

Materials selection

Lecturer

Stephane GODET (Coordinator)

Course mnemonic

CHIM-H534

ECTS credits

3 credits

Language(s) of instruction

English

Course period

First term

Course content

The content of the course is as follows

- › The Materials' Universe
- › Constraints, free variable and materials indexes
- › Shape factors
- › Eco-informed choice
- › Introduction to LCA

Objectives (and/or specific learning outcomes)

This course motivates how a rational method can be applied in order to choose the best material or combination of materials for a specific applications, while taking into account its life cycle. At the end of this course the student should be able to

- › Identify free variables and constraints in a given application
- › Based on those, derives the material's indices that enable the best material to be selected
- › Break up a complex structure in several parts onto which the above method can be applied
- › follow a rational method to conduct a complete Life cycle analysis of the production, use and end-of-life of a given product

Teaching method and learning activities

The lectures consist in short theoretical presentations followed by hands-on sessions on the computer using the Cambridge Engineering Selector. The students are then asked to 're-design' an existing object of their choice. They analyse the role of the different parts and propose their own version of the optimized choice taking into account ecological and environmental aspects.

Contribution to the teaching profile

This teaching unit contributes to the following competences:

- › In-depth knowledge and understanding of integrated structural design methods in the framework of a global design strategy
- › Conceive, plan and execute a research project, based on an analysis of its objectives, existing knowledge and the relevant literature, with attention to innovation and valorization in industry and society
- › Correctly report on research or design results in the form of a technical report or in the form of a scientific paper
- › Present and defend results in a scientifically sound way, using contemporary communication tools, for a national as well as for an international professional or lay audience
- › Collaborate in a (multidisciplinary) team
- › Think critically about and evaluate projects, systems and processes, particularly when based on incomplete, contradictory and/or redundant information
- › A creative, problem-solving, result-driven and evidence-based attitude, aiming at innovation and applicability in industry and society
- › Consciousness of the ethical, social, environmental and economic context of his/her work and strives for sustainable solutions to engineering problems including safety and quality assurance aspects
- › The flexibility and adaptability to work in an international and/or intercultural context
- › An attitude of life-long learning as needed for the future development of his/her career
- › An integrated insight in chemical process and materials' technology

References, bibliography and recommended reading

Materials Selection in Mechanical Design, by M.F. Ashby, ISBN 978-9380931722

Materials and the Environment, by M.F. Ashby, ISBN 978-0123859716

Other information

Contact(s)

Stéphane Godet, sgodet@ulb.ac.be

Evaluation method(s)

Other

Evaluation method(s) (additional information)

The students are asked to 're-design' an existing objet of their choice. They analyse the role of the different parts and propose their own version of the optimized choice taking into account ecological and environmental aspects. This is summarized in a technical report and presented during a 'commercial' presentation.

Determination of the mark (including the weighting of partial marks)

report: 50%

presentation: 50%

Main language(s) of evaluation

English

Programmes

Programmes proposing this course at the
Brussels School of Engineering

MA-IRMA | Master of Science in Chemical and Materials
Engineering | finalité Professional/unit 2