2SC5910 – Control of a motorization chain

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Department: CAMPUS DE METZ
Language of instruction: FRANCAIS
Campus: CAMPUS DE METZ
Workload (HEE): 60
On-site hours (HPE): 34,50

Description
This course covers the necessary concepts to control a motorization chain in its electronic aspects (converters, power, power supply), servo control (modelling, observers, regulators) and digital (analog-digital conversion, programming, real-time). The practical aspects will be tested on microcontroller cards to concretely implement a speed control system of a DC motor.

Quarter number
ST5

Prerequisites (in terms of CS courses)
None

Syllabus
- DC motor
- DC-DC converters
- Mechanical modelling
- Synthesis of control laws (analog regulation and digital regulation)
- Non-linear regulation
- Microcontroller programming

Class components (lecture, labs, etc.)
12h of lecture, 6h of tutorials, 15h of labs and 1h30 for the final exam.
24 students for tutorial/labs groups

Grading
A written report on the practical work, to be given on the date indicated by the teacher, will be requested and a one-and-a-half hour individual exam will take place at the end of the course. The score of the individual examination will count for 60% and the score of the practical work report

will count for 40% of the final grade. In case of absence, the standard penalty according to the regulations will be applied.

If the exam fails, a remedial exam will take place in the form of a one-and-a-half hour individual written exam.

Course support, bibliography
« Commande des entraînements à vitesse variable », handout.

Resources
Lectures will be given to present the main concepts.
Applications will be tested on electronic cards during tutorial courses.

Tutorial groups size : 24 students
Lab groups size : 24 students

Learning outcomes covered on the course
- Understanding how motors work
- Choose the characteristics and performances adapted to the problem
- Develop the command laws
- Mastering the servo systems

Description of the skills acquired at the end of the course

- C1 : Analyze, design, and build complex systems with scientific, technological, human, and economic components
- C2 : Develop in-depth skills in an engineering field and a family of professions