**FOR APPROVAL** | **PUBLIC** | **OPEN SESSION**

**TO:**  UTM Academic Affairs Committee

**SPONSOR:**  Professor Rhonda McEwen, Vice-Principal Academic and Dean
**CONTACT INFO:**  vpdean.utm@utoronto.ca

**PRESENTER:**  Professor Heather Miller,Vice-Dean, Teaching & Learning
**CONTACT INFO:**  905-569-4768, vdteachlearn.utm@utoronto.ca

**DATE:**  February 3, 2022 for February 10, 2022

**AGENDA ITEM:**  3

**ITEM IDENTIFICATION:**

Minor Modification: Graduate Curriculum Changes, Institute for Management & Innovation (IMI), UTM

**JURISDICTIONAL INFORMATION:**

Under section 5.6 of its *Terms of Reference*, the Academic Affairs Committee is responsible formajor and minor modifications to existing degree programs. All major modifications shall be reported annually for information to the appropriate body of Governing Council.

**GOVERNANCE PATH:**

1. **UTM Academic Affairs Committee [For Approval] (February 10, 2022)**

**PREVIOUS ACTION TAKEN:**

No previous action was taken on this proposal.

**HIGHLIGHTS:**

The Graduate Minor Modification proposals (enclosed) outline Minor Modifications to existing graduate programs and courses. These curricular changes are intended to have significant positive effects on a cumulative basis, but are considered to be minor changes in the context of the UTQAP. Proposals for changes brought forward at this meeting were reviewed by the IMI Curriculum Committee on November 2, 2021 and then by the UTM Divisional Graduate Curriculum Committee on December 8, 2021. Proposed changes will come into effect on either May 1, 2022 or Septeber 1, 2022, as noted within each enclosed proposal.

The first set of changes, one course change and two new courses, is being proposed by IMI (as a unit). The course change is to renumber the existing BTC2040H *Change Management* course so

that it can be an IMI-wide offering (as IMI3002H). This signals more clearly to students that this course is open to all graduate students, not just MBiotech students. The two new course proposals offer additional elective options and reflect a growing interest from IMI students for offerings in the area of sustainability leadership (IMI2002H) and project management (IMI2003H). These three proposals will help IMI establish more opportunities to bring students across all their professional graduate programs together.

**Master of Biotechnology (MBiotech) Program**

Offered through the University of Toronto Mississauga's (UTM) Institute for Management & Innovation (IMI), the Master of Biotechnology (MBiotech) Program is proposing one change to an existing course, three new course offerings, and two program modifications. The course change is a title change to bring the name in line with the nomenclature of other MBiotech courses (from *Data Science in Health Part II* to *Data Science in Health II)*.

Two of the new courses proposed (BTC1855H *Health Data Visualization with Tableau* and BTC1878H *Coding in R language*) will replace existing program requirements of the Digitial Health Technology (DHT) field within MBiotech. Previously these requirements were fulfilled through courses outside of IMI (mainly through the Master of Science in Biomedical Communication Program, MScBMC, within the Faculty of Medicine). However, these courses were designed for the needs of the MScBMC program and students and did not align well with the DHT field and its program learning outcomes. In particular, coding was taught in Java Script instead of R and data visualization was not done with Tableau. The courses emphasized content from an artistic lens and in-course examples and case studies were necessarily focused on science communication instead of digital health technology. By introducing these DHT-specific courses, MBiotech will be able to better align the content and assessments with DHT program learning outcomes and shape the courses to meet the needs and interests of DHT students. The third new course proposed by MBiotech is a new elective option, BTC1896H *Technology and Cognitive Performance*. This course is designed to increase elective options for DHT students but will be open to any graduate student that has the pre-requisite background.

Program modifications ensure alignment of completion requirements with the above described course changes.

**Master of Urban Innovation (MUI) Program**

The Master of Urban Innovation (MUI) Program is a professional graduate master's program offered through the Institute for Management & Innovation (IMI) at the University of Toronto Mississauga (UTM). The MUI Program is currently proposing to introduce a special topics course (MUI2000H) to allow for additional elective options for their second year students. The course will also allow the Program to take advantatge of visiting scholars that have expertise in the area of urban innovation. It also allows for faculty to gauge interest in new topic courses before proposing them as permanent offerings.

**FINANCIAL IMPLICATIONS:**

There are no net implications for the campus' operating budget.

**RECOMMENDATION:**

Be it Resolved,

THAT the graduate curriculum changes in the Institute for Management and Innovation (IMI), as described in the appended proposals and as recommended by the Vice-Principal Academic & Dean, Professor Rhonda McEwen, be approved, with the effective dates as noted in the documentation.

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**DOCUMENTATION PROVIDED:**

Minor Modification Proposals: New Graduate Courses, Changes to Existing Graduate Courses, Change to an Existing Graduate Program

# University of Toronto
# Minor Modification Proposal:
# New Graduate Courses

This template should be used to create a new graduate course. **All fields are required.**

| Graduate Department/Unit/Centre/Institute<br>For courses offered by collaborative specializations, list supporting unit. | Institute for Management & Innovation (IMI) |
|---|---|
| **Faculty/academic division** | University of Toronto Mississauga (UTM) |
| **Dean's Office contact** | Yen Du<br>Manager, Academic Programs, Reviews & Quality Assurance<br>Yen.du@utoronto.ca |

## Part 1: ROSI

**The data will be used to complete the ROSI record.**

| New Course—fill out ALL fields | |
|---|---|
| **Course designator and number** (e.g., HIS 5XXXH) | IMI2002H |
| **FCE weight** (e.g., 0.5, 1.0) | 0.5 |
| **Full course title for transcript** (max 60 characters) | Leadership for a Sustainable Future |
| **Abbreviated title** (max 30 characters) | Sustainable Leadership |
| **Available via Student Web Services** (yes or no) | Yes |
| **Course type** (regular, modular, continuous or extended) | Regular |
| **Evaluate\* function in ROSI used by unit** (yes or no) *university's online course evaluation system | Yes |
| **Online course** (yes or no) | No |
| **Required course** (yes or no) | No |
| **Grading scale** (letter grades or CR/NCR) | Letter grades |
| **Course prerequisites; if yes, please list** (e.g., HIS 5XXXH) | |
| **Course credit exclusions; if yes, please list** (e.g., HIS 5XXXH) | |

## Effective Date

**The earliest effective date is September 1, 2022. Courses that will be offered for the first time in either the Winter/ Spring 2023 or Summer 2023 terms can indicate January 1, 2023 or May 1, 2023, respectively. Effective dates cannot be retroactive.**

# Part 2: New Course Documentation

**Please complete all fields below. If available, please include either a draft or proposed course syllabus as Appendix A.**

## Course Description

The current state of the world demands exploring new models of leadership. The prevalent dominant models of leadership are driven by mechanistic worldview, short-term gains, outer-self and extrinsic motivations. Leadership for a sustainable future has to be rooted in the paradigm of living systems, living in harmony with the planet earth, long-term vision, inner-self, and intrinsic motivations. The planet earth and its living systems have many properties, such as adaptivity, equity, inter-dependence, evolution, renewal, relations, and resiliency, which should be integral part of the models of future leadership.

The course critically examines the current leadership models and theories, develops the foundations of the models for a sustainable future, examines emerging and potential models for a sustainable future, guides students to develop their related capabilities and competencies in leadership for a sustainable future. The personal, interpersonal, organizational, social, and planetary dimensions of leadership for sustainable future are addressed.

The course uses journal articles and cases for discussion. Students gain experential knowledge of leadership for a sustainable future through a project of their choice involving a real-life leadership project for a sustainable future of their choice.

## Academic Rationale

Briefly indicate the academic reason for creating the course, its impact to the program and unit, and the expected impact to students (both current and future).

The impetus for this new couse was the high enrolment of IMI graduate students in similar courses offered through other graduate units at the St. George campus. This consistent interest and demand in sustainability-focused courses suggested that IMI would benefit from developing its own offerings in this area. An in-house course will allow IMI to shape the content for better alignment to their graduate programs and students' interests. It will also provide autonomy and flexibility in scheduling to reduce conflicts among other IMI courses. Additionally, offering the course at the UTM campus (as opposed to the St. George campus) will make this accessible to more IMI students.

Students across IMI professional graduate programs require leadership skills. Currently, no course realated to leadership for a sustainable future is available to IMI students. This course will be an attractive and useful option for students seeking elective options while helping IMI students develop a shared and critical perspective on the role of leaders in solving wicked problems and creating a more sustainable future.

This course is intended as an annual offering of approx. 20-30 students. Priority will be given to IMI graduate students but the course is open to all UofT graduate students, space permitting. All IMI Program Directors have confirmed that they will accept this as an elective option within their respective programs.

## Learning Outcomes

Identify the course objectives and explain how this course contributes to the achievement of Program Learning Outcomes (PLOs).

By the end of this course, students will be able to:
- demonstrate a deep understanding of current issues and challenges, and foresight of future challenges;
- use systems and critical thinking skills in identifying and analyzing the issues and challenges faced by leaders; and
- demonstrate a critical and holistic understanding of current research and scholarship and its trends in leadership.
- demonstrate strong written and verbal communication skills to communicate ideas, issues, vision, and conclusions clearly and effectively.

## Similarity/Overlap with Other Courses & Consultation

No such course

## Resource Requirements

1. Confirm who will teach this proposed course and/ or how teaching in this course will be staffed. If applicable, describe the potential impact to teaching resources across the program.
2. Identify any space and equipment needs for this proposed course (such as computer labs, wet labs, etc.).
3. Identify any library resources required for this proposed course.

