

Application for funding of faculty common course 2020

Ansökan om medel för fakultetsgemensam forskarutbildningskurs 2020

English course title: Biological characterization of biomaterials

Kursnamn på engelska

Swedish course title: Biologisk karaktärisering av biomaterial

Kursnamn på svenska

Extent (credits): 5 hp

Omfattning (högskolepoäng)

Language of instruction: English

Undervisningsspråk

Recommended prerequisites:

Rekommenderade förkunskaper

Master's level or equivalent (e.g. Civilingenjör), with specialization in materials engineering, biotechnology, chemistry, biology or in another appropriate discipline. Experience in biomaterials and cell culture would be advantageous.

General course objective/s and learning outcomes (Also specify which PhD examination goals that are addressed/covered. Describe how.)

Kursens syfte och mål (Beskriv vilka mål för examen på forskarnivå som beaktas och på vilket sätt.)

The aim of the course is to provide students with a deep understanding of how biomaterial-biological system interactions are investigated *in vitro* and *in vivo* along a biomaterial development process. The course will also give an insight into legislation, ethics and commercialization aspects of biomedical materials.

At the end of the course, the student should be able to:

- Explain the principles of protein-biomaterial interactions as well as the methods commonly used to characterize such interactions.
- Account for *in vitro* models used to assess blood-biomaterial interactions and the parameters to be evaluated.
- Explain and compare different *in vitro* methods commonly used to evaluate cell-biomaterial interactions.
- Identify the design parameters for the *in vivo* evaluation of biomaterials, taking into consideration ethical issues.
- Select *in vitro* and *in vivo* tests/studies to evaluate the biocompatibility of a biomaterial towards a specific application.

Course contents

Kursinnehåll

The course will consist on 13 two-hour (45min x 2) sessions. The students will also work on a case study project that will be presented at the end of the course.

The content of the course will be the following:

- 1) Basics about cells and biomaterials
- 2) Protein-biomaterial interactions
- 3) Blood-biomaterial interactions
- 4) 2D and 3D models to characterize biomaterials *in vitro*

- 5) Single cell analysis using droplets & microfluidic systems to characterize biomaterials in vitro
- 6) Evaluation of biocompatibility
- 7) Animal testing
- 8) Legislation and ethics
- 9) Planning research towards commercialization.

Instruction (course structure)

Undervisning (kursens uppläggning)

In general, each lecture session will be divided in 45 min lecture + 45 min interactive activities (seminar/discussion/work in groups). This will be done to ensure the students engage in their own learning process.

Assessment (form of examination)

Examination (examinationsformer)

The examination will be divided in three parts: 30% assignments + 40% individual project + 30% active participation in seminars and activities. Attendance to 80% of the lectures will be required.

Course examiner (name, e-mail): Natalia Ferraz, natalia.ferraz@angstrom.uu.se

Examinator (namn, e-post)

Department with main responsibility: Engineering Sciences

Huvudansvarig institution

Contact person/s (course responsible teacher) (name, e-mail):

Kontaktperson/er (kursansvarig lärare) (namn, e-post)

Gemma Mestres; Gemma.Mestres@angstrom.uu.se

Natalia Ferraz; natalia.ferraz@angstrom.uu.se

Course dates/period: October – December 2020

Kurs datum/period

Maximum number of participants: 25

Antal platser

Submit the application for admission to:

Skicka anmälan till kursen till

Natalia Ferraz, natalia.ferraz@angstrom.uu.se

Submit the application not later than: 15th September 2020

Skicka anmälan senast