UNIVERSITY OF BORÅS

Advanced Finishing and Printing
Avancerad beredning och tryck
7.5 credits

Ladok Code: AT2AB1
Version: 7.0
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: The programme courses Polymer Technology 7.5 credits, Advanced Fibre and Yarn Technology 7.5 credits and Textile Chemistry 7.5 credits.
Subject Area: Textile Technology
Grading Scale: Seven-degree grading scale (A-F)

Content
The course Advanced Finishing and Printing builds on knowledge and skills acquired in the courses Textile Chemistry and Advanced Textile Chemistry and further investigates the functionality that can be achieved through resource-efficient textile processes such as inkjet printing technology, 3D printing and supercritical carbon dioxide treatment. The course will prepare students to study state-of-the-art developments in printing and finishing technology that highlight digitalisation, sustainability aspects, resource-efficient processes, and local production.

Inkjet printing, 3D printing and supercritical carbon dioxide treatment are new deposition technologies that have great potential for resource-efficient textile processes. For inkjet printing, the focus of the course is on the basic understanding of the ink formulation, the prints themselves and the machines. The focus of 3D printing is to functionalise or bring “smartness” to the textile. In 3D printing, the polymer filament is melted and deposited on the textile. Therefore, the 3D printer can be used as a patterning tool for 2D deposition of materials on textiles. In supercritical carbon dioxide finishing, the focus is on anhydrous dyeing of textiles using carbon dioxide.

The course focuses on critical approach, lab experience, and scientific communication. Labs and workshops give students the opportunity to practice their skills and work more independently in the field.

Learning Outcomes
After completing the course, the student will be able to:

Knowledge and understanding
1.1 explain concepts relevant to resource-efficient textile processes such as 3D printing, inkjet printing and supercritical carbon dioxide treatment,
1.2 describe how these techniques can be applied to change textile properties and their application in functionalisation and finishing of textiles,
1.3 accurately describe: (i) ink formulation, inkjet printing and machinery; (ii) 3D printing, adhesion between printed filament and textile substrate; (iii) supercritical carbon dioxide state; and
1.4 from a sustainable development perspective, describe the benefits of the said resource-efficient textile processes and local textile production.

Competence and skills
2.1 critically apply acquired knowledge to interpret the latest literature in resource-efficient textile processes,
2.2 select appropriate materials, processes and evaluation methods in the above subjects and independent problem-solving skills in a laboratory environment;
2.3 analyse the need for and select from existing technical solutions or, where necessary, adapt them to provide functionality

and/or smartness to textile products; and
2.4 write scientific reports in good English and communicate results as prototypes to laypeople, industry, and researchers.

Judgement and approach
3.1 operate in a social and organisational context, which means assessing and evaluating relevant societal and ethical aspects when using the resource-efficient textile processes in research and development work,
3.2 evaluate the opportunities, limitations and problems offered by resource-efficient processes in the digital and sustainable transformation of the textile industry.

Forms of Teaching

- Lectures
- Laboratory sessions
- Workshops

The language of instruction is English.

Forms of Examination

The course will be examined through the following examination elements:

Laborations
Learning outcomes:
Credits: 3
Gradingscale: Fail (U) or Pass (G)

Workshop
Learning outcomes:
Credits: 4.5
Gradingscale: Seven-degree grading scale (A-F)

The final grade of the course is determined by Workshop, which is issued when all examination components have been passed.

Redoing laboratory sessions and the Workshop is only offered during a regular course instance. Examinations of both examination stages are offered three times a year.

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

BISWAS, T. T., YU, J. & NIERSTRASZ, V. A. (2019) 12 - Inkjetting of enzymes. In: CAVACO-PAULO, A., NIERSTRASZ, V. A. & WANG, Q. Advances in Textile Biotechnology (Second Edition). Woodhead Publishing.

In addition, articles, research reports and other material can be made available via the university's learning platform.

Student Influence and Evaluation

Students' opinions are collected systematically and regularly through written evaluation after completing the course. Once per semester, student representatives evaluate courses completed with the director of studies and the course leader. Otherwise, refer to the university's policy for course evaluations and documents issued by the board of directors, the director of studies and the course coordinator.

Miscellaneous

The course is primarily a programme course for the Master's Programme in Textile Engineering.

This syllabus is a translation from the Swedish original.