

HTH SCI 1106 C02 (iBioMed)

Entrepreneurship in Biomedical Innovations: Bench to Market

Fall/Winter 2020-2021

1. INSTRUCTIONAL TEAM

PROFESSORS

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2. SCHEDULE AND ONLINE DELIVERY

SCHEDULE

- **Thursdays 330pm – 630pm EST** meet in tutorial groups on Microsoft Teams for Thought Labs
- **Pre-recorded lectures released every Tuesday** morning before Thursday tutorials and available on-demand

OFFICE HOURS

One-hour period virtual office hours with professor; synchronous format

- **Term 1:** Tuesday 1030-1130am EST or 1230pm-130pm EST
- **Term 2:** Friday 1230am-130pm EST

VIRTUAL COMMUNICATION PLATFORMS

This course will be delivered completely online. We will be using two virtual learning platforms for different purposes:

Microsoft Teams during live class hours to:

- Virtually meet on Thursdays in your assigned tutorial group
- Collaborate with your group on weekly tasks under the mentorship of your TA

Avenue to Learn outside scheduled class hours to:

- Access course announcements
- Review course materials (course outline, investigation packages, evaluation details, course deadlines, available resources)
- Access weekly course modules with pre-recorded lectures
- Contribute to online weekly discussions
- Submit course work for grading into assignment dropboxes
- View grades and feedback

In special circumstances (i.e. technical difficulties) other platforms like Zoom may be utilized; students will be given notice if there is a change.

GETTING STARTED

This course will be delivered completely online.

- Review the *Getting Started* module on Avenue to Learn to familiarize yourself with the above online platforms and see what resources are available to you on campus: <http://avenue.mcmaster.ca>
- New to Avenue to Learn? Check out this brief video: https://www.macvideo.ca/media/Introduction+to+Avenue+to+Learn+for+New+McMaster+Students/1_34czfyt

3. COMMUNICATION POLICY

Emails about clarification regarding tutorials should be directed to your TA. Lecture or content questions will be addressed in the *Meeting Minutes* assessment. The most frequently asked questions and/or important questions that appear on Meeting Minutes will be addressed by the instructor. Thus, content-related questions will not be answered via e-mail since misunderstandings can arise.

If you must contact the instructor, please email directly. Please do not use Avenue or Teams as instructors will not respond on these platforms. Every attempt will be made to reply within 24 hours (excluding weekends). When emailing please include a subject prefix of "HTH SCI 1106", use appropriate and professional conduct (e.g. salutation) and include your full name and student number in your email. Emails must be sent from your @mcmaster.ca account.

4. COURSE DESCRIPTION

This is a project-based integrated learning course where we will use advancements in the biomedical field to explore cellular mechanisms underlying human health and pathology and follow the journey of healthcare solutions from bench to market. There will be a focus on the synthesis of key concepts in cellular biology with clinical developments and business perspectives. This course will develop critical thinking, teamwork and project management skills.

Upon successful completion of the course, you should be able to:

LO.01	Identify the molecular interactions and functions of proteins, enzymes and other biologically relevant molecules in cellular mechanisms
LO.02	Compare signal transduction mechanisms in the healthy and pathological state
LO.03	Connect cellular biology to clinical, market and social outcomes
LO.04	Formulate a real-world stance by synthesizing information from various sources
LO.05	Work in high-functioning groups that have specialized roles to complete deliverables
LO.06	Present effective PowerPoint Presentations that describes a new innovation
LO.07	Give & Receive feedback to and from students to find ways to improve professional development

5. COURSE DELIVERY

COURSE PHILOSOPHY & PROGRESSION

The delivery of this course occurs through pre-recorded lectures, tutorials (Thought Labs), and online asynchronous discussions.

Students will complete 4 units, or “Investigations”, throughout the year. Each investigation explores a different field of the health sciences. The aim is for you to bridge the gap between cellular and molecular biology topics and their real-world applications. Each investigation includes a weekly group task where students will delve into a specific field in the health sciences. These will be further explained in the Investigation packages provided on Avenue to Learn.

LECTURES:

Pre-recorded lectures released every Tuesday morning before Thursday tutorials on Avenue to Learn. Lectures introduce fundamental topics that will be explored further in tutorial Thought Labs.

