lmeca2220
2021

UCLouvain

Internal combustion engines

5.00 credits	30.0 h + 30.0 h	Q2

Teacher(s)	Contino Francesco ;Jeanmart Hervé ;
Language :	English
Place of the course	Louvain-la-Neuve
Prerequisites	Students are expected to master the following skills: 　　　- be able to characterize a thermal cycle; 　　　- be able to calculate heat exchanges in simple cases; 　　　　- be able to characterize fluid flows in pipe; as they are covered within the courses LMECA1855 and LEMCA2321.
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
Learning outcomes	**At the end of this learning unit, the student is able to :** 1　In consideration of the reference table AA of the program "Masters degree in Mechanical Engineering", this course contributes to the development, to the acquisition and to the evaluation of the following experiences of learning: 　• AA1.1, AA1.2, AA1.3 　• AA2.1, AA2.3, AA2.5 　• AA3.1, AA3.2 　• AA5.3, AA5.4, AA5.6 　• AA6.1, AA6.2, AA6.3 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.
Evaluation methods	The evaluation is based on : - an oral examination on the theoretical knowledge acquired with one of the course supervisors - a written examination on a practical implementation of the course's achievements The weighting of each part is announced to the students at the beginning of the academic year. The default weighting is 70% / 30%. Special circumstances may lead to a change in the nature of the examination. For example, the oral examination may become written, the exercise examination may be cancelled, etc. Students will be notified in due course.
Teaching methods	Teaching is based on lectures, exercises and assignments.
Content	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.

Inline resources	http://icampus.uclouvain.be/claroline/course/index.php?cid=MECA220
Bibliography	Reference books for this course: . R. van Basshuysen, F. Schäfer, Internal Combustion Engine Handbook. Basics, Compontents, Systems, and Perspectives, SAE International, 2002. **. C. R. Ferguson, Internal Combustion Engines. Applied Thermosciences, John Wiley & Sons, 1986.** . J. B. Heywood, Internal Combustion Engine Fundamentals, McGraw-Hill Book Company, 1988. . R. Stone, Introduction to International Combustion Engines, 4th Edition, Palgrave Macmillan, 2012.
Other infos	Syllabus du cours disponible au SICI
Faculty or entity in charge	MECA

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Mechanical Engineering	MECA2M	5		🔍
Master [120] in Electro-mechanical Engineering [Version 2020]	ELME2M	5		🔍