

MATS9AH POLYMER-BASED COMPOSITE

MATS9AH	Duration : 21 hours	ECTS Credits : 2	Semester : S9
Polymer-based composite			
Person(s) in charge:			
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Keywords:			
Composites, Polymers, Elaboration, Characterization, Properties			
Prerequisites:			
Polymers - Mechanical behaviour of materials			
Objective :			
Have a global view on composites, their properties and their utilisation.			
Program and Contents:			
There are several categories of composites. Their behaviour depends on the features, proportions, geometry, distribution and properties of their components. Knowing these data enables combining various types of materials to obtain composites which have better properties than metallic alloys, ceramics and polymers.			
The objectives of this course are:			
<ul style="list-style-type: none">■ To explain the difference between polymer blends and reinforced composites,■ To name the three types of composites with fibres reinforcement, to explain their differences according to the length and the orientation of the fibres, and to describe the mechanical properties of each type,■ To calculate the longitudinal module and the longitudinal resistance of a composite reinforced by continuous fibres and a composite reinforced by discontinuous fibres,■ To name the three reinforcement modes of composites with a polymer matrix and to indicate the features of each of these modes and the corresponding domains of application.			
1. Polymer blends: definitions, development, properties, applications, 2. Generalities on composites with a polymer matrix 3. Forming: principles and different processes of forming of composites 4. Characteristics of composites 5. Elastic Modules of composites 6. Rupture process of composites 7. Load transfer			
Abilities:			
Levels	Description and operational verbs		
Know	Main families of composites		
Understand	Different fabrication processes of composites		
Apply	Evaluate physical and mechanical properties (Calcul of elasticity modulus, of maximal load, of bulk density)		
Analyse	Behaviour of composite in service		
Summarise	Understand important existing link between use properties (mechanical properties), microstructure of composite and forming process		
Assess	Choice of composite and of process to elaborate a given product.		
Evaluations:			
<input checked="" type="checkbox"/> Written Test	<input type="checkbox"/> Continuous Control	<input checked="" type="checkbox"/> Oral Report	<input checked="" type="checkbox"/> Project
			<input type="checkbox"/> Written Report