



## COURSE SYLLABUS

# Materials and Process Selection, 7.5 credits

*Material och processval, 7,5 högskolepoäng*

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<b>Course Code:</b> TKAS22	<b>Education Cycle:</b> Second-cycle level
<b>Confirmed by:</b> Dean Mar 1, 2022	<b>Disciplinary domain:</b> Technology
<b>Valid From:</b> Aug 1, 2022	<b>Subject group:</b> MT1
<b>Version:</b> 1	<b>Specialised in:</b> A1F
	<b>Main field of study:</b> Product Development

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### Intended Learning Outcomes (ILO)

After a successful course, the student shall

Knowledge and understanding

- display knowledge of the structure-properties relationship of different material groups
- show familiarity with how life cycle assessment and environmental impact of a product are evaluated
- demonstrate comprehension of the relationship between the product requirements and the selection of materials and manufacturing methods

Skills and abilities

- demonstrate the ability to choose the best selection strategy for materials and manufacturing methods based on the final product
- demonstrate the ability to perform material selection optimisation

Judgement and approach

- demonstrate an understanding of the importance of the life cycle assessment of a product or a material
- demonstrate the ability to critically analyse and select materials and methods of production to customise a product

### Contents

The course deals with the selection of materials and production processes for product design. The analysis of different case studies helps to understand and evaluate the relationship between a product's function and requirements. These requirements will be translated into materials' properties and manufacturing methods to select the best solution and valid alternatives. Surface treatment technologies will be reviewed as an important part of product adaptation. Materials selection from a sustainability point of view and the methods used to assess the environmental impact of the material throughout the product's life cycle are also discussed.

The course includes the following elements:

- Overview of properties of different material groups
- Analysis of different products, their features, and their requirements
- Overview of the characteristics of different surface treatment techniques
- The relationship between product requirements and material properties
- The relationship between product specifications and choice of manufacturing methods
- Sustainability perspective in material selection
- Overview of Life Cycle Assessment (LCA) of products and materials and their environmental impact

### **Type of instruction**

Lectures and assignments.

The teaching is conducted in English.

### **Prerequisites**

Courses comprising at least 210 credits within the program and must have completed the course Materials in Product and Manufacturing Technology, 15 credits (or the equivalent).

### **Examination and grades**

The course is graded 5,4,3 or Fail.

Registration of examination:

Name of the Test	Value	Grading
Examination <sup>1</sup>	4 credits	5/4/3/U
Laboratories and assignments	3.5 credits	U/G

<sup>1</sup> Determines the final grade of the course, which is issued only when all course units have been passed.

### **Course literature**

The literature list for the course will be provided 8 weeks before the course starts.

Titel: Materials Selection in Mechanical Design

Författare: Michael F. Ashby,

Förlag: BH Elsevier

ISBN: ISBN: 9780081005996 (5th edition)