ME-403

Applied mechanical design

Schiffmann Jürg Alexander

Cursus	Sem.	Type
Mechanical engineering minor	H	Opt.
Mechanical engineering	MA1, MA3	Opt.

Language of teaching	English
Credits	5
Withdrawal	Unauthorized
Session	Winter
Semester	Fall
Exam	During the semester
Workload	150h
Weeks	14
Hours	**5 weekly**
Lecture	1 weekly
Project	4 weekly
Number of positions	**40**

It is not allowed to withdraw from this subject after the registration deadline.

Remark

réservé au étudiants GM

Summary

Students will be exposed to hands-on design problems throughout the term. They will acquire methodologies to (1) address open ended engineering problems, (2) cultivate creativity, (3) support decision making and (4) develop problem solving abilities.

Content

This project based course addresses students interested in mechanical design. Students will work in groups on a particular design problem throughout the course. Starting from customer specifications the groups will have to understand the problem at hand, perform functional decomposition, generate solutions, select basic concepts while justifying their decision, mathematically model, pre-design and then design the concept to fulfill the customer specifications. At the end of the term the students will present their concept to the class and to potential customers. The practical work of this course will be continuously accompanied by theoretical aspects and by insights into the design process. Appropriate methodologies and tools will be presented as a function of the project progress and requirements.

Keywords

- Mechanical design
- Design methodology
- Design process
- Creativity

Learning Prerequisites

Required courses

Completed Bachelor in Mechanical Engineering

Learning Outcomes

By the end of the course, the student must be able to:

- Analyze design requirements to define and quantify the engineering specifications, CP3
- List , define, and quantify the functions of an existing or new design based on the engineering specifications, CP4
- Select appropriately the main design solution based on the required functional components and other quantifiable design parameters (i.e. mechanical performance, manufacturing costs, development time, available technology), CP5
- Design a system based on engineering specifications utilizing suitable numerical and analytical tools for optimizing the design parameters, CP10
- Identify the main- and sub-functions of a mechanical system and corresponding main- and sub-systems in a complete mechanical system / machine to classify the required constitutive elements, CP11

Transversal skills

- Write a scientific or technical report.
- Plan and carry out activities in a way which makes optimal use of available time and other resources.
- Identify the different roles that are involved in well-functioning teams and assume different roles, including leadership roles.

Teaching methods

- Ex-cathedra
- Projet

Assessment methods

- Intermediate and final reports
- Presentations