Course syllabus for

Signal theory, 7.5 credits

Signalteori, 7.5 hp

This course has been cancelled, for further information see Transitional provisions in the last version of the syllabus.

Please note that the course syllabus is available in the following versions:
Spring2009 , Autumn2010 , Spring2012 , Spring2013 , Spring2014 , Spring2015 , Spring2016 , Spring2024

Course code	1AU011
Course name	Signal theory
Credits	7.5 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Audiology
Level	G1 - First cycle 1
Grading scale	Pass, Fail
Department	Department of Clinical Science, Intervention and Technology
Decided by	Programnämnden för audionomprogrammet
Decision date	2008-10-22
Course syllabus valid from	Spring 2009

Specific entry requirements

Standardised admission requirements F.1.1.

Objectives

The overall goal of the course is to provide the student with basic knowledge of signals and systems, and an understanding of audiological applications of signal theory. Learning outcomes of the course On completion of the course, the student should be able to describe the characteristics of signals in a time and frequency plan, and explain the relationship between these descriptions, be able to apply knowledge about how the energy distribution of broadband signals is calculated and relate this to signal process characteristics of systems, be able to account for basics of digital signal processing, be able to describe the characteristics of linear and non-linear systems, relate these to hearing aids, and the sense of hearing as a signal processing system, and apply this knowledge in the analysis of the basic properties of pre-programmed hearing aids, by means of a sound processing program, be able to analyse recorded sound by means of the fundamental concepts of signal theory.

Content

The course is divided in two parts, see below. Part 1: Basic signal theory (Basic signal theory), 3 HE credits. The part gives basic knowledge of the representation of simple and complex signals in a time and frequency plan and about relations between the representations. The terminology from the basic physics tuition is extended. The concept of band is treated, including arithmetical rules for band level summation. The basic characteristics of digital signals are discussed. Part 2: Signals and systems (Signals and systems), 4.5 HE credits. This part deals with the affect of systems on signals. Simple ideal systems such as filter are treated as well as real systems, both acoustic and electric. The ear is also brought up as an example of a system. Focus is on linear systems. Undesired non-linearity is treated, such as various types of distortion. The hearing aid as a signal processing system is introduced and, in connection with that, undesired non-linearity is discussed. An orientation is given, how to investigate the characteristics of different systems.

Basic signal theory, 3.0 hp

Grading scale: GU

This part gives basic knowledge of the representation of simple and complex signals in the time and frequency domains and about relations between the representations. The terminology from the basic physics education is extended. The concept of band is treated, including arithmetical rules for band level summation. The basic characteristics of digital signals are discussed.

Signals and systems, 4.5 hp

Grading scale: GU

This part deals with the affect of systems on signals. Simple ideal systems such as filters are treated as well as real systems, both acoustic and electric. The ear is also brought up as an example of a system. Focus is on linear systems. Undesired non-linearity is treated, such as various types of distortion. The hearing aid as a signal processing system is introduced and, in connection with that, undesired non-linearity is discussed. An orientation is given, how to investigate the characteristics of different systems.

Teaching methods

Lectures, seminars and calculation exercises are interleaved with independent theoretical work and practically oriented laboratory sessions. Scheduled supervision is offered in connection with the laboratory sessions.

Examination

Examination takes place through Part 1: Basic signal theory, 3 HE credits Written assignments and laboratory reports, and an oral presentation of parts of the written examination Part 2: Signals and Systems, 4.5 HE credits Written assignments and laboratory reports, and an oral presentation of parts of the written examination For a Pass in the course, satisfactory attendance in compulsory parts (laboratory sessions) is also required. In case of absence from a compulsory part, the student gets an individual complementary assignment determined by the course coordinator. Students who have not passed the regular examination are offered two re-examinations in connection with the regular examination. After that, they may be examined before the start of semester 6. All in all, there is a possibility of six examinations, the last two in connection with the next regular course.

Transitional provisions

Examination may take place under the previous reading list during a period of one and a half years after the date of the renewal of the reading list. Examination will be provided during a period of three years after a close-down of the course.

Other directives

A study guide is distributed, comprising assessment criteria for examination, specific instructions for certain tasks, and a timetable specifying compulsory parts and a list of responsible teachers. Course evaluation will be carried out in accordance with the guidelines established by the Board of Education. Course evaluation is carried out both through a written evaluation at the end of the course, and through an oral forum at least once in connection with the course, where the students may express their opinions. The course replaces AUG006, Signal theory and sound perception 1.

Literature and other teaching aids