



**Karolinska  
Institutet**

Course syllabus for

## **Physics and acoustics, 7.5 credits**

Fysik och akustik, 7.5 hp

This course syllabus is valid from spring 2023.

Please note that the course syllabus is available in the following versions:

Spring2019 , Spring2020 , Spring2022 , Spring2023 , Spring2024

Course code	1AU066
Course name	Physics and acoustics
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	Utbildningsnämnden CLINTEC
Decision date	2018-10-16
Revised by	Education committee CLINTEC
Last revision	2022-10-10
Course syllabus valid from	Spring 2023

## **Specific entry requirements**

Mathematics 2a or 2b or 2c, Natural Sciences 2, Social Sciences 1b or 1a1+1a2.

## **Objectives**

The general aims of the course are that the student should acquire the basic knowledge in mathematics and physiology required for later technical courses and parts in the Study Programme in Audiology.

### **Learning outcomes of the course**

On completion of the course, the student should be able to

- explain basic concepts in mechanics and relate these to basic wave physics and acoustics
- account for basic properties of sound
- understand and explain relationships in simple circuits, and demonstrate knowledge of basic electricity safety
- understand the meaning of mathematical formulas and graphs used in mechanics, wave physics, acoustics and electricity and apply them to solve simple tasks
- understand, present, and carry out simple physical measurements.

- compose scientific reports in English.

## Content

The course consists of the following modules:

### Physics and acoustics, 6.0 hp

Grading scale: GU

The course's major part is an introductory course to the fields of scientific working methods in the subject areas of mechanics, wave physics, acoustics and electricity. Special emphasis is placed on the interpretation of various types of graphs. Mechanics focuses on concepts such as velocity, acceleration, force, pressure, and the transfer of energy and momentum. Basic wave physics includes amongst others knowledge of various types of waves, wave propagation, impedance and phenomena such as resonance and standing waves. Wave physics application in the acoustics is highlighted and concepts such as sound production, sound transmission and reflection are brought up in the acoustics part where the computation of sound level in the context of noise control are also included. Electromagnetism includes basic knowledge of electric circuits, measurement of electric quantities and electric safety.

### Physical measurements, 1.5 hp

Grading scale: GU

The part includes laboratories with physical measurements in the above areas. The laboratories must be documented and reported in table and graph form. In addition, the module includes calculation exercises in the form of written assignments.

## Teaching methods

Lectures, laboratory sessions, calculation exercises and demonstrations.

Laboratory sessions are compulsory.

## Examination

Physics and acoustics, 6 credits

- written examination
- attendance at mandatory educational elements

Physical measurements, 1.5 credits

- written laboratory reports
- attendance at mandatory educational elements

A student who is not approved after the regular examination session has the right to participate in five further examination sessions. At each round of the course, there is an ordinary examination opportunity and two re-examination opportunities. If the student has completed six failed exams/exams/assignments, no further examination opportunity is given. Completion of a written assignment is counted as an examination opportunity. Submission of blank writing counts as an examination opportunity. An examination session for which the student registered but did not participate is not counted as an examination session.

In the event of absence from a mandatory educational element, the student is responsible for contacting

the teacher in charge of the course for substitute assignment. The examiner assesses whether and how a student can make up for missed compulsory education elements. Absence from a compulsory educational element may mean that the student cannot complete other parts of the course, a final examination or make up for the educational element until the next time the course is given

If there are special reasons, or need for adaption for a student with a disability, the examiner may decide to depart from the syllabus regulations on examination form, number of examination opportunities, possibility of completion or exception from compulsory educational elements, etc. Content and learning objectives as well as the level of expected skills, knowledge and abilities must not be changed, removed or lowered.

## Transitional provisions

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

## Other directives

Assessment criteria for the examination, specific instructions for certain tasks and a schedule specifying mandatory elements and a list of responsible teachers can be found on the relevant learning platform at the start of the course.

The course evaluation will be carried out in accordance with the guidelines established by the Committee for Higher Education. The course evaluation will be carried out both through a written course evaluation, at the end of the course, and through an oral course forum at least once in connection with the course, where the students may express their opinions.

Teaching elements may be held in English

The course may not be credited in the degree at the same time as a completed and approved course, whose content of which fully or partially complies to the content of the course

## Literature and other teaching aids

### *Mandatory literature*

*Emanuel, Diana C.; Letowski, Tomasz*

#### **Hearing science**

Philadelphia : Wolters Kluwer Health/Lippincott Williams and Wilkins, c2009 - xv, 335 p.

ISBN:9780781780476 LIBRIS-ID:10724924

[Library search](#)

Scientific papers and other relevant materials may be added.

### *Recommended literature*

*Jerkert, Jesper*

#### **Akustik från grunden**

2. uppl. : Stockholm : Karolinska Institutet, 2008 - 224 s.

ISBN:978-91-631-8307-2 LIBRIS-ID:10708018

*This book is available as pdf file.*

[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](#)

***In-depth literature***

*Jönsson, A; Johansson, C*

**Tänkesätt inom fysiken**

Huddinge : Karolinska Institutet, - 35 s

*This booklet is available as pdf file.*

*Johansson, C.*

**Förberedande kurs i matematik för Audionomprogrammet**

Stockholm : Hälsohögskolan, 1996 - 72 s

*This booklet is available as pdf file.*