

At Louvain-la-Neuve - 180 credits - 3 years - Day schedule - In French

Dissertation/Graduation Project : **NO** - Internship : **NO**

Activities in English: **YES** - Activities in other languages : **NO**

Activities on other sites : **NO**

Main study domain : **Sciences**

Organized by: **Faculty of Science (SC)**

Programme acronym: **PHYS1BA** - Francophone Certification Framework: 6

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PHYS1BA - Introduction

Introduction

Introduction

The physicist possesses great capacities of reasoning and abstraction. He/she continually asks questions about the physical world

PHYS1BA - Teaching profile

Learning outcomes

Understanding, explaining and applying the foundations of the scientific method and the fundamental laws of physics are the challenges that the student enrolled in the Bachelor in physics is preparing to meet in order to mobilize his/her knowledge and skills to follow the Master [120] in physics.

At the end of this programme, the student will have acquired a basic knowledge of the fundamental laws of physics and the basic concepts of mathematics necessary for the study of physics. He/she will be able to solve physics problems using mathematical and numerical tools, to analyze physical phenomena using experimental techniques, to model simple physical systems, to apply a scientific approach and to argument with rigor. He/she will have developed skills in self-reliance, communication and teamwork.

At the end of his/her training at the Faculty of Sciences, the student will have acquired the disciplinary and cross-disciplinary knowledge and skills needed to perform numerous professional activities. His/her modeling skills and in-depth understanding of phenomena, his/her liking for research and his/her scientific rigor will be sought not only in the scientific professions (research, development, teaching, etc.), but also more generally in the present and future Society.

On successful completion of this programme, each student is able to :

1.

Demonstrate a thorough knowledge of the fundamental laws of physics and master and use the basic concepts of mathematics.

1.1 Explain the basic concepts of general physics, microscopic physics, statistical physics, macroscopic physics, theoretical and mathematical physics, experimental physics, and numerical simulation in physics.

1.2 Use the basic tools of mathematical analysis, algebra, geometry and statistics.

1.3 Recognize the fundamental concepts of scientific theories.

1.4 Apply physical and mathematical theories to solve a problem.

1.5 Adequately employ the basic principles of experimental physics: measurements and their uncertainties, measuring instruments, basic data processing by computer tools.

1.6 Explain a measurement method.

1.7 Model simple systems and predict their evolution using numerical methods, including computer simulations.

1.8 Reconstitute the historical evolution of the basic concepts of physics.

2.

Demonstrate methodological, technical, and practical skills for problem solving in physics.

2.1 Justify the choice of methods and tools used to solve known problems in physics.

2.2 Properly use instruments to perform a measurement or study a physical system.

2.3 Correctly handle computer tools to help solve problems in physics.

2.4 Apply basic tools to model simple physical systems and solve known problems in the fundamental areas of physics.

3.

Describe and evaluate a scientific approach and reasoning.

3.1 Evaluate the simplicity, clarity and rigor of a scientific reasoning.

3.2 Build physical reasoning and formalize it.

3.3 Argue the validity of a scientific result.

3.4 Calculate the orders of magnitude of a problem in physics.

3.5 Recognize the analogies between different problems in physics.

3.6 Judge the relevance of a scientific approach and the interest of a physical theory.

4.

Learn and act independently.

4.1 Search, with relevant references, for additional information on the basic concepts of physics.

4.2 Read and interpret this information alone.

4.3 Integrate this information in order to have a complete understanding of a concept.

4.4 Organize and manage time and study.

5.

Work in a team and collaborate with students and teachers to achieve common goals and produce results.

5.1 Share knowledge and methods.

5.2 Identify individual and collective goals and responsibilities and work in accordance with these roles.

5.3 Join a team.

5.4 Recognize and respect the views and opinions of team members.

6.

