

Systems Engineering (7.5 ECTS)

Objectives

Systems Engineering is an area which has at its core the combination of knowledge and competences from engineering, management and human behavior. The students will develop understanding on the principles, methods, tools and techniques nowadays in use to address such complex development projects in multifunctional teams. The course teaches methods and processes for design, development, implementation and management of complex systems. Case studies will be presented and development challenges will be practiced by the students during the course.

Course duration

2 months, each year, April-May

Project results

- Analyze a subsystem of an existing product (Stakeholder analysis, House of quality, Functional Analysis and Decomposition)
- Propose a new design idea for the subsystem (Functional analysis, HoQ, and stakeholders impact)
- Define the requirements of the new concept (functional requirements + performance requirements + design constraints, including a FMEA analysis)
- Provide a preliminary risk assessment and analysis of investment

Project examples

Improvement of fuel cooling system for a road construction machine

The teams work on analyzing the current solution for fuel cooling and developed a concept for an improved cooling systems analyzing it in relation with the integration in the overall machine.

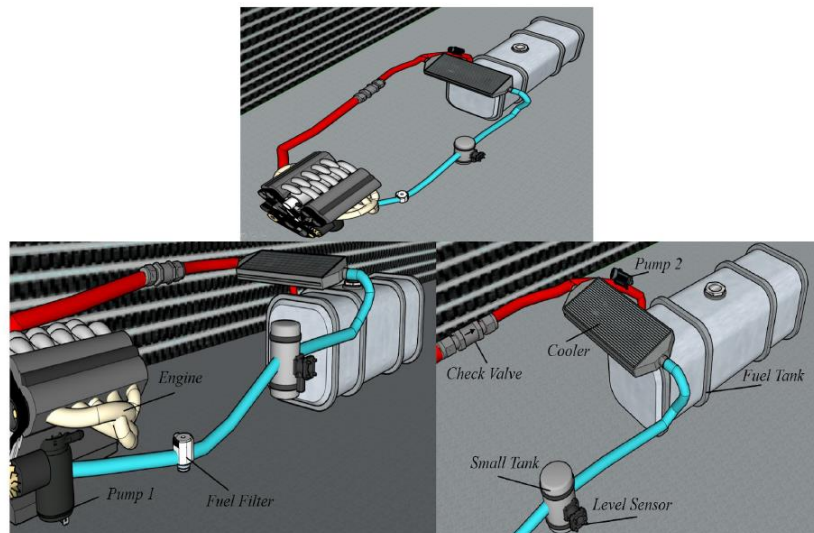


Figure 1. One of the proposed solution for cooling system

Improve the mechanism that controls the driver seat position for a road construction machine.

The teams work on analyzing the current solution for seat rotation and developed a number concept for an improved system in relation with the integration in the overall machine.



Figure 2. Detail of one of the proposed solutions.

[Systems Engineering students innovating with Dynapac – Product Development Research Lab](#)

Project course for exchange students (7.5 ECTS)

Objectives

The project course gives the opportunity to the students to put into practice the knowledge acquired during previous university studies abroad in a problem or challenge that:

- is in line with the student's background
- Is either relevant for research, society or industries.

The subject of the project is customized based on the background of the students which commonly encompasses:

- Mechanical Engineering students with skills on numerical analysis
- Mechanical Engineering students with skills on CAD modelling
- Mechatronics students (more rarely)
- Management Engineering students

Course duration

2 months, each year, November-December

Project results

Depends from the expectation and type of project defined initially

Project examples

Dimensioning of batteries for electric road rollers

The project encompasses the dynamic analysis of a road roller in operation, the application of the laws of motions, the balancing of powers and the definition of mathematical models in MATLAB to define the best dimension and type of battery for a specific product model.

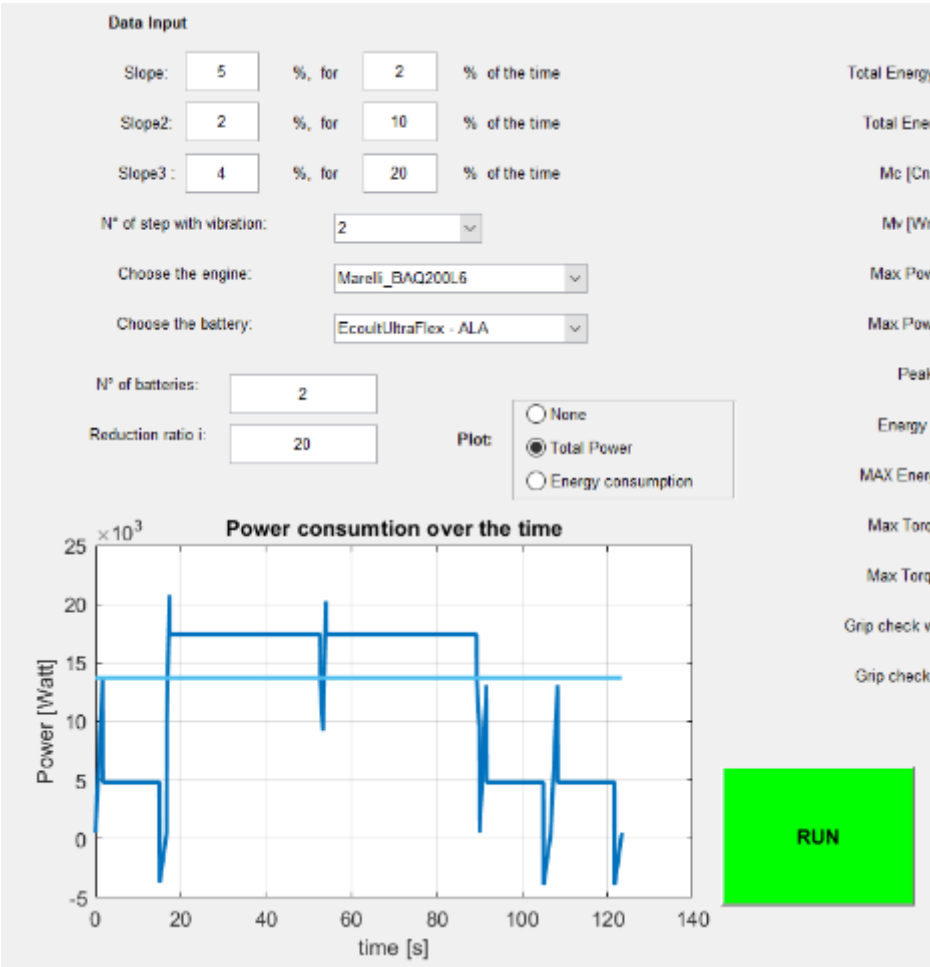


Figure 3. GUI developed for battery dimensioning

[More descriptions available here:](#)
[Industry 4.0, Nakajima Test, Elderly healthcare: Cross-disciplinary projects in the yearly Project Course for Exchange Students. – Product Development Research Lab](#)