MF2010 Component Design 6.0 credits

Komponentkonstruktion

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for MF2010 valid from Autumn 2007

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Specific prerequisites

The course is at an advanced level, and prerequisites are the basic courses Design and Product Realization (DoP) B, Product Realization for M, or Product Realization for T, and one of the Project Courses in Machine Design, Integrated Product Development, or Industrial Design..

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The main goal is to give the students a deeper insight about the ways of thinking that form the basis of components design. Furthermore the course aims at improving the students' ability to use existing, but also to create new, models that can be used to describe the performance of a component.

A student that has completed the course shall:

- have an improved ability to use knowledge from basic subjects, such as mathematics, mechanics and solid mechanics, in the design of machine components;
- be able to describe common failure mechanisms which are limiting the performance of a product;
- be able to calculate the degree of efficiency of a product;
- be able to use Monte Carlo simulation to analyze how the uncertainties in a models input variables affects the results from the model;
- be trained in using international standards when designing standard components;
- be able to use and evaluate analytical and numerical methods from solid mechanics when designing components and also be able to judge the validity of the methods;
- be able to create own models that describes the function of non-standard components and use the models to optimize the performance of the component;
- be able to apply knowledge about bearing design on components with similar contact conditions as in a bearing.

Course contents

The course is based on problem solving. An existing product is used as example throughout the course and all assignments concernes analyses and redesign of this product.

Topics treated are:

- Failure mechanisms in mechanical components;
- Analyses of the forces in a mechanical product;
- Estimation of the degree of efficiency in a product;
- Probabilistic design and Monte Carlo simulation
- Standard design methods for bevel gears
- Advanced analysis of a components strength and optimization of its weight;
- Modeling of non-standard components
- The use of bearing theories applied in similar components.

One laboratory work

Five assignments

One optional oral examination

Course literature

Advanced engineering design, Anton van Beek

Maskinelement, Karl-Olof Olsson

Examination

- INL1 - Assignment, 3.0 credits, grading scale: P, F
- TEN1 - Written examination, 3.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

Final grading requires passed laboratory work and project assignments (IN1; 6hp).

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.