

Faculty of Applied Sciences



MECA2451 Mechanical manufacturing.

[45h+30h exercises] 6 credits

This course is taught in the 2nd semester

Teacher(s): Bruno de Meester de Betzenbroeck, Jean-François Debongnie
Language: French
Level: Second cycle

Aims

To give a good understanding of the issues and challenges in mechanical production:

- How is manufactured a given part ? Through which process and with what type of machine-tool ?
- What are the basic principles of machining by cutting, by erosion, and by the so-called "non conventional" methods ?
- What are the basics principles of manufacturing by forming, casting, sintering and welding ?

Main themes

Methodology in the mechanical workshop and for quality assurance.

Basic principles and machine-tools for machining by cutting, erosion and electrical discharge.

Basic principles for manufacturing by forming, casting, sintering and welding.

Content and teaching methods

The importance of the industry of mechanical production. The challenges in manufacturing.

Machining principles and machine-tool classification.

- Machining by cutting : planning and turning, boring and drilling, milling, broaching and tapping.
- Machining by erosion. Rectification.
- Machining with the non-conventional processes. Electrical discharge machining.

Forming.

- Classification of the forming processes according the deformation temperature, the stresses in the matter and the deformation modes.

- Forming of the flat products. Stretching, drawing and forming limit diagram. Deep drawing.

- Computation of the forces required for forming. Rolling, drawing and extrusion.

- Lubrication.

- Presses characteristics.

Casting : principles, casting sequences, mold design, main casting processes.

Sintering : powder production, compaction, sintering, finishing.

Welding and adhesive bonding : definition, welded and adhesive bonded joints, main welding processes.

Cutting : classification of the processes.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

- Prerequisite : MECA 2821 "Design and Machines".

- Exercises are laboratories and practices on the main machine-tools by groups of 2 or 3 students.

- A part of the examination deals with a discussion of the parts manufactured on the machine-tools by the students during the labs.

Other credits in programs

ELME21/E	Première année du programme conduisant au grade d'ingénieur (6 credits) civil électro-mécanicien (énergie)		
ELME22/E	Deuxième année du programme conduisant au grade d'ingénieur civil électro-mécanicien (énergie)	(6 credits)	Mandatory
ELME22/M	Deuxième année du programme conduisant au grade d'ingénieur civil électro-mécanicien (mécatronique)	(6 credits)	Mandatory
ELME23/E	Troisième année du programme conduisant au grade d'ingénieur civil électro-mécanicien (énergie)	(6 credits)	
MECA21	Première année du programme conduisant au grade d'ingénieur (6 credits) civil mécanicien		Mandatory