CE2020 Chemical Sensing 7.5 credits

Kemiska sensorer: Principer och tillämpningar

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for CE2020 valid from Autumn 2024

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Chemical Science and Engineering,Chemistry and Chemical Engineering

Specific prerequisites

Completed degree project 15 credits, 50 credits in chemistry or chemical engineering, English B/6.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After passing the course the student should be able to:

- Describe the diverse functioning modes of chemical sensors, their fundamental principles as well as derive useful relationships on how the sensor signal depends on different parameters.
- Demonstrate an ability to find alternative scenarios to address current sensing challenges and explain the importance of chemical sensors in the digital transformation and its relation to social, economic and environmental sustainability.
- Describe the fundamental methodology for experiments based on chemical sensors as well as perform simple experiments with them.

Course contents

The paradox of sensing any particular chemical event in our surroundings is probably one of the key innovative and challenging directions towards a sustainable world. What makes this challenge very exciting is the possibility of obtaining decentralized and digitalized chemical information in very efficient and trustable manner by utilizing chemical sensors with extraordinary features never seen before (e.g., implantable, submersible, miniaturized, low-cost, simple, paper-based among others). Tangible benefits to the society with efforts put into the democratization of the chemical information are expected outcomes that will not only ensure better quality of life, but also a deep understanding of ongoing chemical process.

This course builds solid knowledge on the working basis of chemical sensors (mainly electrochemical and optical sensors). In particular, most relevant sensors will be illustrated by the most recent scientific literature in fields such as healthcare, environmental, clinical analysis and quality control. In terms of sustainable development (SD), to what extent are chemical sensors an important piece of technology that pursues social, economic and environmental sustainability will be discussed in each module.

Examination

- LAB1 - Laboratory work, 3.0 credits, grading scale: P, F
- TEN1 - Written exam, 4.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Ethical approach

- All members of a group are responsible for the group's work.

- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.