



**Blekinge Institute of Technology**  
Department of Mathematics and Natural Science

## COURSE SYLLABUS

### Ljud- och vibrationsanalys

### Sound and Vibration Analysis

7,5 ECTS credit points (7,5 högskolepoäng)

**Course code:** ET2545

**Educational level:** Second cycle

**Course level:** A1N

**Field of education:** Technology

**Subject group:** Electrical Engineering

**Subject area:** Electrical Engineering

**Version:** 8

**Applies from:** 2014-01-01

**Approved:** 2013-12-18

**Replaces course syllabus approved:** 2012-02-14

#### 1 Course title and credit points

The course is titled Sound and Vibration Analysis/Ljud- och vibrationsanalys and awards 7,5 ECTS credits. One credit point (högskolepoäng) corresponds to one credit point in the European Credit Transfer System (ECTS).

#### 2 Decision and approval

This course is established by Department for Electrical Engineering 2013-12-18. The course syllabus was revised by School of Engineering and applies from 2014-01-01. The course is replaced with ET2529, Ljud- och vibrationsanalys. Reg.no: BTH 4.1.1-0963-2013. Replaces ET2529.

#### 3 Objectives

The course aims at giving the students basic knowledge of sound- and vibration measurements. The course also reflects how modern signal analysis is applied for the measuring of sound and vibrations. The student will be well prepared for sound- and vibration measuring within the industry as well as for continued studies in the subject.

#### 4 Content

- Mechanical systems
- Transducers for noise and vibration analysis
- Frequency analysis
- Experimental frequency analysis
- Spectrum estimation using the FFT
- The FFT-analyzer
- Frequency response measurements
- Rotating machinery analysis

#### 5 Aims and learning outcomes

On completion of the course the student will:

- be able to understand and use the basic theory for dynamic systems in mechanics.
- have acquired a basic understanding of modal analysis.

- be able to understand and analyze measurement-technical problems in sound- and vibration measuring.
- have knowledge of different measuring methods and sensors that are used for the measuring of sound and vibrations.
- be able to measure and interpret sound- and vibration spectra.
- be able to measure frequency responses and coherence functions.
- be able to use a frequency analyzer.
- have acquired a basic understanding of revolution-per-minute (RPM) analysis in order to understand and solve vibration- and noise problems in relation to rotating machines

#### 6 Generic skills

#### 7 Learning and teaching

The teaching comprises lectures and project work. During the lectures the teacher introduces the theoretical foundations and connects the theory to practical applications in the industry. In the project work the student is able to practise the theoretically acquired knowledge and learn how to handle data acquisition systems and advanced measuring instruments for sound- and vibration measurements. The project work is compulsory and will be carried out individually or in a group. The project work includes the presentation of the work in the form of a report. In order for the student to practise theory, theoretical assignments are handed in. The assignments that are handed in are compulsory and must be done individually. English

#### 8 Assessment and grading

##### Examination of the course

Code	Module	Credit	Grade
1405	Written exam[1]	3.5 ECTS	A-F
1415	Project	3 ECTS	G-U

1425 Assignment

1 ECTS

G-U

<sup>1</sup> Determines the final grade for the course, which will only be issued when all components have been approved.

The course will be graded A Excellent, B Very good, C Good, D Satisfactory, E Sufficient, FX Fail, supplementation required, F Fail.1 Determines the final grade for the course which will not be issued until all items have been passed.

The examination will take place through a written examination and of the handing in of the compulsory assignments and of the project work assignments. Grading of the project work assignments will be done through the grades Godkänd [Passed] or Underkänd [Failed]. For a final grade of the course the grade Godkänd [Passed] is required for the project work part and also for the assignments that are to be handed in.

Upon request grades may also be given in accordance with the ECTS.

### 9 Course evaluation

The course coordinator is responsible for systematically gathering feedback from the students in course evaluations and making sure that the results of these feed back into the development of the course.

### 10 Prerequisites

For admission to the course the following course is required:

- Signal Processing I, ET1203, 7,5 credit points or the equivalent.

### 11 Field of education and subject area

The course is part of the field of education and is included in the subject area Electrical Engineering.

### 12 Restrictions regarding degree

The course cannot form part of a degree with another course, the content of which completely or partly corresponds with the contents of this course.

### 13 Additional information

The course can also be linked to Mechanical Engineering.

### 14 Course literature and other teaching material

Brandt, A. (2011). *Noise and Vibration Analysis*. Wiley. ISBN 978-0-470-74644-8.

