

PHYS1BA

2013 - 2014

Bachelor in Physics

At Louvain-la-Neuve - 180 credits - 3 years - Day schedule - In frenchDissertation/Graduation Project : **NO** - Internship : **NO**Activities in English: **YES** - Activities in other languages : **NO**Activities on other sites : **NO**Main study domain : **Sciences**Organized by: **Faculté des sciences (SC)**Programme code: **phys1ba** - European Qualifications Framework (EQF): 6**Table of contents**

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PHYS1BA - Introduction

PHYS1BA - Admission

Decree of March 31st 2004 defining higher education and favoring the integration of higher education and university refinancing in the European area)

The admission conditions must be fulfilled at the time of [enrolment at university](#).

[> General Condition](#)

[> Special Conditions](#)

[> Knowledge of the French language exam](#)

General Conditions

Except as otherwise provided by other special legal provisions and with a view to obtaining the academic degree that recognises them, admission to undergraduate courses is granted to students with either:

- A certificate of Further Secondary Education issued from the academic year 1993–1994 by a fully fledged secondary education establishment or a school of Continuing Education in the French Community and approved by the Board created for that purpose, and holders of the same certificate issued from the 1994 calendar year by the education board of the French Community;
- or a certificate of Further Secondary Education issued not later than the end of the school year 1992–1993 accompanied, for admission to degree-length undergraduate studies, by a proficiency diploma giving access to higher education;
- or a diploma issued by a higher education establishment of the French Community recognising an academic degree, or a diploma issued by a university institution or an establishment dispensing full-time higher education under previous legislation;
- or a higher education certificate issued by an improvement courses establishment;
- a pass certificate for one of the [entrance examinations](#) co-ordinated by the higher education establishments or by a French Community education board and whose curricula are approved by the Government after consultation, according to the sector, with the Interuniversity Council of the French Community (Conseil interuniversitaire de la Communauté française – CIUF) or the General Council of the Hautes Ecoles (Conseil général des Hautes Ecoles – CGHE); this certificate gives admission to studies in relevant sectors or fields;
- or a diploma, certificate or secondary school certificate similar to those mentioned above issued by the Flemish Community (this certificate does not give exemption from the [French Language Proficiency](#) exam), by the German-speaking Community or the Royal Military School;
- of a diploma, certificate or secondary school certificate outside Belgium and recognised as equivalent to those mentioned above.

Requests for equivalence must be submitted to the [Service des équivalences](#) of the Ministry of Higher Education and Scientific Research of the French Community of Belgium before 15 July 2013.

Notes: the two following certificates are automatically recognised as equivalent to the Certificate of Upper Secondary Education (Certificat d'enseignement secondaire supérieur – CESS): the European baccalaureat issued by the High Council of European Schools; the international baccalaureate issued by the International Baccalaureate Office, Geneva.

However, neither certificate automatically gives exemption from the [French Language Proficiency](#) exam;

- or a proficiency diploma giving access to higher education (diplôme d'aptitude à accéder à l'enseignement supérieur – DAES) conferred by the French Community examination board.

Exam of knowledge of the French language

Anyone not demonstrating sufficient [French language proficiency](#) will not be admitted to the first-year undergraduate examinations.

Special Conditions

- 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 studies is always subject to passing the special entrance examination. The contents of the programme and the form of the examination may be obtained from the Secretariat of this faculty.

- 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 medicine 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).

In the event of the divergence between the different linguistic versions of the present conditions, the French version shall prevail

PHYS1BA - Information

Learning outcomes

The programme aims at the acquisition of : Mastery of the basic concepts and fundamental laws of physics The specific approach of the physicist, namely that of comprehension, critical analysis and modelling the physical phenomena of nature, with the help of mathematical and numerical tools and experimental techniques proper to physics Professional qualities such as the capacity to analyse problems related to physics, abstraction and modelling; rigour in reasoning and expression; a critical mind; self-evaluation capacities and communication skills.

