Surface Physics

Programme course

6 credits

Ytfysik

TFYA20

Valid from: 2017 Spring semester

Determined by
Board of Studies for Electrical Engineering, Physics and Mathematics

Date determined
2017-01-25

Main field of study
Applied Physics, Physics

Course level
Second cycle

Advancement level
A1X

Course offered for
- Materials Science and Nanotechnology, Master's Programme
- Applied Physics and Electrical Engineering - International, M Sc in Engineering
- Applied Physics and Electrical Engineering, M Sc in Engineering
- Physics and Nanoscience, Master's programme

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
Modern Physics, Quantum Mechanics and Physics of Condensed Matter are desirable.

Intended learning outcomes

The overall goal with the course is that the student shall be able to define, derive and utilize/apply relations on problems concerning surfaces of solids. This means that the student shall:

- know how the chemical composition and atomic structure in the outermost atomic layers is experimentally determined.*know about the surface electronic structure, i.e. the origin of surface states.
- know and understand certain static and dynamic properties of surfaces of solids.
- know about common surface adsorption processes and how these can be utilized to change the properties of a surface.
- be able to formulate idealized models for problems within condensed matter physics.
- be able to apply knowledge and skills to solve problems within surface physics.
- be able to explain in a well structured and logical consise way relations/derivations within surface physics as well as between central concepts of the theory.

Course content

Experimental methods to determine the atomic composition and structure at surfaces of solids. Theoretical models describing surface electronic properties, such as appearance of surface states and influence on the work function, and methods to determine these. Description of common surface adsorption processes, physisorption and chemisorption, and how these typically affects both the atomic structure and electronic properties of surfaces of metals and semiconductors.

Teaching and working methods

The course material is presented in the form of lectures and laboratory exercises.

Examination

LAB1	Two laboratory work assignments	1 credits	U, G
TEN1	A written examination	5 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 Johansson

Examiner

Martin Magnuson

Course website and other links

http://www.ifm.liu.se/undergrad/fysikgtu/coursepage.html?selection=all&sort=kk

Education components

Preliminary scheduled hours: 46 h
Recommended self-study hours: 114 h

Course literature

Additional literature

Books

Zangwill A., (1988) *Physics at Surfaces*
Cambridge University Press

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.