UNIVERSITY OF BORÅS

Smart textiles
Smarta textilier
7.5 credits
7.5 högskolepoäng

Ladok Code: AT2ST1
Version: 3.0
Established by: Committee for Education in Technology 2019-06-14
Valid from: Autumn 2019

Education Cycle: Second cycle
Main Field of Study (Progressive Specialisation): Textile Engineering (A1F)
Disciplinary Domain: Technology
Prerequisites: Polymer Technology 9 credits, Textile electronics 7.5 credits, Textile Chemistry I - Organic and physical chemistry 7,5 credits and Textile Chemistry II - Interfaces and chemical treatment 15 credits.
Subject Area: Textile Technology
Grading Scale: Seven-degree grading scale (A-F)

Content
The Smart Textile course is based on knowledge in textile electronics, which is hereby implemented and further investigated based on various aspects of functional and smart textiles. Mandatory elements in the form of laboratory- and project work include: electrical characterization of conductive materials, practical measurements of electrical impedance, conductive functionalization of textiles, design and characterization of textile sensors (resistive and capacitive), integration of electronics for smart textiles prototyping.

The course also gives the student the opportunity to influence the content and to independently demonstrate in-depth knowledge in the field of smart textiles when problem and project-based learning is the starting point.

Learning Outcomes
After the course, students will be able to:

Knowledge and understanding:
1.1 Explain the basic concepts within the area of textile electronics, electrically conductive and smart textiles and describe the connections between them.
1.2 Describe different types of functionalization and characterization methods for conductive textiles and to discuss which and how different parameters affect the conductive properties.
1.3 Show an in-depth understanding of textile sensor principles.
1.4 Describe materials and methods suitable for the implementation of textile electronics.

Skills and abilities:
2.1 Suggest and perform relevant measurements to characterise electrical properties of conductive textiles and textile sensors.
2.2 Demonstrate independent responsibility for their own learning, critically acquire knowledge to produce and characterise conductive sensors, and demonstrate this during laboratory and project work.
2.3 Be able to plan and control project work, put it in its context and take into account social demands.
2.4 Summarize and communicate (orally and in writing) the practical work: construction of prototypes, characterization, analysing the results, arguing for conclusions in discussion with researchers, industry and laymen

Evaluation ability and approach:
3.1 Critically argue for the possibilities offered and limitation of electrically conductive textiles.

Forms of Teaching
Teaching in the course consists of

- Lectures
- Laboratory work
- Projects which ends with a workshop (joint with the course ”Advanced Finishing and Printing”)

The language of the course is English

The language of instruction is English.

Forms of Examination

The course is examined through the following examinations:

- Assignment 1: Lab Log Book (including account of personal contributions in assignment 2 and 3).
  Learning objectives: 1.1-1.2, 2.1-2.2
  Higher Education Credits: 2,0
  Grading scale: Fail, Pass
- Assignment 2: Project report (Problem-Based Assignment)
  Learning objectives: 1.3-1.4, 2.2-2.4, 3.1
  Higher Education Credits: 2,5
  Grading scale: Seven-degree grading scale A-F
- Assignment 3: Project report (Project Assignment)
  Learning objectives: 1.3-1.4, 2.2-2.4, 3.1
  Higher Education Credits: 3,0
  Grading scale: Seven-degree grading scale A-F
  Grading scale: Seven-degree grading scale A-F
  The final grade of the course is obtained by combining the scores for the three examinations.
  Project work assignments are given once per year, project report for each assignment can be examined 3 times per year, where 2 are re-examinations.
  Student rights and obligations at examination are in accordance with guidelines and rules for the University of Borås

  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.

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Literature and Other Teaching Materials

Material is made available on the learning platform.
Langenhove, L. van (red.) (2007). Smart textiles for medicine and healthcare: materials, systems and applications. Cambridge: Woodhead Publ.

Student Influence and Evaluation

The course is evaluated in accordance with current guidelines for course evaluations at the University of Borås, where students' views will be gathered. The course evaluation report is published and returned to participating and prospective students in accordance with the above-mentioned guidelines, and underlies the future development of courses and education programs. Responsible teachers are responsible for the evaluation as described above.

Miscellaneous

This course is primarily a programme course in the Master Programme in Textile Engineering.
This syllabus is a translation from the Swedish original.