

MATS9AC WEAR AND CORROSION METALLIC MATERIALS

MATS9AC		Duration : 21 hours	ECTS Credits : 2	Semester : S9
Wear and corrosion of metallic materials				
Person(s) in charge:				
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Keywords:				
Wear and corrosion of metallic materials				
Prerequisites:				
Objective				
Control of wear and corrosion of metallic materials				
Program and Contents:				
<ul style="list-style-type: none">• Solid surface topography - characterization and analysis of surface roughness.• Definition and history of tribology. Industrial significance. Definition of a tribological system.• The understanding of solid contact mechanics to optimize industrial applications.• The laws of "dry" friction. The various types of friction: Static and dynamic friction, sliding, rolling, viscous and aerodynamic friction.• Basic wear processes: abrasive wear and mechanisms, adhesive wear, rolling contact wear.• Wear quantification: the different types of machines, Archard's law.• Friction and wear examination of engineering materials (rotation of a helicopter engine, crankshaft journal).• Introduction to water corrosion for metallic materials: thermodynamic and kinetic aspects,• introduction to galvanic series. Costs of corrosion and the means to reduce them. The different types of corrosion: uniform corrosion, galvanic corrosion, crevice corrosion, pitting corrosion, intergranular corrosion, selective corrosion, erosion corrosion, stress corrosion, hydrogen corrosion. Application of corrosion in the petroleum industry (guest lecturer in this field).				
Abilities:				
Levels	Description and operational verbs			
Know	The most negative damage for structural materials is often mechanical, chemical or a combination of both			
Understand	Understanding "dry" friction and wear mechanisms (tribology concept).			
Apply	Characterize the friction in a corrosive environment			
Analyse	Main corrosion mechanisms in a damp environment.The coupled phenomena of stress corrosion and tribocorrosion.			
Summarise	Develop specific processes.			
Assess	Final test on all of the preceding items (2 hours)			
Evaluation:				
<input checked="" type="checkbox"/> Written Test	<input type="checkbox"/> Continuous Control	<input type="checkbox"/> Oral Report	<input type="checkbox"/> Project	<input type="checkbox"/> Written Report