

Master in Physics

Focus Research





Physics is concerned with the fundamental laws that govern nature. From elementary particles to the universe at large, physics explores all possible scales, allowing a better understanding of the structure of matter and how to predict its behaviour.

ULB's Master in Physics provides a comprehensive education in physics covering in particular:

- > Plasma physics
- > Nuclear physics
- > Elementary particle and astroparticle physics
- > Fundamental interaction physics
- > Quantum physics
- > Astrophysics and cosmology
- > Statistical physics
- > Complex systems physics
- > Nonlinear optics
- > Condensed matter physics
- > Hydrodynamics

Bloc 1 | M-PHYSA | MA-PHYS

Cours obligatoires









- STAG-F015 **Stage dans un service du département I** | Juan Antonio AGUILAR SANCHEZ (Coordinator) and Michele SFERRAZZA
 5 credits [seminars: 60h]  first and second terms  French
- STAG-F016 **Stage dans un service du département II** | Juan Antonio AGUILAR SANCHEZ (Coordinator) and Michele SFERRAZZA
 5 credits [seminars: 60h]  first and second terms  French

Cours à options

Choisir 50 crédits parmi les cours suivants (en veillant à choisir un minimum de 20 crédits par quadrimestre). Les cours sont répartis en cours à option présentés en modules thématiques et en cours d'intérêt général. L'étudiant peut choisir ses cours dans plusieurs modules thématiques. [Note: pour un souci de cohérence, certains cours sont repris dans plusieurs modules différents.] L'étudiant peut aussi choisir n'importe quel autre cours (y inclus ceux de Bloc 2).

A total of 50 credits chosen from the following

Module thématique: Astrophysique et microphysique

- PHYS-F412 **Dynamique des fluides et des plasmas** | Bernard KNAEPEN (Coordinator)
 (optional) 5 credits [lecture: 36h, tutorial classes: 12h]  first term  English/French
- PHYS-F415 **Cosmologie** | Thomas HAMBYE (Coordinator) and Laura LOPEZ HONOREZ
 (optional) 5 credits [lecture: 24h, tutorial classes: 24h]  second term  French
- PHYS-F426 **Mécanique des milieux continus : hydrodynamique et solides déformables** | Fabian BRAU (Coordinator) and Gregory KOZYREFF
 (optional) 5 credits [lecture: 24h, tutorial classes: 24h]  second term  French
- PHYS-F431 **Advanced condensed matter physics and quantum many-body systems** | Nathan GOLDMAN (Coordinator)
 (optional) 5 credits [lecture: 36h, tutorial classes: 12h]  second term  English

