UCL Faculté des sciences appliquées

FSA

MECA2550 Systèmes de propulsion aérienne

[30h+15h exercises] 4 credits

This course is not taught in 2004-2005
This course is taught in the 1st semester
Language: french
Level: 2nd cycle course

Aims

Aims to provide an analytical description of systems used in aircraft propulsion, to model their behaviour and to introduce students to performance evaluation and component dimensioning.

Main themes

- Basic principles of aircraft propulsion, energy approach, classification and area of application of various propulsion systems
- Implementation of propeller propulsion in an open jet, single and multi-flow turboreactor propulsion and statoreactor propulsion
- Issues linked to aircraft fuels ; combustion techniques and environmental issues.

Content and teaching methods

The course covers the following topics :
- Dynamics and energetics of propulsion systems
- Classification and areas of application of thrusters
Functional analysis of propulsion techniques :
- Propeller in an open jet: aeraulic properties, limitations
- Single- and multi- flow turbo reactors: organic and energy analysis of intake systems for sub- and supersonic flight
- Ejection systems: nozzles and postcombustion
- High speed propulsion and statoreactors
Use of fuels :
- Combustion properties and combustion mode analysis
- Combustion chamber technology and emission control
The course is complemented by demonstrations in scale models in a low-speed wind tunnel. Personal work takes the form of a study of performance modeling. Written reports on the studies form the basis for assessment.