



## Faculty of Applied Sciences

### MECA2240 Testing of thermal machinery.

[30h] 2 credits

This course is taught in the 2nd semester

**Teacher(s):** Hervé Jeanmart  
**Language:** French  
**Level:** Second cycle

#### Aims

Learn experimental methods for the determination of energy and materials fluxes characteristic of thermal machines and equipments.

Develop skills allowing students to control the operation of complex systems, including the security issues.

#### Main themes

Introduction to the operation and functional analysis of test benches of thermal machines and to the related metrology.

Implementation of test benches of internal combustion engines for their thermodynamic, energetic and environmental characterisation.

#### Content and teaching methods

This course is based on the personal confrontation to fundamental experimental techniques related to thermal machines and equipments. It includes three successive activities :

1. General introduction: Functional study of the main parts of a test bench and implemented metrology principles: brakes, flow metering, thermometry, fast pressure acquisition, gaseous effluents analysis.
2. Identification of available equipments on the different test benches and acquisition of independence in their use.
3. Tests carried-out in small independent teams and treating of
  - acquisition and analysis of pressure diagrams
  - thermodynamic optimisation: spark advance mechanism and breathing
  - determination methods of mechanical dissipations
  - external characteristics acquisition
  - partial loadings and simulation of an engine use on a vehicle
  - total energetic balance and application to cogeneration
  - air-fuel ratio and analysis of combustion effluents
  - characteristics of the supercharging.

The realisation of personal trials is aided by instructions that must be pre-read. The technical staff checks that security rules are respected and can help and advise students.

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

Prerequisite courses:

Knowledge in applied thermodynamics, combustion, internal combustion engine and thermodynamic cycles.

#### Other credits in programs

<b>ELME22/E</b>	Deuxième année du programme conduisant au grade d'ingénieur civil électro-mécanicien (énergie)	(2 credits)
<b>MECA22</b>	Deuxième année du programme conduisant au grade d'ingénieur civil mécanicien	(2 credits)