- PHYS-F432 (optional) **Théorie de la gravitation** | Stéphane DETOURNAY (Coordinator) and Frank FERRARI
 5 credits [lecture: 36h, tutorial classes: 24h] 📅 first term 🗨️ French
- PHYS-F434 (optional) **Stellar Atmospheres** | Sophie VAN ECK (Coordinator)
 5 credits [lecture: 36h, tutorial classes: 12h] 📅 second term 🗨️ English
 Ce cours est donné un an sur deux.
- PHYS-F438 (optional) **Astrophysics** | Alain JORISSEN (Coordinator)
 5 credits [lecture: 36h, tutorial classes: 12h] 📅 first term 🗨️ English
- PHYS-F463 (optional) **Théorie quantique des collisions et applications aux réactions nucléaires** | Pierre DESCOUVEMONT (Coordinator)
 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨️ French
 Ce cours est donné un an sur deux.
- PHYS-F467 (optional) **Astroparticle physics** | Juan Antonio AGUILAR SANCHEZ (Coordinator) and Ioana Codrina MARIS
 5 credits [lecture: 36h, tutorial classes: 12h] 📅 second term 🗨️ English
- Module thématique: Interactions fondamentales**
- PHYS-F410 (optional) **Quantum field theory I** | Petr TINIAKOV (Coordinator)
 5 credits [lecture: 24h, tutorial classes: 24h] 📅 first term 🗨️ English
- PHYS-F415 (optional) **Cosmologie** | Thomas HAMBYE (Coordinator) and Laura LOPEZ HONOREZ
 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨️ French
- PHYS-F416 (optional) **Physique des particules** | Barbara CLERBAUX (Coordinator)
 5 credits [lecture: 36h, tutorial classes: 12h] 📅 first term 🗨️ French
- PHYS-F420 (optional) **Particle detection, data acquisition and analysis** | Gilles DE LENTDECKER (Coordinator), Ioana Codrina MARIS and Pascal VANLAER
 5 credits [lecture: 12h, tutorial classes: 12h, practical work: 24h] 📅 first term 🗨️ English
- PHYS-F422 (optional) **Modèle standard des interactions fondamentales** | Thomas HAMBYE (Coordinator) and Laura LOPEZ HONOREZ
 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨️ French
- PHYS-F432 (optional) **Théorie de la gravitation** | Stéphane DETOURNAY (Coordinator) and Frank FERRARI
 5 credits [lecture: 36h, tutorial classes: 24h] 📅 first term 🗨️ French
- PHYS-F440 (optional) **Quantum Field Theory II** | Riccardo ARGURIO (Coordinator)
 5 credits [lecture: 36h, tutorial classes: 12h, project: 12h] 📅 second term 🗨️ English
- PHYS-F467 (optional) **Astroparticle physics** | Juan Antonio AGUILAR SANCHEZ (Coordinator) and Ioana Codrina MARIS
 5 credits [lecture: 36h, tutorial classes: 12h] 📅 second term 🗨️ English
- PHYS-F477 (optional) **Physics of Strong Interactions** | Laurent FAVART (Coordinator)
 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨️ English
- PHYS-F478 (optional) **Solitons and instantons in quantum field theory** | Michel TYTGAT (Coordinator)
 5 credits [lecture: 36h, tutorial classes: 12h] 📅 second term 🗨️ English/French
 Ce cours n'est pas donné en 2022-23, 2024-25, etc.
- Module thématique: Matière, rayonnement et complexité**
- PHYS-F407 (optional) **Polymer physics** | Simone NAPOLITANO (Coordinator)
 5 credits [lecture: 24h, practical work: 24h] 📅 first term 🗨️ French
- PHYS-F411 (optional) **Physique non-linéaire** | Thomas GILBERT (Coordinator)
 5 credits [lecture: 36h, tutorial classes: 12h] 📅 first term 🗨️ French
- PHYS-F412 (optional) **Dynamique des fluides et des plasmas** | Bernard KNAEPEN (Coordinator)
 5 credits [lecture: 36h, tutorial classes: 12h] 📅 first term 🗨️ English/French
- PHYS-F421 (optional) **Nucleosynthesis** | Stéphane GORIELY (Coordinator)
 5 credits [lecture: 36h, tutorial classes: 12h] 📅 second term 🗨️ English
 Ce cours n'est pas donné en 2022-23, 2024-25, etc.



