



LUNDS UNIVERSITET  
Lunds Tekniska Högskola

*Course syllabus*

## Ultraljudsfysik och teknik Ultrasound Physics and Technology

**EEMN15, 7,5 credits, A (Second 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, E4-ss, E4-mt, F4, F4-mt, F4-ss, N4

Language of instruction: The course will be given in English on demand

### Aim

The aim with the course is to give a fundamental understanding and an experimental experience of ultrasound. The student is given an insight in an expanding research area. Another purpose is to prepare the students for diploma work and PhD-studies in electrical and biomedical engineering.

### Learning outcomes

#### *Knowledge and understanding*

For a passing grade the student must

- have a satisfactory overview of technical ultrasound applications
- have extended knowledge in the basic principles in ultrasound physics
- have insight in basic ultrasonic technical principals and their implementation in advanced diagnostical systems
- have knowledge in the present frontier of research

#### *Competences and skills*

For a passing grade the student must

- be able to characterise an ultrasound transducer
- be able to experimentally perform and demonstrate basic physical effects or technical applications
- be able to read and understand a scientific ultrasound paper

- be able to, oral and written, explain problems within the subject ultrasound

### *Judgement and approach*

For a passing grade the student must

- be able to describe ethical and risk related questions from fetal examination to military applications.

## **Contents**

Ultrasound physics, transducer technology, diagnostic equipment technology, doppler, bio-acoustics, field characterisation, airborne ultrasound, diagnostic application, non destructive testing, sonar and research projects at the department

## **Examination details**

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

**Assessment:** Passed compulsory parts, written and oral examination.

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:** First Course in Physics

**The number of participants is limited to:** 32

**Selection:** Number of credits within the programme. Priority is given to students enrolled on programmes that include the course in their curriculum.

**The course overlaps following course/s:** EEM080

## **Reading list**

- Hoskins P R, Thrust A, Martin K, Whittingham T A:.
- Diagnostic Ultrasound: Physics and Equipment.
- CUP 2019. eBook ISBN 9781138893603.

## **Contact and other information**

**Course coordinator:** Universitetslektor Monica Almqvist, monica.almqvist@bme.lth.se

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**Course homepage:** <http://www.bme.lth.se/>