Funding for this course will be managed through IMI. The course will be taught by an existing faculty member, most likely on overload. Teaching Assistant support will be required. When offered, this course will require an appropriate classroom space for scheduled meeting times between instructor and students. Course will be held in existing IMI classrooms whenever possible.

## Governance Approval

| Program Sign-Off | Soo Min Toh |
|---|---|
| | October 25, 2021 |

| Unit Sign-Off | IMI Curriculum Committee<br>November 2, 2021 |
|---|---|
| Decanal Sign-Off | UTM Divisional Graduate Curriculum Committee<br>December 8, 2021 |
| Divisional Council Approval | UTM Academic Affairs Committee (AAC)<br>February 10, 2022 |

# Appendix A: Proposed Course Syllabus

Provide a proposed/ draft course syllabus.

<u>Modules</u>:

The course has four modules:

(i)     Critical analysis of existing leadership models, such as autocratic, authoritative, and democratic, and leadership theories, such as contingency, situational, participative, and behavioral;

(ii)    Foundations of the models of Leadership for a Sustainable Future – This includes motivational factors, such as inner-self, relations with the planet earth, inter-generational wellbeing; characteristics based on the characteristics of living systems, and relationships between ecosystems, human wellbeing, leadership, and sustainable future;

(iii)   Emerging theories and models of leadership, such a truly humanistic leadership, model of the soul of leadership; global citizenship and leadership; quantum physics and leadership; and

(iv)   Experential Knowledge of leadership for sustainable future through a project involving a real life leadership project for a sustainable future of their choice.

<u>Grade Breakdown</u>:

- Future Scenarios Analysis 30%
- Leadership/Follower Self Assessment 40%
- Final Exam 30%

Total = 100%

<u>Assessments</u>**:**

**Future Scenarios Analysis (30%)**

Using the UN SDGs as a guiding framework for outlining future challenges, students will imagine/research desirable future scenarios for business or non-profit organizations through a guided visioning and scenario planning exercise. Students will apply various tools to develop a compelling narrative for how leaders could develop a vision, strategic pathways and solutions for creating the desirable future scenarios for business.

**Leader/Follower Self-Assessment (40%)**

Students will engage in a series of self- and informant assessment exercises to measure leadership strengths and tendencies to develop a evidence-based self-analysis. Using leadership and followership theories, students analyze their suitability for both. Students will also discuss

their suitability for building the desirable future scenarios they have presented in the "Future Scenarios Analysis" assignment.

**Final Exam (30%)**

This will be an open book exam aimed an assessing understanding and application of course concepts to different business scenarios and cases.

# University of Toronto
# Minor Modification Proposal:
# New Graduate Courses

This template should be used to create a new graduate course. **All fields are required.**

| | |
|---|---|
| **Graduate Department/Unit/Centre/Institute** For courses offered by collaborative specializations, list supporting unit. | Institute for Management & Innovation (IMI) |
| **Faculty/academic division** | University of Toronto Mississauga (UTM) |
| **Dean's Office contact** | Yen Du Manager, Academic Programs & Reviews & Quality Assurance Yen.du@utoronto.ca |

# Part 1: ROSI

**The data will be used to complete the ROSI record.**

| New Course—fill out ALL fields | |
|---|---|
| **Course designator and number** (e.g., HIS 5XXXH) | IMI2003H |
| **FCE weight** (e.g., 0.5, 1.0) | 0.5 |
| **Full course title for transcript** (max 60 characters) | Project Management: Practice and Tools |
| **Abbreviated title** (max 30 characters) | Project Management |
| **Available via Student Web Services** (yes or no) | Yes |
| **Course type** (regular, modular, continuous or extended) | Regular |
| **Evaluate\* function in ROSI used by unit** (yes or no) \*university's online course evaluation system | Yes |
| **Online course** (yes or no) | No |
| **Required course** (yes or no) | No |
| **Grading scale** (letter grades or CR/NCR) | Letter grades |
| **Course prerequisites; if yes, please list** (e.g., HIS 5XXXH) | n/a |
| **Course credit exclusions; if yes, please list** (e.g., HIS 5XXXH) | APS1001H Project Management |

## Effective Date

**The earliest effective date is September 1, 2022. Courses that will be offered for the first time in either the Winter/ Spring 2023 or Summer 2023 terms can indicate January 1, 2023 or May 1, 2023, respectively. Effective dates cannot be retroactive.**

# Part 2: New Course Documentation

**Please complete all fields below. If available, please include either a draft or proposed course syllabus as Appendix A.**

## Course Description

The Project Management Institute (PMI) defines project management as "the use of specific knowledge, skills, tools and techniques to deliver something of value to people." Through a series of lectures, case discussions and a final project, students will learn about the practice of project management and the complementary tools. They will also gain experience participating in designing, executing and tracking a real project on or off campus.

## Academic Rationale

Briefly indicate the academic reason for creating the course, its impact to the program and unit, and the expected impact to students (both current and future).

The impetus for this new couse was the high enrolment of IMI graduate students in similar courses offered through other graduate units at the St. George campus. This consistent interest and demand in project management training suggested that IMI would benefit from developing its own offerings in this area. An in-house course will allow IMI to shape the content for better alignment to their graduate programs and students' interests. It will also provide autonomy and flexibility in scheduling to reduce conflicts among other IMI courses. Additionally, offering the course at the UTM campus (as opposed to the St. George campus) will make this accessible to more IMI students.

The course enables students to become more proficient at planning, executing and tracking any project that they are tasked with. With projects of different sizes and scope being ubiquitous at home, school and especially the workplace, effective project management is an essential skill set for all professionals.

This course is intended as an annual offering of approx. 20-30 students. Priority will be given to IMI graduate students, but the course is open to all UofT graduate students, space permitting. All IMI Program Directors have confirmed that they will accept this as an elective option within their respective programs.

## Learning Outcomes

Identify the course objectives and explain how this course contributes to the achievement of Program Learning Outcomes (PLOs).

The course contributes to IMI's learning outcomes of critical thinking, creativity, communication and collaboration.

Upon completion of this course, students should be able to:
- Prepare, analyse and strengthen the underlying business case for a project.

- Apply the common framework of project management and the associated terminology to the planning and execution of a new project.
- Leverage an array of tools (Gantt, PERT, RACI etc.) to assist in the tracking, communications, execution, contingency planning and problem-solving that a major project requires.
- Evaluate a portfolio of projects and allocate resources appropriately.

## Similarity/Overlap with Other Courses & Consultation

APS1001H Project Management (Engineering)
Students and faculty across IMI programs have been consulted and are supportive of the proposal.

## Resource Requirements

1. Confirm who will teach this proposed course and/ or how teaching in this course will be staffed. If applicable, describe the potential impact to teaching resources across the program.
2. Identify any space and equipment needs for this proposed course (such as computer labs, wet labs, etc.).
3. Identify any library resources required for this proposed course.

Funding for this course will be managed through IMI. it is anticipated that the course will be taught by an existing faculty member, most likely on overload. Teaching Assistant support will be required. When offered, this course will require an appropriate classroom space for scheduled meeting times between instructor and students. Course will be held in existing IMI classrooms whenever possible.

## Governance Approval

| Program Sign-Off | Soo Min Toh, Director, Institute for Management & Innovation<br>October 25, 2021 |
|---|---|
| Unit Sign-Off | IMI Curriculum Committee<br>November 2, 2021 |
| Decanal Sign-Off | UTM Divisional Graduate Curriculum Committee<br>December 8, 2021 |
| Divisional Council Approval | UTM Academic Affairs Committee (AAC)<br>February 10, 2022 |

# Appendix A: Proposed Course Syllabus

## INSTITUTE FOR MANAGEMENT & INNOVATION
### UNIVERSITY OF TORONTO MISSISSAUGA

### IMI2003H – Project Management: Practice and Tools

### Course Outline (Fall 2022)

| | |
|---|---|
| Class Location: | TBD |
| Class Times: | Mondays 13-Sep to 6-Dec, 6:30-8:45PM |
| Instructor: | **XXX** MSc, MBA, PMP |
| Office Hours: | By appointment |
| Contact: | xxx@utoronto.ca; (416) 301-xxxx |

## 1   Course Description

The Project Management Institute (PMI) defines project management as "the use of specific knowledge, skills, tools and techniques to deliver something of value to people." They go further, stating "All projects are a temporary effort to create value through a unique product, service or result. All projects have a beginning and an end. They have a team, a budget, a schedule and a set of expectations (scope and quality) that the team needs to meet. Each project is unique and differs from routine operations—the ongoing activities of an organization—because projects reach a conclusion once the goal is achieved."

Through a series of lectures, case discussions and a final project, students will learn about the practice of project management and the complimentary tools. They will also gain experience participating in the designing, executing and tracking a real project on or off campus.

## 2   Course Objectives

Upon completion of this course, students should be able to:
- Prepare, analyse and strengthen the underlying business case for a project.
- Apply the common framework of project management and the associated terminology to the planning and execution of a new project.
- Leverage an array of tools (Gantt, PERT, RACI etc.) to assist in the tracking, communications, execution, contingency planning and problem-solving that a major project requires.
- Evaluate a portfolio of projects and allocate resources appropriately.

### 3 Reading Materials

Textbook: Project Management: Achieving Competitive Advantage Global Edition 5th Edition (2019) by Jeffrey K. Pinto, published by Pearson (ISBN 978-1292269146 1292269146) Paperback or eTextbook ~$75.

