

SUBJECT DESCRIPTION FORM

SUBJECT CODE: HTI4234

SUBJECT TITLE: Lower Limb Prosthetics II

CREDITS: 2

PRE-REQUISITES: HTI4233 Lower Limb Prosthetics I

RESPONSIBLE DEPARTMENT: Department of Health Technology & Informatics

RESPONSIBLE MEMBER OF THE ACADEMIC STAFF:

Dr. Aaron Leung

CONTACT HOURS:

Lecture	21 hours
Demonstration / Assessment	<u>21 hours</u>
Total Contact	42 hours

RATIONALE:

This course is a continuation of Lower Limb Prosthetics I. It provides students with more advanced principles in the design, fabrication, prescription, fitting and evaluation of prosthetic devices for the lower limb. The series progressively integrates health and engineering studies which the students will have taken as part of their earlier BME studies. Those academic studies will form the basis for the derivation and application of the scientific principles used in the practice of prosthetics.

LEARNING OUTCOMES:

The students will be able to:

- 1) correctly apply clinical principles for assessment and prescription of lower limb prostheses at or above knee disarticulation level,
- 2) utilize detailed knowledge of prosthetic socket design variations and their fitting for the individual requirements of transfemoral amputees
- 3) apply the principles for the biomechanical function of prosthetic knee and hip mechanisms to the analysis of function of prostheses incorporating these components
- 4) utilize a clinical and technical knowledge base in the design, subject measurement, moulding, cast rectification, fabrication, CAD/CAM, fitting, evaluation, adjustment of lower limb prostheses for amputations at or above the knee disarticulation level.

SYLLABUS:

Review of general concepts of lower limb prosthetics and how they relate to higher level of amputation; clinical assessment of lower limb amputees; and materials & components of lower limb prosthetics; biomechanics of lower limb prosthetics; prosthetic component options, through-knee prostheses; transfemoral prostheses, hip and pelvis prostheses, measurement, moulding, cast rectification, and fabrication of lower limb prostheses; fitting and assessment of lower limb prostheses; CAD/CAM application.

TEACHING AND LEARNING ACTIVITIES:

The subject is to integrate the theoretical knowledge and the technical skills in a way that is important to patient care and management. In this subject, students will have ample opportunities to interact directly with real amputees. Students will need to go through step by step the clinical process of patient assessment, patient measurement, casting, cast rectification, fabrication, patient fitting, and patient evaluation. Emphasis is placed on the development of clinical judgement and the process of clinical problem solving. Organization of a student mock clinic further connects the teaching and learning activities to a broader experience of organization, management and interpersonal communication. Review of general concepts of lower limb prosthetics and how they relate to higher level of amputation; clinical assessment of lower limb amputees; and materials & components of lower limb prosthetics; biomechanics of lower limb prosthetics; prosthetic component options, through-knee prostheses; transfemoral prostheses, hip and pelvis prostheses, measurement, moulding, cast rectification, and fabrication of lower limb prostheses; fitting and assessment of lower limb prostheses; CAD/CAM application. The 21 hours of lectures and tutorials will be supported by 21 hours of demonstrations, interaction with patient models and assessment of individual prosthetics projects.

ASSESSMENT:

Each of the individual learning outcomes will be assessed as part of the integrated outcome demonstrated by the student in patient care. Individual prosthetic design and fitting projects will be assessed with direct feedback from the model patients/subjects at various stages, as well as from the instructors throughout the process. In the process, students will also learn how to interact with the patients. At the completion of assigned individual projects, students will be guided to critique the work of other fellow students under the facilitation of the instructor. This is done to maximize the learning experience by learning not only from one's own mistakes but also from those of the fellow students.

A final examination will be used to establish that the student has understood and can integrate the factual materials required to design, fabricate, fit and assess prostheses.

Continuous Assessment	50%
Final Examination	50%

REFERENCE MATERIALS:

1. Boone DA Computerized Prosthetics Alignment Training, The Hong Kong Polytechnic University, 2004
2. Stewart CP Prescribing a Lower Limb Prosthesis, British Society of Rehabilitation Medicine, 2000
3. Gage J Normal Walking, Gillette Children's Hospital, 1995
4. Banerjee S.N. (ed.) Rehabilitation Management of Amputees. Williams and Wilkins, 1982.
5. Hoppenfeld S. Physical Examination of the Spine and Extremities.
6. Murdoch G., Donovan R.G. (eds.) Amputation Surgery and Lower Limb Prosthetics. Blackwell Scientific Publications, 1988.
7. Sanders G.T. Lower Limb Amputations - A guide to Rehabilitation. F.A. Davis, 1986.
8. May B.J. Amputations and Prosthetics: A Case Study Approach, F.A. Davis, 1996.
9. Weber D. Clinical Aspects of Lower Extremity Prosthetics: Trans-Tibial, Symes and Partial Foot Amputations, CAPO, Ontario, 1991.
10. Esquenazi A. Prosthetics, *Physical Medicine and Rehabilitation*, Vol. 8, No. 1, Hanley and Belfus, Inc., Philadelphia, 1994.
11. Donald S.G. Prosthetics & Orthotics, Appleton & Lange, Norwalk, Conn., 1990.
12. Wilson A.B. Limb Prosthetics, 6th ed., Demos, New York, 1989.