

SUBJECT DESCRIPTION FORM

Subject Title: Rehabilitation Engineering

Subject Code: HTI5134

Credit Value: 3

Date of Submission: Feb 2007

Responsible Staff and Department(s): Dr. Eric Tam / Dr. Aaron Leung (HTI)

Pre-requisites: HTI3115 Bioelectrical Technology II – Electronics;
HTI3141 Orthopaedics, Traumatology and Rehabilitation;
or equivalent

Recommended Background Knowledge: Knowledge of basic engineering/physics or Human anatomy and Physiology

Exclusions: Nil

Learning Approach:

There will be lectures, seminar as well as laboratory sessions.

Contact Hours:

Lectures/Seminar	27 hours
Laboratories	15 hours
Sub-total:	42 hours

Independent Study Hours:

Self-study	60 hours
Assignments	25 hours
Laboratory Reports	15 hours
Sub-total	100 hours

Total 142 hours

Assessment (types & weighting):

Course Work (100%)	
Assignments, lab reports and projects	70%
Quiz	30%

Learning Outcomes:

This subject aims to provide students a good background on current engineering solutions and their limitations for persons who suffer from physical or sensory impairments. This knowledge will enhance the students' ability to provide quality of care to the people with disabilities through the provision of appropriate rehabilitation engineering devices. As a first course in this specialized area, the objectives of this subject are:

- Understand and apply fundamental knowledge of engineering in rehabilitation
 - Develop analytical skills through case studies
 - Acquire skills in the use of modern instrumentation for patient/technology evaluation
 - Develop self-learning initiatives and integrate learned knowledge for problem solving
 - Apply assistive technology to help individuals with disabilities
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Syllabus:

This subject is concerned with the application of engineering solutions for people with disabilities. Rehabilitation is multi-disciplinary in nature and the team approach is the preferred clinical approach in the provision of rehabilitation engineering devices. The ideal team consists of medical and health professionals and rehabilitation engineers. This subject is appropriate for professionals concerned with rehabilitation.

The contents of this subject covers:

- Augmentative and Alternative Communication Devices
 - Sensory Aids for Hearing and Visual Impairments
 - Seating and Mobility Devices
 - Prosthetics and Orthotics Technology
 - Evaluation and Training Technology
 - CAD/CAM Application in Rehabilitation
 - Human-Machine Interface and Universal Design
 - Emerging Technologies
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References:

1. Cook A.M. and Hussey S.M., *Assistive Technologies: Principles and Practice*, Mosby, USA, 1995.
2. Cooper R.A., *Rehabilitation Engineering Applied to Mobility and Manipulation*, Institute of Physics Pub., 1995.
3. Dejan Popovic and Thomas Sinkjaer, *Control of Movement for the Physically Disabled*, Springer, 2000.
4. Gray D.B., Quatrano L.A., Lieberman M.L., *Designing and using Assistive Technology – the human perspective*, Brooks, 1998.
5. MacLachlan M. and Gallagher P. *Enabling Technologies – Body Image and Body Function*, Churchill Livingstone, 2004.
6. Mann W.C. (ed). *Smart Technology for Aging, Disability, and Independence – The State of The Science*, Wiley, New Jersey, 2005.
7. Muzumdar A. *Powered Upper Limb Prostheses – Control, Implementation and Clinical Application*. Springer, 2004.
8. Scherer M.J., *Assistive Technology: Matching Device and Consumer for Successful Rehabilitation*, American Psychological Association (APA), 2002.
9. Smith R.V. and Leslie J.H., *Rehabilitation Engineering*, CRC Press, 1990.
10. Teodorescu H.L. and Jain L.C., *Intelligent systems and technologies in rehabilitation engineering*, CRC Press, 2001.
11. Webster J.G. et al (eds.), *Electronic Devices for Rehabilitation*, Chapman and Hall, U.K., 1985.
12. Zollars J.A., *Special Seating: An Illustrated Guide*, Otto Bock Orthopaedic Industry, Inc., Minneapolis, MN, USA, 1996.