### 4 Marking Scheme

**A. Class participation ........................................ 15%**
  1) General contributions ........................ 5%
  2) Pre-read quizzes .............................. 5%
  3) Quickwrite exercises .......................... 5%

**B. Individual Project plan .................................. 15%**

**C. Group project, report and presentation ......... 40%**

**D. Final exam .................................................... 30%**

**TOTAL ............................................................. 100%**

### Attendance for All Students

All students are required to login before 6:30 PM i.e. at the start of the lecture. Only viewing the recording of a presentation is considered ABSENT unless you have prior approval. You must be virtually present for the event to receive attendance credit. Any effort to forge or misrepresent your attendance will be treated as an academic offence. We understand that absenteeism for work events or "networking" events does occur hence the leniency outlined above. Nevertheless, the MBiotech program has a "brand" to build and protect. In the past we have seen many occasions where students have abused discretionary absence to the point where our guest speakers present to a half empty room. The absenteeism measures here have evolved to protect the obligations of the program to the speakers that we invite and the hard work of the student teams who present.

### 5 Class Participation

Students are expected to actively participate in class discussions and to ask questions. Active class involvement augments the learning experience, increases assimilation of material and stimulates the level of class discussion. Contribution is expected to be relevant to the current discussion and includes: asking questions pertinent to the lectures and presentations, clarifying difficult concepts, answering questions, and advancing the discussion to a new issue. Just as important is listening attentively to your classmates and critiquing ideas constructively.

### Pre- & Post-lecture Assignments

Prior to each lecture relevant pre-read articles and short 5-6 question quiz will be posted to Quercus to be completed before class. Following each lecture, the Quickwrite responses, where students are given 1 minute or so to write down their thoughts on a topic or response to a question posed in the lecture should be posted to Quercus by 6:00 PM before the next class.

### 6   Individual Project Plan

Each student is to prepare a project charter and project plan including communication, schedule, cost and risk plans as well as example progress reports, and change requests. The written portion of this report is to be approximately of 10 pages in length (Margins: all 2.54 cm, 1.5 line spacing, New Times Roman 12 pt., additional Figures, Tables, References and Appendices can also be included). The report will be marked by the instructors for completeness, quality and value.

### 7   Group Project, Report and Presentation

Each team (2-4 students per team) has to identify and assist with the management of a real project that is to be conducted within the timeframe of the course (i.e. an on or off-campus event). At the conclusion of the term, the teams will be responsible for:

- A report covering the planning, management and lessons learned is to be completed. The written portion of this report is to be approximately of 10 pages in length (Margins: all 2.54 cm, 1.5 line spacing, New Times Roman 12 pt., additional Figures, Tables, References and Appendices can also be included). The report will be marked by the instructors for completeness, quality and value.

- A 10-minute PowerPoint presentation to the class highlighting the lessons learned.

### 8   Assignment Due Dates

All assignments (individual report, peer-review report, final individual report and group report) are due by 6:00 PM on the assigned date as outlined in this syllabus. Any updates to the Course Outline will be announced to the class and posted on Quercus. Assignments are to be submitted to Quercus in the specified format (PDF, MSWord, MSPowerPoint). **Late penalties equal to 20% per day** (24-hour period) will be accessed until the assignment is submitted.

### 9   Recording

The lectures will be recorded and the slide decks will be posted to Quercus in order to assist in note-taking and study for **personal use only**. The lectures are the intellectual property of the instructor or presenters, and the use of recordings and slide decks must respect this. More specifically, students are not to upload the recordings or slide decks to a shared drive, folder or hosted platform such as YouTube or Facebook, nor publish an instructor's or peer's notes to a website or sell them.

### 10   Re-marking

Requests for remarking will be entertained. This may result in a higher or a lower grade than that initially given. Requests for remarks are to be provided to the professor within one week of receipt of the grade and each request is to be accompanied by a written explanation (up to one page) from the student outlining why he/she believes the paper is worthy of a higher grade.

### 11   Missed Assignments and Tests

In the event a student fails to submit an assignment or misses the final exam due to

illness or domestic tragedy, the student must contact the professor and submit a completed University of Toronto official "Student Medical Certificate" (available at: http://www.utm.utoronto.ca/access/medcert.pdf indicating type of illness and date of illness (or other applicable documentation for domestic situations) to the MBiotech office within 48 hours of the due/test date, if possible.

## 12  Academic Misconduct

Students should note that copying, plagiarizing, or other forms of academic misconduct will not be tolerated.  Any student caught engaging in such activities will be subject to academic discipline ranging from a mark of zero on the assignment, test or examination to dismissal from the University. Any student abetting or otherwise assisting in such misconduct may also be subject to academic penalties.

Students agree that by taking this course all required papers may be subject to submission for textual similarity review to https://www.ouriginal.com/ for the detection of plagiarism.  The terms that apply to the University's use of this tool are described at https://teaching.utoronto.ca/ed-tech/teaching-technology/pdt/pdt-faq/

## 13  Course Schedule v1.0

NOTE: The dates are fixed, however the order of the presentation of the various topics may change. Notification of all changes will be made on Quercus as early as possible.

| # | DATE | MATERIAL | PROPOSED READINGS |
|---|------|----------|-------------------|
| 1 | Sep 13 | What is a project? Why project management? | CH 1, 2 |
| 2 | Sep 20 | Project scheduling | CH 9, 10 |
| 3 | Sep 27 | Scope and quality management | CH 5 |
| 4 | Oct 4 | Communications and teamwork | CH 4, 6 |
| **Thanksgiving** | | | |
| 5 | Oct 18 | Risk management | CH 7 |
| 6 | Oct 25 | Cost and resource management | CH 8, 12 |
| 7 | Nov 1 | Control, change and completion | CH 13, 14 |
| 8 | Nov 8 | Advanced topics: agile and critical chain | CH 11 |
| 9 | Nov 15 | Program and portfolio management | CH 3, Readings |
| 10 | Nov 22 | Case competition | |

| # | DATE | MATERIAL | PROPOSED READINGS |
|---|------|----------|-------------------|
| 11 | Nov 29 | Group project presentations | |
| 12 | Dec 6 | Final exam | |

# University of Toronto
# Minor Modification Proposal:
# Changes to Existing Graduate Courses

This template should be used to reactivate a closed/deactivated course; rename an existing course; renumber an existing course; etc.

| Graduate Department/Unit/Centre/Institute For courses offered by collaborative specializations, list supporting unit. | Institute for Management & Innovation (IMI) |
|---|---|
| **Faculty/academic division** | University of Toronto Mississauga (UTM) |
| **Dean's Office contact** | Yen Du Manager, Academic Programs, Reviews & Quality Assurance Yen.du@utoronto.ca |

## Part 1: ROSI

**The data will be used to complete the ROSI record.**

| Changes to an Existing Course (fill out applicable fields) | |
|---|---|
| **Current course designator and number (required)** (e.g., HIS 5XXXH) | BTC2040H |
| **Deactivated course designator, number and weight** (e.g., HIS 5XXXH) | BTC2040H |
| **Splitting or amalgamating courses** (list course designators, numbers and weights) | |
| **New designator and number** (e.g., HIS 5XXXH) | IMI3002H |
| **New/renamed full course title for transcript** (max 60 characters) | Change Management |
| **New/renamed abbreviated title** (max 30 characters) | Change Management |
| **New FCE weight** of an elective course (e.g., 0.5, 1.0) | 0.5 |
| **Change to grading scale** (from letter grades to CR/NCR or vice versa) | |
| **Change to course type** (from regular to continuous, modular, extended, etc.) | |
| **Change to delivery mode** (in-person, online, hybrid) | |

## Effective Date

**The earliest effective date is September 1, 2022. January 1, 2023 or May 1, 2023 may also be appropriate if course changes are not expected to take effect until later terms. Effective dates cannot be retroactive.**

# Part 2: Course Change Proposal

**Please complete all fields below.**

## Description of Proposed Change

Briefly outline the change being proposed.

Change the elective BTC2040H designator and number to an IMI designator and number (IMI3002H). All other aspects of the course remains the same.

An exclusion of BTC2040H should be added to IMI2003H to ensure students that have previous credit in BTC2040H cannot enrol under this new course code.

## Academic Rationale

Briefly indicate the academic reason for the change, its impact to the program and unit, and the expected impact to students (both current and future).

This Change Management course is foundational to IMI's teaching mandate to develop positive change-makers in their respective fields. As such, this course ideally runs with a diverse group of students from varying academic backgrounds. Though the course has always been available to all IMI graduate students, the current BTC course designator suggests the course is specific to the MBiotech Program and has discouraged enrolment from other program students. Shifting the designator to IMI will help to signal to students that the course supports all IMI graduate programs and students.

This course is not a required part of the MBiotech program and so this change does not affect the MBiotech program requirements. The course will continue to be accepted toward program completion requirements (as an elective option) for all current IMI professional graduate programs.

## Consultation

All IMI program directors have been consulted and are supportive of the proposed change.

## Resource Requirements

1. Confirm if the proposed change will alter current teaching arrangements for the course and/ or teaching resources across the program. If yes, describe the impact. If no, state no change.

2. Confirm if the proposed change will alter current space and/ or equipment needs for the course (such as computer labs, wet labs, etc.). If yes, describe the impact. If no, state no change.
3. Confirm if the proposed change will alter current library resources required for the course. If yes, describe the impact. If no, state no change.

> This course is expected to be an annual offering from IMI. There is a current instructor who has taught the course for many years as BTC2040H and is expected to continue teaching the course as IMI3002H. Funding for the course will now be managed through IMI rather than the MBiotech program. No additional changes to existing resourcing for this course is anticipated.

