PHYS1BA - Introduction

Introduction

Introduction

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.

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).
6.2 Follow a scientific presentation in English (level B2 CEFR).
6.3 Orally present a topic in a structured way in French and / or English.
6.4 Write scientific reports in a structured way and cite the sources correctly.
6.5 Use a variety of media and computer tools to communicate and explain scientific concepts and results.

Programme structure

The programme leading to the Bachelor degree in physics consists of (1) a general training called major in physics (150 credits) and (2) either an additional module in physics (30 credits) or a minor or additional module in another discipline (30 credits). It is spread over

				Year 1	2	3
LPHYS1221	Electromagnetism 1	Gwenhaël de Wasseige Vincent Lemaitre	TD [q1] [52.5h+52.5h] [10 Credits]		x	

				Year 1	2	3
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.) Françoise Stas Marine Volpe	EN [q1 or q2] [30h] [2 Credits]			x

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 developement *(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 (*) *[en-prog-2024-mindd]*
> Minor in Gender Studies *[en-prog-2024-mingenre]*
> Minor in Geography *[en-prog-2024-mingeog]*
> Minor in Computer Sciences *[en-prog-2024-minsinf]*
> Additionnal module in Physics *[en-prog-2024-apphys]*
> Approfondissement en statistique et sciences des données *[en-prog-2024-appstat]*
> Minor in numerical technologies and society *[en-prog-2024-minstic]*
> Minor in Mechanics *[en-prog-2024-lminomeca]*
> Minor in Construction *[en-prog-2024-lminogce]*
> Minor in Electricity *[en-prog-2024-lminoelec]*
> Minor in Applied Chemistry and Physics *[en-prog-2024-minofyki]*
> Minor in Applied Mathematics *[en-prog-2024-lminomap]*
> Minor in Mathematics *[en-prog-2024-minmath]*
> Mineure Polytechnique *[en-prog-2024-minpoly]*

(*) This programme is the subject of access criteria

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.

In addition, when the jury validates a student's individual programme at the beginning of the year, it ensures its coherence, meaning that it may:

- require the student to combine registration in two separate CUs which it considers necessary from a pedagogical point of view.
- transform a prerequisite into a corequisite if the student is in the final year of a degree course.

For more information, please consult the

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]

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

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.) Françoise Stas Marine Volpe

- 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 1

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	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