UCLouvain

PHYS1BA

2024 - 2025

Bachelor in Physics

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.

Communicate in French and English as part of his academic training.

6.1 Read and understand scientific texts in French and English (C1 CEFR level).


Year

Course prerequisites

The **table** below lists the activities (course units, or CUs) for which there are one or more prerequisites within the programme, i.e. the programme CU for which the learning outcomes must be certified and the corresponding credits awarded by the jury before registering for that CU.

These activities are also identified **in the detailed programme**: their title is followed by a yellow square.

Prerequisites and student's annual programme

As the prerequisite is for CU registration puposes only, there are no prerequisites within a programme year. Prerequisites are defined between CUs of different years and therefore influence the order in which the student will be able to register for the programme's CUs.

Training in mathematics

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

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

LMAFY1101	Data exploration and introduction to statiscal inference	Anouar El Ghouch	FR [q2] [30h +30h] [5 Credits]

Training in chemistry

LCHM1112	General Chemistry	Yaroslav Filinchuk	FR [q1] [30h +22.5h] [5 Credits]

Training in languages and human sciences

English

LANG1861	English: reading and listening comprehension of scientific texts	Catherine Avery (coord.) Fanny Desterbecq Amandine Dumont (coord.) Marc Piwnik	EN [q2] [10h] [3 Credits]

PHYS1BA - 2ND 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...)

Majeure

Basic training in physics

LMAT1261	Lagrangian and Hamiltonian mechanics	Christian Walmsley Hagendorf	FR [q1] [22.5h +30h] [5 Credits] > English-friendly
LPHYS1221	Electromagnetism 1	Gwenhaël de Wasseige Vincent Lemaitre	FR [q1] [52.5h +52.5h] [10 Credits]

Advanced training in physics

LPHYS1213	Physics of fluids	Eric Deleersnijder Vincent Legat	FR [q2] [37.5h +30h] [5 Credits]
LPHYS1231	Special Relativity	Marco Drewes	FR [q2] [30h +15h] [5 Credits]
LPHYS1241	Quantum Physics 1	Agni Bethani Matthieu Génévriez	EN [q2] [30h +30h] [5 Credits]

Training in mathematics

LMAT1222	Complex analysis 1	Tom Claeys	FR [q2] [30h +15h] [5 Credits] > English-friendly
LPHYS1202	Mathematical methods for physics	Céline Degrande	FR [q1] [30h +30h] [5 Credits]

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

LPHYS1201	Computer Science and Numerical Methods	Giacomo Bruno	FR [q1] [30h +45h] [6 Credits]

Training in languages and human sciences

English

LANG1862	English: reading and listening comprehension of scientific texts	Ahmed Adrioueche (coord.) Catherine Avery Ariane Halleux (coord.) Adrien Kefer (compensates Amandine Dumont)	EN [q1] [30h] [2 Credits]

Religious sciences

The student chooses one teaching unit among

LTECO2100	Sociétés, cultures, religions : Biblical readings	Hans Ausloos	FR [q1] [15h] [2 Credits]
LTECO2200	Societies-cultures-religions : Human Questions	Pedro Dusabamahoro Valinho Gomes	FR [q1] [15h] [2 Credits]
LTECO2300	Societies, cultures, religions : Ethical questions	Marcela Lobo Bustamante	FR [q1] [15h] [2 Credits]

Minor or additional module

The student completes his.her training by choosing either the annual module in physics, or a minor or additional module in the list proposed for the Bachelor in physics, for a total of 30 credits. He.she distributes the teaching units according to the following model: 10 credits during the second semester of the second annual unit, 10 or 15 credits during the first semester of the third annual unit and 10 or 5 credits during the second semester of the third annual unit.
Maximum 1 element(s)

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...)

Majeure

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	FR [q2] [45h +30h] [6 Credits] > English-friendly

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	FR [q2] [22.5h +22.5h] [5 Credits]

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

Training in languages and human sciences

English

LANG1863	English for Students in Sciences (Upper-Intermediate level)	Ahmed Adrioueche (coord.) Catherine Avery (coord.) Amandine Dumont (coord.) Sandrine Jacob (coord.) Adrien Kefer (compensates Amandine Dumont) Nevin Serbest Florence Simon (coord.) Marine Volpe	EN [q1 or q2] [30h] [2 Credits]

Philosophy

LSC1120A	Philosophy	Charles Pence	FR [q1] [45h] [2 Credits]

Optional courses

These credits are not counted within the 120 required credits.

