



Course syllabus

Faculty of Technology

Department of Mechanical Engineering

4MT325 Avancerad strukturdynamik - modellering, testning och validering, 5 högskolepoäng

Advanced Structural Dynamics - modelling, testing and validation, 5 credits

Main field of study

Mechanical Engineering

Subject Group

Mechanical Engineering

Level of classification

Second Level

Progression

A1N

Date of Ratification

Approved by Faculty of Technology 2019-12-16

The course syllabus is valid from autumn semester 2020

Prerequisites

Bachelor of Science in Engineering (180 credits) in which Algebra and analysis corresponding to 22.5 credits and Solid Mechanics or Structural Mechanics, 7.5 credits are included.

Objectives

After the course the student shall:

- be able to plan a vibrational test which data will be used for model calibration
- know how to choose model parameters to be used for calibration
- be able to reduce/expand modes from analyses/tests
- be able to define correlation, validation and calibration
- know how models can be optimized to better represent test data
- be able to implement tools for correlation, validation and calibration in Matlab

Content

The course contains:

- Pre-test planning, observability and controlability, distribution functions, identifiability, Fisher's information matrix, experimental modal analysis, expansion/reduction of modes, correlation measures, optimization methods
- Implementation of methods in Matlab
- Performance of the complete calibration process applied on an industrial component

Type of Instruction

The instructions consist of lectures, exercises and a project work.

Examination

The course is assessed with the grades A, B, C, D, E, Fx or F.

The grade A constitutes the highest grade on the scale and the remaining grades follow in descending order where the grade E is the lowest grade on the scale that will result in a pass. The grade F means that the student's performance is assessed as fail (i.e. received the grade F).

The examination is based on a written project report (1.5 credits pass/fail) together with a written final exam (3.5 credits, A-F). An approved report and a minimum grade E on the exam are required to obtain a final grade for the course. The final grade is based on the grade from the exam.

Repeat examination is offered in accordance with Local regulations for courses and examination at the first and second-cycle level at Linnaeus University.

If the university has decided that a student is entitled to special pedagogical support due to a disability, the examiner has the right to give a customised exam or to have the student conduct the exam in an alternative way.

Course Evaluation

During the implementation of the course or in close conjunction with the course, a course evaluation is to be carried out. Results and analysis of the course evaluation are to be promptly presented as feedback to the students who have completed the course. Students who participate during the next course instance receive feedback at the start of the course. The course evaluation is to be carried out anonymously.

Other

Grade criteria for the A–F scale are communicated to the student through a special document. The student is to be informed about the grade criteria for the course by the start of the course at the latest.

Required Reading and Additional Study Material

Required reading

Structural Dynamics and Linear Systems – Compute, Test, Calibrate and Validate. Thomas Abrahamsson, Chalmers, 350 pages.