UCL Université catholique de Louvain

LFSAB1501

2013-2014

Project 1

8.0 credits	40.0 h + 40.0 h	1q

Teacher(s) :	Keunings Roland ; Legat Jean-Didier ; Pecheur Charles ; Ben-Naoum Abdou Kouider ; Raucent Benoît (coordinator) ;
Language :	Français
Place of the course	Louvain-la-Neuve
Main themes :	The project is organized in 5 steps: " The for-study: students will select the best solution among various possibilities. This is an exploratory phase devotyed to a better unterstanding of the demand, and to propose solutions. The for-study deliverable is a study model, a report and a presentation in front a pre-jury. Theoretical modelling and simulation: a theoretical model of the cinematics and the simulation of the control of the robot to perform the requested trajectory or maneuvres in the chosen solution will be developed: instrcutions to drive straight, turn right, turn left, U-turn, "Experimentation and validation: an experimental caracterization of LEGO-motor and a prototype using LEGO subssets will be built and experimentally verified. The robot control commands will be written in JAVA. Students will have the possibility to register to the De Bremaecker-Stockem contest. Synthesis and presentation: Final report and oral presentation of the performed work in front of a jury.
Aims :	Aims Content oriented disciplinary aims integrated to the project: At the end of the project P1, students will be able to " Use hand-drawing as design and communication tools: 2D maps, simple perspectives " Build a model for the cinematics of a mobile robot, to calculate internal forces in a simplified model, to measure torques and internal friction effects, to measure power and energy provided par the robot motor, to clauclte the balance of electrical and mechanical power Establish a JAVA procedure in order to transfer to the robot the caracteristics of a given trajectory, to develop, implement and test the command software driving the robot along the foreseen trajectory path (scaled). Basic methodological aims: The project intends the student develop the following transverse skills, being able to: 1. work in team in order to execute a engineering type project 2. solve a multidisciplinary problem 3. practice scientific and reflexive research 4. efficiently practice oral communication 5. efficiently practice written communication 6. auto-evaluate himself in view of foreseen eductional goals (autodidaxy). These skills will be progressively developed comulatrively and with a deepening progression among the three projects FSAB1501, FSAB1502 and FSAB1503. The progression of the development of these transversal skills during the 3 projects as well as a description of the corresponding successive steps is presented on the following link, where the six previous general skills to be reached are detailed more specifically (link vers la page française). *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 :	A non certificative evaluation is foreseen all along the semester. For each activity, students receive the evaluation grid that will be used at the end of the semester. The for-project evaluation is essentially "formative" (non certificative): its output is a"contract" that will drive the evaluation during the final jury at the end of the activity. After the final presentation, a debriefing of the activity is foreseen between the students group and his tutor. The final mark consists within: A group mark (1/2) for the final report , the final presensation in front of the jury and the continuous evaluation of the work during the semester by the tutor An individual mark (1/4) for the drawing performance of the student An individual mark (1/4) based on a written exam during the exam periode and beased on the content each student is supposed to acquire during the work.
Content :	The project consists in the design, modeling, and prototype-based validation of a robot, in order to: " establish the requirements " propose a structure for the robot " prepare and hand-made drawing of the whole set (maps and communication, 2D and perspectives) " model and simulate the physical behaviour of the robot " design a software-based command system for the robot " show the technical feasibility of the proposed solution by means of a prototype using Lego MindStorms building blocks and the RCX processor. The project is a problem-based situation which is specific because of its duration (a full semester term) and because of the opportunities it provides for the integration of knowledge and skills. The project aims to provide a context both for the content learned during the term and for previously acquired knowledge and competencies.

Cycle and year of study :	> Bachelor in Engineering
Faculty or entity in charge:	BTCI