Module Description, available in: EN

Materials Selection and Design

General Information

Number of ECTS Credits

3

Module code

TSM_MatSelDes

Valid for academic year

2024-25

Last modification

2018-11-05

Coordinator of the module

Alberto Ortona (SUPSI, alberto.ortona@supsi.ch)

Explanations regarding the language definitions for each location:

- Instruction is given in the language defined below for each location/each time the module is held.
- Documentation is available in the languages defined below. Where documents are in several languages, the percentage distribution is shown (100% = all the documentation).
- The examination is available 100% in the languages shown for each location/each time it is held.

	Lausanne			Lugano	Zurich		
Instruction				**X** E 100%			
Documentation				**X** E 100%			
Examination				**X** E 100%			

Module Category

TSM Technical scientific module

Profile Recommendations

This module is recommended for the following profiles:

	Lugano
Profile	ME

Lessons

2 lecture periods and 1 tutorial period per week

Entry level competences

Prerequisites, previous knowledge

Fundamentals of Material Science

Mechanics of Materials

Brief course description of module objectives and content

Materials offer immense opportunities for innovation. However, advance is possible only if a procedure exists for making a rational choice from the materials and a method of identifying ways to shape, join, and finish them.

The objective of this course is to develop a systematic procedure for selecting materials and processes, leading to the subset that best matches the requirements of a design. The structure gives rapid access to data and allows the user great freedom in exploring potential choices. The method is implemented in the GRANTA CES EduPack software to provide greater flexibility: it enhances the learning experience and provides a solid grounding in many of the domains of expertise specified by the various professional engineering accreditation bodies (analysis of components, problem-solving, design and manufacturing , economic, societal and environmental impacts).

Aims, content, methods

Learning objectives and competencies to be acquired

Understand the importance of material property charts

Understand the method for material selection and design

Understand the concept of effective properties and their dependence on phase spatial arrangement in hybrid materials.

Learn the manufacturing techniques of hybrid materials.

Module content with weighting of different components

The course content will be focused on:

- Material property charts
- Material selection and design
- Examples of hybrid materials and their applications
- Hybrid materials processing

Development of an hybrid material

Teaching and learning methods

Teaching: Ex cathedra teaching (theory),

Laboratory exercise with GRANTA ANSYS EduPack.

Learning methods: Self study

Literature

M. F. Ashby, “Materials Selection in Mechanical Design”, Elsevier, 2011.

M. F. Ashby, H. Shercliff, D. Cebon, “Materials: engineering, science, processing and design”, Butterworth-Heinemann, 2018.

Assessment

Certification requirements

Module does not use certification requirements

Basic principle for exams

As a rule, all standard final exams are conducted in written form. For resit exams, lecturers will communicate the exam format (written/oral) together with the exam schedule.

Standard final exam for a module and written resit exam

Kind of exam

Written exam

Duration of exam

120 minutes

Permissible aids

No aids permitted

Special case: Resit exam as oral exam

Kind of exam

Oral exam

Duration of exam

30 minutes

Permissible aids

No aids permitted