

**CUMMING SCHOOL OF MEDICINE
GRADUATE COURSE OUTLINE**

COURSE TITLE: Molecular, Cellular and Microbial Biology and Immunology			
Course	MDSC 674.02		
Pre/Co-Requisites	No defined pre-requisites or co-requisites. All students must be registered in the Master of Biomedical Technology (MBT) graduate program.		
Faculty	Cumming School of Medicine, Graduate Science Education		
Instructor Name(s)	Drs. Janice Braun & Zenobia Ali, Wagdi Almishri, Bjoern Petri and guest instructors	Email	braunj@ucalgary.ca zali@ucalgary.ca waalmish@ucalgary.ca bpetri@ucalgary.ca
Office Location		Office Hours	Please email the instructor you need an appointment with
Instructor Email Policy	<p>Email to make an appointment. Please specify the course name and section number in the subject line of all emails (MDSC 670 L01). I will not respond to emails that do not contain this information. I will respond to emails that do contain this information within 2 days.</p> <p>Although email is commonly used by students to communicate with their instructors, it does limit the effectiveness of communication and may not be the best way for me to answer student questions. If I feel that communicating via email is not optimal, I may request a telephone call or personal meeting.</p>		
Telephone No.	Please email instructors		
TA Name, if applicable	N/A	Email	N/A
Class Term, Days	Fall & Winter 2020-2021		
Class Times	9:00am-10:20am		
Class Location	This course will take place online via Desire2Learn (D2L) and Zoom via synchronous instruction. To best succeed in the course, students are encouraged to participate in the synchronous Zoom sessions. When unable to participate live due to the time difference or unforeseen circumstances, inform the instructor in advance. Contacting instructors allows you to make arrangements, if you will be absent from class for an interview or other reason.		

COURSE INFORMATION/DESCRIPTION OF THE COURSE
<p>This course is required for students in the Masters in Biomedical Technology (MBT) graduate program. It is intended to provide a survey of core principles and technologies in the indicated disciplines and includes the most recent advances, with an emphasis on showing how the science and technology may be applied in the development of novel solutions to biomedical problems.</p> <p>MDSC674.02 course is online/remote synchronous.</p>

COURSE OBJECTIVES/LEARNING OUTCOMES
<p>Students will achieve a broad understanding of Molecular, Cellular and Microbial Biology and Immunology and related technologies such as microscopy, bioinformatics. They will also become familiar with bioethical issues. Active participation in classroom discussion is expected.</p>

Communication

Brightspace (By D2L) is located on the University of Calgary server and will be used extensively for communication with Students. A link to the zoom class will be provided on D2L. It is the student's responsibility to ensure that they receive all posted communications and documents and that they receive e-mails send by instructors of fellow students through D2L. Only your @ucalgary.ca e-mail address maybe linked to D2L. Please ensure that you are regularly checking your @ucalgary.ca account

Learning Technology Requirements

A link will be provided by the instructor for each module. In order to successfully engage in learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security and malware updates;
- A current and updated web browser;
- Webcam (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Broadband internet connection

Most current laptops will have a built-in webcam, speaker and microphone.

Please see the following for a detailed explanation of the minimal required technology for online learning
<https://elearn.ucalgary.ca/technology-requirements-for-students/>

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/>.

CUT POINTS FOR GRADES			
This course adheres to the grading system outlined in the University of Calgary, Faculty of Graduate Studies Calendar. Grades of A+ and A are not distinguished in the calculation of GPAs. Percentage/letter grade conversion used for this course is as follows			
Grade	Grade Point Value	Percentage Conversion	Graduate Description
A+	4.00	95-100	Outstanding
A	4.00	85-94	Excellent – superior performance showing comprehensive understanding of the subject matter
A-	3.70	80-84	Very Good Performance
B+	3.30	75-79	Good Performance
B	3.00	70-74	Satisfactory Performance
B-	2.70	65-69	Minimum Pass for Students in the Faculty of Graduate Studies
C+	2.30	55-64	All grades below ‘B-’ are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course requirements
C	2.00	50-54	

