

Microsystems and Nanobiology

Programme course

6 credits

Mikrosystem och nanobiologi

TFTB33

Valid from: 2017 Spring semester

Determined by

Board of Studies for Chemistry, Biology
and Biotechnology

Date determined

2017-01-25

Main field of study

Engineering Biology

Course level

Second cycle

Advancement level

A1X

Course offered for

- Engineering Biology, M Sc in Engineering

Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites

Basic knowledge of physics, chemistry, biology, biosensor technology, surfaces science and supramolecular chemistry.

Intended learning outcomes

The course aims to give knowledge and experience in development of microsystems including nanotechnology, for uses in biotechnology and biomedicine. After finished course the students shall be able to:

- explain the motives and goals for the use of microsystems in biotechnology and biomedicine
- explain limitations and possibilities with miniaturisation of analysis systems for biological objects
- motivate choice of materials and methods for micro/nanosystems for biotechnology
- explain the most important principles behind self organization and functional polymers
- perform simple micro-patterning using photolithography and soft lithography
- present solution to seminar task

Course content

Microsystems-fabrication and use in bioanalytical systems. Miniaturization of electronic, chemical and mechanical functions. Self assembly of nano-structures and functional nano-materials.

Nanotechnology for novel detection and enhanced sensitivity. Fabrication methods for microstructures, soft lithography and photolithography. Biological microchips, smart microsystems, single cell analysis, microfluidics.

Teaching and working methods

Lectures on basic theory, seminars, laboratory work, guest lectures and study visits to relevant companies and institutions.

Examination

UPG2	Seminars	1 credits	U, G
LAB1	Laboratory work	1 credits	U, G
TEN3	Written examination	4 credits	U, 3, 4, 5

Grades

Four-grade scale, LiU, U, 3, 4, 5

Other information

Supplementary courses: Imaging and ubiquitous biosensing.

Department

Institutionen för fysik, kemi och biologi

Director of Studies or equivalent

Magnus Boman

Examiner

Niclas Solin

Course website and other links

<http://cms.ifm.liu.se/applphys/biorgel/education/mikrosystem-nanobiologi-t/>

Education components

Preliminary scheduled hours: 36 h

Recommended self-study hours: 124 h

Course literature

Additional literature

Books

Marc J. Madou, *Manufacturing Techniques for Microfabrication and Nanotechnology*

Other

Hand-outs, research papers, review papers.
Own information search.

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://stydokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.