## Governance Approval

| Program Sign-Off | Prof Leigh Revers, Program Director, MBiotech<br>Nov 5, 2021 |
|---|---|
| Unit Sign-Off | IMI Graduate Curriculum Committee<br>November 5, 2021 |
| Decanal Sign-Off | UTM Divisional Graduate Curriculum Committee<br>December 8, 2021 |
| Divisional Council Approval | UTM Academic Affairs Committee (AAC)<br>February 10, 2022 |

# University of Toronto
# Minor Modification Proposal:
# Changes to Existing Graduate Courses

This template should be used to reactivate a closed/deactivated course; rename an existing course; renumber an existing course; etc.

| | |
|---|---|
| **Graduate Department/Unit/Centre/Institute** For courses offered by collaborative specializations, list supporting unit. | Institute for Management & Innovation (IMI) |
| **Faculty/academic division** | University of Toronto Mississauga (UTM) |
| **Dean's Office contact** | Yen Du Manager, Academic Programs, Reviews & Quality Assurance Yen.du@utoronto.ca |

## Part 1: ROSI

**The data will be used to complete the ROSI record.**

| Changes to an Existing Course (fill out applicable fields) ||
|---|---|
| **Current course designator and number (required)** (e.g., HIS 5XXXH) | BTC1877H |
| **Deactivated course designator, number and weight** (e.g., HIS 5XXXH) | |
| **Splitting or amalgamating courses** (list course designators, numbers and weights) | |
| **New designator and number** (e.g., HIS 5XXXH) | |
| **New/renamed full course title for transcript** (max 60 characters) | Data Science in Health II |
| **New/renamed abbreviated title** (max 30 characters) | Data Science in Health II |
| **New FCE weight** of an elective course (e.g., 0.5, 1.0) | |
| **Change to grading scale** (from letter grades to CR/NCR or vice versa) | |
| **Change to course type** (from regular to continuous, modular, extended, etc.) | |
| **Change to delivery mode** (in-person, online, hybrit) | |

## Effective Date

**The earliest effective date is September 1, 2022. January 1, 2023 or May 1, 2023 may also be appropriate if course changes are not expected to take effect until later terms. Effective dates cannot be retroactive.**

# Part 2: Course Change Proposal

**Please complete all fields below.**

# Description of Proposed Change

Briefly outline the change being proposed.

We wish to change the course title from *Data Science in Health Part II* to *Data Science in Health II*, removing the word "Part."

# Academic Rationale

Briefly indicate the academic reason for the change, its impact to the program and unit, and the expected impact to students (both current and future).

This change is purely for naming consistency. All other courses in series are enumerated with Roman numerals, *e.g. Biopartnering I, Biopartnering II, etc.*

# Consultation

The Directors of MBiotech have consulted with the course instructor and the Faculty Lead for the Digital Health Technology (DHT) field (Jayson Parker), who is in support of the change.

# Resource Requirements

1. Confirm if the proposed change will alter current teaching arrangements for the course and/ or teaching resources across the program. If yes, describe the impact. If no, state no change.
2. Confirm if the proposed change will alter current space and/ or equipment needs for the course (such as computer labs, wet labs, etc.). If yes, describe the impact. If no, state no change.
3. Confirm if the proposed change will alter current library resources required for the course. If yes, describe the impact. If no, state no change.

No change.

# Governance Approval

| Program Sign-Off | Leigh Revers, Program Director, MBiotech<br>October 25, 2021 |
|---|---|
| Unit Sign-Off | IMI Graduate Curriculum Committee<br>November 2, 2021 |
| Decanal Sign-Off | UTM Divisional Graduate Curriculum Committee |

| | December 8, 2021 |
|---|---|
| **Divisional Council Approval** | UTM Academic Affairs Committee (AAC) <br> February 10, 2022 |

# University of Toronto Minor Modification Proposal: New Graduate Courses

This template should be used to create a new graduate course. **All fields are required.**

| | |
|---|---|
| **Graduate Department/Unit/Centre/Institute** For courses offered by collaborative specializations, list supporting unit. | Institute for Management & Innovation (IMI) |
| **Faculty/academic division** | University of Toronto Mississauga (UTM) |
| **Dean's Office contact** | Yen Du Manager, Academic Programs, Reviews & Quality Assurance Yen.du@utoronto.ca |

## Part 1: ROSI

**The data will be used to complete the ROSI record.**

| New Course—fill out ALL fields | |
|---|---|
| **Course designator and number** (e.g., HIS 5XXXH) | BTC1855H |
| **FCE weight** (e.g., 0.5, 1.0) | 0.5 |
| **Full course title for transcript** (max 60 characters) | Coding in R language |
| **Abbreviated title** (max 30 characters) | Coding in R language |
| **Available via Student Web Services** (yes or no) | No |
| **Course type** (regular, modular, continuous or extended) | Regular |
| **Evaluate\* function in ROSI used by unit** (yes or no) *university's online course evaluation system | Yes |
| **Delivery Mode** (in-person, online, hybrid) | In-person |
| **Required course** (yes or no) | Yes |
| **Grading scale** (letter grades or CR/NCR) | Letter grades |
| **Course prerequisites; if yes, please list** (e.g., HIS 5XXXH) | None |
| **Course credit exclusions; if yes, please list** (e.g., HIS 5XXXH) | None |

## Effective Date

**The earliest effective date is September 1, 2022. Courses that will be offered for the first time in either the Winter/ Spring 2023 or Summer 2023 terms can indicate January 1, 2023 or May 1, 2023, respectively. Effective dates cannot be retroactive.**

# Part 2: New Course Documentation

**Please complete all fields below. If available, please include either a draft or proposed course syllabus as Appendix A.**

## Course Description

This course teaches basic programming skills to non-programmers and introduces them to the value of those skills. Students will learn about the various capabilities of the R programming language and participate in discussions about the purpose of programming including task automation and interactive web design. Students will be introduced to elementary data types, control flow and functions as well as functional and object oriented programming. Students will practice approaches to problem solving with computer programs and learn debugging strategies. By the end of the course, students are expected to create a program that helps them solve a problem or perform a task (either self-chose or assigned) in the context of data science

## Academic Rationale

Briefly indicate the academic reason for creating the course, its impact to the program and unit, and the expected impact to students (both current and future).

The course will focus on coding concepts that are necessary for students to understand in order to complete mandatory data science courses that also require coding in the language taught in this course ("R").  It is tailored to the curriculum needs of digital health technology students, a stream within the Master of Biotechnology program.

Training in coding is a core requirement for the Digital Health Technology stream (DHT). Currently, this requirement is supported by a course offering from the Masters of Science in Biomedical Communications (MScBMC) Program. However, this course teaches coding in Java Script, which is not used in other Digital Health Technology (DHT) courses. The coding language required for DHT courses is R. Teaching R is thus left to two mandatory data coursers in DHT, where students are required to learn R concurrently with biostatistics. This is a less than ideal situation for students and instructor. There is too much content to cover in the two data science courses, resulting in a negative student experience. To better support our two mandatory data science courses, a dedicated course in R coding is needed to train in specific techniques that have direct application to the DHT field.

The proposed course will give students a solid foundation in R coding, which is necessary for our data science courses. In addition, this coding course is customized to the needs of our curriculum so it will specifically train students on techniques that they will need for specific tasks in the data science courses in our stream and elsewhere.

# Learning Outcomes

Identify the course objectives and explain how this course contributes to the achievement of Program Learning Outcomes (PLOs).

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

- Critically evaluate coding approaches to a problem;
- Analyze large data sets with data cleaning strategies;
- Understand how to code in the R language to support data science practices;
- Understand over data wrangling and data cleaning;
- Demonstrate a mastery over basic coding concepts in the R language such as loops, functions and control flow;
- Apply the R coding language to handle large data sets and for viewing in graphical form;
- Identify problems in coding; and
- Complete a large project based coding challenge as the major project for the course.

These course objectives of BTC1855H will contribute to the achievement of the DHT field's program learning outcome to "[A]apply advanced machine learning tools to find relationships in a data set; be able to test the robustness of a claimed pattern in a data set; **ability to program statistical models in R language**; be able to use data visualization to support analysis of data sets." Currently our students are having difficulty achieving this program learning outcome. The reasons for this are described in the rationale above. This learning outcome objective is critical as it is the foundation that supports the two data science courses that are mandatory requirements that occur later in the program. Without this course our ability to effectively deliver on our data science curriculum commitment will be greatly compromised.

Without this course to support the program learning outcome quoted above other learning outcomes will be also greatly impacted:

1. "Critically evaluate biostatistical analysis; work with unstructured data sets to prepare for analysis and use data cleaning techniques to prepare them for analysis. "
2. "Apply advanced machine learning tools to find relationships in a data set; be able to test the robustness of a claimed pattern in a data set; ability to program statistical models in R language; be able to use data visualization to support analysis of data sets."

It is very difficult for students to achieve learning outcomes described above without having a solid foundation in the R coding language to both practice data cleaning techniques and to build large complex statistical models, pursuant to the program learning outcomes above. All our data science courses require a strong background in coding and the language do use is "R".

Lastly there will also be impact on a broad learning outcome without this course:

- "Originality in the application of knowledge: analyzing large data sets and identifying new product opportunities."

Without the foundation technical knowledge described above it will be very difficult for students to prepare and actually conduct an analysis on a large data set for the purposes of critiquing an analysis they must review or providing originality in their own analysis.

