Linnæus University

Jnr: 2021/2563-3.1.2.2

Course syllabus

Faculty of Technology
Department of Mechanical Engineering

4MT315 Strukturdynamik, 7,5 högskolepoäng
Structural dynamics, 7.5 credits

Main field of study
Mechanical Engineering

Subject Group
Mechanical Engineering

Level of classification
Second Level

Progression
A1F

Date of Ratification
Approved 2015-05-13
Revised 2021-06-15 by Faculty of Technology. Prerequisites and content is revised. Objectives are adjusted.
The course syllabus is valid from autumn semester 2022

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. In addition, the following course are also required Finite Element Method, 7.5 credits, or equivalent.

Objectives

After the course the students shall:

- be familiar with the basic principles of structural dynamics
- be able to derive the equations of motions for multiple degree of freedom systems
- be able to solve eigenvalue problems
- understand and be able to apply methods for frequency and time domain solutions
- understand and be able to apply reduction techniques
- have insight into experimental dynamics
- have insight into pretest planning together with correlation between test data and data from calculation models

Content

The course contains:
Fundamental theory and definitions within Structural dynamics
Single degree of freedom systems

- free vibration
- forced vibration
- time fomain
- frequency domain

Multiple degree of freedom systems

- free vibration
- forced vibration
- time domain
- frequency domain

Methods for solving eigenvalue problems
Modal orthogonality and superposition
Time-step methods for transient response analyses
Reduction of calculation models
State space models

Experimental dynamics

- correlation between test and analysis results

Type of Instruction

Theories and examples are presented at lectures. Further, projects in which the computer code MATLAB will be used, assist in the learning process.

Examination

The course is assessed with the grades A, B, C, D, E, Fx or F.
The examination is based on projects together with a written final exam.

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).

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.

Credit Overlap

The course cannot be included in a degree along with the following courses of which the content fully, or partly, corresponds to the content of this course: 4MT015, 7.5 credits

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

R. Craig and A. Kurdila: Fundamentals of Structural Dynamics, 2nd ed., Wiley 2006

Additional literature may be used.