PHYS-F426 (optional)	Mécanique des milieux continus : hydrodynamique et solides déformables Fabian BRAU (Coordinator) and Gregory KOZYREFF ⌚ 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨 French
PHYS-F431 (optional)	Advanced condensed matter physics and quantum many-body systems Nathan GOLDMAN (Coordinator) ⌚ 5 credits [lecture: 36h, tutorial classes: 12h] 📅 second term 🗨 English
PHYS-F442 (optional)	Physique statistique II Pierre GASPARD (Coordinator) and PATRICK GROSFILS ⌚ 5 credits [lecture: 36h, tutorial classes: 12h, project: 12h] 📅 first term 🗨 French
PHYS-F446 (optional)	Processus stochastiques et systèmes complexes Thomas GILBERT (Coordinator) ⌚ 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨 French
PHYS-F474 (optional)	Quantum optics Stéphane CLEMMEN (Coordinator) and Serge MASSAR ⌚ 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨 English
PHYS-F476 (optional)	Optique non linéaire et physique des lasers Mustapha TLIDI (Coordinator) ⌚ 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨 French
PHYS-F481 (optional)	Simulation methods in statistical physics Bortolo Matteo MOGNETTI (Coordinator) ⌚ 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨 English
PHYS-F509 (optional)	Quantum Information Theory Stefano PIRONIO (Coordinator) ⌚ 5 credits [lecture: 24h, tutorial classes: 24h] 📅 first term 🗨 English/French
PHYS-F517 (optional)	How To Make (almost) Any Experiment Using Digital Fabrication Denis TERWAGNE (Coordinator) ⌚ 5 credits [lecture: 24h, practical work: 24h] 📅 first term 🗨 French
<h2>Cours d'intérêt général</h2>	
HULB-0000 (optional)	Cours externe à l'Université ⌚ 5 credits 📅 academic year
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-F427 (optional)	Méthodes asymptotiques en physique Gregory KOZYREFF (Coordinator) and Fabian BRAU ⌚ 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨 French
PHYS-F482 (optional)	Advanced techniques of experimental physics Denis TERWAGNE (Coordinator), Juan Antonio AGUILAR SANCHEZ and Pascal VANLAER ⌚ 5 credits [lecture: 24h, practical work: 24h] 📅 first term 🗨 English
PHYS-F484 (optional)	Gravitational Waves Sébastien CLESSE (Coordinator), Nicolas CHAMEL and Geoffrey COMPERE ⌚ 5 credits [lecture: 36h, tutorial classes: 12h] 📅 second term 🗨 English
PHYS-F485 (optional)	Representation of groups and application to physics Geoffrey COMPERE (Coordinator) and Giulio COLLINUCCI ⌚ 5 credits [lecture: 36h, tutorial classes: 12h, project: 10h] 📅 first term 🗨 English
PHYS-H302 (optional)	Eléments d'optique physique Marc HAELTERMAN (Coordinator) ⌚ 5 credits [lecture: 24h, tutorial classes: 12h, practical work: 24h] 📅 second term 🗨 French

Autres cours

Moyennant l'approbation du jury, l'étudiant peut aussi choisir n'importe quel autre cours dans la liste suivante :

- > les cours du bloc 2 du Master en sciences physiques
- > les cours du Master : Ingénieur civil physicien de l'Ecole polytechnique de Bruxelles
- > les cours du Master en sciences mathématiques
- > les cours du Master en sciences chimiques

ou n'importe quel autre cours (y compris hors ULB)

HULB-0000 (optional)	Cours externe à l'Université ⌚ 5 credits 📅 academic year
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TEMP-0000
(optional)

Cours extérieurs au programme

🕒 5 credits 📅 academic year 🗨️ French



Master in Physics

Focus Research

Bloc 2 | M-PHYSA | MA-PHYS

Tronc commun

MEMO-F534 **Mémoire** | Bortolo Matteo MOGNETTI (Coordinator) and Patricia Maria LOSADA PEREZ
 30 credits [mfe/tfe: 360h] first and second terms

Cours à options

Choisir 30 crédits, qui seront spécifiques à la finalité, parmi les cours suivants, ainsi que ceux listés en bloc 1. L'étudiant peut aussi choisir n'importe quel autre cours moyennant l'approbation du jury.

A total of 30 credits chosen from the following

Module thématique: Astrophysique et microphysique

GEOL-F4003 (optional) **Origine de la vie et son évolution sur Terre** | Steeve BONNEVILLE (Coordinator)
 5 credits [lecture: 36h] first term French

GEOL-F4004 (optional) **Cosmoschimie et planétologie** | Vinciane DEBAILLE (Coordinator) and Alain JORISSEN
 5 credits [lecture: 36h] first term
 Ce cours est donné un an sur deux.

PHYS-F414 (optional) **Structure et évolution stellaire** | Lionel SIESS (Coordinator)
 5 credits [lecture: 36h, tutorial classes: 12h] second term French
 Ce cours n'est pas donné en 2022-23, 2024-25, etc.

PHYS-F450 (optional) **Météorologie dynamique** | Stéphane VANNITSEM (Coordinator)
 5 credits [lecture: 24h, tutorial classes: 24h] first term French

Module thématique: Interactions fondamentales

PHYS-F417 (optional) **Advanced Quantum Field Theory** | Glenn BARNICH (Coordinator)
 5 credits [lecture: 36h, tutorial classes: 12h] first term English

PHYS-F418 (optional) **Advanced general relativity** | Glenn BARNICH (Coordinator)
 5 credits [lecture: 36h, tutorial classes: 12h] second term English
 Ce cours n'est pas donné en 2022-2023, 2024-25, etc.

