



# Bachelor in Physics

The 2024-2025 programme is subject to change. It is provided for information purposes only.

## Programme mnemonic

BA-PHYS

## Studies level

Bachelor

## Learning language

french

## Schedule

office hours

## Studies category / subcategory

Sciences and technics / Sciences

## Campus

Plaine and Solbosch

works (~50%), they develop projects during the “Printemps des Sciences” (Bloc 2) and under the supervision of a faculty researcher from one of the teams in the Physics Department (Bloc 3). A visit of the European laboratory of particle physics, CERN, in Geneva, is organized in Bloc 3.

ULB is the only complete university located in the capital of Europe. Almost one third of the students are foreigners and this very valuable multi cultural environment favours its international relationships.

The ULB Physics Department has several research groups of international reputation having obtained scientific awards, some being very prestigious. It also hosts the worldwide known International Solvay Institutes for Physics and Chemistry.

In the 1<sup>st</sup> year each student may be chaperoned by older students and is entitled to individual guidance in physics, chemistry and mathematics. Each student has access to online exercises on the “Virtual University”.

Facilities at your disposal:

- > general physics laboratories and leading-edge research laboratories.
- > the ULB physics “Experimentarium” : a museum of experiments and also an interactive, constantly evolving, laboratory.
- > study rooms.
- > computer rooms.
- > libraries.
- > online courses and practicals on the « Virtual University ».

## Programme objectives

Physicists explore the world and build new knowledge from experimental observations and reasoning. To reach that goal they need to become **experts in mathematics and in computer science** but they also need to develop their **creativity and innovative capacity**. It is then that they become capable of establishing new methods and new tools to solve present and future problems rigorously and efficiently.

A degree in physics and the skills gained should render the students well versed in areas ranging from **medicine to finance** through **pure and applied sciences**.

Physics is a fascinating field, but one that will require determination and the ability to work autonomously.

## Programme's added value

Physicists are trained to solve new and complex problems. Right from the first year they have to face experimental and theoretical situations. In addition to the many exercises and laboratory

## Teaching methods

From the first year, various teaching methods are used: lectures, practicals (exercises and laboratory), interactive seminars, homework and personal work. Practicals represent about 50% of the time.

## Succeed in your studies

Choose





The information and guidance counsellors at the InfOR-études [<https://www.ulb.be/en/studies-info-desk-1>] service will help you choose your studies throughout the year.

**Succeed**

Take part in preparatory courses [<https://www.ulb.be/en/studies-info-desk-1>] or get help to succeed [<https://www.ulb.be/en/studies-info-desk-1>], before or during your studies.

**Get help**

Apply for financial aid, look for accommodation or a student job, get support [<https://www.ulb.be/fr/aides-services-et-accompagnement/aid-services-and-support-1>] for your specific needs.

## International/Openness

Exchange agreements, from 6 months to one year, with other universities in Belgium and abroad have been set up for students from bloc 3 onwards (optional). Courses taken in partner universities are officially recognized by ULB at the end of the BA.

## Job opportunities

If you go on to do a Master in Physics, you have the option of working in the following areas:

- > Pure research (physics, biophysics, geophysics, astrophysics).

- > Applied research (physics, nuclear medicine, image reconstruction, materials science, meteorology, telecommunications, energy production).
- > Research and Development (various sectors of engineering, computer science, actuaries).
- > Teaching (physics, mathematics, computer science).
- > Consultancy.

Due to their analytical problem solving skills, physicists with a master's degree are very much in demand.

### Contacts

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 <https://sciences.ulb.be/departement-physique>

### Jury President

Ioana Codrina MARIS

### Jury Secretary

Bernard KNAEPEN



# Bachelor in Physics

At ULB, an emphasis is put on understanding the scientific method and students are well prepared for careers in both pure and applied research. Teaching follows the most recent research results.

During the three first years (BA), students receive the necessary basic education in mathematics (32%), physics (51%) and chemistry (6%). This is complemented by English (3%), computer science (5%) and some optional subjects (3%), aiming to either broaden the students' scientific culture or to increase their knowledge of English. An ability to take initiative is very important and will be exercised both when it comes to your individual work or to placement within a research team in the physics department, per your choice.

