UNIVERSITY OF BORÅS

Polymers in Medical Applications and Tissue Engineering

Polymera material för användning i medicinska tillämpningar och vävnadsteknik

5 credits
5 högskolepoäng

Ladok Code: FRRPT01
Version: 1.0
Established by: The Research education committee in Resource Recovery 2022-03-30
Valid from: Spring 2022

Education Cycle: Third cycle
Research Subject: Resource Recovery
Prerequisites: The student has to be admitted to a PhD programme. The examiner can make exceptions to this rule.
Grading Scale: Fail (U) or Pass (G)

Content

Polymers (Synthetic and Natural) have many applications as an implant in surgery. In using polymers as implants, three main requirements are biocompatibility, blood compatibility, and suitable surface properties.

This course aims to give PhD students knowledge about the type of polymers used as an implant in surgery and ongoing progress in the field of tissue engineering for organ replacement using polymeric materials. The course will cover the following topics:

- The history of the application of polymeric materials in surgery as implant and basics of requirements
- Sterilization techniques for polymeric implants and devices
- Type of polymers used as an implant in bone and joint surgery, cardiovascular applications, ear, nose and throat surgery, maxillofacial surgery, ophthalmic surgery
- Sutures in surgery (Natural and Synthetic)
- Adhesives in medical applications
- Procedures used in regenerative medicine

Learning Outcomes

After completion of the course, the student should be able to:

Knowledge and understanding
1.1 Give an account of the types of polymers used in medical applications and tissue engineering
1.2 Give an account of the requirements for polymers used in medical applications and tissue engineering
1.3 Give an account of the progress in the field of tissue engineering for organ replacement using polymers

Skills and abilities
2.1 To be able to discuss the methods of assessment of biocompatibility, blood compatibility and surface properties of polymers used in medical applications and tissue engineering
2.2. To be able to discuss the methods of sterilization of polymeric materials used in medical applications and tissue engineering

Valuation and approach
3.1 Analyse and evaluate the relationship between the students´s own research project and the current research front

Forms of Teaching

The teaching consists of lectures, written project work, oral seminar.

The language of instruction is English.

Forms of Examination

The course is examined through the following components:

• Examination
Learning outcomes: 1.1-1.3, 2.1-2.2
Credits: 4.0
Grading scale: Pass/Fail UG

• Project work with seminar
Learning outcomes: 3.1
Credits: 1.0
Grading scale: Pass/Fail UG

If the student has received a decision/recommendation regarding special pedagogical support from the University of Borås due to disability or special needs, the examiner has the right to make accommodations when it comes to examination. The examiner must, based on the objectives of the course syllabus, determine whether the examination can be adapted in accordance with the decision/recommendation.

Student rights and obligations at examination are in accordance with guidelines and rules for
the University of Borås.

Literature and Other Teaching Methods

Biomaterials Science: An Introduction to Materials in Medicine, Elsevier Academic Press, Third Edition, 2012. Edited by: Buddy D. Ratner, Allan S. Hoffman, Frederick Schoen, Jack E. Lemons

Material provided during the course and selected scientific articles.

Student Influence and Evaluation

The course is evaluated in accordance with current guidelines for course evaluations at the University of Borås in which students' views are to be gathered. The course evaluation report is published and returned to participating and prospective students in accordance with the above-mentioned guidelines, and will be taken into consideration in the future development of courses and education programmes. Course coordinators are responsible for ensuring that the evaluations are conducted as described above.

Miscellaneous

This syllabus is a translation from the Swedish original.