MSE-440

Composites technology

Bourban Pierre-Etienne, Michaud Véronique, Wakeman Martyn

Cursus	Sem.	Type
Materials Science and Engineering	MA1, MA3	Opt.
Mechanical engineering	MA1, MA3	Opt.

Language of teaching	English
Credits	3
Session	Winter
Semester	Fall
Exam	During the semester
Workload	90h
Weeks	14
Hours	**3 weekly**
Courses	2 weekly
Exercises	1 weekly
Number of positions	

Summary

The latest developments in processing and the novel generations of organic composites are discussed. Nanocomposites, adaptive composites and biocomposites are presented. Product development, cost analysis and study of new markets are practiced in team work.

Content

Basics of composite materials

- Constituents
- Processing of composites
- Design of composite structures

Current development

- Nanocomposites
- Textile composites
- Biocomposites
- Adaptive composites
- Sustainable composites

Applications

- Driving forces and markets
- Cost analysis
- Aerospace
- Automotive
- Sport
- Biomed

Keywords

Composites - Applications - Nanocomposites - Biocomposites - Adaptive composites - Design - Cost

Learning Prerequisites

Required courses

Notion of polymers

Recommended courses

Polymer composites

Learning Outcomes

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

- Propose suitable design, production and performance criteria for the production of a composite part
- Apply the basic equations for process and mechanical properties modelling for composite materials
- Discuss the main types of composite applications

Transversal skills

- Use both general and domain specific IT resources and tools
- Use a work methodology appropriate to the task.
- Communicate effectively with professionals from other disciplines.
- Evaluate one's own performance in the team, receive and respond appropriately to feedback.

Teaching methods

Ex cathedra and invited speakers
Group sessions with exercises and team work on the project

Expected student activities

Attendance at lectures
Design of a composite part, bibliography search

Assessment methods

Written exam + report and oral presentation in class

Supervision

Office hours	Yes

Resources

Moodle Link

- https://go.epfl.ch/MSE-440