UCL Université catholique de Louvain

LINMA1510

2016-2017

Linear Control

5.0 credits	30.0 h + 30.0 h	2q

Teacher(s) :	Dochain Denis ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	> http://icampus.uclouvain.be/claroline/course/index.php?cid=LINMA1510
Prerequisites :	Applied mathematics : Signals and systems [LFSAB1106]
Main themes :	Derivation of mathematical models of linear dynamical systems (state equations and transfer functions). Design of regulators and closed-loop control systems in order to satisfy specifications of stability, robustness, steady-state accuracy and transient performance. PI and PID regulation. Computer aided design.
Aims :	With respect to the referentiel AA, this courses contributes to the development, the acquisition and the evaluation of the following learning outcomes : -- AA1.1, AA1.2, AA1.3 -- AA5.3, AA5.4, AA5.5 At the end of the course, the student will be able : to design control systems on the basis of linear models; to design control systems in closed loop aimed at meeting stability, robustness, steady-sate accuracy and transient behaviour performance requirements ; to use computer-aided control design methods ; to implement closed-loop control systems in laboratory conditions, in conditions close to those encountered in industrial practice; to use industrial PID regulators; to use discrete time controllers implemented on PLC's; to perform experiments in an autonimous way, from the planning of the work until the practical implementation and the performance evaluation. *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 :	Laboratory evaluation outside of the exam period and exercise-based written exam.
Teaching methods :	Problem-based learning, laboratory experiments.
Content :	-- Mathematical models -- General principles of closed-loop control -- Stability -- Steady-state accuracy -- Disturbance attenuation -- Transient performance -- Robustness -- Regulation structures -- Case studies: electrical machines, automotive systems, aeronautics, thermic and nuclear power plants, heat exchangers, industrial grinding and mixing processes, etc.
Bibliography :	Transparents, laboratory notes (available on icampus). Reference monograph : K. Astrom & mp; R. Murray, Feedback Systems: An Introduction for Scientists and Engineers http://www.cds.caltech.edu/~murray/amwiki/index.php

Faculty or entity in charge:	MAP

Programmes / formations proposant cette unité d'enseignement (UE)

Intitulé du programme	Sigle	Credits	Prerequis	Acquis d'apprentissage
Master [120] in Electrical Engineering	ELEC2M	5	-	
Minor in Engineering Sciences: Applied Mathematics	LMAP100I	5	-	
Minor in Engineering Sciences: Mechanics	LMECA100I	5	-	
Master [120] in Mechanical Engineering	MECA2M	5	-	