Syllabus for

Academic year 2012/2013 >

MMK221 - Materials selection and design

Syllabus adopted 2012-02-19 by Head of Programme (or corresponding)
Owner: MPAEM
7,5 Credits
Grading: TH - Five, Four, Three, Not passed
Education cycle: Second-cycle
Major subject: Mechanical Engineering
Department: 43 - MATERIALS AND MANUFACTURING TECHNOLOGY

Teaching language: English
Open for exchange students
Block schedule: B

Credit distribution

Course module	Sp1	Sp2	Sp3	Sp4	Summer course	No Sp	Examination dates
0107 Project 7,5 c Grading: TH		7,5 c					Fri 21/12-2012 pm M

In programs
MPAEM MATERIALS ENGINEERING, MSC PROGR, Year 1 (compulsory elective)
MPAEM MATERIALS ENGINEERING, MSC PROGR, Year 2 (elective)
MPDES INDUSTRIAL DESIGN ENGINEERING, MSC PROGR, Year 1 (elective)
MPDES INDUSTRIAL DESIGN ENGINEERING, MSC PROGR, Year 2 (elective)
MPPDE PRODUCT DEVELOPMENT, MSC PROGR, Year 1 (compulsory elective)
MPPDE PRODUCT DEVELOPMENT, MSC PROGR, Year 2 (elective)

Examiner:
Professor Christer Persson
Professor Lars Nyborg
Professor Antal Boldizar

Replaces
MMK220 Selection and design of materials

Course evaluation:
https://document.chalmers.se/doc/bb62035b-b5b9-4d78-b37c-725d80d21c37

Eligibility:
For single subject courses within Chalmers programmes the same eligibility requirements apply, as to the programme(s) that the course is part of.

Course specific prerequisites
Basic courses in Materials Technology or equivalent.

Aim
The aim of the course is to provide a broad competence platform for applied engineering work related to materials selection. The course introduces analytical tools and methods for qualified materials selection for engineering applications. Principles for material design for typical applications are also treated where the importance of behaviour of specific materials and classes of materials are considered with respect to temperature stability, mechanical strength and chemical resistance, etc

Learning outcomes *(after completion of the course the student should be able to)*
Understand the basics of design-oriented materials selection for engineering applications;
Work with and apply systematic and objective materials selection based on the principles according to Cambridge Engineering Selector (CES);
Apply the CES software in materials- and process selection;
Define correct conditions and objectives regarding materials selection;
Have a common background knowledge about material indices for material performance and understand how these indices are constructed;
Analyse materials selection case studies where both single or multiple constraints are active;
Analyse and evaluate the role of geometrical aspects in materials selection;
Describe the general principles for definition of material properties and the basic physical principles behind these in

general sense;

Content

The course includes following:

- overview lectures regarding design-oriented materials selection based on concepts according to Cambridge Engineering Selector, interactive excercises where the participants are trained in systematic and objective materials selection work, individual assignments that are rewieved, group-based project work where the participants will work through and present a case study.

In the course, particular empasis is placed on the overall understanding of material performance and its evaluation as well as the methodology and working concept for systematic and obejctive materials selection. Basics regarding definition, development and use of material indices are treated. Methodology for more complex problems are treated including situations where two or more material property demands should be fulfilled at the same time. An important tool treated is the software Cambrdige Engineering Selector (CES). Design-oriented aspects including engineering design in the context of materials selection are also treated.

Organisation

The course is organised via lectures of overview character, interactive excercises and project assignements. The course is run in English.

Literature

M.F. Ashby, Materials Selection in Mechanical Design, 4th edition, Elsevier, 2005

Examination

Written examination and project work including final presentation. The grading is based on the total score for both methods of examination.