LPHYS1221

List of available minors

In addition to the major in physics, the student has three possibilities :

- opting for the additional module in physics ;
- opting for a minor or additional module offered by
 - the Faculty of Sciences :
 - Minor in mathematics
 - Minor in geography
 - Minor in scientific culture
 - Additional module in statistics and data sciences

- the Louvain School of Engineering :

NB : The choice of such a minor must be done in concertation with the study advisers of the School of Physics and Louvain School of Engineering

- - Minor in computer sciences
 - Minor in engineering sciences : applied mathematics
 - Minor in engineering sciences : mechanics
 - Minor in engineering sciences : applied chemistry and physics
 - Minor in engineering sciences : electricity
 - Minor in engineering sciences : biomedical
 - Minor in engineering sciences: construction
- opting for one of the following minors proposed by the Sector of Human Sciences :
 - Minor in culture and creation
 - Minor in sustainable development (*this program is subject to access criteria*)
 - Minor in the study of the kind

> [Minor in Culture and Creation](#) [*en-prog-2024-mincucrea*]

> [Minor in Scientific Culture](#) [*en-prog-2024-mincults*]

> [Minor : Issues of Transition and Sustainable Development \(*\)](#)

o Training in mathematics

o LMAT1121	Differential and integral calculus	Cécile Coyette (compensates Tom Claeys)	EB [q1] [30h +30h] [5 Credits]
o LMAT1122	Mathematical analysis : differentiation	Augusto Ponce	EB [q2] [45h +45h] [8 Credits]
o LMAT1131	Linear Algebra	Marino Gran	EB [q1] [45h +45h] [8 Credits]
o LMAT1141	Geometry I	Pascal Lambrechts	EB [q2] [45h +30h] [7 Credits]

o Training in digital and instrumental techniques, data science and computer science

o LMAFY1101	Data exploration and introduction to statistical inference	Anouar El Ghouch	EB [q2] [30h +30h] [5 Credits]
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o Training in chemistry

o LCHM1112	General Chemistry	Yaroslav Filinchuk	EB [q1] [30h +22.5h] [5 Credits]
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o Training in languages and human sciences

o English



PHYS1BA - 3RD ANNUAL UNIT

- Mandatory
- ⊗ Optional
- △ Not offered in 2024-2025
- ⊖ Not offered in 2024-2025 but offered the following year
- ⊕ Offered in 2024-2025 but not the following year
- △ ⊕ Not offered in 2024-2025 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🚫🌐 Not open to incoming exchange students
- (FR) Teaching language (FR, EN, ES, NL, DE, ...)

Click on the course title to see detailed informations (objectives, methods, evaluation...)

o Majeure**o Advanced training in physics**

● LPHYS1322	Electromagnetism 2	Céline Degrande	(FR) [q1] [37.5h +22.5h] [5 Credits] 🌐 > English- friendly
● LPHYS1342	Quantum Physics 2	Christophe Ringeval	(FR) [q1] [45h +22.5h] [5 Credits] 🌐 > English- friendly
● LPHYS1343	Statistical physics	Christian Walmsley Hagendorf	(FR) [q2] [45h +30h] [6 Credits] 🌐 > English- friendly

o Specialized training in physics

● LPHYS1345	Solid state physics	Eduardo Cortina Gil	(FR) [q2] [30h +22.5h] [5 Credits] 🌐 > English- friendly
● LPHYS1346	Physique subatomique	Christophe Delaere	(FR) [q2] [22.5h +22.5h] [5 Credits] 🌐
● LPHYS1347	Physique atomique et moléculaire	Matthieu Génévriez Clément Lauzin	(FR) [q2] [22.5h +22.5h] [5 Credits] 🌐

o Training in digital and instrumental techniques, data science and computer science

● LPHYS1303	Numerical Simulation in Physics	Francesco Ragone	(FR) [q1] [22.5h +30h] [5 Credits] 🌐 > English- friendly
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o Training in languages and human sciences**o English**

● LANG1863



PHYS1BA - Information

Access Requirements

Decree of 7 November 2013 defining the landscape of higher education and the academic organization of studies.

