UCLouvain

lmapr2672

2021

Sintered materials and surface treatments

5.00 credits	30.0 h + 30.0 h	Q2

This biannual learning unit is not being organized in 2021-2022 !

Teacher(s)	Erauw Jean-Pierre ;Jacques Pascal ;Proost Joris ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	Metallic and ceramic powders: production and characterization; shaping of the semi-finished green product ; sintering process ;properties of sintered products.
Learning outcomes	**At the end of this learning unit, the student is able to :** Within the engineering degree program in chemistry and materials science, the course involves simultaneously four axes covering both disciplinary and transversal learning outcomes. At the end of the course, students will be able to : (Learning Outcome 1.1) • Explain the physical and physico-chemical phenomena underlying the processes of shaping of massive bodies from metal or ceramics powders via dry, wet, or plastic methods. • Describe the interactions between the critical parameters for the manufacturing of a homogeneous, high density green part • Describe the driving forces and mechanisms of material transport that govern the different stages of sintering of an aggregate of solid particles • Describe the influence of residual porosity on the mechanical behavior of sintered materials • Describe and classify the different surface treatment processes. 1 (L.O. 1.2 and 3.2) • By reclaiming the achievements of the bachelor program in mathematical concepts and in the use of computational tools, develop a mathematical model to simulate a physical phenomenon (L.O. 3.1) • Draw a state of the art in a specific technological domain based on a set of technical and scientific references (L.O. 4.2) • Conduct a project group (L.O. 5.3) • Present and defend an oral report effectively and critically
Evaluation methods	Students are assessed individually in writing and orally. The exam questions are formulated to verify the acquired disciplinary learning outcomes mentioned above. The exam focuses on the response to questions relating to the understanding of the theory. The achievement of transversal learning outcomes is evaluated via an oral assessment on the project. Each student orally presents the work of the group. The content of the project is summarized in a report and is discussed. Depending on the evolutionof the sanitary situation, the organisation of the exam could be modified (online exam, ...)
Teaching methods	The course consists of a dozen of lectures and a dozen of exercise sessions or small projects. These ones are related to the concept considered during the lectures.
Content	The course considers successively the different stages of the manufacture of sintered materials: synthesis of powders; shaping of the green aggregate, sintering, surface treatments, properties of products.
Inline resources	https://moodleucl.uclouvain.be/course/view.php?id=10096

Bibliography	Les supports du cours sont mis à disposition des étudiants sur Moodle. Ils consistent notamment en : • Un syllabus présentant l'exposé des matières • La copie des documents power-point utilisés par les enseignants • Les énoncés des exercices • Les instructions pour le projet de groupe • Des articles de la littérature
Other infos	This course involves the knowledge of the scientific bases of metals and ceramics as well as of the thermodynamics taught in the bachelor program in civil engineering and in the core courses of the program KIMA.
Faculty or entity in charge	FYKI

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Chemical and Materials Engineering	KIMA2M	5		