Peripheral Auditory System, 3 credits
Research level

**Learning outcomes**
By the end of the course the students will be able to:
- Understand the acoustical influence on sound transmission from the external ear and ear canal.
- Understand the mechanical influence on sound transmission from the middle ear.
- Understand the place-frequency coding of the cochlea and the active mechanisms involved in sound-to-neural transformation.
- Design experiments illustrating peripheral-based psycho-acoustic effects.
- Describe origins of hearing impairments.
- Understand basic concepts of auditory models.

**Contents**
- Anatomy of the ear
- Basic sound, vibration and acoustics
- Psycho-acoustics
- Auditory physiology
- Coding sounds - Auditory neural representation
- Hearing impairments
- Electrical potentials in the auditory system
- Active mechanisms in the auditory system

The course is based on quantitative methodologies

**Educational Methods**
Lectures and/or tutorial groups and seminars.

The educational method used is problem-based learning (PBL). PBL emphasises the student’s development of free, self-supporting, lifelong learning ability as an instrument for critical inquiry. The students own queries and formulated problems form the basis of PBL. Important is also the student’s ability to take responsibility for his/her own learning, and to seek and evaluate information and knowledge and to train co-operation and a flexible attitude to different views and ideas.

The course is given in such a way that both men’s and women’s experiences and knowledge are made visible and developed.

**Examination**
1. Give a lecture for one of the course topics. The topics are handed out to the students at the start of the course according to the students’ background knowledge.
2. Design and conduct an experiment illustrating one or several auditory peripheral phenomena.
3. Present the experiment result with an oral presentation at a seminar
4. The ability of the student to answer theoretical questions (within the scope of the learning outcomes) posed by the examiner at the seminar

Students who have failed the course or part of the course twice are entitled to request another examiner for the following examination occasion.

Admission Requirements
General requirements
Admitted to education at research level (PhD-studies).

Special requirements
None

PhD students are admitted according to the following priority order:
1. PhD students registred at the Faculty of Health Sciences or PhD students strongly connected to the Faculty of Health Sciences registred at other faculties within Linköping University or PhD students admitted to HEAD national research school.
2. PhD students registred at other faculties within Linköping University
3. PhD students registred at other universities

Participation in the course of other students than above is only possible if there are fewer applicants from the above groups than students to be admitted.

Grading
Pass or Fail.

Course evaluation
Planning and implementation of the course shall be carried out on the basis of the wording in this course plan. The evaluation of the course should therefore consider the question how well the course agrees with the course plan. Written evaluation will be arranged at a scheduled time at the end of the course.

Certificate
At the student’s request, course certificate may be issued by the course organiser.

Course Literature
The course organiser will provide a list of relevant literature before the start of the course.

Additional information
If the course is withdrawn, or is subject to major changes, examinations according to this course plan are normally offered on a total of at least three occasions within one year, one of them in close connection with the first examination.

The course is given in English.
**Peripheral Auditory System, 3 credits**

Organiser: Department of Clinical and Experimental Medicine

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Decided by Research and postgraduate studies board (Forsknings- och forskarutbildningsnämnden, FUN) 2010-06-18 on behalf of the Board of the faculty of Health Sciences (Fakultetsstyrelsen, FSM)