Imaging and Ubiquitous Biosensing

Programme course

6 credits

Imaging and Ubiquitous Biosensing

TFTB38

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
A1F

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
Molecular and surface physics, Biochemistry, Microbiology with immunology.

Intended learning outcomes
The students will be trained to interpret the phenomena behind different detection approaches, to associate detected signals with multidimensional representation schemes and their related data structures and to handle this information to produce target evaluations.
Guided by the examiner the students will plan, conduct and present a short (bio)sensing project based on one of the studied techniques. Upon this course the students should be able to:

- Understand different detection principles involved in imaging and ubiquitous (bio) sensing methods.
- Associate detected signals with multidimensional representation schemes and their data structures.
- Understand evaluation schemes and processing.
- Plan, conduct, report and present a imaging and/or ubiquitous (bio)sensing experiment.

Course content

An introduction to imaging methods for bio and chemical sensing exploiting diverse optical and electrical phenomena and instrumentation strategies for ubiquitous sensing. Among these methods imaging systems for evaluation of colorimetric assays, reflective quick tests and arrays of fluorescent indicators are studied. Imaging versions of optical techniques for non-labelled assays such as ellipsometry and surface plasmon resonance, and field effect imaging detection in gas phase (SLPT) and solution (LAPS) are considered among others.
Diverse approaches for distributed chemical analysis, home tests and point of care determinations are also considered with special attention to ubiquitous instrumentation such as lab-on-a-disk, odour identification with desktop scanners and computer screen photo-assisted techniques (CSPT). The focus of the course is on the measuring strategies and the information processing and includes the necessary instruction on Matlab programming.

Teaching and working methods

Lectures, exercises and a project work.

Examination

PRA1	Experimental project including report and oral presentation	3 credits	U, G
TEN1	Oral or written examination	3 credits	U, 3, 4, 5

Grades

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

Department

Institutionen för fysik, kemi och biologi

Director of Studies or equivalent

Magnus Boman

Examiner

Daniel Filippini

Education components

Preliminary scheduled hours: 58 h
Recommended self-study hours: 102 h

Course literature

Föreläsningsanteckningar, utdrag ur böcker, vetenskapliga artiklar, produkt broschyrer, speciella internet adresser.

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://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.