UCL Université catholique de Louvain

LFSAB1501

2015-2016

project 1

8.0 credits	40.0 h + 40.0 h	1q

Teacher(s) :	Jacqmot Christine (compensates Raucent Benoît) ; Bollen Xavier (compensates Raucent Benoît) ; Legat Jean-Didier ; Pecheur Charles ; Ben-Naoum Abdou Kouider ; Raucent Benoît (coordinator) ; Keunings Roland ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	> http://icampus.uclouvain.be/claroline/course/index.php?cid=LFSAB1501
Prerequisites :	None
Main themes :	The project consists of four phases: -- The pre-project consists in choosing the best solution among all imaginable ones. This is thus an exploratory phase that aims at better understanding the demand and proposing solutions. The pre-project ends with the creation of a study model, a report and a pre-jury. -- Theoretical model and simulation consists in presenting a theoretical model (kinematics) and a simulation of the way in which the machine will be commanded to execute the manoeuvers in the chosen solution: what instructions must be given for moving on a straight line, taking a turn. -- Experimentation and validation: At this stage, experiments are carried to characterize the LEGO motors and a pilot prototype in LEGO is built and experimented. The robot is commanded in JAVA. Students have the opportunity to compete with their robot for the De Bremaecker-Stockhem prize. -- Synthesis and presentation of the work in a report and orally, facing a final jury.
Aims :	Contribution of the course to the program objectives Regarding the learning outcomes of the program of Bachelor in Engineering, this course contributes to the development and the acquisition of the following learning outcomes: LO 1.1, 1.2 LO 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7 LO 3.1, 3.2, 3.3 LO 4.1, 4.2, 4.3, 4.4, 4.5 LO 5.1 Specific learning outcomes of the course More precisely, at the end of the course the students will be able to: to use technical drawing (by hand) as a design and communication tool: 2D plan and simple perspectives (cavalier and axonometric). to build a kinematic model of a mobile robot, to compute internal efforts of a simplified robot model, to measure torques and internal frictions, to measure power and work produced by robot motors, to establish a balance of electrical and mechanical energy. to develop and test a JAVA program that allows the robot to perform, at scale, arbitrary manoeuvers and trajectories. The project aims at developing the following cross-cutting skills: Working in team to carry through an engineering-type project. Carrying a multi-disciplinary project. Exercising scientific research practices. Communicate verbally in an efficient manner. Communicate in writing in an efficient manner. Self-appraise with respect to target training objectives in order to progress. The development of this skills must be carried in a progressive way, cumulated and deepened across the three projects LFSAB1501, LFSAB1502 and LFSAB1503. The progression in the development of these crosscutting skills and a description of the different stages to be passed towards the development of each is presented on the web pages of the EPL BTCI Program Commission. *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 :	The project will be assessed formatively (not summatively) all along the project. For each activity, students receive in advance the grid that will be used to assess their work. The pre-project is essentially formative and leads to a "contract" that will be assessed during the final jury. At the end of the presentation to the jury, a de-briefing session will take place between the students and their tutor. The final note for the project includes: -- A group note (1/2): group presentation to the jury, grooup report, evaluation by the tutor. -- An individual note (1/4): written exam during the session. -- An individual drawing note (1/4).
Teaching methods :	Project based learning
Content :	The project aims at designing a robot, modelling and validating the design by building a prototype: establishing requirements proposing a structure for the robot drawing by hand plans of the robot and communication drawings (in 2D and perspective) modelling and simulating the physical behaviour of the machine proposing a computer implementation of the command of the machine showing the technical feasibility of the proposed solution on a reduced model of the robot using the LEGO Mindstorms system The project is a particular problem-situation by its duration (one quadrimester) and by the possibility to integrate knowledge and skills. The project aims at putting into context and integrating matters taught during the same quadrimester, while applying previously acquired knowledge and skills.
Faculty or entity in charge:	BTCI

Programmes / formations proposant cette unité d'enseignement (UE)				
Intitulé du programme	Sigle	Credits	Prerequis	Acquis d'apprentissage
Bachelor in Engineering	FSA1BA	8	-	