

Course Outline (W2026)

BME100: Introduction to Biomedical Engineering

Instructor(s)	Dr. Victor Yang [Coordinator] Office: EPH400Q Phone: (416) 979-5000 x 552143 Email: yangv@torontomu.ca Office Hours: Tues after 4-5pm lecture (DSQ13 Dundas Square Cineplex)
Calendar Description	This course will deal with the terminology of the medical profession; anatomy and physiology of the human body, from overall system and functional approaches; survey of present-day medical measurements and consideration of those areas in which engineering may be applied advantageously to medicine. The course will also include seminars from guest speakers from biomedical profession. Exposure to medical equipment in hospitals, and small animal handling training will also be provided. Bioethics will also be covered in the course. This course is graded on a pass/fail basis.
Prerequisites	None
Antirequisites	None
Corerequisites	None
Compulsory Text(s):	1. None
Reference Text(s):	1. "Introduction to Biomedical Engineering", Second Edition by John Enderle, Susan M. Blanchard, Joseph Bronzino
Learning Objectives (Indicators)	<p>At the end of this course, the successful student will be able to:</p> <ol style="list-style-type: none"> 1. Students will be able to improve their knowledge base for natural sciences through research for the project. Further, the in-class quizzes provide students with terminologies to help them recognize and describe terminologies and concepts related to chemistry, biology, etc. (1a) 2. Students will be able to improve their knowledge base for engineering fundamentals through research for the project. The project should present an engineering solution for a medical problem. Further, the in-class quizzes provide students with terminologies that recalls principles and theories in engineering fundamentals such as Newton's laws, mass law, etc. (1c) 3. Students will, by the end of the course, recognize medical terminologies that helps them converse with scientists, physicians and engineers. This aims to prepare the students for the medical and biology related courses in the 2nd year of their studies. (1d) 4. Demonstrate the ability to work in a team and quantify individual and group project contributions. (6a) 5. For the project report, students must select a topic that is current and developing. The topics selected are evaluated for their relevance to the public interest. (8b)

6. The project report must be based on a current biomedical problem. The results of the project should explain the impact of the project on environment. **(9a)**
7. Demonstrate knowledge of the ethical principles in general or in application of knowledge, results of research, or creative expression. **(10a)**
8. Demonstrate the significance of time management in group work. **(11b)**
9. Ability to use google scholar to obtain peer-reviewed journal articles and books. **(12a)**

NOTE: Numbers in parentheses refer to the graduate attributes required by the Canadian Engineering Accreditation Board (CEAB).

Course Organization	1.0 hours of lecture per week for 13 weeks 2.0 hours of lab per week for 12 weeks 0.0 hours of tutorial per week for 12 weeks														
Teaching Assistants	Peter Mastrofrancesco; Sidone Olivia Grange; Stephanie McGinnity														
Course Evaluation	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center;">Theory</td> </tr> <tr> <td>Lecture and Lab/Tutorial Participation</td> <td style="text-align: right;">40 %</td> </tr> <tr> <td colspan="2" style="text-align: center;">Laboratory</td> </tr> <tr> <td>Project Report (Written):</td> <td style="text-align: right;">35 %</td> </tr> <tr> <td>Project Presentation (Oral):</td> <td style="text-align: right;">15 %</td> </tr> <tr> <td>Project Slide Deck (Poster):</td> <td style="text-align: right;">10 %</td> </tr> <tr> <td>TOTAL:</td> <td style="text-align: right;">100 %</td> </tr> </table> <p>Note: In order for a student to pass a course, a minimum overall course mark of 50% must be obtained. In addition, for courses that have both "Theory and Laboratory" components, the student must pass the Laboratory and Theory portions separately by achieving a minimum of 50% in the combined Laboratory components and 50% in the combined Theory components. Please refer to the "Course Evaluation" section above for details on the Theory and Laboratory components (if applicable).</p>	Theory		Lecture and Lab/Tutorial Participation	40 %	Laboratory		Project Report (Written):	35 %	Project Presentation (Oral):	15 %	Project Slide Deck (Poster):	10 %	TOTAL:	100 %
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Project Slide Deck (Poster):	10 %														
TOTAL:	100 %														
Examinations	No Exams.														
Other Evaluation Information	To pass the course, a student must achieve a minimum overall grade of 50%. Attendance is mandatory. The Participation grade, like the class, is an all-or-nothing component. If the student is found to be absent during any class or lab, with no valid medical note, he/she will receive 0% for the Participation grade. Note that BME100 is a pass-fail course.														
Teaching Methods	Lecture and lab/tutorial for course project.														
Other Information	None														

Course Content

Week	Hours	Chapters / Section	Topic, description
1	1		Introduction (Instructor Bio Course outline Project requirements and fundamental background)
2-3	2		Anatomy and Physiology - Introduction to human Anatomy and Physiology
4	1		Introduction to Biomechanics Examples from Biomedical Engineering Projects
5-7	3		Introduction to Biomaterials (metals polymers ceramics/bioglasses) Clinical applications of Biomaterials Bioglasses and polymers in Biomedical Engineering
8	1		Bone components and composition Osteoporosis Modifiable and unmodifiable determinants Examples (spine surgery)
9	1		Cardiac physiology Stents Laminar and turbulent flow Stent delivery device Aneurysm repair
10	1		Amplifiers Bio-signals and signal acquisition and averaging Biomedical devices