## Similarity/Overlap with Other Courses & Consultation

There is no overlap that we are aware of. The biomedical communications courses are taught in Java Script, making their courses not equivalent to this proposed R coding course. Discussion we have had with Biomedical Communications (BMC) over the future prospects of this course have been already described in the academic rationale above. Consultation with the MScBMC has occurred, they have no objections. Student feedback since the launch of the DHT field reflects a diminished student experience due to the misalignment of the curriculum with respect to coding content. This was an impetus for this proposed new course.

## Resource Requirements

1. Confirm who will teach this proposed course and/ or how teaching in this course will be staffed. If applicable, describe the potential impact to teaching resources across the program.
2. Identify any space and equipment needs for this proposed course (such as computer labs, wet labs, etc.).
3. Identify any library resources required for this proposed course.

As a program requirement for the DHT field, this course will be offered annually. Funding for the course will be managed through the MBiotech Program. It is anticipated that the course will be taught with a sessional instructor and TA support. No special software or equipment is required. A lecture hall is already in place and ready for this course.

## Governance Approval

| | |
|---|---|
| **Program Sign-Off** | Leigh Revers, Program Director, MBiotech<br>October 25, 2021 |
| **Unit Sign-Off** | IMI Graduate Curriculum Committee<br>November 2, 2021 |
| **Decanal Sign-Off** | UTM Divisional Graduate Curriculum Committee<br>December 8, 2021 |
| **Divisional Council Approval** | UTM Academic Affairs Committee (AAC)<br>February 10, 2022 |

# Appendix A: Proposed Course Syllabus

Provide a proposed/ draft course syllabus.

## 1.1.1.1 Marking Scheme

The breakdown of the grade for the course will be as follows:

Weekly assignments ................................... 21%

Weekly code reviews ................................. 14%

Midterm Project ........................................ 25%

Final Project ............................................. 40%

**TOTAL** .................................................... **100%**

| Session | Topic | Assignments |
|---------|-------|-------------|
| 1 | **Introduction to the Course**<br><br>**R environment and the basics** | o Installation Guide (Please install R and RStudio IDE before class**)**<br>o A (very) short introduction to R<br>o No assignment |
| 2 | **Getting and saving data** | o Assignment 1 posted by 5:00pm |
| 3 | **Programming I – Control Flow** | o Assignment 2 posted by 5:00pm |
| 4 | **Programming II – Loops and Functions** | o Code review 2 due at 1:00pm<br>o Assignment 3 posted by 5:00pm |
| 5 | **Data Wrangling** | o Code review 3 due at 1:00pm<br>o Assignment 4 posted by 5:00pm |
| 6 | **Tidy Programming** | o Code review 4 due at 1:00pm<br>o **Midterm project posted by 5:00pm** |
| 7 | **Cleaning Data** | o **Midterm project due**<br>o Assignment 5 posted by 5:00pm |

| Session | Topic | Assignments |
| --- | --- | --- |
| 8 | **Web Scraping** | o   No assignment |
| 9 | **Data Analysis using Excel** | o   Code review 5 due at 1:00pm<br>o   **Final Project posted by 5:00pm**<br>o   No assignment |
| 10 | **Data Visualisation – ggplot2** | o   Assignment 6 posted by 5:00pm |
| 11 | **Reporting Findings - Reports** | o   Code review 6 due at 1:00pm<br>o   Assignment 7 posted by 5:00pm |
| 12 | **Reporting Findings - Dashboards** | o   Code review 7 due at 1:00pm<br>o   No assignment |
| | | o   Final Project due |

# University of Toronto
# Minor Modification Proposal:
# New Graduate Courses

This template should be used to create a new graduate course. **All fields are required.**

| | |
|---|---|
| **Graduate Department/Unit/Centre/Institute**<br><br>For courses offered by collaborative specializations, list supporting unit. | Institute for Management & Innovation (IMI) |
| **Faculty/academic division** | University of Toronto Mississauga (UTM) |
| **Dean's Office contact** | Yen Du<br><br>Manager, Academic Programs, Reviews & Quality Assurance<br><br>Yen.du@utoronto.ca |

# Part 1: ROSI

**The data will be used to complete the ROSI record.**

| New Course—fill out ALL fields | |
|---|---|
| **Course designator and number** (e.g., HIS 5XXXH) | BTC1878H |
| **FCE weight** (e.g., 0.5, 1.0) | 0.5 |
| **Full course title for transcript** (max 60 characters) | Health Data Visualization with Tableau |
| **Abbreviated title** (max 30 characters) | Health Data Visualization |
| **Available via Student Web Services** (yes or no) | No |
| **Course type** (regular, modular, continuous or extended) | Regular |
| **Evaluate\* function in ROSI used by unit** (yes or no) \*university's online course evaluation system | Yes |
| **Delivery Mode** (in-person, online, hybrid) | In-person |
| **Required course** (yes or no) | Yes |
| **Grading scale** (letter grades or CR/NCR) | Letter grades |
| **Course prerequisites; if yes, please list** (e.g., HIS 5XXXH) | BTC1855H; BTC1859H |
| **Course credit exclusions; if yes, please list** (e.g., HIS 5XXXH) | None |

# Effective Date

**The earliest effective date is September 1, 2022. Courses that will be offered for the first time in either the Winter/ Spring 2023 or Summer 2023 terms can indicate January 1, 2023 or May 1, 2023, respectively. Effective dates cannot be retroactive.**

September 1, 2022

# Part 2: New Course Documentation

**Please complete all fields below. If available, please include either a draft or proposed course syllabus as Appendix A.**

# Course Description

In this course, we discuss data analytics and visualizations using Tableau Desktop and Tableau Prep software. We survey methods in data cleaning and prepping through ETL (Extract, Transform, Loading). We examine best practises in developing dashboards and understand how to tell a story with health and biological data. Our overall goal is to provide a foundation for using Tableau in data-driven decision making in the life sciences. Visualization with Tableau will be supplemented with R coding techniques students have learned from previous courses.

Upon completion of this course, students will be able to frame various classes of healthcare problems as analytics problems using Tableau, to appropriately identify data sources and build visualizations from them. Students will get practice in planning and developing interactive dashboards that help answer analytical problems and provide data accessibility to a non-technical audience.

# Academic Rationale

Briefly indicate the academic reason for creating the course, its impact to the program and unit, and the expected impact to students (both current and future).

Training in data visualization is a core requirement for the Digital Health Technology field (DHT). Currently, this requirement is supported by a course offering from the Master of Science in Biomedical Communications (MScBMC) Program, MSC2019H *Information and Data Visualization in Science and Medicine*. MSC2019H is designed specifically for the MScBMC program and approaches data visualization from an artistic lens, building from their earlier MSC courses. Tableau is also not the main software tool for the course. By contrast, DHT students are much more quantitative and technical, requiring training on manipulating large data sets and rapid data analytics techniques in the context of data visualization software. To align with the curriculum of the BTC courses, dedicated training in Tableau is required.

In summary, this course offering is necessary to meet the instructional requirements and learning objectives with respect to data visualization as originally laid out in the proposal for the DHT field.

# Learning Outcomes

Identify the course objectives and explain how this course contributes to the achievement of Program Learning Outcomes (PLOs).

By the end of this course students will be able to:
- Critically evaluate of visualization implementation;
- Critically evaluate of data cleaning practices;
- Analyze large data sets quickly with Tableau;
- Understand how to use data visualization with tableau as applied to healthcare data;
- Apply R coding to data visualization;
- Apply the software package Tableau to data visualization tasks with health data;
- Work on a team-based major written project submission and oral presentation;
- Understand the foundation of dashboard construction for the visual display of health care data for non-technical viewers; and
- Critically evaluate healthcare forecasts generated with Tableau.

These course objectives of BTC1878H will contribute to the achievement of the DHT field's program learning outcome to "[A]apply advanced machine learning tools to find relationships in a data set; be able to test the robustness of a claimed pattern in a data set; ability to program statistical models in R language; **be able to use data visualization to support analysis of data sets.**" The reference here to data visualization refers to the field of data visualization, which goes well beyond the standard graphical implementations and well-known programs such as Microsoft Excel. This course will contribute directly to the fulfillment of this program learning outcome.

# Similarity/Overlap with Other Courses & Consultation

There is no overlap that we are aware of. The current MSC2019H does not focus on the software tool Tableau, which is critical to the DHT field

# Resource Requirements

1. Confirm who will teach this proposed course and/ or how teaching in this course will be staffed. If applicable, describe the potential impact to teaching resources across the program.
2. Identify any space and equipment needs for this proposed course (such as computer labs, wet labs, etc.).
3. Identify any library resources required for this proposed course.

As a program requirement for the DHT field, this course will be offered annually. Funding for the course will be managed through the MBiotech Program. It is anticipated that the course will be taught with a sessional instructor. The students and the instructor will have access to the software package Tableau through the University of Toronto license (available through the UTM library computers as well). A computer lab is not required; a lecture hall for the lecture component is needed.

## Governance Approval

| | |
|---|---|
| **Program Sign-Off** | Leigh Revers, Program Director, MBiotech<br>October 25, 2021 |
| **Unit Sign-Off** | IMI Graduate Curriculum Committee<br>November 2, 2021 |
| **Decanal Sign-Off** | UTM Divisional Graduate Curriculum Committee<br>December 8, 2021 |
| **Divisional Council Approval** | UTM Academic Affairs Committee (AAC)<br>February 10, 2022 |

# Appendix A: Proposed Course Syllabus

Provide a proposed/ draft course syllabus.

