



HL2005 Implants and Biomaterials 6.0 credits

Implantat och biomaterial

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for HL2005 valid from Autumn 2007

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Electrical Engineering

Specific prerequisites

HL2006 Medical engineering, basic course.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The objective of the course is to give the students an overview of implants, a basic knowledge of biomaterials and the special technical and clinical circumstances applicable to implants.

Course contents

Active Implants: Active implants are implants for the diagnosis or treatment of disease containing an energy source. The cardiac pacemaker is a typical and maybe the most common active implant. This part of the course discusses: implants/transplants, cardiomechanics – a comparison with mechanical pumps, left ventricular support, the artificial heart, cardiac electrophysiology, implantable stimulators and sensors with emphasis on pacemakers.

Biomaterials: The materials used for implants must fulfill very special criteria. They must in interaction with the living body lead to the desired result and at the same time resist the hostile chemical environment. This part of the course covers basal material physics, characteristics of materials and the use of metals, ceramics, polymers and composites in implants.

Passive implants: Orthopaedic implants are taken as a starting point for a discussion of the special clinical and technical conditions applicable to passive implants.

Field trip: Pacesetter AB.

Course literature

Biomaterials Science: An Introduction to Materials in Medicine, Buddy D. Ratner (Editor), Allan S. Hoffman (Editor), Fred Schoen, Fredenck J. Scheon (Editor). (ISBN: 0125824610, available at course start)

Material distributed during lectures.

Examination

- TEN1 - Examination, 6.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Ethical approach

- All members of a group are responsible for the group's work.

- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.