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

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 maxi7.0rmmmmu9Qs TJ 1 0 Examinaave6overn2cave612.8 Tfi subject

- For any secondary school diploma **from a European Union country**, the admission request must contain the equivalence of your diploma or, at the very least, proof of the filing of the equivalence request with the Wallonia-Brussels Federation (French Community of Belgium). For any information relating to obtaining an equivalence, please refer to the following site.
- For any secondary school diploma **from a country outside the European Union**, the admission application must contain the equivalence of your diploma issued by the Wallonia-Brussels Federation (French Community of Belgium). If you have a restrictive equivalence for the programme of your choice, in addition of it, you **must** have either the DAES or a certificate of successful completion of the examination giving access to 1st cycle studies when you submit your application

Access based on validation of professional experience

Admission to undergraduate studies on the basis of accreditation of knowledge and skills obtained through professional or personal experience (Accreditation of Prior Experience)

Subject to the general requirements laid down by the authorities of the higher education institution, with the aim of admission to the undergraduate programme, the examination boards accredit the knowledge and skills that students have obtained through their professional or personal experience.

This experience must correspond to at least five years of documented activity, with years spent in higher education being partially taken into account: 60 credits are deemed equivalent to one year of experience, with a maximum of two years being counted. At the end of an assessment procedure organized by the authorities of the higher education institution, the Examination Board will decide whether a student has sufficient skills and knowledge to successfully pursue undergraduate studies.

After this assessment, the Examination Board will determine the additional courses and possible exemptions constituting the supplementary requirements for the student's admission.

Special requirements to access some programmes

- Admission to **undergraduate studies in engineering: civil engineering and architect**

  Pass certificate for the special entrance examination for undergraduate studies in engineering: civil engineering and architect.

  Admission to these courses is always subject to students passing the special entrance examination. Contact the faculty office for the programme content and the examination arrangements.
- Admission to **undergraduate studies in veterinary medicine**

  Admission to undergraduate studies in veterinary medicine is governed by the Decree of 16 June 2006 regulating the number of students in certain higher education undergraduate courses (non-residents).
- Admission to **undergraduate studies in physiotherapy and rehabilitation**

  Admission to undergraduate studies in physiotherapy and rehabilitation is governed by the Decree of 16 June 2006 regulating the number of students in certain higher education undergraduate courses (non-residents).
- Admission to **undergraduate studies in psychology and education: speech and language therapy**

  Admission to undergraduate studies in psychology and education: speech and language therapy is governed by the Decree of 16 June 2006 regulating the number of students in certain higher education undergraduate courses (non-residents).
- Admission to **undergraduate studies in medicine and dental science**

  Admission to undergraduate studies in medecine and dental science is governed by the Decree of 16 June 2006 regulating the number of students in certain higher education undergraduate courses (non-residents).

  Note: students wishing to enrol for a **Bachelor's degree in Medicine** or a **Bachelor's degree in dental science** must first sit an aptitude test (fr).
- Access to **Bachelor of Science in Business Engineering**

  The Bachelor of Science in Business Engineering is a joint program organised by KU Leuven and UCLouvain Saint-Louis Bruxelles. In order to register, all candidate must first submit an application via the KU Leuven admission platform. The conditions of access to this programme are specific.

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

Acronym	PHYS
Postal address	Chemin du Cyclotron 2 - bte L7.01.04 1348 Louvain-la-Neuve Tel: +32 (0) 10 47 32 94 - Fax: +32 (0) 10 47 30 68
Website	https://uclouvain.be/fr/facultes/sc/phys

Academic supervisor: Vincent Lemaitre

Jury

- President: Christian Walmsley Hagendorf
- Secretary: Christophe Delaere
- Study advisor: Clément Lauzin

Useful Contact(s)

- Administrative manager for the student's annual program: Nathalie Micha