FCK3102 Nanocellulose; From fundamentals to new materials 4.5 credits

Nanocellulosa; Från grundläggande principer till nya material

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

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

Establishment

Course syllabus for FCK3102 valid from Autumn 2020

Grading scale

P, F

Education cycle

Third cycle

Language of instruction

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

Intended learning outcomes

After completion of the course the doctoralstudent should have the knowledge and ability to

- demonstrate for the level of the course adequate acquired knowledge in the specialized topics of the course.
- design, plan and carry out a project to address a scientific applied within the specialized scope of the course.
- present and motivate orally own project results, and critically evaluate own and others' presented project results.

Course contents

- History and development of nanocelluloses and their current standing as an industrially applicable product.
- Structure of the fibre wall including fibril aggregates, hemicellulose and lignin, and the overall link to nanocellulose extraction via chemical and mechanical processes.
- Different types of nanocelluloses and how key chemical and morphological differences alters behaviour in dispersions and materials.
- Essential nanocellulose characterization techniques including, scattering techniques, spectroscopy, surface probe microscopy and electron microscopy.
- Colloidal properties and self-assembly and how they can be tuned for the design of materials.
- New and innovative materials utilizing nanocellulose including, gels, emulsions, advanced papers, sensors, composites, biomedical devices and electroactive materials.
- Current challenges limiting the wide spread use of nanocelluloses.

Specific prerequisites

Accepted for doctoral studies at universities and higher-education institutions, and external participants with similar competence.

Examination

- DEL1 - Participation, 1.5 credits, grading scale: P, F
- TEN1 - Written exam, 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.

Participation in lectures, and 2 weeks of studies of supplied literature and a passed written exam.

Other requirements for final grade

Compulsory presence during the lectures is credited as 1.5 ECTS, and the passed written exam as 3.0 ECTS.

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.