The admission requirements must be met prior to enrolment in the University.

In the event of the divergence between the different linguistic versions of the present conditions, the French version shall prevail.

SUMMARY

- [General access requirements](#)
- [Specific access requirements](#)
- [Access based on validation of professional experience](#)
- [Special requirements to access some programmes](#)

General access requirements

Except as otherwise provided by other specific legal provisions, admission to undergraduate courses leading to the award of a Bachelor's degree will be granted to students with one of the following qualifications :

1. A Certificate of Upper Secondary Education issued during or after the 1993-1994 academic year by an establishment offering full-time secondary education or an adult education centre in the French Community of Belgium and, as the case may be, approved if it was issued by an educational institution before 1 January 2008 or affixed with the seal of the French Community if it was issued after this date, or an equivalent certificate awarded by the Examination Board of the French Community during or after 1994;
2. A Certificate of Upper Secondary Education issued no later than the end of the 1992-1993 academic year, along with official documentation attesting to the student's ability to pursue higher education for students applying for a full-length undergraduate degree programme;
3. A diploma awarded by a higher education institution within the French Community that confers an academic degree issued under the above-mentioned Decree, or a diploma awarded by a university or institution dispensing full-time higher education in accordance with earlier legislation;
4. A higher education certificate or diploma awarded by an adult education centre;
5. A pass certificate for one of the [entrance examinations](#) organized by higher education institutions or by an examination board of the French Community; this document gives admission to studies in the sectors, fields or programmes indicated therein;
6. A diploma, certificate of studies or other qualification similar to those mentioned above, issued by the Flemish Community of Belgium, the German Community of Belgium or the Royal Military Academy;
7. A diploma, certificate of studies or other qualification obtained abroad and deemed equivalent to the first four mentioned above by virtue of a law, decree, European directive or international convention;

Note:

Requests for equivalence must be submitted to the Equivalence department ([Service des équivalences](#)) of the Ministry of Higher Education and Scientific Research of the French Community of Belgium in compliance with the official deadline.

The following two qualifications are automatically deemed equivalent to the Certificate of Upper Secondary Education (Certificat d'enseignement secondaire supérieur – CESS):

- European Baccalaureate issued by the Board of Governors of a European School,
- International Baccalaureate issued by the International Baccalaureate Office in Geneva.

8. Official documentation attesting to a student's ability to pursue higher education (diplôme d'aptitude à accéder à l'enseignement supérieur - DAES), issued by the Examination Board of the French Community.

Specific access requirements

- Access to bachelor programmes for candidates of nationality outside the European Union who are not assimilated to Belgian nationals is subject to the following criteria:
 - not have obtained a secondary education diploma for more than 3 years maximum. Example: for an admission application for the academic year 2024-2025, you must have obtained your diploma during the academic years 2021-2022, 2022-2023 ou 2023-2024. In the French Community of Belgium, the academic year runs from September 14 to September 13
 - not already hold an undergraduate degree
- Candidates, whatever their nationality, with a secondary school diploma **from a country outside the European Union**, must have obtained an average of 13/20 minimum or, failing that, have obtained this average, have passed one year of study in Belgium (for example special Maths / sciences). A non-successful year will not be taken into consideration.

Teaching method

During the first annual unit :

- Sessions are organized around working method issues such as how to approach different subjects and time management.
- Tutorials allow students to take stock of the subjects presented at the courses: teachers in each discipline answer questions and explain the less understood concepts.
- Compulsory tests are organized one month after the start of classes in the first semester.

During the three annual units :

- Exercise and laboratory sessions are organized in small groups and supervised by assistants. Some practicals are subject to knowledge checks at the beginning of the session and reports to be written at the end of the session.
- Personal and / or group work is planned for certain activities.
- Websites are associated with most teaching units : useful information for the student is deposited there.

Evaluation

The evaluation methods comply with the [regulations concerning studies and exams](#). More detailed explanation of the

Acronym

PHYS

Postal address

