



## Smart Textiles and High-tech Clothing Smarta textilier och högteknologiska kläder

3 credits

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**Ladok Code:** TST011

**Version:** 2.0

**Established by:** Research Board 2009-06-10

**Valid from:** Spring 2009

**Education Cycle:** First cycle

**Main Field of Study (Progressive Specialisation):** Textile Technology (G1N)

**Disciplinary Domain:** Technology

**Prerequisites:**

**Subject Area:** Textile Technology

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

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### Content

Smart Textiles or Intelligent Textiles are textile products that somehow interact with their environment. In general an intelligent system is considered to consist of a sensor, a processor and an actuator. The stimuli information is transmitted from the sensor to the processor, which according to pre-set data interprets the signal and transmits a command to the actuator, which performs the pre-determined action. An intelligent system performs the action repeatedly, once a similar stimulus is measured, and the function is usually reversible. Textiles that fulfill this definition can be called Smart Textiles. The difference between Smart Textiles and Wearable Technology is that Smart Textiles function intelligently without electronic or other mechanical components. If electronic or mechanical components are embedded in textiles and the textile part does not have any intelligent properties, then we talk about wearable technology.

The course will introduce:

- *Phase Change Materials*, for temperature regulation.
- *Shape Memory Materials*, can change their shape from a temporary deformed shape to a pre-programmed shape due to external stimuli, for example temperature change, stress, magnetic field, UV-light or moisture.
- *Chromic Materials*, materials which according to a certain stimulus change color, radiate a color or erase a color.
- *State Change Materials* material developed by d3o for absorbing impact energy. The material can be used for shock protection for in sports clothing, protective clothing, etc.

Conductive yarns, fiber optics, electro-optics and photonics are often used in smart textile products but as such cannot be considered as smart textiles.

Commercial applications are being developed for sports, protective wear, medical as well as for fun purposes. According to estimates this kind of products will be in the market during the next 5 to 10 years.

### Learning Outcomes

The course will give the student a basic knowledge in the field of Smart textiles, it's definition and possible uses, e.g. high-tech garments.

### Forms of Teaching

The course is on distance using PingPong (teaching platform).

The language of instruction is English.

### Forms of Examination

The course will be examined through the following examination elements:

### *Assignment*

Learning outcomes:

Credits: 2

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

### *Examination*

Learning outcomes:

Credits: 1

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

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

## **Literature and Other Teaching Materials**

### **Advanced studies**

- Textiles in Sport, Shishoo, R.(2005), Woodhead Publishing Limited

Relevant Internet links will be given at the beginning of the course.

## **Student Influence and Evaluation**

## **Miscellaneous**

The course is a part of the Nordplus-project.