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## MINPHYS - Introduction

### Introduction

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#### Introduction

The minor in physics offers additional training in physics that facilitates access to the [Master \[120\] in Physics](#) and the [Master \[60\] in Physics](#)

## MINPHYS - Teaching profile

### Learning outcomes

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.

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.

### Programme

#### DETAILED PROGRAMME BY SUBJECT

- Mandatory
- ⌘ Optional
- △ Not offered in 2021-2022
- ⊗ Not offered in 2021-2022 but offered the following year
- ⊕ Offered in 2021-2022 but not the following year
- △ ⊕ Not offered in 2021-2022 or the following year
- Activity with requisites
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

30 crédits

The student chooses 30 credits among :

Year

2 3

#### o Content:

⌘ LCHM1112	General Chemistry	Yaroslav Filinchuk	FR [q1] [30h+22.5h] [5 Credits]	X	
⌘ LPHYS1112	Mechanics 2 and thermodynamics	Thierry Fichet Vincent Lemaître	FR [q2] [52.5h+45h] [10 Credits]	X	

Year

2 3

⌘ LPHYS1112A	Mechanics 2 and thermodynamics : Mechanics 2	Thierry Fichet Vincent Lemaitre	FR [q2] [30h+22.5h] [5 Credits]	x	
⌘ LPHYS1112B	Mechanics 2 and thermodynamics : thermodynamics	Thierry Fichet Vincent Lemaitre	FR [q2] [22.5h+22.5h] [5 Credits]	x	
⌘ LPHYS1213	Physics of fluids	Eric Deleersnijder Vincent Legat	FR [q2] [37.5h+30h] [5 Credits]	x	
⌘ LPHYS1214	Astronomy and geophysics	Véronique Dehant Patricia Lampens	FR [q2] [22.5h+15h] [5 Credits]	x	
⌘ LPHYS1221	Electromagnetism 1	Jan Govaerts	FR [q1] [52.5h+52.5h] [10 Credits]	x	
⌘ LPHYS1221A	Electromagnetism 1	Jan Govaerts	FR [q1] [40h+40h] [7 Credits]	x	
⌘ LPHYS1231	Special Relativity	Jean-Marc Gérard	FR [q2] [30h+15h] [5 Credits]	x	
⌘ LPHYS1241	Quantum Physics 1	Marco Drewes	FR [q2] [30h+30h] [5 Credits]	x	
⌘ LPHYS1303	Numerical Simulation in Physics	Michel Crucifix Francesco Ragone	FR [q2] [22.5h+30h] [4 Credits]		x
⌘ LPHYS2211	Group theory	Philippe Ruelle	FR [q2] [22.5h+22.5h] [5 Credits]		x
⌘ LPHYS1322	Electromagnetism 2 🟡	Jan Govaerts	FR [q1] [37.5h+22.5h] [5 Credits]		x
⌘ LPHYS1332	General Relativity 🟡	Jean-Marc Gérard	FR [q1] [30h+22.5h] [4 Credits]		x
⌘ LPHYS1342	Quantum Physics 2 🟡	Christophe Ringeval	FR [q1] [45h+22.5h] [5 Credits]		x
⌘ LPHYS1343	Statistical physics 🟡	Christian Walmsley Hagendorf	FR [q2] [45h+30h] [6 Credits]		x
⌘ LPHYS1344	subatomic, atomic and molecular physics 🟡	Clément Lauzin Vincent Lemaitre Xavier Urbain	FR [q2] [45h+45h] [6 Credits]		x
⌘ LPHYS1345	Solid state physics 🟡	Giacomo Bruno Christophe Delaere	FR [q2] [30h+22.5h] [4 Credits]		x

## THE PROGRAMME'S COURSES AND LEARNING OUTCOMES

For each UCLouvain training programme, a [reference framework of learning outcomes](#) specifies the skills expected of every graduate on completion of the programme. Course unit descriptions specify targeted learning outcomes, as well as the unit's contribution to reference framework of learning outcomes.

## MINPHYS - Information

### Access Requirements

The minor in physics is offered to Bachelor's students in mathematics, geography, general orientation, and engineering, civil engineering orientation. It is also accessible, on the advice of the study advisor, to students who have received sufficient training in physics and mathematics.

### Evaluation

**The evaluation methods comply with the regulations concerning studies and exams (<https://uclouvain.be/fr/decouvrir/rgee.html>). More detailed explanation of the modalities specific to each learning unit are available on their description sheets under the heading "Learning outcomes evaluation method".**

### Possible trainings at the end of the programme

Bachelor's students in mathematics, geography, general orientation, and engineering, civil engineering orientation, who have followed this minor will be admitted to the Master [120] in physics and the Master [60] in physics. Their programme will usually include some of the teaching units of the Bachelor in physics that they have not followed. The same rule applies to other students who have followed this minor, with possible restrictions depending on their training. However, the student wishing to make such a change is invited to contact as soon as possible the study advisors of his school and the School of Physics.

### Contacts

#### Curriculum Management

Entity	
Structure entity	SST/SC/PHYS
Denomination	(PHYS)
Faculty	Faculty of Science (SC)
Sector	Sciences and Technology (SST)
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 <a href="https://uclouvain.be/fr/facultes/sc/phys">https://uclouvain.be/fr/facultes/sc/phys</a>
Website	<a href="https://uclouvain.be/fr/facultes/sc/phys">https://uclouvain.be/fr/facultes/sc/phys</a>

Academic supervisor: [Michel Crucifix](https://uclouvain.be/repertoires/michel.crucifix) (<https://uclouvain.be/repertoires/michel.crucifix>)

Useful Contact(s)

- Study advisor for physics: [philippe.ruelle@uclouvain.be](mailto:philippe.ruelle@uclouvain.be)
- Administrative manager for the annual program of the student registered in the Faculty of sciences: [Nathalie Micha](https://uclouvain.be/repertoires/nathalie.micha) (<https://uclouvain.be/repertoires/nathalie.micha>)
- Secretary of the School of physics: [Catherine De Roy](https://uclouvain.be/repertoires/catherine.deroy) (<https://uclouvain.be/repertoires/catherine.deroy>)

### Practical informations

#### Registration for the minor

A registration for the 2nd annual unit via the web allows you to register for a minor (the student who wishes to change his/her choice of additional module or minor must contact the secretariat of his/her faculty). The student may defer his/her registration to a minor and proceed with this operation when he/she registers on line for the teaching units of his/her major.

When the student re-enrolls via the web the following year, he/she is automatically re-enrolled in the same minor as the previous year. At this stage, any request for change is subject to the approval of the study advisor.

#### Registration for the teaching units of the minor

The registration for the teaching units of a minor is done at the same time as the registration to the teaching units of the major. The same goes for exam registration.

**Timetable of courses and examinations**

<https://uclouvain.be/fr/facultes/sc/horaires-ti.html> (<https://uclouvain.be/fr/facultes/sc/horaires-ti.html>)

