

Corrosion of engineering materials

Course code: ACE3

ECTS Credits: 1

Department	: MSISI	Lectures	: 12h30
Lecturers	: L. Chocinski	Tutorials	:
Year of study	: 2 nd year	Laboratory sessions	:
Semester	: 3 rd semester	Project	:
Assessment method(s)	: 1 written test	Home works	:
Language of instruction	: English	Total hours	: 12h30
Type of courses	: Compulsory		

Objective: The aim of this course is to underscore the importance of corrosion in industrial conditions and the links between other fields studied at ENSMA.

Prerequisites: Elementary knowledge in materials science

Content:

1. Introduction and elementary knowledge

- Definition
- Industrial importance and economy issue
- Elementary knowledge (redox couples...)

2. Dry corrosion: high temperature oxidation

- Mechanisms and examples

3. Wet corrosion

- Mechanisms and electrochemical aspects
- Modes of corrosion
- Uniform corrosion, galvanic corrosion, pitting corrosion, crevice corrosion
- Corrosion-deformation interactions (stress corrosion cracking, corrosion fatigue, hydrogen embrittlement)

4. Corrosion in industrial field

- Aeronautics (cells: aluminium alloys, engines (Ti, Ni), coatings)
- Power industry (steels, nuclear materials)
- Mechanical engineering

Recommended reading: None

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