



**Karolinska  
Institutet**

Course syllabus for

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

Fysik och akustik, 7.5 hp

This course syllabus is valid from spring 2020.

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	2019-10-21
Course syllabus valid from	Spring 2020

## **Specific entry requirements**

Mathematics 2a / 2b / 2c, Natural Sciences 2, Social Sciences 1b / 1a1+1a2 (field specific entry requirements A14). Or: Mathematics B, Natural Sciences B, Social Sciences A (field specific entry requirements 16).

## **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 occurring 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 two 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

This part comprises laboratory sessions with physical measurements in the above areas. Results of the laboratory sessions should be documented and reported in tabular and graph form. Examination takes place through the submission of a written laboratory report. In addition, the part includes calculation exercises.

## Teaching methods

Lectures, laboratory sessions, calculation exercises and demonstrations.

Laboratory sessions are compulsory. In case of absence from a compulsory part, the student is responsible for contacting the course coordinator and ask for an complementary assignment determined by the examiner.

The examiner decides on how and whether a missed compulsory part can be compensated for through another assignment. No final results can be reported as long as the student has not fulfilled all compulsory parts or completed the respective compensatory assignments. Absence from a compulsory part may imply that the student is required to attend the respective part of the course on the next occasion the course is given..

## Examination

Physics and acoustics, 6 credits  
Written examination

Physical measurements, 1.5 credits  
Written laboratory reports

For a Pass grade in the course, attendance of all compulsory parts is also required. Students who have not passed the regular examination are offered five re-examinations in addition to the regular opportunity. Each time the course is held, one regular and two re-examination opportunities are provided. Further examination opportunities are provided in connection with the next time the course is

given. Every time that the student takes part in a particular examination is counted as one 'used' examination opportunity. Submitting a completion of a written assignment is counted as examination opportunity.

If there are special reasons, or need for adaptation 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

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.

The course is held in English.

## 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](#)

*Johansson, C.*

#### **Förberedande kurs i matematik för Audionomprogrammet**

Stockholm : Hälsohögskolan, 1996 - 72 s

*This booklet was distributed during the introduction course.*

*Jönsson, A; Johansson, C*

#### **Tänkesätt inom fysiken**

Huddinge : Karolinska Institutet, - 35 s

*This booklet was distributed during the introduction course.*

*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

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