TUTORIALS (THOUGHT LABS):

Thursdays 330-630pm EST on Microsoft Teams. In virtual tutorial groups, the Thought Labs are a dedicated time to consolidate lecture concepts with weekly investigation tasks. Refer to your assigned tutorial section. At the end of the investigation, students will present their findings in an executive summary and PowerPoint presentation. Students will be able to reflect on their own progression through the course and provide additional feedback to their group members.

On **Microsoft Teams**, each student will be assigned to:

- (1) A **'General' tutorial channel** where they will be able to meet virtually with their assigned TA and other classmates in their tutorial section.
- (2) A **'Private' group channel** accessible only to your teammates. Here you can collaborate on weekly tasks, share files and investigation deliverables. Groups will have access to their private channel at any time over the duration of the investigations.

LECTURE & TUTORIAL STRUCTURE

Time	Activity
330-400pm EST TA General Channel on MS Teams	<ul style="list-style-type: none"> • Group Discussion on Lecture takeaways • Students ask questions to peers (not TAs) • Group Establishes Group Dynamic Roles for Tutorial Week • TA introduces Task Focus of the week
400-630pm EST Group Private Channel on MS Teams*	<ul style="list-style-type: none"> • Group brainstorms on Task Focuses • Group completes preliminary research to Answer Task Focus • Group focuses their Meeting Minutes Document • Group Meets with TA upon request

*TA will rotate between private group channels during the 430pm-630pm tutorial slot. TAs will indicate the times they will join your group for 30-40 mins for discussion.

COURSE MATERIALS

There are no set course materials for this course. However, you will be given online packages that explain the investigations covered and the assessments. Students will be expected to learn to use the primary literature from resources with peer-reviewed journal articles (i.e. Google Scholar, PubMed, JSTOR) or reputable sources (i.e. World Health Organization, Forbes, clinicaltrials.gov).

6. COURSE WORK AND ASSESSMENTS

GROUP DYNAMICS INSTRUCTIONS

For each investigation, your team will be working in groups of 6-7 students. Students will be assigned a role within your group, which will rotate from week-to-week. Some roles are mandatory, and some are optional, but suggested. Please see *Group Dynamics Instructions* document in Avenue to Learn.

EVALUATION STRUCTURE

Throughout the course, there will be 4 different investigations that will explore 4 different sectors of the health sciences. The first investigation (Investigation 0) will serve as a crash course to familiarize students with the course format. The following investigations will be higher in weight and longer in duration compared to Investigation 0.

Investigation	Weight
0: COVID19	10%
1: Metabolism	30%
2: Mechanotransduction	30%
3: Neurobiology	30%
Total	100%

Each of the Investigation Weights are broken down within the Assessments below:

Assessment	Evaluation	Weight
Meeting Minutes	Group*	20%
Presentation	Group*	40%
Reflections	Individual	20%
Avenue to Learn Participation	Individual	20%
Total		100%

*Individual ratings from Group Feedback Assessments are factored into group mark.

GRADED ASSESSMENTS

Weekly Meeting Minutes

Each week, your team will be responsible for submitting a brief document on the Task Focus (one submission per group). This will allow students to consolidate lecture material in groups, complete preliminary research, and set research objectives for the group. Please see the *Meeting Minutes Instructions* document in Avenue to Learn for more information.

Investigation Presentation and Executive Summary

At the end of each investigation, teams will be responsible for presenting their findings from the investigation to their TA and tutorial group. These presentations will be done in a PowerPoint format and accompanied with a concise one-page Executive Summary. Two groups will be chosen to present to their professors and the entire class. Please see the *Presentation Instructions* document in Avenue to Learn.

Personal Reflection

At the end of each investigation, students will submit a reflection about their experiences working in their groups and thoughts about the investigation content. This is completed individually to track student growth and give TAs and instructors a better idea of your progress in the course. Please see the *Personal Reflection Assessment* document in Avenue to Learn.

Avenue to Learn Participation

For each investigation, students will engage with the Avenue to Learn platform to contribute to online discussions with their peers. Students provide their novel insight/answers on the discussion board, answering questions or providing commentary on news articles. Please see the *A2L Participation* document in Avenue to Learn.

Group Feedback

After each investigation, team members will give each other feedback on 6 key attributes: Professionalism, Teamwork, Commitment, Congeniality and Communication. Group members will then assign a rating to each member based on their feedback and comments. An adjustment factor on each individual grade will be calculated from these ratings explained in Appendix 3 of this [paper](#).

Course Schedule

Detailed course schedule with due dates and investigation topics can be found in the *Assessment Calendar* in Avenue to Learn.

