UCL Université catholique de Louvain

LMECA2755

2010-2011

Industrial automation.

5.0 credits	30.0 h + 30.0 h	1q

Teacher(s) :	Fisette Paul ; Dehez Bruno ;
Language :	Français
Place of the course	Louvain-la-Neuve
Main themes :	- Industrial sensors - Pneumatic and electropneumatic systems - Industrial Robotics - Programmable Logic Controllers - Field bus technology - Mechanical indexors
Aims :	Provide students with basics in the fields of : - Industrial sensors - Pneumatic and electropneumatic systems - Robotics - Programmable Logic Controllers (PLC) - Field bus technology - Mechanical indexors Give students the opportunity to practice in the field of sequential automation, via seven laboratories dealing with pneumatic and electropneumatic logics, as well as programming an industrial conveyor. *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".*
Content :	1. Introduction (1 lecture) : What is industrial automation and what does it involve ? - course organization - grading - illustrations (video) 2. Industrial sensors (2 lectures) Types and characteristics of sensors Presentation of different types of sensors - principle and technology: - displacement/position sensors - velocity/acceleration sensors - force/torque sensors - pressure sensors - 3. Pneumatic and electropneumatic systems (3 lectures, 5 labs) Pneumatic systems : - compressed air : production, filtering, lubrication - valves and cylinders: technology, applications, dimensioning - pneumatic logics : simple circuits - study of signal problems - bi-stable /mono-stable devices - Installation : layout and dimensioning Electropneumatic systems: - electro-valves, relays, : technology, dimensioning - electropneumatic logics : simple circuits - study of signal problems - bi-stable /mono-stable devices 4. Robotics (3 lectures) Introduction: industrial robots, economic/statistical aspects Robot classification, performances Robot components : - actuators - transmission elements - effectors (grippers,

	) 5. Programmable Logic Controllers (3 lectures + 2 labs) Introduction : origins, PLC versus electropneumatic logic Technology, functioning, peripheral devices Programming languages Ladder programming : principles, practical examples Grafcet programming : origins, principles, practical examples Functional approach to sequential programming (Grafcet based) 6. Field bus (1 lecture) Origins, principle - economic aspects Technology, description of widespread field buses (Profibus DP, ASI,) Fieldbus and pneumatic systems 7. Mechanical indexors (1 lecture) Applications, advantages, limitations Technology : paradromic and globic cams Characteristic parameters (dwell, index, stops, double index,) Static and dynamic dimensioning - practical examples
Other infos :	Prérequisites : no Grading : Written exam Support : - Notes : sensors, pneumatic systems and robotics - Copies of slides : PLC, Mechanical indexors, Field bus Visits to companies are organized during semester 1 or 2 in the field of industrial automation (ex. production lines, car manufacturing,)
Cycle and year of study :	> Master [120] in Mechanical Engineering > Master [120] in Electro-mechanical Engineering > Master [120] in Biomedical Engineering
Faculty or entity in charge:	MECA