UNIVERSITY OF BORÅS

Advanced Textile Chemistry
Avancerad textilkemi
7.5 credits

Ladok Code: AT2TC1
Version: 4.0
Established by: Committee for Education in Technology 2023-05-12
Valid from: Autumn 2023

Education Cycle: Second cycle
Main Field of Study (Progressive Specialisation): Textile Engineering (A1F)
Disciplinary Domain: Technology
Prerequisites:
Subject Area: Textile Technology
Grading Scale: Seven-degree grading scale (A-F)

Content
The advanced textile chemistry consists of two course modulus, Chemical treatment of textiles (5.5 hp) and Nanotechnology (2 hp).
In the chemical treatment of textiles module the students learn a variety of examples of chemical treatment of textile, functionalization of textile fibers and surfaces. The course module emphasizes on the novel strategies using functional materials and enzymes biotechnology for the treatment of textile. The examples include chemical softening, water-, oil- and dirt- repellent finishing, flame retardant finishing, anti-static finishing, anti-microbial and UV protective finishing.

The recent development of nanotechnology influences the conventional way of thinking and methodology about functionalization and finishing of textiles. The Nanotechnology module starts with the basic concept of nanomaterials and nanotechnology, the size-dependent effect, application and preparation of the nanomaterials. The module advances further on the application of nanotechnology within textile treatment, e.g., deposition of nanoparticles.
The course discusses the current legislation concerning the use of chemicals, nanomaterials and chemical processes in the treatment of textiles, which has great impact on health, environment and sustainable development of the society.
The advanced textile chemistry emphasizes on the hand-on practices, writing of scientific reports as well as presentation skills of student. The lab sessions related to the finishing of textile, and application of nanotechnology in textile finishing etc. are embedded in the course content.

Learning Outcomes
The examinee shall independently be able to:

Knowledge and understanding
1.1 demonstrate and apply comprehensive technical knowledge of: i), chemical treatment and functionalization of textile, ii), nanomaterials and nanotechnology,
1.2 demonstrate profound technological and methodological knowledge within chemical functionalization and finishing of textiles, and
1.3 demonstrate in-depth understanding of sustainable development aspects regarding the application of chemicals and nanotechnology in textile functionalization finishing. Demonstrate in-depth understanding of impact of the chemicals, enzymes, chemical treatment processes of textiles and application of nanotechnology on health, environment and sustainability under current legislation.

Skills and abilities
2.1 demonstrate an ability to critically and systematically integrate knowledge to interpret the state-of-the-art literature in the novel approaches in functionalization of textiles.
2.2 demonstrate skills to select appropriate materials and processes within above-mentioned topics, plan, conduct the experiment in a laboratory environment. Demonstrate skills to identify and creatively to solve the problem.

2.3 demonstrate the ability to create, analyze and critically evaluate different technical solutions to develop and apply chemicals, enzyme biotechnology, nanomaterials and chemical processes in chemical treatment of textiles, considering individuals needs and society's goals for economically, socially and ecologically sustainable development.
2.4 demonstrate abilities to write scientific reports in good English and capabilities to communicate results to laymen, industry and researcher.

Forms of Teaching

The course consists of lecturing and laboratory session.

The language of instruction is English.

Forms of Examination

The course will be examined through the following examination elements:

Written exam
Learning outcomes:
Credits: 4
Gradingscale: Seven-degree grading scale (A-F)

Laboratory sessions including report
Learning outcomes:
Credits: 3
Gradingscale: Fail (U) or Pass (G)

Presentation
Learning outcomes:
Credits: 0.5
Gradingscale: Fail (U) or Pass (G)

The student is examined by written examination and lab sessions (lab reports).

If the student has received a decision/recommendation regarding special pedagogical support from the University of Borås due to disability or special needs, the examiner has the right to make accommodations when it comes to examination. The examiner must, based on the objectives of the course syllabus, determine whether the examination can be adapted in accordance with the decision/recommendation.

Student rights and obligations at examination are in accordance with guidelines and rules for the University of Borås.

Literature and Other Teaching Materials

Gulrajani M.L., Advances in the Dyeing and Finishing of Technical Textiles, 1st ed., Woodhead Publishing, 2013

Cavaco-Paulo A. and Gubitz G., Textile Processing with Enzymes, 1st ed., Woodhead Publishing, 2003

Nierstrasz V. and Cavaco-Paulo A., Advances in Textile Biotechnology, 1st ed., Woodhead Publishing, 2010

If applicable additional material is made available on the learning platform.

Student Influence and Evaluation

The course is evaluated in accordance with current guidelines for course evaluations at the University of Borås in which students' views are to be gathered. The course evaluation report is published and returned to participating and prospective students in accordance with the above-mentioned guidelines, and will be taken into consideration in the future development of courses and education programmes. Course coordinators are responsible for ensuring that the evaluations are conducted as described above.

Miscellaneous

This syllabus is a translation from the Swedish original.