7. ACCREDITATION

GRADUATE ATTRIBUTES

The Graduate Attributes defined in this section are measured for Accreditation purposes only and will not be directly taken into consideration in determining a student's actual grade in the course. For more information on Accreditation, please visit: <https://www.engineerscanada.ca>. The Canadian Engineering Accreditation Board (CEAB) Graduate Attributes are outlined below:

3.1.1 Knowledge base — Demonstrated competence in university-level *natural sciences* appropriate to the program

3.1.2 Problem Analysis — An ability to use appropriate knowledge and skills to identify, formulate, analyze and solve complex engineering problems in order to reach substantiated conclusions.

3.1.3 Problem Investigation — An ability to conduct investigations of complex problems by methods that include appropriate experiments, analysis and interpretation of data, and synthesis of information, in order to reach valid conclusions.

3.1.6 Individual and Teamwork — An ability to work effectively as a member and leader in teams preferably in a multi-disciplinary setting.

3.1.7 Communication Skills — An ability to communicate topics in engineering within the profession and society at large, including reading, writing, speaking and listening to technical knowledge.

3.1.12 Life-Long Learning — An ability to identify and to address their own educational needs in changing world in ways sufficient to maintain their competence and to allow them to contribute to the advancement of knowledge

8. POLICIES

ALTERNATIVE EVALUATIONS TO TUTORIALS DUE TO ABSENCE

If students are unable to attend their tutorial section due to technical difficulties or extreme circumstances, students can submit an alternative assessment in lieu of this absence. Students are to write a 500-word **individual** Meeting Minutes on the lecture content and what the student would have contributed to the group. This is due the following Thursday at the start of tutorial time. Students can only use this one time without using an MSAF. If students miss a Presentation, students must submit an MSAF and will be required to do the presentation **individually** with an instructor at a later time.

CONDUCT EXPECTATIONS

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the [Code of Student Rights & Responsibilities](#) (the “Code”). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, whether in person or online.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students’ access to these platforms.

ACADEMIC INTEGRITY

You are to exhibit honesty and use ethical behavior in all aspects of the learning process, especially in a complete virtual environment. Academic credentials you earn are rooted in principles of honesty and academic integrity. **Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage.** Acting with academic dishonesty can result in serious academic consequences such as a grade of zero on an assignment, loss of credit with a notation on transcript (i.e. Grade of F assigned for academic dishonesty), and in severe cases, suspension or expulsion from the university. **It is your responsibility to understand what constitutes academic dishonesty.** Please see the [Academic Integrity Policy](#) on the McMaster University website. Three forms of academic dishonesty in this course include:

- Plagiarism (i.e. the submission of work that is not your/group’s own for which others have been given credit for)
- Improper collaboration on group work and
- Copying or using unauthorized aids in examinations.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students’ access to these platforms.

AUTHENTICITY/PLAGIARISM DETECTION

In this course, we will be using a web-based service (Turnitin.com) to reveal authenticity and ownership of student/group assessments. This plagiarism detection module is a built-in feature into Avenue to Learn. Students will be expected to submit their work electronically via Avenue to Learn plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish to submit their work through A2L and/or Turnitin.com must still submit an electronic and/or hardcopy to the professor(s). No penalty will be assigned to a student who does not submit work to Turnitin.com or A2L. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). To see the Turnitin.com Policy, please go to www.mcmaster.ca/academicintegrity.

ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University's Academic Accommodation of Students with Disabilities policy.

ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)

Students that require academic accommodation for religious, indigenous or spiritual observances should read and follow the RISO policy. Students that require RISO accommodation should submit their request to the Faculty or Program Office within 10 working days at the beginning of the term they require this accommodation. Alternatively, it can be submitted to the Registrar's office before examinations. Students should also inform the professor or course coordinator as soon as possible to create alternative arrangements for classes or assessments missed.

REQUESTS FOR MISSED ACADEMIC TERM WORK (MSAF)

In the event of an absence, medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar as follows: Requests for Relief for Missed Academic Term Work.

1. All MSAFs are to be directed to both of the professors through email.
2. It is the prerogative of the instructors of the course to determine the appropriate relief for missed term work in this course. Please refer to above for alternative assessments in the case of missed synchronous work.

ONLINE ELEMENT

This course uses **Avenue to Learn** and **Microsoft Teams**. Students should be aware that, when they make use of these platforms, information such as first and last names, usernames for the McMaster email accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

COPYRIGHT AND RECORDING

Students are advised that lectures, demonstrations, performances, and any other course material

provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors. Students must not disseminate these materials to others not registered in the course, or post to third-party websites.