## *** See below/ next page

| Session | Topic |
|---|---|
| 1 | **Introduction to the Course**<br>**Understanding Data Visualization Needs** |
| 2 | **Working with "dirty data" and data cleaning** |
| 3 | **Creating and Connecting data sources** |
| 4 | **Defining subsets of your data** |
| 5 | **Calculations and Parameters Part I:  Creating and Editing Calculations** |
| 6 | **Calculations and Parameters Part II:  Level of Detail Calculation** |
| 7 | **Using Tableau Prep** |
| 8 | **WORKING WITH R CODING TO SUPPORT DATA VISUALIZATION** |
| 9 | **Graphs in Tableau** |
| 10 | **Forecasting and Statistics in Tableau** |
| 11 | **Creating Dashboards Part I** |
| 12 | **Creating Dashboards Part II** |
|  |  |

| Item | Value | Due* |
|---|---|---|
| Participation | 10% | |
| Assignment I: *Cleaning and Prepping datasets (individual)* | 10% | |
| Assignment II: *Creating a filterable chart (individual)* | 10% | |
| Assignment III: *Developing an interactive dashboard (individual)* | 10% | |
| Project: Final presentation (Team) | 30% | |
| Final Exam | 30% | |
| | | |

# University of Toronto
# Minor Modification Proposal:
# New Graduate Courses

This template should be used to create a new graduate course. **All fields are required.**

| | |
|---|---|
| **Graduate Department/Unit/Centre/Institute** For courses offered by collaborative specializations, list supporting unit. | Institute for Management & Innovation (IMI) |
| **Faculty/academic division** | University of Toronto Mississauga (UTM) |
| **Dean's Office contact** | Yen Du Manager, Academic Programs, Reviews & Quality Assurance Yen.du@utoronto.ca |

# Part 1: ROSI

**The data will be used to complete the ROSI record.**

| New Course—fill out ALL fields | |
|---|---|
| **Course designator and number** (e.g., HIS 5XXXH) | BTC1896H |
| **FCE weight** (e.g., 0.5, 1.0) | 0.5 |
| **Full course title for transcript** (max 60 characters) | Technology and Cognitive Performance |
| **Abbreviated title** (max 30 characters) | Technology and Cognition |
| **Available via Student Web Services** (yes or no) | Yes |
| **Course type** (regular, modular, continuous or extended) | Regular |
| **Evaluate\* function in ROSI used by unit** (yes or no) \*university's online course evaluation system | Yes |
| **Delivery Mode** (in-person, online, hybrid) | In-person |
| **Required course** (yes or no) | No |
| **Grading scale** (letter grades or CR/NCR) | Letter grades |
| **Course prerequisites; if yes, please list** (e.g., HIS 5XXXH) | 2.0 credits in Biology (undergraduate) |
| **Course credit exclusions; if yes, please list** (e.g., HIS 5XXXH) | None |

# Effective Date

**The earliest effective date is September 1, 2022. Courses that will be offered for the first time in either the Winter/ Spring 2023 or Summer 2023 terms can indicate January 1, 2023 or May 1, 2023, respectively. Effective dates cannot be retroactive.**

# Part 2: New Course Documentation

**Please complete all fields below. If available, please include either a draft or proposed course syllabus as Appendix A.**

## Course Description

The course looks at the use of wearable technology to enhance cognitive performance.  This spans both medical and health and wellness domains.  Digital health, neuroscience and psychology are components of this course.  The course explores the scientific foundations that supports existing wearable technology (e.g. smart watches, wireless blood pressure monitors, blood glucose meters, consumer REM/EEG devices), that may be used to enhance elements of cognition.

## Academic Rationale

Briefly indicate the academic reason for creating the course, its impact to the program and unit, and the expected impact to students (both current and future).

The course is an extension of subject matter taught within the Digital Health Technology field (DHT) that is part of the Master of Biotechnology (MBiotech) program offered within the Institute for Management & Innovation (IMI) at the University of Toronto Mississauga (UTM). The course extends digital health into domains of cognitive performance where there may not necessarily be an underlying medical issue.  The course is very focussed on health and wellness issues and how that can be supported by current technology offerings.

The course is primarily intended as an elective for DHT students who wish to pursue digital health outside the immediate domain of medical need. It complements and reinforces concepts in other required courses of the DHT field. The course does not assume a prior knowledge in digital health, psychology, neuroscience but introductory elements of these areas will be taught as needed pursuant to each topic at hand.  Accordingly, the course will be open to student in either the Biopharmaceutical or the Digital Health Technology fields of the MBiotech Program. Students in other programs can also participate, if space allows. This course is intended to be an annual offering.

## Learning Outcomes

Identify the course objectives and explain how this course contributes to the achievement of Program Learning Outcomes (PLOs).

By the end of this course, students will be able to:
- Critically evaluate technology in the context of providing cognitive support;
- Critically evaluate the use of biometric data in health and wellness;
- Analyze use cases of technology that purport to enhance cognitive performance;
- Understand how current foundations in neuroscience provide a precedent for emerging technology applications;

- Identify gaps in the current application of wearable technology;
- Identify gaps in basic research that are needed to validate current efforts to use wearable technology;
- Apply communication skills through individual presentations; and
- Complete a large project-based challenge as the major project for the course.

These course objectives of BTC1896H will contribute to the achievement of the following DHT field's program learning outcomes:

1. "Understand how **health software** & medical devices are regulated (focus on digital health technologies)"
2. "Familiarity with new technologies in digital health"
3. "Apply recent rulings by the US Food & Drug Administration to determine the kind of testing required for approval of a **new health related software application** or a medical device accessory; alter design, target user and advertising claims to minimize the risk classification of a new product; create products claims of user benefit that while aggressive, do not trigger medical device oversight."
4. "Familiarity with **trends in technologies in digital health**. Best and worst practices in design and use that will be used to help **assess the potential of new technologies**."

"Health" and "medical" do not mean the same thing in a regulatory context and that is why these two topics are treated differently. This course expands upon the core curriculum of the digital health technology stream by focusing on health applications, rather than medical applications, of technology. *Health technologies (e.g. mobile and wearable technologies; pandemic tracking tools) can quickly become medical technologies, so it is important to have a broader perspective of the technology landscape as it pertains to supporting and enhancing our lifestyles.* The health products focused on in this course will specifically be about cognition and neuroscience. These kinds of product categories are particularly relevant to the learning objectives described above.

## Similarity/Overlap with Other Courses & Consultation

There is no overlap that we are aware of. The Department of Psychology has no graduate courses on wearable technology, mobile health or digital health. The Faculty of Engineering has some courses but none overlap significantly in scope or content. "Biomedical Devices Human Factors" (BME1802) suggests commonality between the two courses; however, they differ in two key aspects with BME1802 placing greater emphasis on human factors and less focus on the psychology and cognitive aspect. Product development courses (BME1801 and BME1802) provide students exposure to wearable technology but only on rotation with other course topics. Additionally, their emphasis is on engineering design and medical device regulation.

## Resource Requirements

1. Confirm who will teach this proposed course and/ or how teaching in this course will be staffed. If applicable, describe the potential impact to teaching resources across the program.

2.  Identify any space and equipment needs for this proposed course (such as computer labs, wet labs, etc.).
3.  Identify any library resources required for this proposed course.

> Funding for the course will be managed through the MBiotech program. It is anticipated that core MBiotech faculty will teach this course, likely on overload. Teaching assistant support will be required.  No special equipment or software licenses are required.  A lecture hall is required.

## Governance Approval

| | |
|---|---|
| **Program Sign-Off** | Leigh Revers, Program Director, MBiotech<br>October 25, 2021 |
| **Unit Sign-Off** | IMI Curriculum Committee<br>November 2, 2021 |
| **Decanal Sign-Off** | UTM Divisional Graduate Curriculum Committee<br>December 8, 2021 |
| **Divisional Council Approval** | UTM Academic Affairs Committee (AAC)<br>February 10, 2022 |

# Appendix A: Proposed Course Syllabus

Provide a proposed/ draft course syllabus.

Foundations lectures 1-6

1.  The Cognitive Exoskeleton:  A vision for wearable technology.
2.  Concentration in high performance tasks: Role of technology
3.  Enhancing creativity: can technology play a role?
4.  Stress and its impact on cognition:  technology applications
5.  Attention and its impact on cognition:  technology applications
6.  Sleep and its impact on cognition: technology applications
7.  Individual student presentations cognitive technology Part I
8.  Part II
9.  Part III
10. Part IV
11. Video games and Cognitive Performance: segmenting technology
12. Dark Data in Health Challenge (team presentations)

Marking scheme

| | |
|---|---|
| Participation: | 15% |
| Individual Cognitive Technology talk | 25% |
| Group based Dark Data Project | 25% |
| Final Exam | 35% |

# University of Toronto
# Minor Modification Proposal:

## Change to an Existing Graduate Program

This template should be used to bring forward all proposals for minor modifications to program or admissions requirements for existing graduate programs under the University of Toronto's Quality Assurance Process. **All fields are required.**

| | |
|---|---|
| **Program/Collaborative Specialization being modified:**<br>E.g., MSc in Sustainability Management (MScSM) | Master of Biotechnology (MBiotech) |
| **Graduate unit:** | Institute for Management & Innovation (IMI) |
| **Faculty/academic division:** | University of Toronto Mississauga (UTM) |
| **Dean's office contact:** | Yen Du<br>Manager, Academic Programs, Reviews & Quality Assurance<br>Yen.du@utoronto.ca |
| **Version date:** | December 6, 2021 |

# 1  Summary

Check box for type(s) of change.
Summarize what the change is, including details about any changes to FCEs.

| | | | |
|---|---|---|---|
| | Changing admission requirements | | Renaming field, concentration or emphasis* |
| X | Changing program requirements | | Renaming of program or collaborative specialization (please notify VPAP before governance) |
| | Changing timing of program requirements | | Creating a new emphasis |
| | Changing delivery mode of program | | Changes to programs affecting an MOA |
| Summary:  Program requirements for the Digital Health Technology (DHT) field within the Master of Biotechnology Program, offered through the Institute for Management & Innovation (IMI) at the University of Toronto Mississauga (UTM) are being updated to reflect the proposed new *Coding in R Language* course, BTC1855H (concurrently being proposed). The proposed BTC1855H course will be a required course for all DHT field students, replacing the current MSC2011H requirement. | | | |

* Anything with a changed/new name requires consultation prior to submission to the Dean's Office; if name change implies significant change to what is being offered or how it is being offered, this may be a major modification or new program.