Teaching method

En première année :

- Des séances sont organisées autour des questions de méthode de travail comme la manière d'aborder les différentes matières et la gestion du temps.
- Les monitorats permettent aux étudiants qui le souhaitent de faire le point sur les matières vues aux cours : les enseignants de chaque discipline répondent aux questions et réexpliquent les notions moins bien comprises.
- Des interrogations obligatoires intervenant dans la note finale de chaque matière sont organisées un mois après le début des cours au premier quadrimestre.

Pour les trois années :

- Les séances d'exercices et de laboratoire sont organisées en petits groupes et sont encadrés par des assistants. Certains travaux pratiques font l'objet de contrôles de connaissances en début de séance et de rapports à remettre en fin de séance.
- Des travaux personnels et/ou de groupe sont prévus pour certaines activités.
- Des sites internet sont associés à la plupart des cours : des informations utiles y sont déposées.

Evaluation

Différentes modalités sont mises en oeuvre pour l'évaluation des connaissances et des compétences acquises au cours de la formation; elles sont adaptées aux types de prestations : évaluation continue notamment pour les exercices pratiques, évaluation des travaux personnels et de groupe, évaluation globale (écrite et/ou orale) durant les sessions d'examens.

Mobility and/or Internationalisation outlook

Sauf cas exceptionnels, la mobilité internationale n'est recommandée que dans le cadre des programmes de master.

Possible trainings at the end of the programme

Erreur de transformation xhtml vers fo pour 'programme_detaillé' erreur=org.xml.sax.SAXParseException; lineNumber: 274; columnNumber: 13; Des guillemets ouvrants sont attendus pour l'attribut "{1}" associé à un type d'élément "class".

PHYS1BA - Contacts

Curriculum Managment

Entite de la structure PHYS

Acronyme	PHYS
Dénomination	Ecole de physique
Adresse	Chemin du Cyclotron, 2 bte L7.01.04 1348 Louvain-la-Neuve Tél 010 47 32 94 - Fax 010 47 30 68
Site web	https://www.uclouvain.be/phys
Secteur	Secteur des sciences et technologies (SST)
Faculté	Faculté des sciences (SC)
Commission de programme	Ecole de physique (PHYS)

Jury

Président du jury de 1ère année : **Jan Govaerts**

Secrétaire du jury de 1ère année : **Jean Van Schaftingen**

Président des jurys de 2ème et de 3ème année : **Xavier Urbain**

Secrétaire des jurys de 2ème et de 3ème année : **Giacomo Luca Bruno**

Usefull Contacts

PHYS1BA - Detailed programme

Programme structure

Erreur de transformation xhtml vers fo pour 'structure' erreur=org.xml.sax.SAXParseException; lineNumber: 275; columnNumber: 1178; Des guillemets ouvrants sont attendus pour l'attribut "{1}" associé à un type d'élément "class".

Programme by subject

Year

1	2	3
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o Majeure (150 credits)

o Physique générale (36 credits)

o LPHY1111	General Physics 1	Jan Govaerts, Vincent Lemaître	45h+45h	8 Credits	1q	x		
o LPHY1112	General Physics 2	Jan Govaerts, Vincent Lemaître	45h+45h	8 Credits	2q	x		
o LPHY1211	General Physics 3	Jan Govaerts, Vincent Lemaître	30h+30h	4 Credits	1q		x	
o LMAFY1181	Actualities in Mathematics and Physics	Pascal Lambrechts, Bernard Piraux	15h	2 Credits	1+2q	x		
o LPHY1212	Integrated exercises in general physics and data processing	Alain Cornet, Thierry Fichetef, Krzysztof Piotrkowski	15h+30h	3 Credits	2q		x	
o LPHY1311	Classical electromagnetism	Krzysztof Piotrkowski	37.5h +15h	5 Credits	1q			x
o LPHY1312	Travaux dirigés	Michel Crucifix, Jean-Marc Gérard, Philippe Ruelle, Xavier Urbain	0h+60h	6 Credits	1+2q			x

