

Teacher(s)	Crucifix Michel ;Génévriez Matthieu ;
Language :	French > English-friendly
Place of the course	Louvain-la-Neuve
Prerequisites	It is recommended that students have sufficient knowledge of the notions of theoretical and experimental physics and computer science taught in the second annual block of the bachelor's program in physics to undertake personal work. We think in particular of the courses LPHYS1213, LPHYS1221, LPHYS1231, LPHYS1241, LPHYS1201 and LPHYS1202
Main themes	The objective of this teaching unit is to enable the student to have a first contact with the research in physical sciences through the realization of a project of limited scope (e.g., conduction of a small experiment and analysis of its results, realization of a theoretical calculation, development of a simple numerical model and analysis of its results, analysis and interpretation of data coming from an experiment or a numerical simulation, bibliographical study of a current problematic of physics, ...) within a research team under the supervision of a project leader.
Learning outcomes	<p><b>At the end of this learning unit, the student is able to :</b></p> <p><b>a. Contribution of the teaching unit to the learning outcomes of the programme</b></p> <p>AA1: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7                  AA2: 2.1, 2.2, 2.3, 2.4                  AA3: 3.1, 3.2, 3.3, 3.6                  AA4 : 4.1, 4.2, 4.3                  AA5 : 5.1, 5.3, 5.4                  AA6: 6.1, 6.3, 6.4, 6.5</p> <p><b>1 b. Specific learning outcomes of the teaching unit</b></p> <p>At the end of this teaching unit, the student will be able to: 1. appropriate a scientific question and implement a research methodology to answer it; 2. select the existing relevant bibliography on the subject under study and correctly cite the sources of information; 3. critically read and summarize a scientific article; 4. interact with members of a research team; 5. evaluate and argue the validity of a physical result; 6. represent complex physical results in graphical form; 7. write a small scientific report respecting the structure and style of the relevant field of physics; 8. orally present a research subject in physical sciences respecting time constraints and using adequate visual aids; 9. answer questions in a precise and concise manner.</p>
Evaluation methods	<p>A written report of three pages maximum, accompanied by two figures describing the project and its results must be submitted to Moodle in week 9 of the second term. The report is in the form of an article, with an abstract and a bibliographic list.</p> <p>The grade established by the teacher takes into account the appreciation of the project manager and the quality of the written work.</p>
Teaching methods	Introduction to the principles of scientific literature during a 2-hour course. Realization by the student of a research project of limited scope in physical sciences under the guidance of a manager. The different stages are: constitution of a relevant bibliography on the subject, reading and understanding of the selected articles, implementation and execution of the project, analysis and interpretation of the results obtained, writing of a summary report in the form of a article of 3 pages maximum with 2 figures maximum accompanied by a bibliography, reading of another student's report (principle of peer-review), and oral presentation of the report. To carry out this project, the student is immersed in a research group with which she can interact.
Content	This teaching unit consists of the realization by the student of a small research project in physical sciences supervised by a manager, who guides him in the resolution of the proposed problem. This project is being carried out within one of the UCLouvain research institutes in which the academic members of the School of Physics (ELI, IMCN, iMMC and IRMP) are assigned, in one of the federal scientific institutes in which researchers work. academic members of the School of Physics (Royal Observatory of Belgium and Institute of Space Aeronomy of Belgium), in a private company or in the hospital environment. In the first two cases, the person in charge is an academic member of the School of Physics. In the other two, it is a member of the host institution; however, an academic member of the School of Physics must vouch for the quality of the project.

	<p>Moreover, the person in charge of this course organizes a session during the month of October to introduce students to the principles underlying the production of scientific literature, in particular the peer-reviewed scientific article.</p> <p>The different possible subjects are communicated to the students during the month of October. They all require around twenty hours of work on the part of the student. The choice of the student must be made and communicated to the person in charge of the project he / she has selected and to the holder of the teaching unit for mid-November.</p>
Bibliography	Un portefeuille de lecture minimum est communiqué à l'étudiant.e en début de projet.
Faculty or entity in charge	PHYS

<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Bachelor in Physics	PHYS1BA	2		