# 2  Effective Date of Change

| May 1, 2022 |
| --- |

# 3  Academic Rationale

What are the academic reasons for the change?

This program change comes as a result of the concurrent new course proposal for BTC1855H, *Coding in R Language*. This new coding course, designed specifically for DHT field students to achieve DHT program learning outcomes, will replace the previous coding course requirement that was offered through the Master of Science in Biomedical Communications (MScBMC) Program. The MScBMC Program offers coding in Java Script, which is not the required coding language for DHT, creating a hole in the DHT curriculum. DHT attempted to insert the R coding content in two subsequent mandatory data science courses. These two courses became bloated with content and unmanageable. Upon review of the situation, it was determined that a better approach would be DHT to design and offer their own DHT-specific course that can target the DHT program learning outcomes and give students the coding skills they need to be successful in the DHT field.

In summary, the proposed coding course will provide far better support for the rest of the curriculum in the digital health technologies field through customized content and instruction in the R coding language,.

# 4  Impact on Students

Outline the expected impact on continuing and incoming students, if any, and how they will be accommodated.

The impact will be positive as more coding support will be made available for students through the offering of this course.  This will allow us to fulfil our curriculum goals pursuant to our original proposal for the digital health technology stream.

# 5  Consultation

Describe any consultation undertaken with the students, faculty, Dean and chair/director, as well as any consultation beyond the unit (if appropriate). Address any major issues discussed.

We have expressed our thanks to the talented in faculty in Biomedical Communications for supporting us this far by offering their own instruction on coding to our students.  They understand and agree with our logic that we need to launch this course internally in order to better meet the needs of our digital health technology students so that they are in a better position to perform in their data science courses.  They understand we need to change the language of the coding course and to make it more specific to the needs of our data science courses.

# 6  Resources

Describe any resource implications of the change(s) including, but not limited to, faculty complement, space requirements, libraries resources, and enrolment/admissions/ program size).

No resource implications to the program change. For course-specific resource implications, see concurrent new course proposal for BTC1855H.

# 7  Governance Approval

| Program Sign-Off | Leigh Revers, Program Director, MBiotech<br>October 25, 2021 |
| --- | --- |
| Unit Sign-Off | IMI Graduate Curriculum Committee<br>November 2, 2021 |
| Decanal Sign-Off | UTM Divisional Graduate Curriculum Committee<br>December 8, 2021 |
| Divisional Council Approval | UTM Academic Affairs Committee (AAC)<br>February 10, 2022 |

# Appendix A: Calendar Entry

Provide an edited copy of the new calendar entry, highlighting any new text in yellow and using strikethrough to indicate any deleted text.

## Field: Digital Health Technologies

### Minimum Admission Requirements

- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Institute for Management & Innovation's additional admission requirements stated below.
- An appropriate bachelor's degree from a recognized university in any area of biology, chemistry, computer science, engineering, epidemiology, psychology, public health, sociology, statistics, or related field with a minimum mid-B standing in the final two years of study.
- A minimum 1.0 credit of university-level statistics (or equivalent) with at least a mid-B standing.
- Applicants who have completed their studies outside of Canada must also submit their Graduate Record Examination (GRE) Subject Test scores and meet the SGS minimum standards for English proficiency.
- The MBiotech program also evaluates applicants on their letter of intent, CV, three references and both a science and business interview.

### Program Requirements

- Students must complete **9.5 graduate full-course equivalents (FCEs)** over a 24-month period:
    - 4.5 FCEs in MBiotech courses (includes credits for Seminar and Placement)
    - 4.0 FCEs in Digital Health Technologies courses
    - 1.0 FCE in elective courses.
- An ongoing **seminar series** led by university, industry, and government specialists links all the participants with the academic, practical, and applied aspects of the program.

### Program Length

6 sessions full-time (typical registration sequence: S/F/W/S/F/W)

### Time Limit

3 years full-time

## Required Courses

A general description of each required course is posted on the [Biotechnology website](#).

| | |
|---|---|
| BTC1600H | Biopartnering I |
| BTC1610H | Biopartnering II |
| BTC1842H | Medical Device Reimbursement |
| **BTC1855H** | **Coding in R Language** |
| BTC1859H | Data Science in Health I |
| BTC1877H | Data Science in Health Part II (Prerequisite: BTC1859H.) |
| BTC1882H | Digital Ethnography in Health |
| BTC1895H | Introduction to IT Consulting and Web Design |
| BTC1899H | Digital Health Technology |
| BTC1900Y[0] | Work Term I (Internship) |
| BTC1910Y[0] | Work Term II (Internship) |
| BTC2000H^{+} | Effective Management Practices |
| BTC2010H | Fundamentals of Managerial Concepts |
| BTC2030H | Management of Technological Innovation |
| ~~MSC2011H~~ | ~~Special Topics in Biomedical Communications~~ |
| MSC2019H | Information and Data Visualization in Science and Medicine |

[0] *Course that may continue over a program. The course is graded when completed.*

[+] *Extended course. For academic reasons, coursework is extended into session following academic session in which course is offered.*

### 7.1.1.1 Elective Courses

| | |
|---|---|
| BTC1840H | Patent Law for the Life Sciences |
| BTC1850H | Creating Life Science Products |

| | |
|---|---|
| BTC1860H | Generations of Advanced Medicine: Biologics in Therapy (GAMBiT) |
| BTC1889H | Deep Learning in Health<br>(Prerequisites: BTC1859H and BTC1877H or 1.5 credits in statistics [undergraduate or graduate]. 1.0 credit of undergraduate/graduate biology or related discipline. Advanced data science coding in the R language.) |
| BTC1920Y | Work Term III (Internship) |
| BTC2110H | Topics in Biotechnology |
| BTC2040H | Change Management |
| BTC2100Y | Thesis Project in Biotechnology |
| BTC2120H | Topics in Biotechnology |

Other graduate courses approved by Program Directors.

# University of Toronto
# Minor Modification Proposal:

## Change to an Existing Graduate Program

This template should be used to bring forward all proposals for minor modifications to program or admissions requirements for existing graduate programs under the University of Toronto's Quality Assurance Process. **All fields are required.**

| Program/Collaborative Specialization being modified: <br> E.g., MSc in Sustainability Management (MScSM) | Master of Biotechnology (MBiotech) |
|---|---|
| **Graduate unit:** | Institute for Management & Innovation (IMI) |
| **Faculty/academic division:** | University of Toronto Mississauga (UTM) |
| **Dean's office contact:** | Yen Du <br> Manager, Academic Programs, Reviews & Quality Assurance <br> Yen.du@utoronto.ca |
| **Version date:** | December 8, 2021 |

# 1   Summary

Check box for type(s) of change.
Summarize what the change is, including details about any changes to FCEs.

| | Changing admission requirements | | Renaming field, concentration or emphasis* |
|---|---|---|---|
| X | Changing program requirements | | Renaming of program or collaborative specialization (please notify VPAP before governance) |
| | Changing timing of program requirements | | Creating a new emphasis |
| | Changing delivery mode of program | | Changes to programs affecting an MOA |
| Summary:  Program requirements for the Digital Health Technology (DHT) field within the Master of Biotechnology Program, offered through the Institute for Management & Innovation (IMI) at the University of Toronto Mississauga (UTM) are being updated to reflect the proposed new *Health Data Visualization with Tableau* course, BTC1878H (concurrently being proposed). The proposed BTC1878H course will be a required course for all DHT field students, replacing the current MSC2019H requirement. | | | |

* Anything with a changed/new name requires consultation prior to submission to the Dean's Office; if name change implies significant change to what is being offered or how it is being offered, this may be a major modification or new program.

# 2  Effective Date of Change

September 1, 2022

# 3  Academic Rationale

What are the academic reasons for the change?

This program change comes as a result of the concurrent new course proposal for BTC1878H, *Health Data Visualization with Tableau*. This new data visualization course, designed specifically for DHT field students to achieve DHT program learning outcomes, will replace the previous data visualization course requirement that was offered through the Master of Science in Biomedical Communications (MScBMC) Program. The MScBMC course focuses on the artistic side of data visualization and does not exclusively train in Tableau. A technical and quantitative approach to data visualization via Tableau is critical to the DHT field.

In summary, replacing the data visualization requirement of the field with an in-house course is necessary to meet the instructional requirements and learning objectives of DHT field.  This new course and program change will better support and compliment the DHT curriculum through customized content. Additional changes capture the new elective option for the DHT field (also proposed concurrently), BTC1896H, and the course designator and code change for BTC2040H (also proposed concurrently).

