



HL2010 Ultraljud 6,0 hp

Ultrasound

När kurs inte längre ges har student möjlighet att examineras under ytterligare två läsår.

Fastställande

Kursplan för HL2010 gäller från och med HT07

Betygsskala

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

Utbildningsnivå

Avancerad nivå

Huvudområden

Elektroteknik

Särskild behörighet

Bachelor's degree in Engineering Physics, Electrical Engineering, Computer Science or equivalent. Basic knowledge of anatomy.

Undervisningspråk

Undervisningspråk anges i kurstillfällesinformationen i kurs- och programkatalogen.

Lärandemål

The course will give knowledge about ultrasound as a medical diagnostic modality and also future therapeutic possibilities with ultrasound. Basic physics about ultrasound transmission and reflection will be described. The gain and filtering theories for the equipment. Calibration routines and errors in the ultrasound equipments. Ultrasound interaction with tissue and contrast substances. Quantitative imaging, including Doppler, speckle scattering and measurements on the returning radiofrequency signal. Basic anatomical and functional findings with ultrasound, including velocity and pressure calculations from ultrasound images. Storage and communication of the images. Parametric imaging. How does ultrasound give diagnostic information in comparison with other imaging modalities.

Following this course, you will gain knowledge and understanding

- **about the construction of an ultrasound equipment**
- **regulations concerning ultrasound**
- **how the equipment is tested and common errors.**
- **how the equipment is used in a clinical panorama, including image and data storage.**
- **3-d and 4-d image reconstruction.**
- **on line and off line image reconstruction.**
- **different ways to present quantitative information.**
- **how equipments are used in radiological, cardiological, vascular and gynecological departments.**
- **how cardiological information are calculated from the images.**
- **how to make a specification for purchase of a system.**

Kursinnehåll

- You will explicitly learn about the different diagnostic procedures, their clinical application and how they are performed.
- Diagnostic procedures for detection of myocardial ischemia, like stress testing and use of perfusion markers
- Quantification of different valvular diseases
- Quantification of vascular diseases.
- Skeletal muscle disturbances
- Measurement of distances areas and volumes in the body.
- Quantification of tissue deformation.
- Automatic or semiautomatic image processing procedures for ultrasound images.
- Difficult to image views with invasive transducers.
- Standard imaging routines. What to look for and what calculations should be performed.
- You will also get an insight to the development of next diagnostic ultrasound based imaging procedures.

Kurslitteratur

To be decided.

Examination

- LAB1 - Laborationer, 1,5 hp, betygsskala: P, F
- TEN1 - Tentamen, 4,5 hp, betygsskala: A, B, C, D, E, FX, F

Examinator beslutar, baserat på rekommendation från KTH:s handläggare av stöd till studenter med funktionsnedsättning, om eventuell anpassad examination för studenter med dokumenterad, varaktig funktionsnedsättning.

Examinator får medge annan examinationsform vid omexamination av enstaka studenter.

Övriga krav för slutbetyg

Passed written exam (TEN1; 4.5 cr.) grading A-F.

Passed lab work (LAB1; 1.5 cr.) grading P/F.

Etiskt förhållningssätt

- Vid grupparbete har alla i gruppen ansvar för gruppens arbete.
- Vid examination ska varje student ärligt redovisa hjälp som erhållits och källor som använts.
- Vid muntlig examination ska varje student kunna redogöra för hela uppgiften och hela lösningen.