

ME-516

Lifecycle performance of product systems

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Cursus	Sem.	Type
Energy Science and Technology	MA2, MA4	Opt.
Mechanical engineering minor	E	Opt.
Mechanical engineering	MA2, MA4	Opt.
Minor in Engineering for sustainability	E	Opt.
Robotics, Control and Intelligent Systems		Opt.
Robotics	MA2, MA4	Opt.
Systems Engineering minor	E	Opt.

Language of teaching	English
Credits	3
Withdrawal	Unauthorized
Session	Summer
Semester	Spring
Exam	During the semester
Workload	90h
Weeks	14
Hours	3 weekly
Courses	2 weekly
Exercises	1 weekly
Number of positions	
It is not allowed to withdraw from this subject after the registration deadline.	

Summary

Provide the conceptual, scientific, technical and methodological understanding of measuring and evaluating the impact of engineering decisions on economic and environmental performance in the lifecycle of a product-system.

Content

- Overview of lifecycle performance challenges of product systems today
- Lifecycle characteristics of products in Beginning of Life (BOL), Middle of Life (MOL) and End of Life (EOL) phases
- Key Performance Indicators (KPI) of product systems in BOL, MOL and EOL
- Methodologies for Lifecycle Economic & Environmental Performance Evaluation of product systems
- Overview of lifecycle design & assessment tools including LCA/LCC
- Case Studies of Lifecycle Economic & Environmental Performance Evaluation of alternative lifecycle product system configurations

Keywords

Product Lifecycle, LCA, LCC

Learning Prerequisites**Important concepts to start the course**

- Principles of mechanical design
- Principles of materials

Learning Outcomes

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

- Choose suitable methods and tools for (a) the development of, (b) the modelling and simulation of, (c) the analysis of and (d) the choice of solution for an engineering problem in the mechanical engineering domain (product design, manufacturing process and system production), CP1

- Choose production tools and methods based on performance and cost requirements and needs, taking into consideration applicability limits and associated hypotheses, CP8
- Carry out a multi - criterion (technological, economic and environmental) analysis of the solutions.

Transversal skills

- Communicate effectively, being understood, including across different languages and cultures.
- Make an oral presentation.
- Evaluate one's own performance in the team, receive and respond appropriately to feedback.
- Write a scientific or technical report.

Teaching methods

The course is organised in theoretical sessions, presentations of selected topics by the students and a project on the LCA (Life Cycle Assessment) to be realised by the students in groups using appropriate software.

Expected student activities

Participation in the course.
Study documents and do presentations.
Prepare and ask questions.
Do a project using a software tool.
Write a project report

Assessment methods

The students are graded by their report on the project (80% of the grade) and presentations in the class (20% of the grade).

Resources

Bibliography

Course material documentation is distributed in the moodle platform during the semester.