The recording of lectures, tutorials, or other methods of instruction may occur during a course, either by the instructor for instructional purposes; students may make recordings for the purpose of personal study but must not be disseminated in any form. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

REFERENCE TO RESEARCH ETHICS

The two principles underlying integrity in research in a university setting are these: a researcher must be honest in proposing, seeking support for, conducting, and reporting research; a researcher must respect the rights of others in these activities. Any departure from these principles will diminish the integrity of the research enterprise. This policy applies to all those conducting research at or under the aegis of McMaster University. It is incumbent upon all members of the university community to practice and to promote ethical behaviour. To see the Policy on Research Ethics at McMaster University, please go to <https://reo.mcmaster.ca/>.

EXTREME CIRCUMSTANCES

The University reserves the right to change dates and deadlines on all courses in extreme circumstances such as severe weather, labour disruptions, etc. Changes can be communicated through communication channels like the McMaster Daily News, Avenue, Teams or email.

NOTICE REGARDING POSSIBLE COURSE MODIFICATION

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

HEALTH AND WELLNESS RESOURCES FOR STUDENTS

As a signatory on the Okanagan Charter, McMaster University is committed to enhancing mental health and wellness and provides various resources for students to manage their well-being. Students are encouraged to seek support as necessary; the following are several campus- and community-based resources that you may find helpful. For more resources and additional information, please visit the Student Wellness Centre.

ON-CAMPUS RESOURCES:

- **Student Wellness Centre:** Provides counselling, medical services, wellness education, guided self-help, and other relevant resources. PGCLL 210; 905-525-9140, x27700; <https://wellness.mcmaster.ca>
- **Sexual Violence Support:** An on-campus resource where students, staff, and faculty of all backgrounds and social identities can find support and information about sexual, intimate partnership or family violence. UH 104; 905-525-9140 x20909; <https://svpro.mcmaster.ca>

- **Faculty/Program Office:** Feel free to contact an Academic Advisor in your Faculty/Program Office who can connect with academic advising and connect you with other resources.

OFF-CAMPUS RESOURCES:

- **Good2Talk:** Free, confidential helpline providing professional counselling and information and referrals for mental health, addictions and well-being to post-secondary students in Ontario, 24/7/365; 1-866-925-5454; <https://good2talk.ca>
- **Togetherall:** Online peer-to-peer chat-based service that provides mental health and wellbeing support, 24/7/365. <https://www.togetherall.com/>
- **SACHA (Sexual Assault Centre - Hamilton Area):** Confidential, anonymous 24-hour nonjudgmental telephone support for adults who have experienced sexual violence. 905-525-4162; <http://sacha.ca>
- If you have immediate safety concerns for yourself or others, call **Campus Security** who will respond with the **MSU Emergency First Response Team (EFRT)** at 905-522-4135 or call 911 if you are off campus.

LAND ACKNOWLEDGEMENT

McMaster University recognizes and acknowledges that it is located on the traditional territories of the Mississauga and Haudenosaunee nations, and within the lands protected by the Dish with One Spoon wampum agreement.

PEDAGOGICAL STUDY

For the study of engineering education, you may be asked to provide information or feedback about course components. When possible, the instructor will share these results with participants.

Integrated Biomedical Engineering & Health Sciences (IBEHS) Labs/Design Studio Safety

Information for Laboratory Safety and Important Contacts

This document is for users of IBEHS instructional laboratories at the following locations:

- ETB - 533/534 (Medical Imaging & Medical Instrumentation Labs)
- ABB - C104 (Design Studio)
- HSC - 4N72 (Genetic Engineering Lab)

This document provides important information for the healthy and safe operation of IBEHS instructional laboratories. This document is required reading for all laboratory supervisors, instructors, researchers, staff, and students working in or managing instructional laboratories in IBEHS. It is expected that revisions and updates to this document will be done continually. A McMaster University [lab manual](#) is also available to read in every laboratory.

