Subject Description Form

Subject Code	BME5133
Subject Title	Modern Rehabilitation Engineering and Robotics
Credit Value	3
Level	5
Responsible staff & Department/School	Dr Xiaoling HU (BME)
Pre-requisite / Co-requisite/ Exclusion	BME31116 Biosignal Processing; or equivalent
Objectives	This subject aims to provide students a good background on advanced engineering solutions and automation in applications for persons who suffer from physical or sensory impairments.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Apply fundamental knowledge of engineering in rehabilitation b. Apply analytical skills to assess and evaluate the need of the end-user c. Conduct patient/technology evaluation via the use of modern instrumentation d. Develop self-learning initiatives and integrate learned knowledge for problem solving
Contribution to Programme Outcomes (Refer to Part I Section 2)	Programme Learning Outcome (a): Acquire and apply advanced levels of knowledge and skills in BME discipline. (Teach, Practice, and Measure) Programme Learning Outcome (b): Apply critical analysis and problem-solving skills for evidence-based practice in BME discipline. (Teach, Practice, and Measure)
Subject Synopsis/ Indicative Syllabus	This subject is on the rehabilitation with modern engineering solutions for people with sensorimotor disabilities, underpinned with the advances in neuroscience, engineering, and clinical practice. It is multi-disciplinary in nature. Team approach is the preferred clinical approach in the provision of rehabilitation engineering devices, e.g., robots, in long-term automatic services. This subject is appropriate for professionals concerned with rehabilitation. The contents of this subject covers: - Quantitative neural coding techniques - Human-machine interface and robotic design - Sensory aids for hearing and visual impairments - Assistive technology in balance - Prosthetics and orthotics technology - Evaluation and training technology - Emerging technologies

Teaching/Learning Methodology

Lecture, laboratories and/or presentations

Teaching/learning methodology	Intended subject learning outcomes					
	a	b	c	d		
1. Lectures	√	√	√	√		
2. Labs		√	√			
3. Group Project	√	√	√			

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b	c	d		
1. Assignments	30%	√			√		
2. Lab report	10%		√	√			
3. Group project presentations	30%	√	√	√	√		
4. Quiz	30%	√	√	√			
Total	100 %						

Different assignments and lab experience and/or presentations were used to guide the students towards the learning objectives of this course. Students are expected to demonstrate their learned knowledge through the quiz.

Student Study Effort Expected

Class contact:	
▪ Lectures/Tutorial/Seminar	33 Hrs.
▪ Laboratories	6 Hrs.
Other student study effort:	
▪ Self-study	38 Hrs.
▪ Assignments and laboratory reports	40 Hrs.
Total student study effort	117 Hrs.

Reading List and References	▪ Intelligent Biomechatronics in Neurorehabilitation, Elsevier, U.K., ISBN: 9780128149423, 2019 ▪ Daniel J. DiLorenzo, Joseph D. Bronzino, Neuroengineering, 2007. ▪ Bruce F. Katz, Neuroengineering the Future: Virtual Minds and the Creation of Immortality, 2008. ▪ IOP Publishing, Journal of Neural Engineering, (2004- present). ▪ BioMed Central, Journal of NeuroEngineering and Rehabilitation, (2004- present). ▪ IEEE, IEEE Transactions on Neural Systems and Rehabilitation Engineering, (1994- present)
Date of Last Major Revision	3 June 2021
Date of Last Minor Revision	30 June 2023