o Physique théorique et mathématique (23 credits)

o LPHY1223	Special Relativity	Jean-Marc Gérard, Jan Govaerts	22.5h +15h	4 Credits	1q		x	
o LPHY1222	Quantum Physics	Fabio Maltoni	30h+30h	4 Credits	2q		x	
o LPHY1322	Quantum Physics 2	Christophe Ringeval	45h +22.5h	6 Credits	1q			x
o LPHY1323	General Relativity	Jean-Marc Gérard	30h+15h	5 Credits	2q			x
o LPHY1224	Méthodes mathématiques pour la physique	Christian Hagendorf, Christophe Ringeval	15h+30h	4 Credits	1q		x	

o Atomes et molécules, noyaux, particules (12 credits)

o LPHY1331	Elementary nuclei and particules	Vincent Lemaître	30h+10h	4 Credits	2q			x
o LPHY1341	Atoms and molecules	André Nauts, Xavier Urbain	30h+10h	4 Credits	2q			x
o LPHY1342	Etat solide	Giacomo Bruno, Christophe Delaere	30h+20h	4 Credits	2q			x

o Astronomie et géophysique (2 credits)

o LPHY1261	Astronomy and geophysics	Véronique Dehant (coord.), Patricia Lampens	15h+7.5h	2 Credits	2q		x	
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o Physique macroscopique et statistique (13 credits)

o LPHY1251	Statistical physics and Thermodynamics I	Hugues Goosse, André Nauts	30h +22.5h	4 Credits	2q	x		
o LPHY1351	Statistical and thermodynamic physics 2	Christian Hagendorf	30h +22.5h	4 Credits	2q			x
o LPHY1352	Physics of fluids	Eric Deleersnijder, Vincent Legat	45h +22.5h	5 Credits	1q			x

o Physique expérimentale et numérique (10 credits)

o LMAT1151	Numerical analysis : tools and software of calculus	Tom Claeys	30h+45h	6 Credits	2q	x		
o LPHY1271	Computer Science and Numerical Methods	Giacomo Bruno	15h+30h	4 Credits	1q		x	

o Mathématique (42 credits)

o LMAT1131	Linear Algebra	Enrico Vitale	45h+45h	8 Credits	1q	x		
o LMAT1122	Mathematical analysis 2	Augusto Ponce, Jean Van Schaftingen	30h+30h	5 Credits	2q	x		
o LMAT1121	Mathematical analysis 1	Augusto Ponce, Jean Van Schaftingen	30h+30h	5 Credits	1q	x		
o LMAT1141	Geometry I	Pascal Lambrechts	45h+30h	7 Credits	2q	x		
o LMAT1161	Mécanique analytique 1	Christian Hagendorf, Luc Haïne	22.5h +30h	5 Credits	2q	x		
o LMAT1261	Mécanique analytique 2	Christian Hagendorf, Luc Haïne	22.5h +30h	4 Credits	1q		x	
o LMAT1271	Calculation of probability and statistical analysis	Catherine Timmermans (compensates Rainer von Sachs), Rainer von Sachs	30h+30h	4 Credits	2q		x	
o LMAT1222	Complex analysis	Luc Haïne	30h+15h	4 Credits	2q		x	

o Anglais (7 credits)

o LANG1861	English: reading and listening comprehension of scientific texts	Ahmed Adriouèche, Fanny Desterbecq, Charlotte Peters (coord.), Annick Sonck	10h	3 Credits	2q	x		
o LANG1862	English: reading and listening comprehension of scientific texts	Ahmed Adriouèche (coord.), Isabelle Druant, Katherine Opello, Annick Sonck	30h	2 Credits	1q		x	
o LANG1863	English for Political Science (Upper-Intermediate level)	Ahmed Adriouèche (coord.), Fanny Desterbecq (coord.), Marielle Henriët (coord.), Susan Jackman, Sabrina Knorr (coord.), Nevin Serbest, Françoise Stas (coord.)	30h	2 Credits				x

o Sciences religieuses (2 credits)

