

**BME1471: Rehabilitation Engineering**  
**Course Syllabus, Winter 2023-2024**  
**Course Instructor: Kei Masani**

**Introduction and course objectives**

Rehabilitation and biomedical engineering are closely linked in various aspects and need to be studied together. For example, electrical stimulation and robotics technologies have recently been proven to facilitate rehabilitation outcomes. Knowledge of the state-of-the-art engineering technologies is required for students in biomedical engineering research. Furthermore, developing new technologies that assist rehabilitation requires thorough knowledge of physiological systems and understanding how they link to those technologies.

This course will introduce various state-of-the-art technologies in rehabilitation engineering. To cover diverse research topics in the field, expert guest lecturers in each field will be invited. The physiological basis of each technique will be emphasized, to encourage students to understand fundamental principles of each technique and to seek applications in their own areas of research.

**Course time and location**

Lectures will be held on Fridays, 10am-12pm. MY330.

**Contact info, office hours, and contact policies**

I can be reached at the following email address: k.masani@utoronto.ca, and you are welcome to email me anytime. For email messages, please include "[BME1471]" in the subject line.

**Marking scheme**

Assignments: 100%

Assignment 1: At each lecture, a brief summary needs to be submitted (at least 1-page, single space), involving following 3 sections:

- 1. research problem/motivation: why do it
- 2. current technologies: what is available (incl. previous/current studies done in the field)
- 3. new/future technologies: what is proposed by the lecturer.

Each point should be clearly summarized. Additional opinions/comments on the topic at the end would be preferable, as it indicates that the student digests the research topic well. Each summary is due in one week after each lecture (i.e., by the end of next Thursday 11:59pm). Each summary counts 10% (e.g., if you submit all 10 summaries, you can cover 100%).

Assignment 2 (30%): For one lecture, a brief review on the lecture topic (3-5 pages) can be submitted. The review is due in two weeks after the course end date (tentative).

Please submit the assignment via email as an attachment. Please include your name and assignment # in the file name of assignment.

**Course outline and important dates**

Week 1, Jan 12:	Introduction
Week 2, Jan 19:	Muscle fatigue reduction during FES
Week 3, Jan 26:	FES therapy for standing balance
Week 4, Feb 2:	Dr. Jan Andrysek
Week 5, Feb 9:	Dr. Azadeh Yadollahi
Week 6, Feb 16:	Dr. Elaine Biddiss
Week 7, Feb 23:	* Reading Week
Week 8, Mar 1:	Dr. Jose Zariffa
Week 9, Mar 8:	Dr. Paul Yoo
Week 10, Mar 15:	Dr. Cesar Marquez
Week 11, Mar 22:	Dr. Atena Roshan Fekr
Week 12, Mar 29:	* Good Friday
Week 13, Apr 5:	Dr. Babak Taati (11am-12pm)