

**Course title**  
Acoustic Transducers**Code**  
ACT9005**ECTS credits** 5  
**Faculty** Faculty of Technology and Maritime S  
**Location** Høgskolen i Vestfold  
**Teaching Language** English**Participants**

PhD-students at Vestfold University College and collaborating institutions

**Prerequisite knowledge**

Introductory acoustics, fluid mechanics, calculus, and electric circuit theory

**Aim and Objectives**

The course shall give an in-depth insight into selected topics of acoustics, aimed at students specializing in the field. Some details can be adapted to the needs and interests of the students who have elected the course.

Upon completion of this course, the student should

- Be able to design and model a piezo-electric acoustic transducer, using analytical models and FEM tools.
- Be able to calculate the radiation field from transducers and transducer arrays
- Have some insight into nonlinear acoustic phenomena, with emphasis on applications in medical ultrasound
- Have a good understanding of the acoustic principles of medical ultrasound imaging and underwater sonar

**Outline Syllabus**

Piezo-electric acoustic transducers. Analytical models and FEM simulations

- Capacitive acoustic transducers
- Acoustic radiation fields from transducers and transducer arrays.
- Introduction to nonlinear acoustics, aimed at effects important in medical ultrasound
- Examples from medical ultrasound and underwater sonar

**Work Methods/Teaching**

Lectures, homework assignments and independent project work.

**Assessment /Method(s)**

Project report. Pass/Fail grade

**Compulsory Work / Exercises**

- Compulsory assignments
- Project

**Reading list**

The reading list may be modified at course startup. A tentative list is:

- Selected chapters from B. A. J. Angelsen, "Ultrasound Imaging: Waves, Signals, and Signal Processing"
- Recent papers on ultrasound technology, taken from the scientific literature

**Coordinator (Professional responsible)**

Prof. Lars Hoff