PHYS-F469 (optional) **Physics beyond the standard model** | Thomas HAMBYE (Coordinator) and Michel TYTGAT
 5 credits [lecture: 36h, tutorial classes: 12h, seminars: 12h] first term English

PHYS-F483 (optional) **Théorie des cordes** | Giulio COLLINUCCI (Coordinator)
 5 credits [lecture: 36h, tutorial classes: 12h] second term French
 Ce cours est donné un an sur deux.

Module thématique: Matière, rayonnement et complexité

PHYS-F450 (optional) **Météorologie dynamique** | Stéphane VANNITSEM (Coordinator)
 5 credits [lecture: 24h, tutorial classes: 24h] first term French

PHYS-F475 (optional) **Nanophysics** | Pierre GASPARD (Coordinator) and James LUTSKO
 5 credits [lecture: 24h, tutorial classes: 24h, project: 36h] first term English

PHYS-F480
(optional) **Physics of Interfaces** | Patricia Maria LOSADA PEREZ (Coordinator)
🕒 5 credits [lecture: 24h, practical work: 24h] 📅 first term 🗨 English

PHYS-F512
(optional) **Molecular motors and stochastic processes** | Pierre GASPARD (Coordinator)
🕒 5 credits [lecture: 36h, tutorial classes: 24h] 📅 first term 🗨 English

Cours d'intérêt général

One course chosen from the following

One course chosen from the following

HULB-0000
(optional) **Cours externe à l'Université**
🕒 5 credits 📅 academic year

HULB-0000
(optional) **Cours externe à l'Université**
🕒 10 credits 📅 academic year

STAG-F017
(optional) **Stage en entreprise, hôpital ou centre de recherche non académique** | Stéphane GORIELY (Coordinator)
🕒 10 credits [work placement: 120h] 📅 first and second terms 🗨 French



Master in Physics

Focus Teaching

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- > Plasma physics
- > Nuclear physics
- > Elementary particle and astroparticle physics
- > Fundamental interaction physics
- > Quantum physics
- > Astrophysics and cosmology
- > Statistical physics
- > Complex systems physics
- > Nonlinear optics
- > Condensed matter physics
- > Hydrodynamics

Bloc 1 | M-PHYSD | MA-PHYS

Cours obligatoires

- PEDA-E510 **Pédagogie et didactique, aspects généraux** | Thomas BARRIER (Coordinator), Maud Delepière and Nathanaël FRIANT
 ⌚ 5 credits [lecture: 60h] 📅 first term 🗨️ French
- PHYS-F510 **Didactique de la physique (du secondaire et du supérieur)** | Sébastien CLESSE (Coordinator) and PHILIPPE LEONARD
 ⌚ 5 credits [lecture: 36h] 📅 first term 🗨️ French
- STAG-F015 **Stage dans un service du département I** | Juan Antonio AGUILAR SANCHEZ (Coordinator) and Michele SFERRAZZA
 ⌚ 5 credits [seminars: 60h] 📅 first and second terms 🗨️ French
- STAG-F018 **Stage et pratique réflexive I** | Serge MASSAR (Coordinator), Laura LOPEZ HONOREZ and Michele SFERRAZZA
 ⌚ 5 credits [project: 45h, work placement: 105h] 📅 first and second terms 🗨️ French

Cours optionnels

Choisir 40 crédits parmi les cours suivants (en veillant à choisir un minimum de 20 crédits par quadrimestre). Les cours sont répartis en cours à option présentés en modules thématiques et en cours d'intérêt général. L'étudiant peut choisir ses cours dans plusieurs modules thématiques. [Note: pour un souci de cohérence, certains cours sont repris dans plusieurs modules différents.] L'étudiant peut aussi choisir n'importe quel autre cours (y inclus ceux de Bloc 2) moyennant l'approbation du jury.

A total of 40 credits chosen from the following

Module thématique: Astrophysique et microphysique

- PHYS-F412 **Dynamique des fluides et des plasmas** | Bernard KNAEPEN (Coordinator)
 (optional) ⌚ 5 credits [lecture: 36h, tutorial classes: 12h] 📅 first term 🗨️ English/French
- PHYS-F415 **Cosmologie** | Thomas HAMBYE (Coordinator) and Laura LOPEZ HONOREZ
 (optional) ⌚ 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨️ French
- PHYS-F421 **Nucleosynthesis** | Stéphane GORIELY (Coordinator)
 (optional) ⌚ 5 credits [lecture: 36h, tutorial classes: 12h] 📅 second term 🗨️ English
- Ce cours n'est pas donné en 2022-23, 2024-25, etc.

