

5.0 credits	30.0 h + 30.0 h	2q	This biannual course is taught on years 2010-2011, 2012-2013, ...

Teacher(s) :	Delannay Francis ; Proost Joris ; Erauw Jean-Pierre ;
Language :	Français
Place of the course	Louvain-la-Neuve
Main themes :	<p>The course concentrates successively on 6 themes.</p> <p>1 : Introduction : processing of ceramics and powder metallurgy</p> <p>2 : Powders : synthesis, properties and characterisation</p> <p>3 : Processes of shaping of the green product</p> <p>4 : Densification - sintering</p> <p>5. Surface treatments</p> <p>6 : Properties of sintered products and coatings.</p>
Aims :	<p>Sintered materials are the basis not only of most technologies for the processing of ceramics, but also of a particular domain of metallurgical processes called "powder metallurgy". This course aims at presenting the theoretical framework for the understanding of the physical and physico-chemical mechanisms underlying the processes (i) for manufacturing of macroscopic objects from powders and (ii) for the deposition of coatings for improving the surface properties of parts : wear, friction, resistance to oxidation and corrosion, etc..</p> <p><i>The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".</i></p>
Content :	<p>A. Introduction</p> <p>B. Powder method</p> <p>1. Synthesis of ceramic and metallic powders by the physical and chemical route</p> <p>2. Powder characterisation (size, shape, specific surface, rheology)</p> <p>3. Preparation of the green product : role of additives; principle of colloidal chemistry applied to suspensions, rheology of suspensions</p> <p>4. Methods of shaping and presintering stages (drying, surface finition),</p> <p>)</p> <p>5. Densification by natural sintering, sintering under pressure, liquid phase sintering, reactive sintering.</p> <p>6. Alternative méthodes of densification (pyrolysis, réaction gas-metal, etc</p> <p>)</p> <p>C. Method of ceramic processing through the liquid phase</p> <p>D.. Surface treatments</p> <p>E. Criteria for process quality control</p>
Other infos :	<p>The prerequisites of this course are the courses "Introduction to materials science" (MAPR1805), "Thermodynamics - phase equilibria" (MAPR1310), "Complements of inorganic chemistry" (MAPR 1231) and "Physical-chemistry of metals and ceramics" (MAPR2013).</p> <p>The practical work consist of laboratoria on the processing of ceramics and coatings.</p> <p>A plant visit is organised in order to illustrate the processes of which the theoretical bases are studied in the course.</p>
Cycle and year of study :	<p>> Master [120] in Electrical Engineering</p> <p>> Master [120] in Physical Engineering</p> <p>> Master [120] in Chemical and Materials Engineering</p>
Faculty or entity in charge:	FYKI