



COURSE SYLLABUS

Experimentell och numerisk modalanalys

Experimental and numerical modal analysis

7.5 credits (7,5 högskolepoäng)

Course code: MT2566

Main field of study: Mechanical Engineering

Disciplinary domain: Technology

Education level: Second cycle

Specialization: AIF - Second cycle, has second cycle course/s as entry requirements

Subject area: Mechanical Engineering

Language of instruction: English

Applies from: 2019-09-02

Approved: 2020-03-01

1. Decision

This course is established by Dean 2019-02-19. The course syllabus is approved by Head of Department of Mechanical Engineering 2020-03-01 and applies from 2019-09-02.

2. Entry requirements

Admission to the course requires attended course Sound and Vibration Analysis, 7.5 credits.

3. Objective and content

3.1 Objective

The student acquires knowledge and skills in methods and tools for multidimensional vibration analysis of mechanical structures, including experimental modal analysis in conjunction with numerical modeling and simulation.

3.2 Content

- Single and multiple degree of freedom systems
- Modal concepts in analytical and matrix formulations
- Damping models
- Modal parameters and frequency responses
- Practical aspects on measurements and frequency response functions
- Estimation of modal parameters
- Multiple references
- Structural modifications, sub-structure synthesis
- Correlation with finite element analysis

4. Learning outcomes

The following learning outcomes are examined in the course:

4.1 Knowledge and understanding

On completion of the course, the student will be able to:

- show understanding in methods suitable for vibration analysis of linear systems
- understand the basics of modal analysis

4.2 Competence and skills

On completion of the course, the student will be able to:

- specify and set-up an experimental modal analysis suitable for a mechanical system.
- Perform experimental modal analysis on mechanical systems, including selection and attachment of transducers, selection and attachment of equipment for external loading, data collection and parameter extraction.
- perform simulations of mechanical systems based on parameters from numerical models and/or experimental tests, i.e. predict structural responses caused by external loading and/or minor structural modifications.
- Extract modal parameters, correlate with and update numerical models.

4.3 Judgement and approach

On completion of the course, the student will be able to:

- verify the characteristics of a studied system and its components.
- validate system models and experimental measurements

5. Learning activities

The teaching consists of lectures, assignments and laboratory group work. Additionally, a project work will be carried out, individually.

6. Assessment and grading

Modes of examinations of the course

Code	Module	Credits	Grade
2010	Project assignment	3.5 credits	AF
2020	Written Assignment	4 credits	GU

The course will be graded A Excellent, B Very good, C Good, D Satisfactory, E Sufficient, FX Fail, supplementation required, F Fail.

Determines the final grade for the course, which will only be issued when all components have been approved.

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For a final grade in the course, all modes must be completed. The final grade of the course will be the same as the grade in the project work. If grade FX are given, the student may after consultation with the course coordinator / examiner get an opportunity to within 6 weeks complement to grade E or G for the specific course element.

Limitations concerning time for completion:

- The project work is expected to be completed and presented within the give time frame for the course.
- If a student fails in the course, the student can re-register on the course at a later course moment and, if there is room, perform a new task.

The course-PM for each course revision should include the assessment criteria and make explicit in which modes of examination that the learning outcomes are assessed.

An examiner can, after consulting the Disability Advisor at BTH, decide on a customized examination form for a student with a long-term disability to be provided with an examination equivalent to one given to a student who is not disabled.

7. Course evaluation

The course evaluation should be carried out in line with BTH:s course evaluation template and process.

8. Restrictions regarding degree

The course can form part of a degree but not together with another course the content of which completely or partly corresponds with the contents of this course.

9. Course literature and other materials of instruction

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

Additional material provided by the department

10. Additional information

This course replaces the course ET2544