



Course syllabus

Produktion och Material Production and Materials

MMTF05, 5 credits, G2 (First Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED M

Date of Decision: 2023-04-11

General Information

Compulsory for: MID1

Language of instruction: The course will be given in English

Aim

This course will aim at two aspects: knowledge on production technology and method on material selection. Production technology will particularly focus on the processes applied for creating variant shape and surface profiles, as well as surface textures and surface appearance. Material selection will focus on further understanding relationship between material and design through learning the method on selection of the right material for the designed product among hundreds and thousands of different types of engineering materials. To be able to make an optimal choice regarding materials, a wide range of knowledge from different engineering areas is required. After the course, the participants will gain understanding of many technologies on creation of shape and surface features and be able to use a stringent methodology regarding material selection to meet specified product requirements.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- become familiar with the basics of production technology of creating shape, surface profiles and surface attributes.
- be able to perform a systematic material and process selection based on a methodology including conception translation, screening and ranking.
- understand and be able to create and use material property charts in correlation to predefined selection criteria.

- formulate conditions consisting of multiple constraints and objectives.

Competences and skills

For a passing grade the student must

- understand fundamentals of production technologies
- be able to execute advanced material and process selection based on the software CES EduPack.
- be able to critically analyze, estimate and formulate suggestions to durable solutions regarding materials.
- evaluate and develop solutions regarding materials in correlation to the specified design.
- be able to apply knowledge from previous courses.

Contents

Realisation of designed shape and surface attributes is an important subject for a designed product since every product has some sort of production process applied to it. The art of material selection is a complex field of subject. Finding the most suitable materials for a specified product requires a stringent procedure and knowledge from different engineering areas. The course will aim at these two aspects to give applied skills regarding methodology to perform advanced material selection and modern production technologies. Learning of material selection will be performed through presented theories and by use of a software tool (CES EduPack). The software consists of comprehensive databases covering material and process related data important to perform an optimized selection. Parameters and properties that determine the final choice of material can be, e.g., mechanical loads, chemical environment, operating temperature etc. The selected material and the product design determine possible manufacturing processes. The outline of the course is:

- Material and design
- Material and production processes
- Selection of materials (CES EduPack)
- Creating surface attributes

The course consists of a number of given lectures and exercises. However, a major part of the course is about to individually perform compulsory exercises, computer modelling and projects.

Examination details

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

Assessment: There will be continuous examination throughout the course consisting of compulsory exercises, computer modelling and projects. A written exam concludes the course.

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.

Admission

Assumed prior knowledge: MMTF01 Production or similar course.

The number of participants is limited to: No

Reading list

- Ashby, M. F.: Materials Selection in Mechanical Design, Fourth edition. Elsevier Butterworth-Heinemann, 2011, ISBN: 978-1-85617-663-7.
- Study literature compiled by the department.

Contact and other information

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Course homepage: <http://www.iprod.lth.se>