

## Faculty of Applied Sciences



### MECA2150 Thermal cycles.

[30h+30h exercises] 5 credits

This course is taught in the 1st semester

**Teacher(s):** Yann Bartosiewicz, Joseph Martin  
**Language:** French  
**Level:** Second cycle

#### Aims

Specialised training in thermal cycles, with the view to provide students knowledge and skills required for the conception of thermodynamics systems, as well as the quantitative evaluation and critic of these

#### Main themes

Vapour power plants  
 Gas turbines  
 Combined cycles  
 Cogeneration  
 Refrigerating plant

#### Content and teaching methods

Characterization of energetic performances of cyclic heat power plants.  
 Exergy concept and its application to cyclic transformations.  
 Exergetic approach of combustion.  
 Energetic and exergetic analysis of vapour power plant.  
 Energetic and exergetic analysis of gas turbine plant.  
 Energetic and exergetic analysis of combined cycles.  
 Cogeneration : energetic and exergetic approach.  
 Energetic and exergetic analysis of simple refrigeration plant.

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

Prerequisite courses :

MECA 2855, Thermodynamics and energetics.

Assessment :

Open-book exam and discussion about the personal work.

Texts :

- R.W.Haywood, Analysis of engineering cycles, Pergamon press, 1991.
- J.H.Horlock, Combined power plants, Pergamon press, 1992.
- M.J. Moran, H.N. Shapiro : Fundamentals of Engineering Thermodynamics, John Wiley, 1995.
- J.H. Horlock, Advanced gas turbine cycles, Pergamon (Elsevier Science), 2003.

Courses :

Oral presentation using PowerPoint slides

Tutorials involve a personal work implying an initiation to cycle calculation (using usual programs) as well as two or three visits of power plants of different types.

**Other credits in programs**

<b>ELME22/E</b>	Deuxième année du programme conduisant au grade d'ingénieur civil électro-mécanicien (énergie)	(5 credits)	Mandatory
<b>MAP22</b>	Deuxième année du programme conduisant au grade d'ingénieur civil en mathématiques appliquées	(5 credits)	
<b>MECA21</b>	Première année du programme conduisant au grade d'ingénieur civil mécanicien	(5 credits)	
<b>MECA22</b>	Deuxième année du programme conduisant au grade d'ingénieur civil mécanicien	(5 credits)	Mandatory
<b>MECA23</b>	Troisième année du programme conduisant au grade d'ingénieur civil mécanicien	(5 credits)	