



Faculty of Health, Science and Technology  
Mechanical Engineering

# Syllabus

## Sustainable Product Development

<b>Course Code:</b>	MSAD19
<b>Course Title:</b>	Sustainable Product Development <i>Hållbar produktutveckling</i>
<b>Credits:</b>	15
<b>Degree Level:</b>	Master's level
<b>Progressive Specialisation:</b>	Second cycle, has only first-cycle course/s as entry requirements (A1N)

**Major Field of Study:**  
MTA (Mechanical Engineering)

### Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2024-02-05, and is valid from the Autumn semester 2024 at Karlstad University.

### Prerequisites

Registered for Materials Engineering, 7.5 ECTS credits, Manufacturing Technology, 7.5 ECTS credits, and Machine Design, 7.5 ECTS credits, plus 90 ECTS credits completed in a Bachelor programme in Engineering, or 135 ECTS credits completed in a Master programme in Engineering, plus upper secondary level Swedish 3 or Swedish as a second language 3, and English 6, or equivalent

### Learning Outcomes

The aim of the course is for students to acquire knowledge of and the ability to reflect upon industrial product development, including a holistic approach to the product development process. There is a special focus on the concept of sustainable development.

Upon completion of the course, students should be able to:

The project development process and the project team (2 ECTS cr)

- give an account of the product development process from need to abolition,
- give an account of and reflect upon the different roles in a project team and how they cooperate,
- give an account of the concepts gender, ethics, and code of conduct in the context of a project team, and
- give an account of selected examples of current research in the area.

Product development project (7 ECTS cr)

- use structured methods and tools for planning, organising, and executing a product development project in groups,
- present results in a clear manner to a client, orally and in writing, and argue for their chosen solutions,
- give an account of and reflect upon a coherent product development process, including synergies in the selection of form, material, and manufacturing method,
- analyse group dynamics in the work of the project team in relation to theory, and
- reflect upon the choice of materials for a product development project from a sustainability perspective.

Sustainable development (3 ECTS cr)

- give an account of and reflect upon the role of the engineer in relation to the concept of sustainable development from a product perspective,
- give an account of the concept of sustainable development in relation to different definitions and ecological, social, and economic dimensions,
- give an account of a few established principles for sustainable development,
- explain the problem of resources in relation to definitions, access, and distribution, and
- give an account of selected examples of current research in the area.

Specialisation assignment (3 ECTS cr)

- give an account of in-depth insights into an aspect of sustainable development, such as systematic material selection or life cycle analysis (LCA),
- independently use systematic and proven methods for analysis and conceptual development within sustainable product development,
- discuss factors affecting the environment in the different life cycle phases of a product and use a strategy for environmentally-friendly material selection,
- interpret and evaluate industrial product information on materials,
- give an account of the concept of life cycle cost and perform basic estimates, and
- give an account of the concept life cycle perspective.

## **Content**

The course includes techniques, methods, procedures, and organisation for increased efficiency and learning in product development, with a focus on sustainability issues in general and material selection in particular.

The course combines a theory component which includes lectures, exercises, and mandatory seminars and is focused on product development, the project team, sustainable development, and material selection, and a practical case project which is reality-based, associated with a company, and completed in groups.

## **Reading List**

See separate document.

## **Examination**

Assessment is based on:

The project development process and the project team: A written test and a mandatory seminar

Product development project: Mandatory supervision sessions, hand-in assignments, an oral presentation, a project report, and an individual reflection report

Sustainable development: A written exam

Specialisation assignment: An individual hand-in assignment

If students have a decision from Karlstad University entitling them to Targeted Study Support due to a documented disability, the examiner has the right to give such students an adapted examination or to examine them in a different manner.

### **Grades**

One of the grades Distinction (VG), Pass (G), or Fail (U) is awarded in the examination of the course.

### **Quality Assurance**

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

### **Course Certificate**

A course certificate will be provided upon request.

### **Additional information**

The local regulations for studies at the Bachelor and Master levels at Karlstad University stipulate the obligations and rights of students and staff.