The various topics covered are:

- > Classical and 20<sup>th</sup> century physics
- > Quantum mechanics
- > Statistical and non-linear physics
- > Astronomy and astrophysics
- > Fundamental interactions and materials physics

## Bloc 1 | BA-PHYS

### Cours obligatoires

CHIM-F101	<b>Chimie générale</b>   Thierry VISART DE BOCARME (Coordinator), François RENIERS and Laurence RONGY ⌚ 10 credits [lecture: 72h, tutorial classes: 36h, practical work: 12h, project: 24h] 📅 first and second terms 🗨️ French
MATH-F101	<b>Calcul différentiel et intégral I</b>   Bruno PREMOSELLI (Coordinator) and Mélanie BERTELSON ⌚ 15 credits [lecture: 90h, tutorial classes: 90h] 📅 first and second terms 🗨️ French
MATH-F121	<b>Géométrie analytique et calcul matriciel</b>   Anna Vanden Wyngaerd (Coordinator) ⌚ 5 credits [lecture: 24h, tutorial classes: 24h] 📅 first term 🗨️ French
MATH-F122	<b>Algèbre linéaire</b>   Joost VERCRUYSE (Coordinator) and Ignace LORIS ⌚ 10 credits [lecture: 54h, tutorial classes: 54h] 📅 academic year 🗨️ French
PHYS-F110	<b>Physique générale I et II</b>   Pascal VANLAER (Coordinator), Michele SFERRAZZA and Sophie VAN ECK ⌚ 20 credits [lecture: 96h, tutorial classes: 102h, practical work: 42h] 📅 first and second terms 🗨️ French

# Bachelor in Physics

## Bloc 2 | BA-PHYS

### Cours obligatoires

- INFO-F207 **Informatique** | Sébastien CLESSE (Coordinator)  
 5 credits [lecture: 24h, tutorial classes: 24h] 📅 first term 🗣️ French
- LANG-F201 **Anglais scientifique I** | Alexander CORNFORD (Coordinator)  
 5 credits [tutorial classes: 48h] 📅 second term 🗣️ English
- MATH-F201 **Calcul différentiel et intégral II** | Antoine GLORIA (Coordinator)  
 10 credits [lecture: 60h, tutorial classes: 60h] 📅 first and second terms 🗣️ French
- MATH-F204 **Mécanique analytique** | Frank FERRARI (Coordinator) and Glenn BARNICH  
 10 credits [lecture: 60h, tutorial classes: 60h] 📅 first and second terms 🗣️ French
- PHYS-F201 **Thermodynamique** | Nicolas CHAMEL (Coordinator)  
 5 credits [lecture: 36h, tutorial classes: 24h] 📅 second term 🗣️ French
- PHYS-F202 **Relativité, électromagnétisme et optique ondulatoire** | Petr TINIAKOV (Coordinator)  
 10 credits [lecture: 72h, tutorial classes: 48h] 📅 first and second terms 🗣️ French
- PHYS-F203 **Introduction à la mécanique quantique** | Serge MASSAR (Coordinator)  
 5 credits [lecture: 30h, tutorial classes: 30h] 📅 second term 🗣️ French
- PHYS-F210 **Laboratoires, statistique appliquée à la physique expérimentale et projet** | Ioana Codrina MARIS (Coordinator), Juan Antonio AGUILAR SANCHEZ, Stéphane CLEMMEN and Sébastien CLESSE  
 10 credits [lecture: 24h, tutorial classes: 24h, practical work: 72h, project: 72h] 📅 academic year 🗣️ French

