

## Faculty of Applied Sciences



### MECA1451 Mechanical manufacturing.

[30h+30h exercises] 4 credits

This course is taught in the 2nd semester

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

<b>ELME22/E</b>	Deuxième année du programme conduisant au grade d'ingénieur civil électro-mécanicien (énergie)	(4 credits)	Mandatory
<b>ELME22/M</b>	Deuxième année du programme conduisant au grade d'ingénieur civil électro-mécanicien (mécatronique)	(4 credits)	Mandatory
<b>FSA13BA</b>	Troisième année de bachelier en sciences de l'ingénieur, orientation ingénieur civil	(4 credits)	