

The teaching of physical metallurgy based on the acquisition of soft-skills

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Abstract

For several years now, a lack of interest for metallurgy has appeared among engineering students, particularly in the study of metallic alloys.

Teaching this subject therefore requires an evolution towards more adapted teaching methods, no longer focused on the acquisition of knowledge, but also on understanding phenomena by means of practical examples. This teaching method also allows students to acquire a wide range of soft-skills such as written and oral communication, time management, rigour, critical thinking, self-evaluation, ...

To this end, the classes given at the Faculty of Engineering of UMONS at the first year of the Master's degree in Chemistry and Materials Science about metallic alloys (approximately 100 hours), rely on an "inductive" approach of the use of metallic materials: case scenarios, practical exercises to apply the theory, practical lab work, industrial work, plant visits, seminars/conferences, open book oral exam focusing on comprehension.

Specifically, students will have to answer practical questions: 'with which metallic material can the body of a car, a bridge, an engine block, a saucepan, a stent, ... be made?' through, for example, the preparation and presentation of lectures (about 15 hours).

During the exercises sessions (6 hours), students are asked to correct the answers of their classmates.

The reports submitted at the end of practical lab works (15 hours) must be adapted to a particular audience (young adolescents, summary report for a colleague, full report for a boss).

About 15 hours are devoted to the analysis by students (alone or in groups of 2) of real industrial cases previously solved by the Metallurgy department and offered to students in the form of project with the writing of a final report that has to be accessible to a non-metallurgist industrial customer.

The plant visits (at least 4 per year) give an illustration of the problems faced by engineers in the metallurgical industry and allow students to meet and discuss with engineers in the field.

The final exam is open book with preliminary preparation by means of a scientific article in English dealing with a subject close to core content of the class.