L'étudiant choisit 2 crédits parmi les cours suivants

o LTECO2100	Questions of religious sciences: biblical readings	Hans Ausloos	15h	2 Credits	1q		x	
o LTECO2200	Questions of religious sciences: reflections about christian faith	Dominique Martens	15h	2 Credits	2q		x	
o LTECO2300	Questions of religious sciences: questions about ethics	Philippe Cochinaux	15h	2 Credits	1q		x	

o Cours au choix

L'étudiant choisit au moins 3 crédits parmi les cours ci-dessous. S'il ne choisit pas CHM1112, ce cours sera obligatoire en 2e année

						Year		
						1	2	3
⊗ LBIO1114	Introduction to biology	Patrick Dumont, Caroline Nieberding	30h+7.5h	3 Credits	2q	x		
⊗ LCHM1112	General Chemistry	Olivier Riant	22.5h +22.5h	3 Credits	1q	x		
⊗ LBIR1130A	Introductions aux sciences de la terre	Philippe Sonnet	30h	3 Credits	2q	x		
⊗ LCOPS1115	Economic Policy	Philippe De Villé, Tanguy Isaac, Arastou Khatibi	45h+15h	5 Credits	1q	x		

o Option (30 credits)

Tout en veillant au nombre de crédits requis, l'étudiant complète sa formation avec une mineure qu'il choisit dans la liste suivante : - Mineure d'approfondissement en sciences physiques - Mineure en géographie - Mineure en mathématiques. L'étudiant peut éventuellement choisir une autre mineure sur base d'un projet qu'il élabore avec le conseiller aux études en physique.

⊗ Mineure au choix (30 credits)

L'étudiant choisit ses cours en fonction des contraintes liées à la mineure et en concertation avec son conseiller aux études.

○	Cours de 2e année	N.		Credits			x	
○	Cours de 3e année	N.		Credits				x

Programme year by year

PHYS1BA - FIRST YEAR

○ Mandatory

△ Courses not taught during 2013-2014

⊕ Periodic courses taught during 2013-2014

⊗ Optional

⊖ Periodic courses not taught during 2013-2014

‡ Two years course

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

○ Majeure

○ Physique générale

○ LPHY1111	General Physics 1	Jan Govaerts, Vincent Lemaitre	45h+45h	8 Credits	1q
○ LPHY1112	General Physics 2	Jan Govaerts, Vincent Lemaitre	45h+45h	8 Credits	2q
○ LMAFY1181	Actualities in Mathematics and Physics	Pascal Lambrechts, Bernard Piraux	15h	2 Credits	1+2q

○ Physique expérimentale et numérique

○ LMAT1151	Numerical analysis : tools and software of calculus	Tom Claeys	30h+45h	6 Credits	2q
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○ Mathématique

○ LMAT1131	Linear Algebra	Enrico Vitale	45h+45h	8 Credits	1q
○ LMAT1122	Mathematical analysis 2	Augusto Ponce, Jean Van Schaftingen	30h+30h	5 Credits	2q
○ LMAT1121	Mathematical analysis 1	Augusto Ponce, Jean Van Schaftingen	30h+30h	5 Credits	1q
○ LMAT1141	Geometry I	Pascal Lambrechts	45h+30h	7 Credits	2q
○ LMAT1161	Mécanique analytique 1	Christian Hagendorf, Luc Haine	22.5h +30h	5 Credits	2q

○ Anglais

○ LANG1861	English: reading and listening comprehension of scientific texts	Ahmed Adriouche, Fanny Desterbecq, Charlotte Peters (coord.), Annick Sonck	10h	3 Credits	2q
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○ Cours au choix

L'étudiant choisit au moins 3 crédits parmi les cours ci-dessous. S'il ne choisit pas CHM1112, ce cours sera obligatoire en 2e année

