

ME-403

Applied mechanical design

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Cursus	Sem.	Type
Mechanical engineering	MA1, MA3	Opt.

Language of teaching	English
Credits	4
Withdrawal	Unauthorized
Session	Winter
Semester	Fall
Exam	During the semester
Workload	120h
Weeks	14
Hours	4 weekly
Courses	1 weekly
Project	3 weekly
Number of positions	32

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/listen to the customer requests and define the specifications, CP3
- List the functions of an existing or new product based on the specifications, CP4
- Choose the main solutions and identify the respective components to fulfill one function, taking into account the performance, technology and price constraints, CP5
- Evaluate the methodological choices for the building of a model and validate the results with respect to the analysis and modeling objectives, CP9
- Choose material and the relative treatments based on its use, performance and compatibility with the manufacturing process of the final product, CP13
- Design a system based on the specifications utilizing suitable tools, CP14
- Identify the class, the constitutive elements and the performances of a machine or a mechanical system, CP15

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