



LUNDS UNIVERSITET  
Lunds Tekniska Högskola

*Course syllabus*

## Sensorteknik Transducer Technology

**BMEF10, 7,5 credits, G2 (First Cycle)**

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED BME

Date of Decision: 2023-04-13

### General Information

**Elective for:** BME4-bf, D5-hs, E4-ss, E4-mt, F4, F4-mt, F4-r, F4-ss, IEA3, N4

**Language of instruction:** The course will be given in Swedish

### Aim

The importance of sensors in modern society is increasing rapidly. There are plenty of examples where sensors are needed to gain increased safety (i.e. cars), decreased influence on the environment (i.e. process control in industry, pollution control in cars) and more efficient use of energy (i.e. in-house climate control). Other examples where sensors are expected to get vital importance is Virtual Reality (i.e. remote controlled robotic operations in medicine as well as computer games and simulators).

The aim of this course is to give a broad overview of the most common sensor principles and measurement methods for measurements of physical, chemical and bio-chemical parameters i.e. temperature, pressure, oxygen level, pH, etc.

### Learning outcomes

*Knowledge and understanding*

For a passing grade the student must

- have a broad overview of sensor design, properties and limitations when used for measurements of physical, chemical and bio-chemical parameters.
- have a detailed knowledge of sensors principles and measurement parameters within a specific field.

*Competences and skills*

For a passing grade the student must

- be able to suggest proper sensor principles and measurement method for a given measurement task.
- have gained experience in experimental work.
- be able to give a written and oral report of acquired information and experimental results.
- be able to perform a demonstration of a measurement principle and results.

#### *Judgement and approach*

For a passing grade the student must

- be able to look for, sort out and acquire information from an extensive information material without any reading instructions.

## Contents

The course consider the most common sensors and measurement methods for measurement of physical, chemical and bio-chemical measurement parameters in the field of process- and manufacturing industry as well as medicine and society.

Furthermore, the interfacing, applied signal processing and data acquisition system are studied. The course includes a project that considers a specific measurement parameter or sensor principle. The project task is to gain information about sensor principles and use through literature studies and experimental work. The project is presented oral at a seminar and is finally put together in a written report. A large part of lectures are given by the students as projectseminars.

## Examination details

**Grading scale:** TH - (U,3,4,5) - (Fail, Three, Four, Five)

**Assessment:** For grade 3 it is required that the student have passed a number of compulsory parts: Oral presentation of a project, laboratory work including pre-tests , participation in 80% of the seminars and writing a report and a less extensive written exam. For a higher grade a more extensive written exam is given.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

## Admission

**Assumed prior knowledge:** ESSF10 or BMEF05 Electrical Measurements or EEMF15 Sensors and Measurements or BMEF15 Sensors or EITA40 Circuits and Measurements.

**The number of participants is limited to:** No

**The course overlaps following course/s:** EEM031

## Reading list

- Jacob Fraden: Handbook of Modern Sensors. Springer, New York, NY, 2016, ISBN: 978-3-319-19302-1. Available as e-book (<https://doi.org/10.1007/978-1-4419-6466-3>).

## **Contact and other information**

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**Course homepage:** <http://bme.lth.se/course-pages/sensorteknik/sensorteknik/>