UCLouvain

lelme2003

2019

Project in energy

In view of the health context linked to the spread of the coronavirus, the methods of organisation and evaluation of the learning units could be adapted in different situations; these possible new methods have been - or will be - communicated by the teachers to the students.

6 credits	30.0 h + 30.0 h	Q1 and Q2

Teacher(s)	Bartosiewicz Yann ;De Jaeger Emmanuel ;Jeanmart Hervé ;
Language :	English
Place of the course	Louvain-la-Neuve
Aims	The project mainly targets the acquisition of engineering skills similar to those being exploited in a mechatronics, robotics, or energy conversion systems design office or department a. Disciplinary Learning Outcomes A.A. 1.1. 1.2. 1.3. A.A. 2.1. 2.2. 2.3. 2.4. A.A. 3.2. 3.3. A.A. 4.1. 4.2. 4.4. A.A. 5.3. 5.4. 5.5. 5.6. A.A. 6.1. 6.3. 6.4. **At the end of this course, students will be able to**: 1. Analyze a problem proposed by an external entity, and write its corresponding specifications 2. Achieve a pre-study of an electromechanical device and build up a pre-project: finding possible solutions, comparing them based on criterions from the specs, selecting the best solution, making a pilot mock-up, preliminary dimensioning, etc. 3. Conduct the detailed design of the selected electromechanical solution (or a mockup of the solution) including: the components dimensioning; the selection of standard materials and components (bearings, motors, gears, electronics, batteries, thermal engines, sensors, etc.); the production of a global drawing of the solution, and of detailed drawings for fabrication by using CAD software. 4. Integrate the elements of the design into a functional prototype, build up, and assemble this prototype. 1 5. Build up a synthesis dossier presenting all technical details of the selected solution (global drawing, nomenclature, calculations ') for the teaching staff. b. Transversal Learning Outcomes **At the end of this course, students will be able to**: Develop inventiveness while searching innovative solutions to an external problem. Conduct a project in a group, requiring: To rephrase some objectives. To separate the basis problem into sub-tasks. To evaluate the necessary resources for each task, and write down a working plan. To distribute the work to be done within the group. To maintain efficient communication within the group. To make collective decisions. To manage interpersonal relationships within the group, and to potentially solve conflicts in a constructive way. Collect documentation and look for components from suppliers (describing the need, and selecting the most relevant component). Perform a convincing public presentation by arguing on the decisions, in front of the teaching staff. Perform a critical analysis of the functioning of an electromechanical device; anticipate possible failures and out-of-service causes. Guarantee the device security, as well as users' safety. - - - - *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	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** Except exceptional situations, the evaluation takes the whole group performances into account. The following items will be accounted for: § the work done by the group during the whole year; § intermediate reports and presentations (specs, pre-project, dimensioning, control, etc.); § final report; § global and fabrication drawings; § global functioning of the fabricated robot, and matching with the specs; to a lesser extent (and if relevant) performances during the 'Eurobot' and UCL cups; public presentation; the answers given to the questions raised by the audience. Students for whom the project would not be advanced enough after the UCL cup will not get a 'pass' mark for the exam session of June. They will have to autonomously perform complementary work that will be evaluated within the exam session of September. Caveat: some disciplines being practiced during the projects are mainly evaluated in associated courses (see the 'Prerequisites' folder). The project evaluation mainly focus on the electromechanical design, control, and strategy.
Teaching methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** Early in the year, students freely make group of 4 to 6 students. Each group has to make a robot fulfilling the yearly requirements of the 'Eurobot' robotics cup. Firstly, each group draft a specification list during the first weeks of the project, based from the documents provided by the cup organizing staff. The pre-design goes on during the first half of the first quadrimester and is concluded by a presentation of the pre-project in front of the teaching staff. Thereafter, students achieve the detailed design of the robot, including the full dimensioning and drawings. The first quadrimester is concluded with the release of a technical dossier gathering all these elements. The rest of the year (2^{nd} quad) is devoted to the fabrication of the electromechanical devices, their mounting, and to the programming (control) If relevant, Students are invited to participate to contests in order to compare their device performances to opponents: for example, the Belgian set of the 'Eurobot' cup, during the Eastern break, and a local UCL cup, at the end of the year. A public overviewing presentation is also organized at the end of the year.
Content	Group work on the design of the energy system of an autonomous entity (e.g. neighbourhood, village, island, hotel). This activity builds on skills from both mechanics (thermal cycles, wind turbines, etc.) and electricity (network, converters, etc.).
Inline resources	https://moodleucl.uclouvain.be/course/view.php?id=8357
Bibliography	Durant toute l'année, les étudiants sont accompagnés par des tuteur académiques qu'ls rencontrent de façon régulière. En outre, des personnes ressources (étudiants moniteurs, assistants, staff technique) sont disponibles pour traiter des questions particulières, telles que le choix d'un composant mécanique, électrique ou électronique.
Faculty or entity in charge	ELME

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Electro-mechanical Engineering	ELME2M	6		