Course guides
220223 - 220223 - Acoustics

Last modified: 15/06/2020

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 712 - EM - Department of Mechanical Engineering.

Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Optional subject).
MASTER'S DEGREE IN AERONAUTICAL ENGINEERING (Syllabus 2014). (Optional subject).
MASTER'S DEGREE IN SPACE AND AERONAUTICAL ENGINEERING (Syllabus 2016). (Optional subject).

Academic year: 2020 **ECTS Credits:** 3.0 **Languages:** English

LECTURER

Coordinating lecturer: Andreu Balastegui

Others: Teresa Pàmies, Arnau Clot

TEACHING METHODOLOGY

The course is divided into parts:
Theory classes.
Lab sessions.
Self-study for doing exercises and activities.
In the theory classes, teachers introduce the theoretical basics, concepts, methods and results and illustrate them with examples appropriate to facilitate their understanding. Teachers guide students in applying theoretical concepts to solve problems, always using critical reasoning. We propose that students solve exercises in and outside the classroom, to promote contact and use the basic tools needed to solve problems.
In the lab sessions, the teachers introduce the basic concepts of acoustic measurement and numerical simulations and assist the students.
Students, independently, need to work on the materials provided by teachers and the outcomes of the sessions of exercises, in order to assimilate the concepts.
The teachers provide the syllabus and monitoring of activities (by ATENEA).

LEARNING OBJECTIVES OF THE SUBJECT

Basic concepts of acoustics across the whole knowledge chain of theory, simulation and measurements.

STUDY LOAD

Type	Hours	Percentage
Hours large group	27,0	36.00
Self study	48,0	64.00

Total learning time: 75 h

CONTENTS

Module 1: Fundamentals of Acoustics

Description:
An introduction to the basic concepts of acoustics from the fundamental definitions and parameters to the outdoor propagation of sound.

Related activities:
Class exercises.

Full-or-part-time: 12h
Theory classes: 6h
Self study : 6h

Module 2: Room Acoustics

Description:
An introduction to the basic concepts of the modal behaviour of sound in enclosures and noise insulation.

Related activities:
Class exercises.

Full-or-part-time: 14h
Theory classes: 8h
Self study : 6h

Module 3: Computational Acoustics

Description:
SimCenter is a Finite Element software used to study noise and vibration for small and medium scale mechanical systems.
A brief introduction to SimCenter will precede a series of practical sessions designed to acquire the basic knowledge needed to solve a proposed problem.

Related activities:
Lab session report.

Full-or-part-time: 25h
Theory classes: 7h
Self study : 18h

Module 4: Measurement Techniques

Description:
An introduction to measurement instruments and international norms for noise assessment.

Related activities:
Lab session report.

Full-or-part-time: 10h
Theory classes: 2h
Self study : 8h

Module 5: Project

Description:
The students will have to perform a simulation of a proposed acoustical problem. The project will conclude with a written report.

Related activities:
Project report.

Full-or-part-time: 14h
Theory classes: 4h
Self study : 10h

GRADING SYSTEM

Class exercises: 30%
Lab session reports: 30%
Project report: 40%

BIBLIOGRAPHY

Basic:
- Leo Beranek. Acoustics. American Institute of Physics, 1993.
- Lawrence Kinsler. Fundamentals of Acoustics. John Wiley & Sons, 1982.
- Cyril M. Harris. Handbook of acoustical measurements and noise control. McGraw-Hill, 1995.

Complementary:
- D. A. Bies, C. H. Hansen. Engineering Noise Control. Spon Press, 2009.