Materials science

Course code: AMS2 — ECTS Credits: 5

Department	: MSISI	**Lectures**	: 13h45
Lecturers	: G. Henaff	**Tutorials**	: 12h30
Year of study	: 1st year	**Laboratory sessions.**	: 12h00
Semester	: 2nd semester	**Project**	:
Assessment method(s)	: 2 written tests, practicals	**Home works**	:
Language of instruction	: English	**Total hours**	: 38h15
Type of courses	: Compulsory		

Objective: To understand the relation between structure and mechanical properties. To be able to define a heat treatment. To be able to select a material in structural design.

Prerequisites: none

Content:

1. **Ferrous alloys**
   - Microstructures at equilibrium of stells and cast irons
   - Heat treatments (quenching and tempering, isothermal transformations)
   - Different classes of steels
2. **Non ferrous metals**
   - Aluminium alloys
   - Copper alloys
   - Titanium alloys
   - Nickel-based superalloys
3. **Mechanical properties**
   - Mechanical Testing (Hardness - Tensile test – Impact test- Creep test)
   - Stress-strain behaviour
   - Failure
   - Creep behaviour and damage
4. **Materials selection in mechanical engineering**

Recommended reading: None

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