UNIVERSITY OF BORÅS

Textile Electronics
Textil elektronik

7.5 credits
7.5 högskolepoäng

Ladok Code: AT1TX1
Version: 3.0
Established by: Committee for Education in Technology 2018-03-08
Valid from: Spring 2018

Education Cycle: First cycle
Main Field of Study (Progressive Specialisation): Textile Engineering (G1N)
Disciplinary Domain: Technology
Prerequisites: The student fulfills the admission requirements for the master's degree in textile technology (or equivalent).
Subject Area: Textile Technology
Grading Scale: Seven-degree grading scale (A-F)

Content

The course aims at providing a theoretical basis for analysis and synthesis of both passive and active analog circuits. In addition, to give an understanding of the function of such circuits. The course also aims at providing some skills in electronic construction.

The main content of the course includes: basic laws and connections in electricity and electronics; electrical current, potential, conductivity, permittivity, dielectric materials, Ohm's Law; electrical and electronic components, resistors, capacitors, inductors, diodes; electrical circuits, topologies, connections, Kirchoff's laws, Thevenins and Norton's theorem; Node and loop analysis; operational amplifier, the ideal operational amplifier and its applications; introduction to sensors and measurement technology, DC and AC measurement, peak value, efficiency and electrical characterization of materials.

Learning Outcomes

After the course, students will be able to:

Knowledge and understanding:
1.1 Describe the origin of electrical properties in materials
1.2 Explain the terms electric field and current, dielectricity (polarizable insulators) and permittivity
1.3 Explain the relationship between voltage and current
1.4 Describe the differences between DC and AC
1.5 Explain the concepts impedance, resistance, influence, capacitance, inductance.
1.6 Explain how to characterize the passive electrical properties of the materials

Skills and Abilities:
2.1 Apply structured methods for the analysis and construction of simple electrical circuits
2.2 Calculate current, voltage and power in general DC and AC circuits
2.3 Dimensioning simple amplifiers
2.4 Perform a simple design task from specification to circuit design
2.5 Select appropriate sensors and measurement methods to electrically measure physical quantities
2.6 Mastering basic characterization of conductive materials

Evaluation ability and approach
3.1 handle circuit theoretical concepts in dialogue with teachers and peers in a respectful and constructive way.
3.2 Critically argue for chosen solutions and identify deviations from theoretical models

Forms of Teaching

- lecture
- workshops / laboratory
- Study visits

The language of instruction is English.

Forms of Examination

The course is examined through the following examinations:

- Examination: Written exam
  Learning Objectives 1.1-2.6
  Higher Education Credits: 4.5
  Grading scale: Seven-degree grading scale (A-F)
- Laboration: laboration and presentation
  Learning Objectives 2.1-2.6
  Higher Education Credits: 1.5
  Grading scale: Seven-degree grading scale (A-F)
- Assignment: Written assignment
  Learning Objectives 3.1-3.2
  Higher Education Credits: 1.5
  Grading scale: Seven-degree grading scale (A-F)

  The final grade of the course is obtained by combining the scores for the three examinations with the proportionality; written exam (60%), laboratory work (20%) and written assignment (20%)

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

Literature and Other Teaching Materials

Storr, W. (2013). Basic electronics tutorials for beginners and beyond. Free edition. electronics-tutorials.ws

Keysigth Technologies (n.d.). Impedance Measurement Handbook A guide to measurement technology and techniques. Application Note. [online] eKeysigth Technologies. Available at: http://literature.cdn.keysight.com/litweb/pdf/5950-3000.pdf [Accessed 13 Feb. 2018].

Muthu, S. (2016). Textile Science and Clothing Technology. 1st ed. Singapore: Springer Singapore.

If applicable additional material is made available on the learning platform.

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 intended for students who have been admitted to the Master's Program in Textile Technology.

This syllabus is a translation from the Swedish original.