COURSE SYLLABUS

Strukturanalys

Structural Analysis

7.5 credits (7,5 högskolepoäng)

Course code: MT2562
Main field of study: Mechanical Engineering
Disciplinary domain: Technology
Education level: Second cycle
Specialization: A1N - Second cycle, has only first cycle course/s as entry requirements

Subject area: Mechanical Engineering
Language of instruction: English
Applies from: 2019-01-21
Approved: 2018-10-01

1. Decision

This course is established by Dean 2018-01-24. The course syllabus is approved by Head of Department of Mechanical Engineering 2018-10-01 and applies from 2019-01-21.

2. Entry requirements

Admission to the course 150 passed credits is required from an engineering program in mechanical engineering.

3. Objective and content

3.1 Objective

The aim of the course is to provide the student with knowledge and skills in basic methods and tools for calculation-based and experimental structural analysis for decision support in product development.

3.2 Content

The course shall provide knowledge and proficiency of fundamental methods and tools for computational and experimental structural analysis to support design decisions in product development.
Topics covered are:
• The product development process,
• Prototyping,
• Virtual and physical modeling,
• Simulation and experimentation,
• Approximate methods in engineering,
• Algorithms and programming,
• Software for technical calculations,
• Introduction to MATLAB,
• Physical phenomena treated as signals,
• Mathematical methods, Fourier and Laplace transforms.

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:
• be able to show knowledge and understanding of how coordinated experimental, analytical, and numerical methods for engineering analysis can be used for decision support in product development,
• be able to show knowledge and understanding for how mechanical structures may be modelled as continuous systems, and be solved both analytically and numerically,
• be able to show knowledge and understanding for how signals from measurements can be harvested and processed with special focus on vibrations.

Skills and abilities
• be able to combine experimental measurements, analytical models, and numerical methods for analysis of a simpler mechanical structure system,
• be able to solve simpler models of mechanical structures analytically and numerically by own software implementations,

• be able to carry out simpler measurements on mechanical structures, and process and present the harvested data,

Values and attitudes
• be able to interpret, validate and communicate analysis results.

5. Learning activities

The teaching comprises lectures, laboratory work, seminars and exercises. Theories and methods are presented and discussed in the form of lectures / seminars. A number of exercise problems and an assignment supporting the learning and understanding of the theory. Students develop their own computer programs for solution of the given problems. Advantages and disadvantages of the methods are discussed based on this experience.
Applications are related to industry relevant problems.

6. Assessment and grading

Modes of examinations of the course

Code	Module	Credits	Grade
1905	Written assignment	4 credits	GU
1915	Written examination	3.5 credits	AF

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

At grade FX on a module, the student will be given an opportunity to complement the work within 6 weeks for a grade E. The final grade is a weighted sum of all modules. Each module consists of several smaller oral and written tasks according to information given at the course start. All tasks of a module need to be approved to get approved on a module.

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

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

Broman G.: Computational Engineering, Department of Mechanical Engineering, Blekinge Institute of Technology, 2003.
Lindfield G. and Penny J.: Numerical Methods Using Matlab, Ellis Horwood, 2000.
Brandt A.: Introductory Noise & Vibration Analysis, Saven EduTech AB and Department of Telecommunications and Signal Processing, Blekinge Institute of Technology, 2001.

10. Additional information

This course replaces the course MT2529