CUMMING SCHOOL OF MEDICINE
GRADUATE COURSE OUTLINE

COURSE TITLE: Project in Biotechnology			
Course	MDSC 678		
Pre/Co-Requisites	No defined pre-requisites or co-requisites. All students must be registered in the MBT graduate program or have special permission from the Course Coordinator		
Faculty	Cumming School of Medicine, Graduate Science Education		
Instructor Name(s)	Drs. Zenobia Ali and Janice Braun (Course coordinators)	Email	zali@ucalgary.ca
Course Instructors, Office Hours and Contact	Email to make an appointment. Please specify the course name and section number in the subject line of all emails. Instructors will not respond to emails that do not contain this information, however instructors will respond to emails that do contain this information within 2 days. 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 instructors feel that communicating via email is not optimal, they may request a telephone call or personal meeting. Dr. Zenobia Ali, Contact: zali@ucalgary.ca Dr. Janice Braun, Contact: braunj@ucalgary.ca Sabiha Zaman, Contact: snzaman@ucalgary.ca Dr. Pina Colarusso (3D Printing Module Coordinator) Contact: gcolarus@ucalgary.ca		
Class Term, Days	Fall 2020 Winter 2021		
Class Times	Blended: a combination of in-person and online synchronous and asynchronous components. Lecture: Mondays from 11 to 11:50 am, online Biopartnering Project Presentation/tutorial: Wednesdays from 11 to 12:20pm, Theatre 4 or CC Theatre the schedule is posted on D2L MDSC678 Labs from September to February twice per week from 1:00 to 4:00 pm, in person DNA cloning lab HMRB B26 Sept 21, 22, 32,24 2020 PCR lab HMRB B26 Sept 28,29,30, Oct 1, 2020 Protein lab HMRB B26 Oct 5,6,7,8, 2020 ELIZA lab HMRB B26 Oct 19,21 2020 3-D Printing lab online Jan18, 19, 20,21, 25, 26, 27, 28, Feb1,2,3,4,8,9, 10 2021		

Class Location	This course will take place in person HMRB B26(in person labs) and Theatre 4 or Clara Christie Theatre and online via Desire2Learn (D2L) and Zoom via synchronous instruction. Course content will be delivered face-to face, with measures taken to ensure appropriate social distancing guidelines, as outlined by the province of Alberta. Attendance is expected unless alternate arrangements have been made with the instructor in advance. Please see the following pages for course details and schedules. Contacting instructors allows you to make arrangements, if you will be absent from class for a MDSC670 interview or other reason.

COURSE INFORMATION/DESCRIPTION OF THE COURSE
Course content will be delivered in a combination of in-person and online components, with measures taken to ensure appropriate social distancing guidelines, as outlined by the province of Alberta, can be followed. In-person attendance is expected unless alternate arrangements have been made with the instructor. Please see the following pages for course details and schedules. This course is required for students in the Masters of Biomedical Technology (MBT) graduate program. It will cover basic principles of project management as well as biotech lab theory and practical aspects covered via tutorials, presentations and laboratory sessions. There will be a combination of lectures, lab tutorials, commercial technology reviews, virtual and practical labs. Students will develop throughout the year the scientific aspects of a project based on a disease. Students can develop a pharmaceutical, diagnostic or device of current interest. The project has to encompass all the different aspects taught in the program, such as, regulatory affairs and clinical trials. If students develop a device, it has to be a Class 3 device. Furthermore, the proposed project idea has to be novel and patentable. This will culminate in a scientific press release of the scientific aspects.
LEARNING RESOURCES/REQUIRED READING
None

COURSE OBJECTIVES/LEARNING OUTCOMES
Students will achieve a broad understanding of how Biomedical Technologies, underlying scientific principles and commercial and clinical strategies may be applied to the practical resolution of novel biomedical problems. In addition, students will articulate their project idea in a 2-minute lightening talk. Students will learn how to design experiments properly after undertaking the Lets Experiment iBiology course online at https://courses.ibiology.org/courses/course-v1:iBiology+LE+SP/about

Communication

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. Only your @ucalgary.ca e-mail address should be used. Please ensure that you are regularly checking your @ucalgary.ca account

Learning Technology Requirements

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 and Zoom access. If you need help accessing or using D2L, please visit the Desire2Learn resource page for students: http://elearn.ucalgary.ca/d2l-student/. For more information on how to get the most out of your zoom sessions visit: https://elearn.ucalgary.ca/guidelines-for-zoom/.

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 and Time
certificate	Lets Experiment ibiology online	Pass/Fail	Sept 25th 2020 by midnight
Scientific Press Release	Students can decide on the hypothetical research and development project they want to pursue based on either personal interest or from a list of suggested projects (see below). Students will declare which project they have chosen by **September 10, 2020 at noon**. The science component of each project will be supervised by a selected MBT faculty member (and others according to expertise) and graded by MBT faculty. Grades will be based on a scientific press release regarding the product (therapeutic, diagnostic or device) that the student has been working on during the year.	20%	April 21st 2021 – submit via email to Dr. Ali by midnight
Laboratory Reports and Presentation for 3D printing	Various laboratory sections in the MBT program are designed to let students explore the many biotechnology and research techniques used by industry to develop new therapeutics, vaccines or diagnostics. Students will be required to attend all laboratory sections and complete all laboratory assignments. Laboratory assignments are based on a variety of techniques and topics.GLP quality lab notebooks will be kept. Grades will be based on: 1) Lab notebooks to be filled in with each lab section and laboratory etiquette 2) Laboratory assignments: report of results of experiment as given and interpretation of results, troubleshooting	40% (5 labs@8%each)	Lab reports for the four labs in the fall term are due on Oct 27th by midnight. The 3D printing lab presentation is on Feb 10th 2021
Project Presentation	Students will present papers and technology platforms relevant to their chosen project.	30%	Presentation dates to be announced.

