UCL Université catholique de Louvain

LMECA2755

2015-2016

Industrial automation

5.0 credits	30.0 h + 30.0 h	1q

Teacher(s) :	Dehez Bruno ; Fisette Paul ; Ronsse Renaud ;
Language :	Anglais
Place of the course	Louvain-la-Neuve
Inline resources:	> http://moodleucl.uclouvain.be/course/view.php?id=7755
Main themes :	Introduction to industrial sensors : physical principles and practical development Pneumatic and electropneumatic systems : technology and sequential logic Industrial Robotics : kinematic structures and models, manipulators, trajectory planning and control. Programmable Logic Controllers : technology, principes and programming GRAFCET : functional programming and implementation
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 -- AA3.3 -- AA5.3, AA5.4, AA5.5 -- AA6.1 More precisely, at the end of this course, students will be able to State the working principle and the main properties ofIndustrial sensors, pneumatic and electropneumatic systems, industrialrobotics, Programmable Logic Controllers (PLC), and of production line management. Select and implement an industrial sensor within a production process Apply notions of sequential programming, by working on didactical benches et programming an industrial conveyor. Derive direct and inverse geometric models of an industrial robot, derive the Jacobian matrix of this robot, and use it to identify the singularities. Develop a simple method for trajectory planning of an industrial robot, and for controlling the position along this trajectory *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 :	Written exam
Teaching methods :	Courses (13 lectures) Laboratories (4 (electro)pneumatics, 1 in robotics and 2 on a Programmable Logic Controller Homework on the selection and implementation of an industrial sensor (1)
Content :	The course covers the various topics listed in the 'Main themes' section. It is an introductive course in the field of industrial automation, where both sensors and actuators are covered (mainly pneumatic and electropneumatic actuators, such as industrial robots), and where the coordinating 'system' is overviewed. This 'system' is restricted to a sequential approach: hard-wired and programmable logics are covered and practiced in practical laboratories. Students will perform these labs by groups of 2 people, on didactic benches for pneumatic and electropneumatic systems, and on an industrial conveyor. They will further manipulate an industrial robot.
Bibliography :	Lecture notes, books, and lab notices are available on Moodle. For "robotic" part, two references : -- Robot Modeling and Control (http://eu.wiley.com/WileyCDA/WileyTitle/productCd-EHEP000518.html) de Mark W. Spong et al. Des exemplaires de ce livre sont disponibles à la bibliothèque (BST). -- Robotics (http://www.springer.com/us/book/9789048137756) de Tadej Bajd, Matja' Mihelj, J. Lenar'i', A. Stanovnik, et Marko Munih. Ce livre est disponible en ligne (depuis le réseau de l'UCL).
Other infos :	One or several industrial seminar(s) is/are organized

Faculty or entity in charge:	MECA

Programmes / formations proposant cette unité d'enseignement (UE)				
Intitulé du programme	Sigle	Credits	Prerequis	Acquis d'apprentissage
Master [120] in Biomedical Engineering	GBIO2M	5	-	
Master [120] in Electro-mechanical Engineering	ELME2M	5	-	
Master [120] in Mechanical Engineering	MECA2M	5	-	