

BME1471: Rehabilitation Engineering
Course Syllabus, Winter 2019-2020
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 Thursdays, 9am-12pm. The location is RS412.

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%

At each lecture, a brief summary needs to be submitted, involving:

- research problem/motivation: why we do it
- current technologies: what is available
- new/future technologies: what is needed.

Each point should be clearly summarized (sectioning would help). Additional opinions/comments on the topic would be preferable, as it indicates that the student digests the research topic well.

Course outline and important dates

Week 1, Jan 9:	Introduction
Week 2, Jan 16:	Fatigue reduction during FES, by Dr. Kei Masani
Week 3, Jan 23:	What does it take to solve problems? by Dr. Tilak Duta
Week 4, Jan 30:	Knee prosthesis design, by Dr. Jan Andrysek
Week 5, Feb 6:	Bioengineering approach to obstructing sleep apnea, by Dr. Azadeh Yadollahi
Week 6, Feb 13:	Brain machine interface, by Dr. Cesar Marquez
Week 7, Feb 20:	* Reading Week
Week 8, Feb 27:	Rehabilitation technologies & interventions: translational potential of current trends, by Dr. Kristin Musselman (should be 10-12)
Week 9, Mar 5:	Interfaces with the peripheral nervous system, by Dr. Jose Zariffa
Week 10, Mar 12:	Psychological effects in human movement and iDAPT tour, By Dr. Jenny Campos
Week 11, Mar 19:	* No lecture
Week 12, Mar 26:	Bioengineering approach for children with disabilities, by Dr. Elaine Biddiss
Week 13, Apr 2:	FES Therapy for Standing, by Dr. Kei Masani