



IM2655 Introduktion till nano-material och nanoteknik 7,5 hp

Introduction to Nanomaterials and Nanotechnology

När kurs inte längre ges har student möjlighet att examineras under ytterligare två läsår.

Fastställande

Kursplan för IM2655 gäller från och med HT08

Betygsskala

A, B, C, D, E, FX, F

Utbildningsnivå

Avancerad nivå

Huvudområden

Teknisk fysik

Särskild behörighet

Good knowledge about the physics and chemistry courses according to the study plan or corresponding background.

Grading scale: A-F

Undervisningsspråk

Undervisningsspråk anges i kurstillfällesinformationen i kurs- och programkatalogen.

Lärandemål

This course will give a general but advanced introduction to the field and discuss paradigm shifts as scientific frameworks from physics, chemistry and biology as well as from materials science.

After a successful completion of the course, students should be able to:

- Describe and explain Nanotechnology.
- Describe Nanomaterials based on their dimensionality.
- Explain the importance of reduction in materials dimensionality, and its relationship with materials properties.
- Give examples on size-dependant phenomena.
- Explain top-down approaches for Nanomaterial fabrication, and give some examples.
- Explain bottom-up approaches for Nanomaterial fabrication, and give some examples.
- Describe and discuss Nanotechnology tools.
- Give examples on the use of Nanotechnology in biomedical applications.
- Give examples on the use of Nanotechnology in optical applications.
- Give examples on the use of Nanotechnology in microelectronics applications.
- Perform a literature survey on a chosen topic in the scientific literature.
- Write a scientific report with appropriate references and citations.
- Present results of a research in the form of an oral presentation.

Kursinnehåll

The course aims at providing you with a general and broad introduction to the multi-disciplinary field of nanotechnology. During the course you will acquire the basic knowledge of the physical phenomena, theoretical concepts and experimental techniques behind the recent vastly improved ability to observe, fabricate and manipulate individual structures on the nanometer scale.

Another aim of the course is to familiarize with the on-going merge of the top-down approach of microelectronics and micromechanics with the bottom-up approach of chemistry/bio-chemistry; a development that is creating new and exciting cross-disciplinary research fields and technologies. The recent scientific and technology work in the nano world will be presented to demonstrate the potential of nanoscience and industrial applications of nanotechnology.

A final goal is to give you an insight into complete systems where nanotechnology can be used to improve our everyday life. The course will also have a part for introducing the KTH library services and scientific information search on different databases. Introduction to scientific report writing is also an integral part of the library program.

Kurslitteratur

Introduction to Nanotechnology, by Frank J. Ovens

Lecture notes and reference literature.

Language of instruction: English

Examination

- ANN1 - Projekt och inlämningsuppgifter, 1,5 hp, betygsskala: P, F
- TEN1 - Tentamen, 6,0 hp, betygsskala: A, B, C, D, E, FX, F

Examinator beslutar, baserat på rekommendation från KTH:s handläggare av stöd till studenter med funktionsnedsättning, om eventuell anpassad examination för studenter med dokumenterad, varaktig funktionsnedsättning.

Examinator får medge annan examinationsform vid omexamination av enstaka studenter.

Övriga krav för slutbetyg

An oral project presentation (TEN1; 4,5 credits) on a selected topic. To pass the course it is necessary to pass the tutorial exercises (TUT1; 1,5 credits, TUT2; 1,5 credits). Further instructions about the examination and requirements are given at the course start.

Etiskt förhållningssätt

- Vid grupparbete har alla i gruppen ansvar för gruppens arbete.
- Vid examination ska varje student ärligt redovisa hjälp som erhållits och källor som använts.
- Vid muntlig examination ska varje student kunna redogöra för hela uppgiften och hela lösningen.