FSK3910 Colloids and Collodial Principles for Industrial Applications 7.5 credits

Kolloider och kollodiala principer för industriella tillämpningar

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

Establishment

Course syllabus for FSK3910 valid from Spring 2021

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

This course is open to doctoral students admitted to doctoral education at KTH and doctoral students from other universities.

Language of instruction

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

Intended learning outcomes

Knowledge and understanding

- Have a grasp of the definition and examples of colloidal systems in nature and industries.
- Understand the phenomena, physical and chemical characteristics of colloidal systems existed in nature, consumer products, and industrial sectors.
- Demonstrate comprehension of influential factors of colloidal system.
- Grasp the fundamental equations and key properties of colloidal system.
- Estimate and calculate physical parameters of colloidal system.

Skill and abilities

- Be familiar with methods and instrumentation on characterization of colloidal system.
- Obtain the knowledge and mechanism of measurement techniques.
- Demonstrate ability to explain why and how colloidal and surface chemistry govern in certain scenario.
- Apply colloidal principles for problem solving in related research fields.
- Develop constructive thinking and suggest suitable strategies to improve the application of colloidal system in current and emerging areas.

Course contents

The theme of the course is on the phenomena characteristics of colloidal system and the theories and the techniques used to study these characteristics. Colloids are everywhere that we look and have fundamentally influenced our lives, with a wide range of applications from food, pharmaceuticals, healthcare, cosmetics, ink, agrochemicals to optical display, sensing, renewable energy (to name a few). It is both a multi- and interdisciplinary topic and is not good to be taught in a non-coherent way as a part of general physical chemistry course. Therefore, this course aims to cover the basic science, important physical rules, and key factors governing the colloidal systems, which will help elucidate the properties of materials and create/improve the respective applications.

The main content of this course can be categorized into three aspects:

- Key phenomena, properties, and fundamental laws of colloids, including forces in transport phenomena, optical, kinetics, hydrodynamic, electrokinetics, rheology properties and stability, properties of surfaces and interfaces in colloidal system.
- Characterization methods and instrumentation, such as spectrophotometers and electron microscopy.
- Colloidal systems and important component, such as emulsion, colloidal nanoparticles, surfactants, macromolecules and hydrogels.

Examination

- TEN1 - Written exam, 5.0 credits, grading scale: P, F
- ANN1 - Quiz and presentation, 2.5 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.

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.