11	1		Introduction to Radiation Imaging Computerized Tomography Magnetic Resonance Imaging
12	1		Introduction to Rehabilitation Rehabilitation following spinal cord injury

Laboratory(L)/Tutorials(T)/Activity(A) Schedule

Week	L/T/A	Description
1-2	How to conduct a literature review	Introduction to literature review Instructions on how to complete the project report Q&A session
3-10	In-class project discussion	Finalize the groups Brainstorm for the proposal idea Group work to complete the project
11-12	Project presentation	Each group must present the findings of their project in class (Power Point).

University Policies & Important Information

Students are reminded that they are required to adhere to all relevant university policies found in their online course shell in D2L and/or on [the Senate website](#)

Refer to the [Departmental FAQ page](#) for further information on common questions.

Important Resources Available at Toronto Metropolitan University

- [The University Libraries](#) provide research [workshops](#) and individual consultation appointments. There is a drop-in Research Help desk on the second floor of the library, and students can use the [Library's virtual research help service](#) to speak with a librarian, or [book an appointment](#) to meet in person or online.
- [Student Life and Learning Support](#) offers group-based and individual help with writing, math, study skills, and transition support, as well as [resources and checklists to support students as online learners](#).

- You can submit an [Academic Consideration Request](#) when an extenuating circumstance has occurred that has significantly impacted your ability to fulfill an academic requirement. You may always visit the [Senate website](#) and select the blue radio button on the top right hand side entitled: Academic Consideration Request (ACR) to submit this request.

For Extenuating Circumstances, [Policy 167: Academic Consideration](#) allows for a once per semester ACR request without supporting documentation if the absence is less than 3 days in duration and is not for a final exam/final assessment. Absences more than 3 days in duration and those that involve a final exam/final assessment, always require documentation. Students must notify their faculty/contract lecturer once a request for academic consideration is submitted. See Senate [Policy 167: Academic Consideration](#).

Longer absences are not addressed through Policy 167 and should be discussed with your Chair/Director/Program to be advised on next steps.

- [FAQs Academic Considerations and Appeals](#)
- Information on Copyright for [Faculty/Contract Lecturers](#) and [students](#).

Lab Safety (if applicable)

Students are to strictly adhere and follow:

- a. The Lab Safety information/guidelines posted in the respective labs,
- b. provided in their respective lab handouts, and
- c. instructions provided by the Teaching Assistants/Course instructors/Technical Staff.

During the lab sessions, to avoid tripping hazards, the area around the lab stations should not be surrounded by bags, backpacks etc, students should place their bags, backpacks etc against the walls of the labs and/or away from their lab stations in such a way that it avoids tripping hazards.

Accessibility

- Similar to an [accessibility statement](#), use this section to describe your commitment to making this course accessible to students with disabilities. Improving the accessibility of your course helps minimize the need for accommodation.
- Outline any technologies used in this course and any known accessibility features or barriers (if applicable).
- Describe how a student should contact you if they discover an accessibility barrier with any course materials or technologies.

Academic Accommodation Support

Academic Accommodation Support (AAS) is the university's disability services office. AAS works directly with incoming and returning students looking for help with their academic accommodations. AAS works with any student who requires academic accommodation regardless of program or course load.

- Learn more about [Academic Accommodation Support](#).
- Learn [how to register with AAS](#).
- Learn about [Policy 159: Academic Accommodation of Students with Disabilities](#)

Academic Accommodations (for students with disabilities) and Academic Consideration (for students faced with extenuating circumstances that can include short-term health issues) are governed by two different university policies. Learn more about [Academic Accommodations versus Academic Consideration and how to access each](#).

Wellbeing Support

At Toronto Metropolitan University, we recognize that things can come up throughout the term that may interfere with a student's ability to succeed in their coursework. These circumstances are outside of one's control and can have a serious impact on physical and mental well-being. Seeking help can be a challenge, especially in those times of crisis.

If you are experiencing a mental health crisis, please call 911 and go to the nearest hospital emergency room. You can also access these outside resources at anytime:

- **Distress Line:** 24/7 line for if you are in crisis, feeling suicidal or in need of emotional support (phone: 416-408-4357)
- **Good2Talk:** 24/7-hour line for postsecondary students (phone: 1-866-925-5454)
- **Keep.meSAFE:** 24/7 access to confidential support through counsellors via [My SSP app](#) or 1-844-451-9700

If non-crisis support is needed, you can access these campus resources:

- **Centre for Student Development and Counselling:** 416-979-5195 or email csdc@torontomu.ca
- **Consent Comes First - Office of Sexual Violence Support and Education:** 416-919-5000 ext 3596 or email osvse@torontomu.ca
- **Medical Centre:** call (416) 979-5070 to book an appointment

We encourage all Toronto Metropolitan University community members to access available resources to ensure support is reachable. You can find more resources available through the [Toronto Metropolitan University Mental Health and Wellbeing](#) website.