	Instructors will mark presentations and your peers will also provide feedback, which will be used to assess your mark. Each student will present once per term. The first presentation will emphasize the nature of the biomedical challenge selected in the chosen project, current strategies for its resolution, market potential, and possible novel approaches. The second presentation will focus more on details of the novel approaches to the biomedical challenge, technologies or research needed to achieve that goal, and desired outcomes.		
Lightening Talks		Pass/Fail	March 1, 2021
Active participation in class	A course participation mark will be assigned to students based on their involvement in classroom discussion and labs, attendance in Biopartnering presentation and lightening talk presentation. Students are expected to ask questions during Biopartnering presentation and to suggest possible solutions to the biomedical problem their colleagues are addressing.	10%	

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

ASSESSMENT AND EVALUATION INFORMATION

ATTENDANCE AND PARTICIPATION EXPECTATIONS:
Students are expected to attend all sessions and present a professional image to instructors and guest lecturers. Please also see section above regarding participation.

GUIDELINES FOR SUBMITTING ASSIGNMENTS:
Digital Lab reports are to be submitted by the assigned date and time via email to the instructor for that lab section.

FINAL EXAMINATIONS:
There is no scheduled registrar's final exam- the poster presentation/ scientific press release is the final evaluation piece.

EXPECTATIONS FOR WRITING:
Students will submit lab reports and assignments with proper referencing and as per instructions above and also based on oral instructions of the instructors.

LATE AND/OR MISSING ASSIGNMENTS:

Late assignments are not accepted in the absence of an urgent medical or family justification provided prior to the assignment due date.

A passing grade on a particular component is not essential to pass the course as a whole

	COURSE TIMETABLE		
Course Schedule Date	**Topic & Reading**	**Instructor**	**Assignments/Due Dates & Times**
self-paced asynchronous	Online Lets Experiment ibio	Ibiology online	Certificate/Sept 25th 2020 midnight
Sept 9, 2020 online	Course Overview	Drs. Braun & Ali	
Sept 14, 2020 Online	GLP lab notebooks, 11am online	Dr. B. Pollock	
Sept 21 2020	DNA Cloning lab lecture, online	Sabiha Zaman	
Sept 21, 22, 32,24,2020 In person	DNA Cloning Lab	Sabiha Zaman	Lab report/ Oct 27h 2020 midnight
Sept 28, 2020	PCR lab lecture, online	Sabiha Zaman	
Sept 28,29,30, Oct 1, 2020 In person	PCR Lab	Sabiha Zaman	Lab report/ Oct 27th 2020 midnight
Oct 5 2020	Protein Lab lecture, online	Dr. Zenobia Ali	
Oct 5,6,7,8, 2020 In person	Protein Lab	Dr. Zenobia Ali	Lab report/ Oct 27th 2020 midnight
Oct 19, 2020	ELISA Lab lecture, online	Dr. Zenobia Ali	
Oct 19,21 2020 In person	ELISA Lab	Dr. Zenobia Ali	Lab report/ Oct 27th 2020 midnight
Nov 16, 2020 online	3D printing lab software installation	LCI teaching team	
Jan 18, 2021 online	Intro. To computer aided design and 3-D printing, online	LCI teaching team	
Jan18, 19, 20,21, 25, 26, 27, 28, Feb 1,2,3,4,8, 9,10 2021 online	3D Printing Lab online	LCI teaching team	Presentation on Feb. 10th 2021 (1-4pm)
Jan 25, 2021 online	3-D printing lab lecture, online	LCI teaching team	
Feb 1, 2021	3D lab case studies, online	LCI teaching team	

online			
Feb 8, 2021 online	3D lab office hours for trouble shooting	LCI teaching team	
Feb. 10, 2021 online	3D lab presentations	LCI teaching team	
March 1 2021 In person	Lightening Talks		
Wednesdays In person	Student presentations – each student presents once per term based on their research topic. SEE BELOW		Project presentations, Wednesdays as per assigned dates

Possible Research Projects:

Each student must choose an important biomedical problem as the focus for the science and business components of their integrated projects. Students pick the disease they want to work on and whether they are working on a diagnostic or a therapeutic. Remember it is not the platform (methodology/ technique) that is being picked rather it is the biomedical problem or disease that is being chosen as part of the project. Examples are provided below, or another project of similar scope can be selected with permission of instructors. No two students may choose the same project. Students must declare what project they have chosen by **September 10, 2020, at noon** by emailing Dr. Ali.

1. Developing a novel Chemotherapy for selected Cancer patients
2. Developing new molecules for contraception
3. Treatment of Acute Respiratory Distress Syndrome
4. Peptide-based Drug Therapies
5. Peripheral Nerve Injury
6. Age-related cognitive impairment
7. A cure for hereditary retinal degeneration
8. New approaches to Cystic fibrosis
9. Skin pigmentation diseases
10. Cancer vaccines
11. Cellular based therapies – regenerative medicine
12. Targeted (monoclonal antibody) cancer therapies
13. Enzymes as Targets for Therapy in specific diseases
14. Integrin-based Drugs and Inflammatory Disease
15. New vaccine delivery systems
16. Novel long-term drug delivery systems
17. Bioremediation of contaminated soils
18. Pipeline/oilfield biocides
19. Environmental contamination biosensors
20. Spongiform encephalopathy

21. Pancreatic, lung, colon or gastric cancer
22. Genomic sequencing to determine disease risk
23. Viruses as therapeutic agents for disease
24. Antiviral strategies
25. RNA or aptamer-based therapeutics
26. Targeting a fungal or parasitic disease
27. Plant-derived pharmaceuticals

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.