TRAVAUX PRATIQUES EN SCIENCE ET GÉNIE DES MATÉRIAUX ET DES SURFACES

PRACTICAL COURSES IN MATERIAL AND SURFACE SCIENCE

Lecturers: Bruno BERTHEL, Clotilde MINFRAY, Gaylord GUILLONNEAU, Michelle

| Lecturers : 0.0 | TC : 0.0 | PW : 32.0 | Autonomy : 12 | Study : 0.0 | Project : 0.0 | Language : FR

Objectives

The practical work of the IDM course provides the practical insight essential to the engineer's training and completes the notions developed in the course, relating to the three main families of construction materials: metals, polymers and ceramics. These practical exercises are grouped according to four themes: "Mechanical Behaviour of Materials", "Tribology and Surfaces", "Heat Treatment of Metal Alloys" and "Polymers and Composites".

Keywords : Mechanical behaviour of materials, tribology, heat treatment, metallic alloys, glasses, polymers and composites

Programme

Objectives (8h PW and 3h Aut. Per PW) : (i) Mechanical Behaviour of Materials: to introduce and practice the most commonly used tests to access the properties and mechanical behaviour materials. (ii) Tribology and Surfaces: to address, through a practical approach, some simple problems of wear and lubrication in a multidisciplinary framework combining mechanics, materials science and surfaces. (iii) Heat Treatment of Metal Alloys: to establish the relationships between chemical composition, heat treatment, microstructure and mechanical properties. (iv) Polymers and Composites: acquire knowledge of the processing of polymers and composites and then make the link between the process and the properties of the material.

Learning outcomes

- Know how to predict the mechanical properties of materials and their structures according to thermo-mechanical treatments
- Know how to identify the elaboration and treatment processes to adapt the properties of materials to a specification
- Know how to identify the relevant scale for a given property
- Be able to explain the basic principles of tribology (friction, wear, lubrication)

Independent study

Objectifs : Acquisition and oral restitution of knowledge, situational exercises and problem solving.

Méhodes : Personal and teamwork: reading documents, using databases, writing reports.

Core texts

J. Barralis, G. Maeder, *PRÉCIS DE MÉTALLURGIE*, Précis Afnor-Nathan, 2005
A. Dobraczinsky, M. Piperaud, J.-P. Trotignon, J. Verdu *PRÉCIS DE MATIÈRES PLASTIQUES*, Précis Afnor-Nathan, 2006
J.-P. Baïlon et J.-M. Dorlot*DES MATÉRIAUX*, Presses internationales polytechnique Montréal, 2002

Assessment

Final mark = 100% Know-how
Know-how mark = average of practical works maks