PHYS-F426 (optional)	<p>Mécanique des milieux continus : hydrodynamique et solides déformables Fabian BRAU (Coordinator) and Gregory KOZYREFF</p> <p>🕒 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨️ French</p>
PHYS-F431 (optional)	<p>Advanced condensed matter physics and quantum many-body systems Nathan GOLDMAN (Coordinator)</p> <p>🕒 5 credits [lecture: 36h, tutorial classes: 12h] 📅 second term 🗨️ English</p>
PHYS-F432 (optional)	<p>Théorie de la gravitation Stéphane DETOURNAY (Coordinator) and Frank FERRARI</p> <p>🕒 5 credits [lecture: 36h, tutorial classes: 24h] 📅 first term 🗨️ French</p>
PHYS-F434 (optional)	<p>Stellar Atmospheres Sophie VAN ECK (Coordinator)</p> <p>🕒 5 credits [lecture: 36h, tutorial classes: 12h] 📅 second term 🗨️ English</p> <p>Ce cours est donné un an sur deux.</p>
PHYS-F438 (optional)	<p>Astrophysics Alain JORISSEN (Coordinator)</p> <p>🕒 5 credits [lecture: 36h, tutorial classes: 12h] 📅 first term 🗨️ English</p>
PHYS-F463 (optional)	<p>Théorie quantique des collisions et applications aux réactions nucléaires Pierre DESCOUVEMONT (Coordinator)</p> <p>🕒 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨️ French</p> <p>Ce cours est donné un an sur deux.</p>
PHYS-F467 (optional)	<p>Astroparticle physics Juan Antonio AGUILAR SANCHEZ (Coordinator) and Ioana Codrina MARIS</p> <p>🕒 5 credits [lecture: 36h, tutorial classes: 12h] 📅 second term 🗨️ English</p>
Module thématique: Interactions fondamentales	
PHYS-F410 (optional)	<p>Quantum field theory I Petr TINIAKOV (Coordinator)</p> <p>🕒 5 credits [lecture: 24h, tutorial classes: 24h] 📅 first term 🗨️ English</p>
PHYS-F415 (optional)	<p>Cosmologie Thomas HAMBYE (Coordinator) and Laura LOPEZ HONOREZ</p> <p>🕒 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨️ French</p>
PHYS-F416 (optional)	<p>Physique des particules Barbara CLERBAUX (Coordinator)</p> <p>🕒 5 credits [lecture: 36h, tutorial classes: 12h] 📅 first term 🗨️ French</p>
PHYS-F420 (optional)	<p>Particle detection, data acquisition and analysis Gilles DE LENTDECKER (Coordinator), Ioana Codrina MARIS and Pascal VANLAER</p> <p>🕒 5 credits [lecture: 12h, tutorial classes: 12h, practical work: 24h] 📅 first term 🗨️ English</p>
PHYS-F422 (optional)	<p>Modèle standard des interactions fondamentales Thomas HAMBYE (Coordinator) and Laura LOPEZ HONOREZ</p> <p>🕒 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨️ French</p>
PHYS-F432 (optional)	<p>Théorie de la gravitation Stéphane DETOURNAY (Coordinator) and Frank FERRARI</p> <p>🕒 5 credits [lecture: 36h, tutorial classes: 24h] 📅 first term 🗨️ French</p>
PHYS-F440 (optional)	<p>Quantum Field Theory II Riccardo ARGURIO (Coordinator)</p> <p>🕒 5 credits [lecture: 36h, tutorial classes: 12h, project: 12h] 📅 second term 🗨️ English</p>
PHYS-F467 (optional)	<p>Astroparticle physics Juan Antonio AGUILAR SANCHEZ (Coordinator) and Ioana Codrina MARIS</p> <p>🕒 5 credits [lecture: 36h, tutorial classes: 12h] 📅 second term 🗨️ English</p>
PHYS-F477 (optional)	<p>Physics of Strong Interactions Laurent FAVART (Coordinator)</p> <p>🕒 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨️ English</p>
PHYS-F478 (optional)	<p>Solitons and instantons in quantum field theory Michel TYTGAT (Coordinator)</p> <p>🕒 5 credits [lecture: 36h, tutorial classes: 12h] 📅 second term 🗨️ English/French</p> <p>Ce cours n'est pas donné en 2022-23, 2024-25, etc.</p>
Module thématique: Matière, rayonnement et complexité	
PHYS-F407 (optional)	<p>Polymer physics Simone NAPOLITANO (Coordinator)</p> <p>🕒 5 credits [lecture: 24h, practical work: 24h] 📅 first term 🗨️ French</p>
PHYS-F411 (optional)	<p>Physique non-linéaire Thomas GILBERT (Coordinator)</p> <p>🕒 5 credits [lecture: 36h, tutorial classes: 12h] 📅 first term 🗨️ French</p>



