UCL Université catholique de Louvain

LMECA2840

2013-2014

Mechanical construction project II.

6.0 credits	45.0 h + 30.0 h	1+2q

Teacher(s) :	Raucent Benoît ; Ronsse Renaud ; Dehez Bruno ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	> http://icampus.uclouvain.be/claroline/course/index.php?cid=MECA2840
Prerequisites :	This course implements a global project overviewing topics that were previously covered in the courses LFSAB1501 (Project 1 - principles of technical drawing) and LMECA1210 (Description and analyze of mechanisms). Moreover, both LMECA2801 (Machine design) and LMECA2755 (Industrial automation), being taught together with the project first phase (first quadrimester of the Master in mechanical engineering), cover topics being fundamental to achieve the project. They are then considered as prerequisites for students coming from other fields than the first year of this master.
Aims :	The project mainly targets the acquisition of engineering skills similar to those being exploited in a mechanical design office or department. a. Disciplinary Learning Outcomes At the end of this course, students will be able to: 1. Analyze a problem proposed by a client from the industry, and write its corresponding specifications. E.g.: conveying of mechanical pieces, sorting and storing of coal, support for organic tissue cutting during a surgery, etc. 2. Achieve a pre-study of the device and present a pre-project to the client: 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 solution, including: the components dimensioning; the selection of standard materials and components (bearings, motors, gears); the production of a global drawing of the solution, and of detailed drawings for fabrication by using CAD software. 4. Build up a synthesis folder presenting all technical details of the selected solution (global drawing, nomenclature, calculations, ...) for the industrial client. b. Transversal Learning Outcomes At the end of this course, students will be able to: 5. Develop inventiveness while searching innovative solutions to an industrial problem. 6. 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 keep the client in the loop. · To make collective decisions. · To manage interpersonal relationships within the group, and to potentially solve conflicts in a constructive way. 7. Collect documentation and look for components from suppliers (describing the need, and selecting the most relevant component). 8. Perform a convincing public presentation by arguing on the decisions. 9. Apply the standards and norms in a particular domain. Perform a critical analysis of the functioning of the 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 :	Except exceptional situations, the evaluation takes the 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); -- final report; -- global and fabrication drawings; -- public presentation; -- the answers given to the questions raised by the audience. Groups for which the project would not be advanced enough after the dimensioning step will not be allowed to perform the public presentation at the end of the second quadrimester. They will have to autonomously perform complementary work that will be evaluated within the exam session of September. Moreover, this situation will also be applicable for individual students who would not have provided a fair personal contribution within their group.
Teaching methods :	a. Process organization Early in the year, students freely make group of 4 to 6 students and select a topic within a list showcasing brief problems from the industry. Thereafter, they meet their industrial client to clarify the needs and submit a specification list, being elaborated during the first weeks of the project. The pre-design goes on during the first quadrimester and is concluded by a presentation of the pre-project in front of the teaching staff. During the second quadrimester, students achieve the detailed design of the mechanical solution, including the full dimensioning and drawings. At the end of the year, a public overviewing presentation is organized, with the industrial clients as attendees. b. Supports Throughout the year, students are supported by a tutor they meet every week. Moreover, additional resource people are available to treat specific questions, e.g. regarding the selection of a mechanical or electrical component. Technological seminars are given by people from the industry (e.g. standards and norms, electrical entrainment, etc.). Reference manuscripts about the selection of components, drawings, and mechanical dimensioning are available at the library. Catalogs of standard components are available. All documents related to the project are available on iCampus.
Cycle and year of study :	> Master [120] in Mechanical Engineering > Master [120] in Biomedical Engineering
Faculty or entity in charge:	MECA