Assessment Components: The University policy on grading related matters is outlined in the 2019-2020 Calendar .			
Assessment Methods	Description	Weight %	Due Date <u>and</u> Time
	Take home written assignment (Pass/Fail)	---	Sept 14 by midnight
Sept 17	Take home written exam module 1	6pts	Sept 21 by midnight
Oct 1	Take home written exam module 2	16pts	Oct 5 by midnight
Oct 29	Take home written exam module 3	16pts	Nov 2 by midnight
Nov 19	Take home written exam module 4	16 pts	Nov 23 by midnight
Jan 21	Take home written exam module 5	16pts	Jan 25 by midnight
Feb 4	Take home written exam module 6	16pts	Feb 8 by midnight
Feb 9	Take home written exam module 7	6pts	Feb 16 by midnight
	participation	8pts	

ASSESSMENT AND EVALUATION INFORMATION
Students are expected to attend all sessions and present a professional image to instructors and guest lecturers.

GUIDELINES FOR SUBMITTING ASSIGNMENTS: Take home exams are due at midnight, Sept 14, Sept 21, Oct 5, Nov 2, Nov 23, Jan 25 Feb 8. Take home exams have a maximum length of one page (double spaced) answer for each question.

FINALEXAMINATIONS: The comprehensive exam is composed of integrative questions that require thoughtful, written answers and diagrams. There will be 7 questions (one for each module, including the mini-module) and students must answer five of these, worth three points each.

EXPECTATIONS FOR WRITING: Writing is in clear and concise English.

LATE AND/OR MISSING ASSIGNMENTS: Late assignments will not be accepted in the absence of an urgent medical or family justification prior to assignment due date.

Is a passing grade on a particular component essential to pass the course as a whole? No

COURSE TIMETABLE			
Course Schedule Date	Topic & Reading	Instructor	Assignments/Due Dates & Times
Sept 8	Course Objectives and Course Instructors	Dr. Braun	Take home assignment (P/F) due Sept 14
Sept 9	Module 1.1 Cell Biology Refresher	Dr. Ali	
Sept 10	Module 1.2 Cell Biology Refresher 2	Dr. Ali	
Sept 14	Module 1.3 Methods in Microscopy	Drs. Ali/Amrien	
Sept 15	Module 2.1 Molec Biology Refresher	Dr. Ali	
Sept 16	Module 2.2 Genomics, Bioinformatics and Biological Data Science	Dr. Ali/de Koning	
Sept 17	Module 2.3 High Throughput Screening	Dr. Ali/de Koning	Take home exam module 1 (6 points) due Sept 21
Sept 21	Module 2.4 Proteomics	Drs. Ali/ Schriemer	
Sept 22	Module 2.5 Hereditary Disease	Dr. Ali	

Sept 23	Module2.6 Epigenetics	Dr. Ali	
Sept 24	Module2.7 Gene Expression	Dr. Ali	
Sept 28	Module2.8 Microarray/PCR	Dr. Ali	
Oct 1		Dr. Ali	Take home exam module 2 (16pts) due Oct 5
Oct 21	Module3.1 Microbiology 1	Dr. Almishri	
Oct 22	Module3.2 Microbiology 2	Dr. Almishri	
Oct 26	Module3.3 Algal Biotechnology	Drs. Almishri/Siegler	
Oct 27	Module3.4 Re-emerging Disease and Resistance	Dr. Almishri	
Oct 28	Module3.5 Parasitology	Drs. Almishri/Dequeiroz	
Oct 29	Module3.6 Waste water Management	Drs. Almishri/Jackson	Take home exam module 3 (16 pts) due Nov 2
Nov 2	Module4.1 Bioremediation	Drs. Almishri/Chua	
Nov 3	Module4.2 Microbiome	Dr. Almishri	
Nov 4	Module4.3 Viruses	Dr. Almishri	
Nov 5	Module4.4 Dual Use Research	Dr. Almishri	
Nov 16	Module4.5 Prion Disease and Safety	Drs. Almishri/Hannaoui	
Nov 17	Module3/M4 review	Dr. Almishri	
Nov 19			Take home exam module 4 (16 pts) due Nov 23

