



# Textiles meet Electronics a new Interdisciplinary Educational Approach

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## Introduction

Traditional courses of study such as textile and clothing technology and electrical engineering need to invest more in interdisciplinary and digitally oriented collaboration to meet the requirements of the growing industry of textile electronics and smart textiles for many application areas such as sports, medicine, health, and mobility. The Hochschule Niederrhein University of Applied Sciences in Krefeld and Monchengladbach combined their expertise of both faculties and developed a Master course starting WS 22/23 focusing on textile electronics. Students learn to understand and apply the basic technologies in the field of smart electronic textiles and to face the challenges of the industry. The focus is aimed at master's students in faculty 03 electrical engineering and 07 textile and clothing technology. The students of both faculties will be able to learn and research in an interdisciplinary and project-oriented manner during their studies to be best prepared for the requirements of the industry for career starters in this field.

## Requirements of German employers for future master's graduates in textile electronics

For the development of the content of the master's program with a focus on textile electronics, selected experts from the fields of textiles, electronics, and textile electronics, representing industry and associations, were first asked about the requirements for graduates. Subsequently, students were given the opportunity to contribute their wishes and ideas for the new specialization by means of a questionnaire. Growing market Demand from the business community.

## Social level

- a) Digitally trained workers
- b) Confident use of digital technologies and forms of work in professional life

## Technological level

- a) Transdisciplinary trained experts
- b) Implementation/development of necessary technologies in areas such as Internet-of-Things, smart advanced sensor technology and (wearable) electronics.

## Annual growth forecast of ~30%

Enormous demand and innovation hub in the field of wearable and flexible electronics.

## Textile electronics - Key lecture: Materials and processes

Organic and inorganic materials of textile electronics are treated with current examples from products, applications, and research contributions in classical, organic, nanostructure-based approaches. Various dry and wet coating methods are taught and implemented in projects. Different material analysis, surface analysis as well as textile testing methods are used to investigate textile electronic materials. Considering the aspects of standards and sustainability, the textile-electronic components, materials, and processes are evaluated by means of suitable test planning and scientific documentation.

## Textile electronics - Key lecture: Systems and applications

This module discusses components of textile electronics from the fields of sensors, actuators, electrical components, and power supply, as well as connection techniques between electronic components and textiles. Signal processing methods, programming, communication protocols and communication methods are also taught in this reference. In product development, usability, sustainability (ECO design), standards, regulators and cost effectiveness play a significant role.

## Next Steps - International Bachelor Smart Textiles

Soon the Niederrhein University of Applied Sciences will offer an international Bachelor Smart Textiles in cooperation with European and worldwide colleges and universities.

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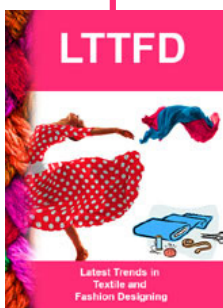


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