



Course syllabus

Faculty of Technology

Department of Mechanical Engineering

4MT015 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 2010-06-23

Revised 2015-01-27 by Faculty of Technology. Review of prerequisites.

The course syllabus is valid from spring semester 2016

Prerequisites

Bachelor of Science in Engineering (180 credits) where Algebra and analysis corresponding to 22.5 credits and Solid Mechanics or Structural Mechanics, 7.5 credits are included. In addition, following courses are also required, Analysis of Structures, 7.5 credits and 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 domain
- 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

- data acquisition
- experimental modal analysis
- correlation between test and analysis results
- pretest planning

Type of Instruction

Theories and examples are presented at lectures. Further, a project in which the computer codes MATLAB and CALFEM will be used, assists in the learning process.

Examination

The course is assessed with the grades U,3,4 or 5.

If requested the grade can be transformed according to ECTS. Such a request shall be made before the end of the course. After the course, a written evaluation according to the roles of the university will be made.

The examination is based on a project together with a written final exam.

Course Evaluation

When the course has finished, an evaluation is compiled. The results are reported to the students and then archived according to the rules of the school.

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.