PHYS-F412 (optional)	Dynamique des fluides et des plasmas Bernard KNAEPEN (Coordinator) ⌚ 5 credits [lecture: 36h, tutorial classes: 12h] 📅 first term 🗨 English/French
PHYS-F421 (optional)	Nucleosynthesis Stéphane GORIELY (Coordinator) ⌚ 5 credits [lecture: 36h, tutorial classes: 12h] 📅 second term 🗨 English Ce cours n'est pas donné en 2022-23, 2024-25, etc.
PHYS-F431 (optional)	Advanced condensed matter physics and quantum many-body systems Nathan GOLDMAN (Coordinator) ⌚ 5 credits [lecture: 36h, tutorial classes: 12h] 📅 second term 🗨 English
PHYS-F442 (optional)	Physique statistique II Pierre GASPARD (Coordinator) and PATRICK GROSFILS ⌚ 5 credits [lecture: 36h, tutorial classes: 12h, project: 12h] 📅 first term 🗨 French
PHYS-F446 (optional)	Processus stochastiques et systèmes complexes Thomas GILBERT (Coordinator) ⌚ 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨 French
PHYS-F474 (optional)	Quantum optics Stéphane CLEMMEN (Coordinator) and Serge MASSAR ⌚ 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨 English
PHYS-F476 (optional)	Optique non linéaire et physique des lasers Mustapha TLIDI (Coordinator) ⌚ 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨 French
PHYS-F481 (optional)	Simulation methods in statistical physics Bortolo Matteo MOGNETTI (Coordinator) ⌚ 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨 English
PHYS-F509 (optional)	Quantum Information Theory Stefano PIRONIO (Coordinator) ⌚ 5 credits [lecture: 24h, tutorial classes: 24h] 📅 first term 🗨 English/French
PHYS-F517 (optional)	How To Make (almost) Any Experiment Using Digital Fabrication Denis TERWAGNE (Coordinator) ⌚ 5 credits [lecture: 24h, practical work: 24h] 📅 first term 🗨 French
Cours d'intérêt général	
HULB-0000 (optional)	Cours externe à l'Université ⌚ 5 credits 📅 academic year
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-F427 (optional)	Méthodes asymptotiques en physique Gregory KOZYREFF (Coordinator) and Fabian BRAU ⌚ 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨 French
PHYS-F482 (optional)	Advanced techniques of experimental physics Denis TERWAGNE (Coordinator), Juan Antonio AGUILAR SANCHEZ and Pascal VANLAER ⌚ 5 credits [lecture: 24h, practical work: 24h] 📅 first term 🗨 English
PHYS-F484 (optional)	Gravitational Waves Sébastien CLESSE (Coordinator), Nicolas CHAMEL and Geoffrey COMPERE ⌚ 5 credits [lecture: 36h, tutorial classes: 12h] 📅 second term 🗨 English
PHYS-F485 (optional)	Representation of groups and application to physics Geoffrey COMPERE (Coordinator) and Giulio COLLINUCCI ⌚ 5 credits [lecture: 36h, tutorial classes: 12h, project: 10h] 📅 first term 🗨 English
PHYS-H302 (optional)	Eléments d'optique physique Marc HAELTERMAN (Coordinator) ⌚ 5 credits [lecture: 24h, tutorial classes: 12h, practical work: 24h] 📅 second term 🗨 French