# Bachelor in Physics

## Bloc 3 | BA-PHYS

### Cours obligatoires

- MATH-F314 **Mathématiques pour la physique** | Riccardo ARGURIO (Coordinator), Denis BONHEURE and Bernard KNAEPEN  
 ⌚ 10 credits [lecture: 66h, tutorial classes: 54h] 📅 first term 🗨️ French
- PHYS-F302 **Mécanique quantique** | Frank FERRARI (Coordinator) and Sébastien CLESSE  
 ⌚ 10 credits [lecture: 66h, tutorial classes: 54h] 📅 first and second terms 🗨️ French
- PHYS-F303 **Physique statistique** | Pierre GASPARD (Coordinator) and Bortolo Matteo MOGNETTI  
 ⌚ 10 credits [lecture: 60h, tutorial classes: 60h] 📅 first and second terms 🗨️ French
- PHYS-F304 **Spectrophysique et Astrophysique** | Sophie VAN ECK (Coordinator) and Pierre-François COHEUR  
 ⌚ 5 credits [lecture: 44h, tutorial classes: 16h] 📅 second term 🗨️ French
- PHYS-F305 **Physique des particules et Physique Nucleaire** | Laurent FAVART (Coordinator) and Michele SFERRAZZA  
 ⌚ 5 credits [lecture: 42h, tutorial classes: 18h] 📅 first and second terms 🗨️ French
- PHYS-F308 **Soft Matter and Solid State Physics** | Patricia Maria LOSADA PEREZ (Coordinator) and Simone NAPOLITANO  
 ⌚ 5 credits [lecture: 40h, tutorial classes: 20h] 📅 first and second terms 🗨️ English
- PHYS-F311 **Laboratoires et Stage de recherche** | Barbara CLERBAUX (Coordinator), Juan Antonio AGUILAR SANCHEZ, Gilles DE LENTDECKER, Patricia Maria LOSADA PEREZ, Ioana Codrina MARIS, Simone NAPOLITANO and Simona TOSCANO  
 ⌚ 10 credits [practical work: 72h, field trips: 24h] 📅 second term 🗨️ French

### Cours optionnels

*One course chosen from the following*

- BIOL-F102 (optional) **Biologie générale** | Patrick MARDULYN (Coordinator) and Etienne MEYLAN  
 ⌚ 5 credits [lecture: 48h] 📅 second term 🗨️ French
- ENVI-F1001 (optional) **Sciences de la Terre, Environnement et Société** | Pierre REGNIER (Coordinator), Jean-Michel DECROLY and Frank PATTYN  
 ⌚ 5 credits [lecture: 48h] 📅 first and second terms 🗨️ French
- ETHI-F201 (optional) **Sciences, éthique, histoire et société** | Grégoire Wallenborn (Coordinator) and Eric MURAILLE  
 ⌚ 5 credits [lecture: 48h] 📅 second term 🗨️ French
- ETHI-F301 (optional) **Science et Société : analyse de controverses scientifiques** | Patrick MARDULYN (Coordinator) and Grégoire Wallenborn  
 ⌚ 5 credits [lecture: 24h, project: 70h] 📅 first term 🗨️ French
- LANG-F301 (optional) **Anglais scientifique II** | Hugh MURPHY (Coordinator) and Alexander CORNFORD  
 ⌚ 5 credits [tutorial classes: 48h] 📅 first term 🗨️ English
- PHYS-F105 (optional) **La structure de l'univers** | Alain JORISSEN (Coordinator) and Rodrigo ALVAREZ  
 ⌚ 5 credits [lecture: 48h] 📅 first term 🗨️ French
- PHYS-F314 (optional) **Electronique** | Gilles DE LENTDECKER (Coordinator), Juan Antonio AGUILAR SANCHEZ and Yifan YANG  
 ⌚ 5 credits [lecture: 24h, tutorial classes: 6h, practical work: 30h] 📅 first term 🗨️ French
- PHYS-F317 (optional) **How To Make (almost) Any Experiment Using Digital Fabrication** | Denis TERWAGNE (Coordinator)  
 ⌚ 5 credits [lecture: 24h, practical work: 36h] 📅 first term 🗨️ French

PHYS-H302  
(optional)

### Éléments d'optique physique

🕒 5 credits [lecture: 24h, tutorial classes: 12h, practical work: 24h] 📅 second term 🗨️ French

TEMP-0000  
(optional)

### Cours extérieurs au programme

🕒 5 credits 📅 academic year 🗨️ French

