UCL Faculté des sciences appliquées

FSA

MAPR2482 Plasticity and metal forming

[30h+22.5h exercises] 4 credits

This two-yearly course is taught in 2004-2005, 2006-2007,...
This course is taught in the 2nd semester

Teacher(s): Francis Delannay, Thomas Pardoen
Language: french
Level: 2nd cycle course

Aims

The course covers the various concepts or theory related to the forming of metals: macroscopic theory of plasticity, mechanisms of microstructure evolution, cristallographic textures, residual stresses, tribology, forming limits. It also introduces to the key technological issues involved in the most common metal forming processes.

Main themes

1. Plasticity theory
- Phenomenological isotropic deformation and flow theory
- Phenomenological anisotropic theory
- Introduction to crystal plasticity
2. Cristallographic textures and deformation textures
3. Localization and fracture during metal forming
- Localisation mechanisms
- Fracture mechanisms
- Forming limit diagrams
4. Residual stresses in metal forming
5. Microstructure evolution : recristallisation, recovery, precipitation
6. Introduction to contact mechanics and wear
7. Technological aspects of metal forming operations (extrusion, deep-drawing, rolling, drawing)

Content and teaching methods

Introduction to the mechanical, metallurgical and technological aspects involved in the forming of metallic materials.

Other credits in programs

ELME23/M	Troisième année du programme conduisant au grade d'ingénieur civil électro-mécanicien (mécatronique)	(4 credits)
MATR22	Deuxième année du programme conduisant au grade d'ingénieur civil en science des matériaux	(4 credits)
MECA21	Première année du programme conduisant au grade d'ingénieur civil mécanicien	(4 credits)
MECA22	Deuxième année du programme conduisant au grade d'ingénieur civil mécanicien	(4 credits)
MECA23	Troisième année du programme conduisant au grade d'ingénieur civil mécanicien	(4 credits)