General Health and Safety Principles

Good laboratory practice requires that every laboratory worker and supervisor observe the following:

1. Food and beverages are not permitted in the instructional laboratories.
2. A Laboratory Information Sheet on each lab door identifying potential hazards and emergency contact names should be known.
3. Laboratory equipment should only be used for its designed purpose.
4. Proper and safe use of lab equipment should be known before using it.
5. The course TA leading the lab should be informed of any unsafe condition.
6. The location and correct use of all available safety equipment should be known.
7. Potential hazards and appropriate safety precautions should be determined, and sufficiency of existing safety equipment should be confirmed before beginning new operations.
8. Proper waste disposal procedures should be followed.
9. [Personal ergonomics](#) should be practiced when conducting lab work.
10. [Current University health and safety](#) issues, and protocols should be known.

Location of Safety Equipment

Fire Extinguisher

On walls in halls outside of labs or
ABB C103/A

First Aid Kit

ETB 534/A, ABB C103/A, HSC 4N72 or dial
"88" after 4:30 p.m.

Telephone

On the wall of every lab near the door

Fire Alarm Pulls

Near all building exit doors on all floors

Who to Contact

Emergency Medical / Security:

On McMaster University campus, call Security at extension **88** or **905-522-4135** from a cell phone.

Hospital Emergency Medical / Security:

For McMaster HSC, call Security at extension **5555** or **905-521-2100** from a cell phone.

Non-Emergency Accident or Incident: Immediately inform the TA on duty or Course Instructor.

University Security (Enquiries / Non-Emergency):

Dial 24281 on a McMaster phone or dial 905-525-9140 ext. 24281 from a cell phone.

See TA or Instructor: For problems with heat, ventilation, fire extinguishers, or immediate repairs.

Environmental & Occupational Health Support Services (EOHSS): For health and safety questions dial 24352 on a McMaster phone or dial 905-525-9140 ext. 24352 from a cell phone.

IBEHS Specific Instructional Laboratory Concerns: For non-emergency questions specific to the IBEHS laboratories, please contact appropriate personnel below from a McMaster phone...

- Leela Pilli – 26888
- Parmveer Bola – 23521
- Alexa Huang – 24548

In Case of a Fire (Dial 88)

When calling to report a fire, give name, exact location, and building.

1. Immediately vacate the building via the nearest Exit Route. Do not use elevators!
2. Everyone is responsible for knowing the location of the nearest fire extinguisher, the fire alarm, and the nearest fire escape.
3. The safety of all people in the vicinity of a fire is of foremost importance. But do not endanger yourself!
4. In the event of a fire in your work area shout "*Fire!*" and pull the nearest fire alarm.
5. Do not attempt to extinguish a fire unless you are confident it can be done in a prompt and safe manner utilizing a hand-held fire extinguisher. Use the appropriate fire extinguisher for the specific type of fire. Most labs are equipped with Class A, B, and C extinguishers. Do not attempt to extinguish Class D fires which involve combustible metals such as magnesium, titanium, sodium, potassium, zirconium, lithium, and any other finely divided metals which are oxidizable. Use a fire sand bucket for Class D fires.
6. Do not attempt to fight a major fire on your own.
7. If possible, make sure the room is evacuated; close but do not lock the door and safely exit the building.

Clothing on Fire

Do not use a fire extinguisher on people.

1. Douse with water from safety shower immediately or
2. Roll on floor and scream for help or
3. Wrap with fire blanket to smother flame (a coat or other nonflammable fiber may be used if blanket is unavailable). Do not wrap a standing person; rather, lay the victim down to extinguish the fire. The blanket should be removed once the fire is out to disperse the heat.

Equipment Failure or Hazard

Failure of equipment may be indicative of a safety hazard - You must report all incidents.

Should you observe excessive heat, excessive noise, damage, and/or abnormal behaviour of the lab equipment:

1. Immediately discontinue use of the equipment.
2. In Power Lab, press wall-mounted emergency shut-off button.
3. Inform your TA of the problem.
4. Wait for further instructions from your TA.
5. TA must file an incident report.

Protocol for Safe Laboratory Practice

Leave equipment in a safe state for the next person - if you're not sure, ask!

Defined Roles

TA	The first point of contact for lab supervision	
IBEHS Lab Technician	Leela Pilli	pillil@mcmaster.ca
IBEHS Instructional Assistant	Parmveer Bola	bolap1@mcmaster.ca
IBEHS Co-Directors	Dr. Greg Wohl	wohlg@mcmaster.ca
	Dr. Michelle MacDonald	macdonml@mcmaster.ca
IBEHS Administrator	Alexa Behar-Bannelier	huanqa2@mcmaster.ca
IBEHS Course Instructor	Please contact your specific course instructor directly	