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
Revised by	Programnämnd 4 (Audionom- och Logopedprogrammen)
Last revision	2012-10-22
Course syllabus valid from	Spring 2013

Specific entry requirements

Specific eligibility according to The Programme syllabus of The Study Programme in Audiology 180 credits

Objectives

The general aim of the course is to give the student 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 signals' properties i time and frequency and explain the relationship between these descriptions
- be able to apply knowledge how the energy distribution for broadband signals is calculated, relate this to the signal process properties of systems
- be able to account for the bases in digital signal processing, and be able to describe the properties of

linear and non-linear systems, relate these to hearing aids, and the sense of hear as signal process system, apply this knowledge
- be able to analyse recorded healthy by means of the fundamental concepts of signal theory

Content

The following parts are included:

Basic signal theory, 3 hp 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 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 orientated laboratory sessions. Certain parts of the teaching are compulsory. Scheduled supervision is offered in connection to the laboratory sessions.

In case of absence from compulsory part, the student is responsible alone to contact course coordinator for complementary assignment.

The course director assesses if, and in that case how absence from compulsory education elements can be replaced. Before the student has participated in the compulsory parts or has replaced compulsory education, in accordance to the instructions of the course coordinator, the final study results cannot be reported.
Absence from a compulsory education element can imply that the student can not recover the occasion until next time the course be given.

Examination

Examination takes place through
Part 1: Basic signal theory, 3 HE credits
Written laboratory reports
Written written assignment

Part 2: Signals and Systems, 4.5 HE credits
Written written assignments
Oral presentation

For a Pass grade in the course is required also
satisfactory attendance at compulsory parts (laboratory sessions and seminars). For students who have not passed the regular examination, possibility for re-examination is offered at a total of six examinations, of which the three last in connection to the next occasion when the course is given. Supplementary qualification of written written assignments/laboratory report be counted as an examination.

Transitional provisions

Examination can take place according to an earlier literature list during a time of one year after the date

when a renewal of the literature list has been made. Examination will be provided during a time of two years after a possible close-down of the course.

Other directives

A study guide is distributed at the beginning of the course, comprising assessment criteria for examination, specific instructions for certain tasks, 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.

Literature and other teaching aids

Jerkert, J
Akustik från grunden.

Stockholm : Karolinska Institutet., 2006

Rosen, Stuart.; Howell, Peter
Signals and systems for speech and hearing

2. ed. : Bingley : Emerald, 2011 - xvii, 364 p.
ISBN:978-1-84855-226-5 (hbk.) LIBRIS-ID:12037068
Library search

Hörapparatutprovning

Borryd, Agneta; Smeds, Karolina; Leijon, Arne

1. uppl. : Bromma : CA Tegnér AB, cop. 2000 - 352 s.
ISBN:91-630-9498-3 (inb.) LIBRIS-ID:8364995
Library search

SAME
Handbok i hörselmätning

Almqvist, Bengt

[Ny utg.] : Bromma : SAME och C-A Tegner AB, 2004 - 242 s.
ISBN:91-631-4908-7 LIBRIS-ID:9481154
Library search

Speaks, Charles E
Introduction to sound : acoustics for the hearing and speech sciences

3. ed. : San Diego : Singular Pub. Group, c1999 - xiii, 316 p.
ISBN:1-56593-979-4 LIBRIS-ID:6364449
Library search