Jan 11	Module5.1 Cancer 1	Dr. Darren Brenner	
Jan 12	Module5.2 Cancer 2	Dr. Darren Brenner	
Jan 13	Module5.3 Biology of Aging 1	Dr. Riabowol	
Jan 14	Module5.4 Biology of Aging 2	Dr. Riabowol	
Jan 18	Module5.5 Diagnostic Pathology	Dr. Gorday	
Jan 19	Module5.6 Neurodegeneration 1	Dr. Braun	
Jan 20	Module5.7 Neurodegeneration 2	Dr. Braun	
Jan 21	Module5.8 Exosomes and Microvesicles	Dr. Braun	Take home exam module 5 (16 pts) due Jan 25
Jan 25	Module6.1 Innate Immunity	Dr. Petri	
Jan 26	Module6.2 Adaptive Immunity I	Dr. Petri	
Jan 27	Module6.3 Adaptive Immunity II	Dr. Petri	
Jan 28	Module6.4 Too much and too little: Hypersensitivity and Deficiencies	Dr. Petri	
Feb 1	Module6.5 Vaccines	Drs. Petri/Dr. Jenne	
Feb 2	Module6.5 Immunoassays/Diagnostics	Dr. Petri	
Feb 3	Module6.7 Flow	Drs. Petri/ Dr. Jenne	
Feb 4	Module6.8 Immunotherapies	Dr. Petri	Take home exam module 6 (16 pts) due Feb 8
Feb 8	Module7.1 Bioethics	Dr. Braun	
Feb 9	Module7.2 Bioethics	Dr. Braun	Take home exam module 7 (6 pts) due Feb 16

Guidelines for Zoom Sessions

Zoom is a video conferencing program that will allow us to meet at specific times for a 'live' video conference, so that we can have the opportunity to meet each other virtually and discuss relevant course topics as a learning community.

To help ensure Zoom sessions are private, do not share the Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and



materials presented in Zoom, including any teaching materials, must not be shared, distributed or published without the instructor's permission.

The use of video conferencing programs relies on participants to act ethically, honestly and with integrity; and in accordance with the principles of fairness, good faith, and respect (as the Code of Conduct). When entering Zoom or other video conferencing sessions, you play a role in helping create an effective, safe and respectful learning environment. Please be mindful of how your behaviour in these sessions may affect others. Participants are required to use names officially associated with their UCID (legal or preferred names listed in the Student Centre) when engaging in these activities. Instructors/moderators can remove those whose names do not appear on class rosters. Non-compliance may be investigated under relevant University of Calgary conduct policies. If participants have difficulties complying with this requirement, they should email the instructor of the class explaining why, so the instructor may consider whether to grant an exception, and on what terms. For more information on how to get the most out of your zoom sessions visit: <https://elearn.ucalgary.ca/guidelines-for-zoom/>.

If you are unable to attend a Zoom session, please contact your instructor to arrange an alternative activity (where available). Please be prepared, as best as you are able, to join class in a quiet space that will allow you to be fully present and engaged in Zoom sessions. Students will be advised by their instructor when they are expected to turn on their webcam (such as for group work, presentations, etc).

The instructor may record online Zoom class sessions for the purposes of supporting student learning in this class – such as making the recording available for review of the session or for students who miss a session. Students will be advised before the instructor initiates a recording of a Zoom session. These recordings will be used to support student learning only.

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 frame their comments and questions to lecturers in respectful and appropriate language, always maintaining sensitivity towards the topic. Students, employees, and academic staff are also expected to demonstrate behaviour in class that promotes and maintains a positive and productive learning environment.

As members of the University community, students, employees and academic staff are expected to demonstrate conduct that is consistent with the University of Calgary Calendar, the Code of Conduct and Non-Academic Misconduct policy and procedures, which can be found at <https://www.ucalgary.ca/policies/forms/title>.

INTERNET AND ELECTRONIC COMMUNICATION DEVICE INFORMATION
Cell phones must be turned off in class unless otherwise arranged with the instructor.
The use of laptop and mobile devices is acceptable when used in a manner appropriate to the course and classroom activities. Students are to refrain from accessing websites that may be distracting for fellow



learners (e.g. personal emails, 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-communicationspolicy.pdf>.

