

## Advanced fiber and yarn technology Avancerad fiber och garnteknologi

7.5 credits

7.5 högskolepoäng

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**Ladok Code:** FTMAF01

**Version:** 1.0

**Established by:** The Research education committee - Textile Technology 2022-01-19

**Valid from:** Spring 2022

**Education Cycle:** Third cycle

**Research Subject:** Textile Technology

**Prerequisites:** Admitted to third-cycle (doctoral) studies in Textile Technology or equivalent.

**Grading Scale:** Fail (U) or Pass (G)

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### Content

This course provides students with advanced technical knowledge of textile fibre and yarn, focusing on production methods with analysis and modelling with the following parts:

- The production methods of synthetic textile fibre/yarn with melt spinning are investigated, analysed and modelled, focusing on material flows in spin processes, shear, and orientation.
- The new technology of sustainable textile fibre production are investigated.
- Textile fibre finishing, testing and characterisation are investigated and analysed.
- The yarn productions process for staple fibre are investigated, analysed and modelled at an advanced level.
- Yarn functionalisation, post-processing, finishing and catheterisation are investigated and analysed.

### Learning Outcomes

Upon completion of the course, the student should be able to, with regard to:

#### 1. *Knowledge and understanding*

- 1.1 Demonstrate technical know-how for fibre/yarn production process and characterisation in a systematic way.
- 1.2 Demonstrate in-depth methodological knowledge of yarn/fibre testing and characterisation.
- 1.3 Understand the relationship between fibres parameters and production methods of yarn deeply.
- 1.4 Demonstrate understanding of modelling of fibre/yarn production method.
- 1.5 Describe the development and manufacturing process from a sustainability perspective for fibre.

#### 2. *Skills and Abilities*

- 2.1 Identify suitable production methods for fibre/yarn based on the raw material properties.
- 2.2 Identify yarn structures and characterisation and describe the production process in a scientific context.
- 2.3 Identify and interpret data from fibre/yarn testing and characterisation, and put them in a scientific context and communicate research results with both experts and laypeople,
- 2.4 Show methodological skills that enable them to manage their own and collaborative projects.

#### 3. *Critical judgement and evaluation*

- 3.1 Critically analyse and argue for fibre/yarn in terms of environmental impact and technology
- 3.2 Analyse how production methods can affect the yarn properties
- 3.3 Analyse how production methods can affect the fibre/yarn properties
- 3.4 Evaluate yarn structure in terms of technical performance, environmental impact and raw material requirements.

### **Forms of Teaching**

Lectures, visiting lectures, seminars, group discussions, case studies, study visits, projects, and laboratory work.

The language of instruction is English.

### **Forms of Examination**

The course is examined through the following forms of examination:

- Assignment 1 (melt-spinning), 2 credits

Learning outcomes 1.1-1.2-2.1-2.2-2.4-3.2-3.3-3.4

Grading scale: Fail (U) or Pass (G)

- Assignment 2 (New textile fibre), 1 credits

Learning outcomes 1.1- 1.5-2.4- 3.1-3.3-3.4

Grading scale: Fail (U) or Pass (G)

- Assignment 3 (Textile fibre finishing and characterization), 1,5 credits

Learning outcomes 1.1-1.2-2.3-2.4-3.3

Grading scale: Fail (U) or Pass (G)

- Assignment 4 (Staple fibre spinning), 2 credits

Learning outcomes 1.1-1.2-1.3-2.1-2.2-2.4-3.2-3.3-3.4

Grading scale: Fail (U) or Pass (G)

- Assignment 5 (Yarn functionalization), 1 credits

Learning outcomes 1.1-1.2-2.3-2.4-3.3-3.4

Grading scale: Fail (U) or Pass (G)

Re-examination of laboratory work takes place at the next course opportunity.

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 Methods**

Software support: Comsol.

Supplementary material is distributed during the course.

### **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 course is primarily intended for doctoral students in Textile Technology

This syllabus is a translation from the Swedish original.