# 4  Impact on Students

Outline the expected impact on continuing and incoming students, if any, and how they will be accommodated.

The impact will be positive as the new curriculum for data visualization afforded by this change will more effectively achieve the program learning objectives of the Digital Health Technology field within the Master of Biotechnology Program.

# 5  Consultation

Describe any consultation undertaken with the students, faculty, Dean and chair/director, as well as any consultation beyond the unit (if appropriate). Address any major issues discussed.

> We have expressed our thanks to the talented in faculty in Biomedical Communications for supporting us this far by offering their own instruction on coding to our students. They understand and agree with our logic that we need to launch this course internally in order to better meet the needs of our digital health technology students so that they are in a better position to perform in their data science courses. They understand we need to change customize a data visualization course and to make it more specific to the needs of our data science courses.

# 6 Resources

Describe any resource implications of the change(s) including, but not limited to, faculty complement, space requirements, libraries resources, and enrolment/admissions/ program size).

> No resource implications to the program change. For course-specific resource implications, see concurrent new course proposal for BTC1878H.

# 7 Governance Approval

| Program Sign-Off | Leigh Revers, Program Director, MBiotech<br>October 25, 2021 |
|---|---|
| Unit Sign-Off | IMI Curriculum Committee<br>November 2, 2021 |
| Decanal Sign-Off | UTM Divisional Graduate Curriculum Committee<br>December 8, 2021 |
| Divisional Council Approval | UTM Academic Affairs Committee (AAC)<br>February 10, 2022 |

# Appendix A: Calendar Entry

Provide an edited copy of the new calendar entry, highlighting any new text in yellow and using strikethrough to indicate any deleted text.

## Field: Digital Health Technologies

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- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Institute for Management & Innovation's additional admission requirements stated below.
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- A minimum 1.0 credit of university-level statistics (or equivalent) with at least a mid-B standing.
- Applicants who have completed their studies outside of Canada must also submit their Graduate Record Examination (GRE) Subject Test scores and meet the SGS minimum standards for English proficiency.
- The MBiotech program also evaluates applicants on their letter of intent, CV, three references and both a science and business interview.

### Program Requirements

- Students must complete **9.5 graduate full-course equivalents (FCEs)** over a 24-month period:
    - 4.5 FCEs in MBiotech courses (includes credits for Seminar and Placement)
    - 4.0 FCEs in Digital Health Technologies courses
    - 1.0 FCE in elective courses.
- An ongoing **seminar series** led by university, industry, and government specialists links all the participants with the academic, practical, and applied aspects of the program.

### Program Length

6 sessions full-time (typical registration sequence: S/F/W/S/F/W)

### Time Limit

3 years full-time

## Required Courses

A general description of each required course is posted on the Biotechnology website.

BTC1600H          Biopartnering I

BTC1610H          Biopartnering II

BTC1842H          Medical Device Reimbursement

BTC1855H          Coding in R Language

BTC1859H          Data Science in Health I

BTC1877H          Data Science in Health Part II
                  (Prerequisite: BTC1859H.)

**BTC1878H**          **Health Data Visualization with Tableau**

BTC1882H          Digital Ethnography in Health

BTC1895H          Introduction to IT Consulting and Web Design

BTC1899H          Digital Health Technology

BTC1900Y$^0$          Work Term I (Internship)

BTC1910Y$^0$          Work Term II (Internship)

BTC2000H$^+$          Effective Management Practices

BTC2010H          Fundamentals of Managerial Concepts

BTC2030H          Management of Technological Innovation

~~MSC2019H          Information and Data Visualization in Science and Medicine~~

$^0$ *Course that may continue over a program. The course is graded when completed.*

$^+$ *Extended course. For academic reasons, coursework is extended into session following academic session in which course is offered.*

### 7.1.1.1    Elective Courses
BTC1840H          Patent Law for the Life Sciences

BTC1850H          Creating Life Science Products

| | |
|---|---|
| BTC1860H | Generations of Advanced Medicine: Biologics in Therapy (GAMBiT) |
| BTC1889H | Deep Learning in Health (Prerequisites: BTC1859H and BTC1877H or 1.5 credits in statistics [undergraduate or graduate]. 1.0 credit of undergraduate/graduate biology or related discipline. Advanced data science coding in the R language.) |
| **BTC1896H** | **Technology & Cognitive Performance** |
| BTC1920Y | Work Term III (Internship) |
| BTC2110H | Topics in Biotechnology |
| **IMI3002H** ~~**BTC2040H**~~ | Change Management |
| BTC2100Y | Thesis Project in Biotechnology |
| BTC2120H | Topics in Biotechnology |

Other graduate courses approved by Program Directors.

# University of Toronto
# Minor Modification Proposal:
# New Graduate Courses

This template should be used to create a new graduate course. **All fields are required.**

| | |
|---|---|
| **Graduate Department/Unit/Centre/Institute** For courses offered by collaborative specializations, list supporting unit. | Institute for Management & Innovation (IMI) |
| **Faculty/academic division** | University of Toronto Mississauga (UTM) |
| **Dean's Office contact** | Yen Du Manager, Academic Programs, Reviews & Quality Assurance Yen.du@utoronto.ca |

## Part 1: ROSI

**The data will be used to complete the ROSI record.**

| New Course—fill out ALL fields | |
|---|---|
| **Course designator and number** (e.g., HIS 5XXXH) | MUI2000H |
| **FCE weight** (e.g., 0.5, 1.0) | 0.5 |
| **Full course title for transcript** (max 60 characters) | Special Topics in Urban Innovation |
| **Abbreviated title** (max 30 characters) | Topics in Urban Innovation |
| **Available via Student Web Services** (yes or no) | Yes |
| **Course type** (regular, modular, continuous or extended) | Regular |
| **Evaluate\* function in ROSI used by unit** (yes or no) \*university's online course evaluation system | Yes |
| **Online course** (yes or no) | No |
| **Required course** (yes or no) | No |
| **Grading scale** (letter grades or CR/NCR) | Letter grades |
| **Course prerequisites; if yes, please list** (e.g., HIS 5XXXH) | N/A |
| **Course credit exclusions; if yes, please list** (e.g., HIS 5XXXH) | N/A |

## Effective Date

**The earliest effective date is September 1, 2022. Courses that will be offered for the first time in either the Winter/ Spring 2023 or Summer 2023 terms can indicate January 1, 2023 or May 1, 2023, respectively. Effective dates cannot be retroactive.**

# Part 2: New Course Documentation

**Please complete all fields below. If available, please include either a draft or proposed course syllabus as Appendix A.**

## Course Description

This course provides an in-depth and critical examination of a specific urban innovation challenge. Students will review interdisciplinary perspectives on the topic. Students will also evaluate and examine contemporary policy approaches and empirical case studies from across cities in Canada and internationally related to the topics. Assessments will normally include a final project and presentation.

## Academic Rationale

Briefly indicate the academic reason for creating the course, its impact to the program and unit, and the expected impact to students (both current and future).

The MUI program seeks to be able to engage with emerging and novel urban innovation challenges, as well as allow students to learn from leading scholars or practitioners housed within the Institute for Management and Innovation (e.g. Scholars-in-Residence, Visiting Scholars, etc.). A special topics course provides the vehicle for these learning opportunities.

Student impact of introducing this course is expected to be positive for incoming students as it provides the MUI program with the infrastructure to take advantage of unique opportunities that present themselves. It will signal to students that the program is willing to explore new and emerging urban innovation challenges.

Student impact is also expected to be positive for current students. It will allow the program to offer unique learning opportunities that might otherwise be unavailable to MUI students and students in other programs.

## Learning Outcomes

Identify the course objectives and explain how this course contributes to the achievement of Program Learning Outcomes (PLOs).

For the specified topic, students will be able to:
- Analyze the policy responses of different cities;
- Analyze the different roles of private, public, and not-for-profit actors;
- Develop an understanding of different theoretical perspectives;
- Compare the experiences and outcomes in different urban contexts; and

- Assess the governance and equity implications in different urban contexts.

# Similarity/Overlap with Other Courses & Consultation

A special topics course allows for one-time offerings of courses for visiting scholars or faculty members based on their area of expertise. The program will review each individual offering to ensure that it is sufficiently differentiated from and does not overlap with other courses offered in the MUI, IMI or other graduate programs. The program will also ensure the course is designed to a similar standard of other courses in the program.

# Resource Requirements

1. Confirm who will teach this proposed course and/ or how teaching in this course will be staffed. If applicable, describe the potential impact to teaching resources across the program.
2. Identify any space and equipment needs for this proposed course (such as computer labs, wet labs, etc.).
3. Identify any library resources required for this proposed course.

This is not a regular course offering and will only be offered when needed to provide program flexibility and opportunities for visiting faculty and scholars. When offered, this course will require an appropriate classroom space for scheduled meeting times between instructor and students. Additional specialized space (such as a seminar room) may be required dependent upon the instructor and topic. These requirements will be identified when confirming a special topic for this course, in consultation with IMI Director and the Office of the Dean.

Library resources that are already available to MUI students will serve this course.

# Governance Approval

| Program Sign-Off | Tara Vinodrai, Program Director, MUI<br>November 2021 |
| --- | --- |
| Unit Sign-Off | IMI Curriculum Committee<br>December 3, 2021 |
| Decanal Sign-Off | UTM Divisional Graduate Curriculum Committee<br>December 8, 2021 |
| Divisional Council Approval | UTM Academic Affairs Committee (AAC)<br>February 10, 2022 |