students must follow the official reappraisal/appeal process and may contact the Student Ombuds' Office (<http://www.ucalgary.ca/ombuds>) for assistance with this and with any other academic concerns, including academic and non-academic misconduct. Students should be aware that concerns about graded term work may only be initiated **within 10 business days** of first being notified of the grade. <https://www.ucalgary.ca/pubs/calendar/current/i-2.html>

Resources for Support of Student Learning, Success, Safety and Wellness

Student Success Centre	http://www.ucalgary.ca/ssc/
Student Wellness Centre	http://www.ucalgary.ca/wellnesscentre/
Distress Centre	http://www.distresscentre.com/
Library Resources	http://library.ucalgary.ca

Wellness and Mental Health Resources

The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and

receive supports when needed. We encourage you to explore the excellent mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370 MacEwan Student Centre, <https://www.ucalgary.ca/wellnesscentre/services/mental-health-services>) and the Campus Mental Health Strategy (<http://www.ucalgary.ca/mentalhealth/>).

Student Ombuds' Office

The Student Ombuds' Office supports and provides a safe, neutral space for students. For more information, please visit www.ucalgary.ca/ombuds/ or email ombuds@ucalgary.ca

BHSc Student Faculty Liaison Committee (SFLC)

The BHSc SFLC, with elected representatives from all majors, serves to raise issues of interest to BHSc students to the program administration, including items pertaining to curriculum, scheduling and events. A list of current representatives can be found on the BHSc website.

Student Union (SU) Information

The SU Vice-President Academic can be reached at (403) 220-3911 or suvpaca@ucalgary.ca.

Student Success Centre

The Student Success Centre provides services and programs to ensure students can make the most of their time at the University of Calgary. Our advisors, learning support staff, and writing support staff assist students in enhancing their skills and achieving their academic goals. They provide tailored learning support and advising programs, as well as one-on-one services, free of charge to all undergraduate and graduate students. For more information visit: <https://www.ucalgary.ca/student-services/student-success>

Emergency Evacuation/Assembly Points

As part of the University of Calgary Emergency Evacuation plan, students, faculty, and staff should locate the closest Assembly Point in case of Fire Alarm. Safety signage is posted throughout the campus showing the locations and the possible route to these locations. All students, faculty, and staff are expected to promptly make their way to the nearest Assembly Point if the Fire Alarm is activated. No one is to return into campus facilities until an all clear is given to the warden in charge of the Assembly Area. For more information, see <https://www.ucalgary.ca/emergencyplan/building-evacuation/assembly-points>

Safewalk

Campus security will escort individuals, day or night, anywhere on campus (including McMahon Stadium, Health Sciences Centre, Student Family Housing, the Alberta Children's Hospital and the University LRT station). Call 403-220-5333 or visit <http://www.ucalgary.ca/security/safewalk>. Use any campus phone, emergency phone or the yellow phone located at most parking lot pay booths. Please ensure your personal safety by taking advantage of this service.

Class Schedule

The following is a list of topics for class, associated readings, and assignment / exam due dates. Please note that unforeseen circumstances may cause changes to the schedule with respect to the timing of topics and readings. Students will be notified of all changes in a timely manner by way of email and D2L announcements. The exam dates are firm and will not be altered.

Dates 2020	THEME	Lecture number	Topics Covered	Instructor
Tuesday, January 14	INTRODUCTION TO CANCER	1	Introduction to cancer-1	Dr. Lees-Miller
Thursday, January 16		2	Introduction to cancer-2	Dr. Lees-Miller
Tuesday, January 21	HALLMARKS OF CANCER	3	Hallmark 1: Growth signaling	Dr. Lees-Miller
Thursday, January 23		4	Hallmark 2: Genome instability	Dr. Lees-Miller
Tuesday, January 28	HALLMARKS OF CANCER	5	Hallmark 3: Replicative potential	Dr. Lees-Miller
Thursday, January 30	IN-CLASS QUIZ ON LECTURES 1-4 (10% of mark)			Dr. Lees-Miller
Tuesday, February 4	HALLMARKS OF CANCER	6	Hallmark 4: Cell death	Dr. Lees-Miller
Thursday, February 6		7	Hallmark 5: Metabolism	Dr. Lees-Miller
Tuesday, February 11	HALLMARKS OF CANCER	8	Hallmark 6: Angiogenesis and Metastasis	Dr. Kurz
Thursday February 13		9	Hallmark 7: Immune evasion/inflammation	Dr. Zemp
February 16-22	SPRING BREAK- NO CLASSES			
Tuesday, February 25	CAUSES OF CANCER	10	Environmental exposure-1	Dr. Goodarzi
Thursday February 27	IN-CLASS MIDTERM #1 ON LECTURES 5-9 (25% of mark)			Drs. Lees-Miller and Kurz
Tuesday, March 3	CAUSES OF CANCER	11	Environmental exposure-2	Dr. Goodarzi
Thursday, March 5		12	Environmental exposure-3	Dr. Goodarzi
Tuesday, March 10	CAUSES OF CANCER	13	Virus-induced cancers- 1	Dr. Corcoran
Thursday, March 12		14	Virus-induced cancers- 2	Dr. Corcoran
Tuesday, March 17	CAUSES OF CANCER	15	Virus-induced cancers- 3	Dr. Corcoran
Thursday, March 19		16	Genetic causes of cancer	Dr. Lees-Miller
Tuesday, March 24	TREATMENT OF CANCER	17	Treatment of cancer 1-Radiation	Dr. Lees-Miller
Thursday, March 26	IN-CLASS MIDTERM #2 ON LECTURES 10 to 16 (25% of mark)			Drs. Goodarzi and Corcoran
Tuesday, March 31	TREATMENT OF CANCER	18	Treatment of cancer 2- Chemotherapy	Dr. Kurz
Thursday, April 2		19	Emerging therapies	Dr. Lees-Miller
Tuesday, April 7	TREATMENT OF CANCER	20	The immune system as a target in cancer	Dr. Zemp
Thursday, April 9		21	Immunotherapy 1	Dr. Zemp
Tuesday, April 14	TREATMENT OF CANCER	22	Immunotherapy 2	Dr. Zemp
Tuesday, April 14	ASSIGNMENT TO BE HANDED IN (15% of mark)			
April 18-29	FINAL EXAM to be scheduled by the registrar ON LECTURES 17-22 (25% of mark)			Drs. Lees-Miller, Kurz and Zemp