



*Course syllabus*

# Konstruktion i termoplastiska material

## Design in Thermoplastic Materials

**MMKN21, 7,5 credits, A (Second Cycle)**

**Valid for:** 2023/24

**Faculty:** Faculty of Engineering, LTH

**Decided by:** PLED M

**Date of Decision:** 2023-04-11

### General Information

**Elective for:** M4-pu, MD4, MPRR2

**Language of instruction:** The course will be given in English

### Aim

Based on the most recent research findings the course aims to provide students with knowledge and insights that are essential for the engineering designer to design and manufacture robust and cost-efficient products based on thermoplastic materials. Topics included in the course are e.g. selection of suitable thermoplastic material, designing procedure and manufacturing method. The course also provides knowledge about cost analysis. In each of the topics qualitative as well as quantitative methods are discussed.

### Learning outcomes

*Knowledge and understanding*

For a passing grade the student must

- for a given conceptual design propose a suitable thermoplastic material
- for a given conceptual design propose a suitable design
- based on the design solution propose a suitable manufacturing method
- calculate the actual costs associated with the given design

*Competences and skills*

For a passing grade the student must

- be able to independently, based on a given conceptual design, select a suitable thermoplastic material in a public data base
- be able to independently or in a group develop a unique engineering design solution
- be able to make a basic simulation of the molding process, with evaluation of the process and the consequences
- be able to independently or in a group, in dialogue, communicate orally and in writing the engineering design solution developed to representatives of an industrial company or the equivalent

#### *Judgement and approach*

For a passing grade the student must

- in a research based way be able to reflect on the engineering design solutions developed and on the basis of that propose additional and/or alternative engineering design solutions
- be able to suggest the need for further and/or alternative engineering design solutions

## Contents

To ensure that most recent research findings are presented in the course, external lecturers with links to research will be invited. During the course the students will get access to the latest research results in actual areas, to enable independent and well thought out assessments.

During the first phase of the course current thermoplastic materials will be presented and discussed, with reference to material properties and costs. Then, a description of the most common manufacturing techniques for thermoplastics is given. After this the course mainly focus on design aspects for thermoplastics.

Based on these insights, the establishment of a product specifications is presented, aiming at forming the criteria for the subsequent material selection. The choice of material is then followed by how the actual design is developed. Not only the material aspects, but also functional ones are taken into account according to sustainable development. The theoretical part of the course ends with an overview of production related aspects, as manufacturing method, finishing work and cost analysis.

In parallel to the theoretical part of the course a design project is carried out. The project follows the topics covered in the lectures. Each part of the project is checked by the supervisor.

## Examination details

**Grading scale:** TH - (U,3,4,5) - (Fail, Three, Four, Five)

**Assessment:** The course includes one compulsory project which is carried out in teams of 3-5 students. Approved projects earn a score in the range of 25 and 50 points. All team members receive the same number of points. In addition, the students must pass an individual written examination by receiving a score of minimum 25 points. The final result is based on the points earned on the project and the written examination.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

## Parts

**Code:** 0319. **Name:** Development Task.

**Credits:** 4,5. **Grading scale:** TH. **Assessment:** The course project is carried out in groups of 3-5 students. The student must receive at least 25 points to be approved, maximum is 50 points. All group members receive the same number of points earned on the projects. **Contents:** The project consists of the following items: analysis and establishment of product specifications, selection of material and manufacturing technique, establishment of the embodiment design cost analysis. The project work also includes a presentation of the results generated.

**Code:** 0419. **Name:** Written Examination.

**Credits:** 3. **Grading scale:** TH. **Assessment:** In order to pass the written exam, the student must earn at least half of the maximum score. **Contents:** The written examination covers the theory presented in the course.

## Admission

**Assumed prior knowledge:** MMKF01 Product Development and Design Methodology or equivalent.

**The number of participants is limited to:** No

**The course overlaps following course/s:** MMKN20

## Reading list

- Ulf Bruder: Värt att veta om plast. 2017, ISBN: 978-91-983811-1-5. In Swedish.
- Research based articles and papers provided by the department.
- Ulf Bruder: User's Guide to Plastics. Carl Hanser Verlag, 2015, ISBN: 978-1-56990-572-2. In English.

## Contact and other information

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