MECA2220 Internal combustion engines.

[30h+15h exercises] 4 credits

This course is taught in the 2nd semester

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

Aims

Provide an analytical description of the functioning of internal combustion engines, as well as the principles of the evaluation of their performances and their basic gauging.
Develop the capacity to integrate the various branches of mechanics allowing to structure the description of internal combustion engines, to master its conceptual aspects and to model its behaviour.

Main themes

Components analysis, thermodynamics and general mechanics, energetic study, basic gauging, calculation of performances and diagnostic principles.
Use of fuels and analysis of their combustion in engines: physicochemical, technological, energetic and environmental aspects

Content and teaching methods

The course is composed of two parts:
1) Components analysis, thermodynamics and general mechanics: - main kinematics chain and functional auxiliaries - thermodynamics cycles, parietal effects, energy fluxes - breathing: operation modes, suction and supercharging - frictions, general architecture, main dimensions.
2) Use of fuels: - combustibility properties and studies of combustion modes - study of abnormalities and optimisation of combustion laws - supercharging technology and control of polluting emissions.
The first part of the presentation gives the necessary bases for the calculations carried out during tutorials under the form of exercises or case studies. The tutorials integrate in parallel the technological aspects of the second part of the course.

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

Prerequisite courses:
Knowledge in applied thermodynamics and combustion, as well as kinematics and dynamics of machines.

Other credits in programs

ELME22/E	Deuxième année du programme conduisant au grade d'ingénieur civil électro-mécanicien (énergie)	(4 credits)	Mandatory
MECA22	Deuxième année du programme conduisant au grade d'ingénieur civil mécanicien	(4 credits)	Mandatory
MECA23	Troisième année du programme conduisant au grade d'ingénieur civil mécanicien	(4 credits)	