UCLouvain

lepl1504

2022

Project 4 (in mechanics)

5.00 credits	30.0 h + 22.5 h	Q2

Teacher(s)	Docquier Nicolas ;Fisette Paul ;
Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	This project assumes acquired: • the notions of three-dimensional kinematics and dynamics of the rigid body as seen in the LEPL1202 course as well as the kinematic principles of the basic mechanisms seen in the LMECA1210 course; • mastery of the following numerical methods: Newton-Raphson method, interpolation methods and numerical integration scheme as seen in the LEPL1104 course; • a sufficient mastery of the basic principles of the C language (language elements, programming, structures, pointers, compilation/execution), as seen in the LEPL1104 course or the LEPL1503 project.
Main themes	Bibliographic research and drafting of specifications; Development of the appropriate methodology to solve a problem Development of algorithms and programming (MATLAB, ROBOTRAN, etc.) Analysis of simulations and performance evaluation of the studied system. Report writing, final presentation.
Learning outcomes	**At the end of this learning unit, the student is able to :** Contribution of the course to the program framework With regard to the AA reference of the program "Bachelor in Engineering Sciences, orientation civil engineer", this course contributes to the development, acquisition and evaluation of the following learning outcomes: AA 1.1, 1.2 AA 2.3, 2.4, 2.7 AA 3.1, 3.2, 3.3 AA 4.2, 4.3, 4.5 Course specific learning outcomes The skills targeted by “projects 4” consist on the one hand of transversal skills, common to all projects 4, and on the other hand of disciplinary technical skills, specific to each specialization. Transversal skills : The 4 projects aim to acquire transversal skills close to the practice of the engineering profession in a varied disciplinary context: • analyze an existing system and improve it; • critically analyze experimental data; 1 • distinguish between reality and the models used to describe or modify it; • understand the notion of uncertainty in the management of the project, in its realization, and in the results obtained. The project will also give pride of place to the right to make mistakes, a characteristic component of a young engineer's early career. Disciplinary technical skills: • In small groups of students, develop a computer application allowing the simulation of complex multi-body systems. • Apply in a multidisciplinary way the skills acquired in mechanics (for example, in the fields of solid mechanics, dynamic systems, methods, etc.) and numerical methods (integration, resolution of nonlinear equations, etc.). • Acquire and use new knowledge and advanced techniques related to the application (consultation of scientific literature and reference books, contacts with experts, etc.). • Implement and test a technical solution and compare it with real data The contribution of this teaching unit to the development and mastery of the skills and achievements of the program(s) can be accessed at the end of this sheet, in the section "Programmes/training offering this teaching unit (TU)".

Evaluation methods	In this course, students are evaluated through : • a continuous assessment of the project which includes intermediate reports and presentations during the term, as well as a written report and presentation to be delivered at the end of the term, carried out in group; • an individual written exam at the end of the term (first session) or in the second session. To constitute the final grade, the weighting given to continuous assessment is : • 3/4 if the mark of the individual written exam is higher than 10/20 ; • 0 if the mark of the individual written exam is less than 6/20; • Linearly progressive between 0, if the score of the individual written exam is 6/20, and 3/4, if the score of the written exam is 10/20. The additional weighting corresponds to the individual examination. The intermediate reports and presentations as well as the final report and presentation are evaluated and all contribute to the group grade. The grade for the continuous assessment (including reports and oral presentations) can be individualized according to the student's involvement in the group during the term (mandatory attendance at activities, active participation in intermediate and assessed work). The work for which a continuous assessment mark is awarded may not be repeated in the second term; the continuous assessment mark acquired in the first term is retained in the event of a second term.
Teaching methods	Work in small groups under the supervision of a tutor; audience sessions for the introduction or restructuring of specific concepts useful for the realization of the project; intermediate presentations of the progress of the project.
Content	Bibliographic research and drafting of specifications; Development of the appropriate methodology to solve a problem Development of algorithms and programming (PYTHON, ROBOTRAN, etc.) Analysis of simulations and evaluation of the performance of the system studied. Report writing, final presentation.
Other infos	This course is part of the set of "Project 4" courses of the civil engineering baccalaureate program. The 4 projects share common transversal objectives but are available in various versions with distinct disciplinary objectives, corresponding to the program sectors. Each student chooses the project proposed by one of his courses.
Faculty or entity in charge	MECA

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Bachelor in Engineering	FSA1BA	5		🔍