MEDIA AND RECORDING IN LEARNING ENVIRONMENTS

Media recording for lesson capture

The instructor may use media recordings to capture the delivery of a lecture. These recordings are intended to be used for lecture capture only and will not be used for any other purpose. Although the recording device will be fixed on the Instructor, in the event that incidental student participation is recorded, the instructor will ensure that any identifiable content (video or audio) is masked, or will seek consent to include the identifiable student content to making the content available on University approved platforms.

Media recording for assessment of student learning

The instructor may use media recordings as part of the assessment of students. This may include but is not limited to classroom discussions, presentations, clinical practice, or skills testing that occur during the course. These recordings will be used for student assessment purposes only and will not be shared or used for any other purpose.

Media recording for self-assessment of teaching practices

The instructor may use media recordings as a tool for self-assessment of their teaching practices. Although the recording device will be fixed on the instructor, it is possible that student participation in the course may be inadvertently captured. These recordings will be used for instructor self-assessment only and will not be used for any other purpose.

Student Recording of Lectures

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

UNIVERSITY OF CALGARY POLICIES AND SUPPORTS

ACADEMIC ACCOMMODATIONS

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/. Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to their Instructor. The full policy on Student Accommodations is available at <http://www.ucalgary.ca/policies/files/policies/student-accommodation-policy.pdf>

IMPORTANT INFORMATION



Any research in which students are invited to participate will be explained in class and approved by the appropriate University Research Ethics Board

INSTRUCTOR INTELLECTUAL PROPERTY

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

COPYRIGHT LEGISLATION

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright (www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright.pdf) and requirements of the copyright act (<https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html>) to ensure they are aware of the consequences of unauthorised sharing of course materials (including instructor notes, electronic versions of textbooks etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy

ACADEMIC INTEGRITY

The Cumming School of Medicine expects intellectual honesty from its students. Course participants should be aware of University policies relating to Principles of Conduct, Plagiarism and Academic Integrity. These are found in the printed Faculty of Graduate Studies Calendar, or online under Academic Regulations in the Faculty of Graduate Studies Calendar, available at [Faculty of Graduate Studies Academic Regulations](#)

ACADEMIC MISCONDUCT

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>

EMERGENCY EVACUATION AND ASSEMBLY POINTS

Assembly points for emergencies have been identified across campus. The primary assembly points for South Campus (Health Science Centre (HSC); Health & Research Innovation Centre (HRIC); Heritage Medical Research Building (HMRB) and Teaching, Research and Wellness (TRW)) are:

- HSC and HMRB: HRIC Atrium (alternate assembly point is Parking Lot 6)
- HRIC: HMRB Atrium (alternate assembly point is Parking Lot 6)
- TRW: McCaig Tower (alternate assembly point is HMRB – Atrium)

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 N of the Faculty of Graduate Studies Calendar. Students must follow the official process and should contact the Student Ombuds Office (<http://www.ucalgary.ca/provost/students/ombuds>) for assistance with this and with any other academic concerns, including academic and non-academic misconduct

THE FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY (FOIP) ACT



This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIP) and students should identify themselves on written assignments (exams and term work.) by their name and ID number on the front page and ID on each subsequent page. Assignments given by you to your course instructor will remain confidential unless otherwise stated before submission. The assignment cannot be returned to anyone else without your expressed permission to the instructor. Grades will be made available on an individual basis and students will not have access to other students' grades without expressed consent. Similarly, any information about yourself that you share with your course instructor will not be given to anyone else without your permission

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 website <https://www.ucalgary.ca/mentalhealth/>

SUPPORTS FOR STUDENT LEARNING, SUCCESS, AND SAFETY

Student Ombudsman: 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

Student Union: The SU Vice-President Academic can be reached at (403) 220-3911 or suvpaca@ucalgary.ca; Information about the SU, including elected Faculty Representatives can be found here: <https://www.su.ucalgary.ca>

Graduate Student's Association: The GSA Vice-President Academic can be reached at (403) 220- 5997 or gsa.vpa@ucalgary.ca; Information about the GSA can be found here: <https://gsa.ucalgary.ca>

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.