UCLouvain

lmeca2150

2017

Thermal cycles

5 credits	30.0 h + 30.0 h	Q1

Teacher(s)	Bartosiewicz Yann ;
Language :	English
Place of the course	Louvain-la-Neuve
Aims	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, AA2.2, AA2.3, AA2.4 • AA3.1, AA3.2, AA3.3 • AA4.1, AA4.2, AA4.3, AA4.4 • AA5.1, AA5.3, AA5.4, AA5.5, AA5.6 • AA6.3 1 The student will acquire the necessary knowledge to understand, design and evaluate thermodynamic systems involved in power cycles. A the end of the course he/she will be able to: • Use the concept of exergy to evaluate the performance of a power cycle and complete the energy approach • To formulate a detailed analysis of losses and irreversibilities at each component of a power cycle and present results by plots/pie charts • To elaborate assumptions and setup models to simulate a steam, gas and combined cycles • To setup a user friendly software with a GUI to simulate a complex combined cycle up to 3 pressure levels and performing energy/exergy analysis - - - - *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Evaluation methods	**Final mark = project (40%) + exam (60%)** Project mark = report (80%) + code (20%) Exam: written, closed book (3h-4h) including theoretical questions, understanding, and small exercises to solve
Teaching methods	Lectures intensively use slides with technical drawings, plots, and main formula. Some theoretical developments and thermodynamic reminders are done in class. Attendance is highly recommended as a permanent link between models/theory/formula and practical/technological arrangements is explained during the class. The spirit of the course is a permanent comparison between the classical energy approach and the exergy analysis. To apply the theory as seen in class, a project is organized over the whole session with periodic consultations by the assistant
Content	• Chapter 1: characterization of performances of driving engines • Chapter 2: Steam power cycles (Rnakine-Hirn) • Chapter 3: Gas power cycles (Brayton) • Chapter 4: Combined gas-steam cycles • Chapter 5: Combined heat and power cycles (CHP)
Inline resources	http://icampus.uclouvain.be/claroline/course/index.php?cid=MECA2150
Bibliography	• "Installations thermiques motrices. Analyse énergétique et exergétique", Joseph Martin et Pierre Wauters, 2e ed., 2011, presses universitaires de Louvain. **Obligatoire** • "Eléments de thermodynamique technique",Joseph Martin et Pierre Wauters, 2014, presses universitaires de Louvain. **Recommandé** • Slides disponibles sur iCampus, **obligatoire** • "Thermodynamique et énergétique: de l'énergie à l'exergie", L. Borel et D. Favrat, Presses polytechniques et universitaires romandes. **Recommandé**
Faculty or entity in charge	MECA

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