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 60% by their presentations and reports on the project and 40% by an oral exam at the end of the semester. The oral exam will concern the presentation of the project report and question on the theoretical content of the course.

Resources
Bibliography
Course documentation is distributed during the semester.