UCLouvain

lelec1101

2024

Project in Electricity 1 : Electrical circuits

5.00 credits	30.0 h + 30.0 h	Q2

Teacher(s)	Craeye Christophe ;Dehez Bruno ;Oestges Claude (coordinator) ;
Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	**LEPL1201** and **LEPL1502**
Main themes	This project deals with the design, the simulation and the measurement of small electrical circuits implementing resistors, capacitors, inductors, operational amplifiers and sources. It is also strongly coupled with the course LELEC1370 (Measurements and Electrical Circuits).
Learning outcomes	**At the end of this learning unit, the student is able to :** **Contribution of the course to the program objectives (N°)** Axis 1 (1.1, 1.2, 1.3), Axis 2 (2.1, 2.2, 2.3, 2.4, 2.5), Axis 4 (4.1, 4.2, 4.4), Axis 5 (5.2, 5.3, 5.4, 5.5), Axis 6 (6.1, 6.3) **Specific learning outcomes of the course** At the end of the course, the student will be able to : 1 • Design electrical circuits consisting of several functional blocks and implementing resistors, capacitors, inductors, operational amplifiers and sources, on the basis of new knowledge acquired in the field of electricity, especially through the course LELEC1370 (Measurements and Electrical Circuits) • Model such circuits (functional block by functional block and globally) in order to size its components • Simulate these circuits (functional block by functional block and globally) using specialized software (LTSpice) • Build and test these circuits using standard measuring devices • Compare simulations and experimental results and interpret differences • Propose alternative solutions to the proposed circuits, based on a detailed argumentation • Establish the limits of validity of a model • Apply a system design approach by functional blocks • Present the results of a group project through a written report and an oral demonstration.
Evaluation methods	In this course, students are assessed by : • a continuous assessment of the project (in the first and second sessions), which includes a compulsory written report (2/3 of the continuous assessment grade) and a presentation (1/3 of the continuous assessment grade), carried out in group, and to be delivered at the end of the term; • an individual written examination, carried out in session. To calculate the final grade, the weighting given to the continuous assessment is : • 2/3 if the mark of the written exam is higher than 10/20 ; • 0 if the mark of the written exam is lower than 5/20; • linearly progressive between 0, if the mark of the individual written exam is 5/20, and 2/3, if the mark of the written exam is 10/20. The mark for the continuous assessment (including the report for 2/3 and the oral presentation for 1/3) is individualised according to the student's involvement in the group during the term (compulsory attendance at activities, with one-point malus per unjustified absence; active participation in intermediate homeworks and final works). The works for which a continuous assessment mark is awarded may not be repeated in the second session; the continuous assessment mark acquired in the first session is retained in the event of a second session. The use of generative AI software such as chatGPT is authorized for assistance in writing the reports requested as part of this course. In this instance, however, an appendix will be required detailing, for each of the sections concerned, how the AI was used (information search, drafting and/or correction of the text, ...). In addition, external information sources must be systematically cited in compliance with bibliographic referencing standards.
Teaching methods	Teaching consists in a project performed in groups of 4 to 6 students. The project involves the development of an electrical circuit implementing resistors, capacitors, inductors, operational amplifiers and sources. Examples include the development of an AM radio receiver, a precision balance or an active magnetic suspension. Depending on the project's annual theme, this teaching unit also addresses issues related to sustainable development and transition through interactive seminars led by stakeholders.

Content	The project is punctuated by classroom sessions, problems to solve autonomously and by supervised laboratory activities in close connection with the project. The project ends with the presentation of a synthesis report and a demonstration/presentation of the developed system.
Inline resources	Moodle https://moodle.uclouvain.be/course/view.php?id=1861
Bibliography	• Enoncé du projet, corrections et informations pratiques sur Moodle. • Support du cours lié (LELEC1370): Engineering Circuit Analysis, J.D. Irwin & R.M. Nelms, éd. J. Wiley and Sons, 2011
Other infos	The participation in this project requires the matering of basic concepts of electricity dispensed through LEPL1502 (Project 2).
Faculty or entity in charge	ELEC

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Specialization track in Electricity	FILELEC	5		🔍
Minor in Electricity	LMINOELEC	5		🔍
Mineure Polytechnique	MINPOLY	5		🔍