KD2300 Biomedical Materials 7.5 credits

Biomedicinska material

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

Establishment

Course syllabus for KD2300 valid from Spring 2020

Grading scale

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

Education cycle

Second cycle

Main field of study

Chemical Science and Engineering, Chemistry and Chemical Engineering, Biotechnology

Specific prerequisites

Bachelor's degree in engineering or in sciences including 50 credits in chemistry or chemical engineering. English B/6.

Language of instruction

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

Intended learning outcomes

After completion of the course the student will be able to:

- Give examples of biomedical material applications, identify material properties that are critical for metallic, polymer and ceramic biomaterials, and suggest proper type of biomaterial for given applications.
- Explain basic physical, chemical and mechanical processes that may occur on biomaterials in use, including corrosion and degradation reactions that occur for different biomaterials and their consequences.
- Practically perform testing and property evaluations of common biomedical materials.
- Present and evaluate a project and laboratory assignments orally and in writing.

Course contents

Various types of biomaterials for a wide range of biomedical applications. Fundamental structure-property relationships. Basic function and performance of passive and active implant materials. Physical, chemical and mechanical aspects of bulk and surface properties of metallic, polymer and ceramic biomaterials. Principles of surface engineering and combination of different materials. Host-tissue response, blood compatibility, extracellular matrix collagen, bioadhesion, protein adsorption, polymers for controlled drug release. Corrosion and degradation mechanisms of biomaterials in different applications. Selection of biomaterials based on function, biological environments, toxicity and economic aspects. Examples of biomaterials and implant objects and devices. Current research trends and medical device regulation.

Examination

- SEM1 - Project, 3.0 credits, grading scale: P, F
- TEN1 - Written exam, 4.5 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.

Laboratory Work: Report and seminar

Other requirements for final grade

Examination, 4,5 credits,
Lab (report and seminar), 3 credits

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.