Application for funding of faculty common course 2020
Ansökan om medel för fakultetsgemensam forskarutbildningskurs 2020

English course title  Thin film technology
Kursnamn på engelska

Swedish course title Tunnfilmsteknik
Kursnamn på svenska

Extent (credits) 5
Omfattning (högskolepoäng)

Language of instruction English
Undervisningsspråk

Recommended prerequisites
Rekommenderade förkunskaper
Basic knowledge in physics/chemistry is necessary. Elements of materials science are beneficial.

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 course provides introduction into synthesis of thin film materials and coatings. Possible applications include thin films for systems and devices, such as transistors, solar cells, sensors, or batteries. The aim is to provide understanding of the different deposition techniques and the relation between growth conditions and material properties, rather than describe detailed technology implementation.

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<th>MAL</th>
<th>How is the goal addressed</th>
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<td>Kunskap och förståelse</td>
<td>• Acquire knowledge and understanding of thin film technology on specialist level.</td>
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<td>Färdighet och förmåga</td>
<td>• Based on the understanding of the fundamental, propose a solution to various problems related the use of thin film materials, especially synthesis.</td>
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<td>• Analyse a given topic, find independently the necessary information, and present the topic in the course.</td>
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Värderingsförmåga och förhållningssätt

Course contents
Kursinnehåll
Deposition of thin films by physical (PVD) and chemical (CVD and ALD) techniques with focus on the fundamental physical and chemical processes. A brief overview of solgel and electrochemical deposition.

Main topics covered in the course are: Evaporation, sputtering, ion-plating as well as CVD and ALD. Plasma technologies for thin films. Effect of the substrate on the film growth and techniques for surface modification. Models for nucleation and film growth. Morphology and texture and their impact on material properties. Solgel, electrochemical deposition. Examples of applications of thin film materials and deposition technologies.

Instruction (course structure)
Undervisning (kursens uppläggning)
Combination of standard lectures and seminars: Each module is introduced in a lecture with participants presenting specific topics during a follow up seminar. Main focus lies on the theoretical principles, only a brief overview of the practical implementation is given. Lab demonstrations are also provided.

Given the varied background of the students, the focus is on active learning facilitated by a combination of traditional lectures and seminars, where the participant work under guidance.

Elements of physics, chemistry, and technology are required and four lecturers from two departments contribute to the course.

Assessment (form of examination)
Examination (examinationsformer)

Presentations and assignments during the course, Final interview (oral examination)

Course examiner (name, e-mail)
Examinator (namn, e-post)
doc Tomas Kubart, tomas.kubart@angstrom.uu.se
doc Tobias Törndahl, Tobias.Torndahl@angstrom.uu.se

Department with main responsibility Teknikvetenskaper
Huvudansvarig institution

Contact person/s (course responsible teacher) (name, e-mail)
Kontaktperson/er (kursansvarig lärare) (namn, e-post)
Tomas Kubart, tomas.kubart@angstrom.uu.se

Course dates/period Period 1, VT 2021
Kurs datum/period

Maximum number of participants 20
Antal platser

Submit the application for admission to
Skicka anmälan till kursen till
Tomas Kubart, tomas.kubart@angstrom.uu.se

Submit the application not later than 2019-12-20
Skicka anmälan senast