Master in Physics

Focus Teaching

Bloc 2 | M-PHYSD | MA-PHYS

Cours obligatoires

- EDUC-E520 **Aspects socio-historiques, psychologiques, culturels, éthiques et de neutralité de l'enseignement** | Jose-Luis WOLFS (Coordinator), Sylviane BACHY, Camille Tilleul and Philippe VIENNE
 5 credits [lecture: 60h] first and second terms French
- MEMO-F535 **Mémoire** | Bortolo Matteo MOGNETTI (Coordinator) and Patricia Maria LOSADA PEREZ
 30 credits [mfe/tfe: 360h] first and second terms
- STAG-F019 **Stages et pratique réflexive II** | Serge MASSAR (Coordinator), Laura LOPEZ HONOREZ and Michele SFERRAZZA
 10 credits [project: 45h, work placement: 105h] first and second terms French

Cours optionnels

Choisir 15 crédits parmi les cours suivants, ainsi que ceux listés en bloc 1. L'étudiant peut aussi choisir n'importe quel autre cours moyennant l'approbation du jury.

A total of 15 credits chosen from the following

Module thématique: Astrophysique et microphysique

- GEOL-F4003 (optional) **Origine de la vie et son évolution sur Terre** | Steeve BONNEVILLE (Coordinator)
 5 credits [lecture: 36h] first term French
- GEOL-F4004 (optional) **Cosmoschimie et planétologie** | Vinciane DEBAILLE (Coordinator) and Alain JORISSEN
 5 credits [lecture: 36h] first term
 Ce cours est donné un an sur deux.
- PHYS-F414 (optional) **Structure et évolution stellaire** | Lionel SIESS (Coordinator)
 5 credits [lecture: 36h, tutorial classes: 12h] second term French
 Ce cours n'est pas donné en 2022-23, 2024-25, etc.
- PHYS-F450 (optional) **Météorologie dynamique** | Stéphane VANNITSEM (Coordinator)
 5 credits [lecture: 24h, tutorial classes: 24h] first term French

Module thématique: Interactions fondamentales

- PHYS-F417 (optional) **Advanced Quantum Field Theory** | Glenn BARNICH (Coordinator)
 5 credits [lecture: 36h, tutorial classes: 12h] first term English
- PHYS-F418 (optional) **Advanced general relativity** | Glenn BARNICH (Coordinator)
 5 credits [lecture: 36h, tutorial classes: 12h] second term English
 Ce cours n'est pas donné en 2022-2023, 2024-25, etc.
- PHYS-F469 (optional) **Physics beyond the standard model** | Thomas HAMBYE (Coordinator) and Michel TYTGAT
 5 credits [lecture: 36h, tutorial classes: 12h, seminars: 12h] first term English
- PHYS-F483 (optional) **Théorie des cordes** | Giulio COLLINUCCI (Coordinator)
 5 credits [lecture: 36h, tutorial classes: 12h] second term French
 Ce cours est donné un an sur deux.

Module thématique: Matière, rayonnement et complexité

PHYS-F450
(optional)

Météorologie dynamique | Stéphane VANNITSEM (Coordinator)

🕒 5 credits [lecture: 24h, tutorial classes: 24h] 📅 first term 🗨️ French

PHYS-F475
(optional)

Nanophysics | Pierre GASPARD (Coordinator) and James LUTSKO

🕒 5 credits [lecture: 24h, tutorial classes: 24h, project: 36h] 📅 first term 🗨️ English

PHYS-F480
(optional)

Physics of Interfaces | Patricia Maria LOSADA PEREZ (Coordinator)

🕒 5 credits [lecture: 24h, practical work: 24h] 📅 first term 🗨️ English

PHYS-F512
(optional)

Molecular motors and stochastic processes | Pierre GASPARD (Coordinator)

🕒 5 credits [lecture: 36h, tutorial classes: 24h] 📅 first term 🗨️ English

Cours d'intérêt général

One course chosen from the following

HULB-0000
(optional)

Cours externe à l'Université

🕒 5 credits 📅 academic year

HULB-0000
(optional)

Cours externe à l'Université

🕒 10 credits 📅 academic year

