KF2150 Surface Coatings Chemistry 7.5 credits

Ytbehandlingskemi

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for KF2150 valid from Autumn 2011

Grading scale

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

Education cycle

Second cycle

Main field of study

Chemical Science and Engineering, Chemistry and Chemical Engineering

Specific prerequisites

_Admission requirements for programme students at KTH:
_At least 150 credits from grades 1, 2 and 3 of which at least 110 credits from years 1 and 2, and bachelor's work must be completed, within a programme that includes:
75 university credits (hp) in chemistry or chemical engineering, 20 university credits (hp) in mathematics and 6 university credits (hp) in computer science or corresponding.

_Admission requirements for independent students:
_75 university credits (hp) in chemistry or chemical engineering, 20 university credits (hp) in mathematics and 6 university credits (hp) in computer science or corresponding.
Documented proficiency in English corresponding to English B.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After the course the student should be able to:

- Describe a system for surface treatment regarding the components and their function
- Discuss choice of substrate, pre-treatment and application for a given system
- Discuss the importance of good wetting and suitable rheological properties for the surface treatment system
- Explain the film formation in physically and chemically drying systems (oxidative drying, polyester-melamine, epoxy-alcohol, epoxy-amine, isocyanate-alcohol and irradiation curing).
- Choice (and motivate the choice) of suitable surface treatment system for a given application
- Explain the build-up, curing and function of a powder coating
- Discuss the environmental effect of different surface treatment systems
- Exemplify and motivate the use of polymers in thin films in some non-traditional surface treatment applications
- Synthesize a polymer suitable as resin for organic coating
- Cahracterize the uncured coating regarding chemical compositon and properties
- Apply coatings on substrates
- Follow the drying course with pendulum hardness measurements and IR spectroscopy
- Evaluate the properties (adhesion, hardness etc) of the cured film.

Course contents

Introduction to coating chemistry; Resin chemistry - physically drying resins, chemically drying resins, radiation cured resins, powder coatings; Pigments and other additives; Paint manufacturing; Paint rheology; Application methods; Drying methods and equipment; Coating substrates; Pre-treatment methods; Testing methods (wet and dry paint); Internal and external environment in coating processes.

Course literature

Papers distributed during lectures.

Examination

- TEN1 - Written exam, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Course, 3.0 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Other requirements for final grade

Examination, (TEN1; 4,5 credits)
Passed laboratory work, (LAB1; 3,0 credits)

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.