⊗ LBIO1114	Introduction to biology	Patrick Dumont, Caroline Nieberding	30h+7.5h	3 Credits	2q
⊗ LCHM1112	General Chemistry	Olivier Riant	22.5h +22.5h	3 Credits	1q
⊗ LBIR1130A	Introductions aux sciences de la terre	Philippe Sonnet	30h	3 Credits	2q
⊗ LCOPS1115	Economic Policy	Philippe De Villé, Tanguy Isaac, Arastou Khatibi	45h+15h	5 Credits	1q

PHYS1BA - SECOND YEAR

● Mandatory

△ Courses not taught during 2013-2014

⊕ Periodic courses taught during 2013-2014

⊗ Optional

⊖ Periodic courses not taught during 2013-2014

‡ Two years course

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

o Majeure**o Physique générale**

● LPHY1211	General Physics 3	Jan Govaerts, Vincent Lemaitre	30h+30h	4 Credits	1q
● LPHY1212	Integrated exercices in general physics and data processing	Alain Cornet, Thierry Fichetef, Krzysztof Piotrkowski	15h+30h	3 Credits	2q

o Physique théorique et mathématique

● LPHY1223	Special Relativity	Jean-Marc Gérard, Jan Govaerts	22.5h +15h	4 Credits	1q
● LPHY1222	Quantum Physics	Fabio Maltoni	30h+30h	4 Credits	2q
● LPHY1224	Méthodes mathématiques pour la physique	Christian Hagendorf, Christophe Ringeval	15h+30h	4 Credits	1q

o Astronomie et géophysique

● LPHY1261	Astronomy and geophysics	Véronique Dehant (coord.), Patricia Lampens	15h+7.5h	2 Credits	2q
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o Physique macroscopique et statistique

● LPHY1251	Statistical physics and Thermodynamics I	Hugues Goosse, André Nauts	30h +22.5h	4 Credits	2q
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o Physique expérimentale et numérique

● LPHY1271	Computer Science and Numerical Methods	Giacomo Bruno	15h+30h	4 Credits	1q
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o Mathématique

● LMAT1261	Mécanique analytique 2	Christian Hagendorf, Luc Haine	22.5h +30h	4 Credits	1q
● LMAT1271	Calculation of probability and statistical analysis	Catherine Timmermans (compensates Rainer von Sachs), Rainer von Sachs	30h+30h	4 Credits	2q
● LMAT1222	Complex analysis	Luc Haine	30h+15h	4 Credits	2q

o Anglais

● LANG1862	English: reading and listening comprehension of scientific texts	Ahmed Adriouèche (coord.), Isabelle Druant, Katherine Opello, Annick Sonck	30h	2 Credits	1q
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o Sciences religieuses

L'étudiant choisit 2 crédits parmi les cours suivants

⊗ LTECO2100	Questions of religious sciences: biblical readings	Hans Ausloos	15h	2 Credits	1q
⊗ LTECO2200	Questions of religious sciences: reflections about christian faith	Dominique Martens	15h	2 Credits	2q
⊗ LTECO2300	Questions of religious sciences: questions about ethics	Philippe Cochinaux	15h	2 Credits	1q

o Option

Tout en veillant au nombre de crédits requis, l'étudiant complète sa formation avec une mineure qu'il choisit dans la liste suivante : - Mineure d'approfondissement en sciences physiques - Mineure en géographie - Mineure en mathématiques. L'étudiant peut éventuellement choisir une autre mineure sur base d'un projet qu'il élabore avec le conseiller aux études en physique.

⌘ Mineure au choix

L'étudiant choisit ses cours en fonction des contraintes liées à la mineure et en concertation avec son conseiller aux études.

<input type="radio"/>	Cours de 2e année	N.		Credits	
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PHYS1BA - THIRD YEAR

○ Mandatory

△ Courses not taught during 2013-2014

⊕ Periodic courses taught during 2013-2014

⊗ Optional

⊖ Periodic courses not taught during 2013-2014

‡ Two years course

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

○ Majeure**○ Physique générale**

○ LPHY1311	Classical electromagnetism	Krzysztof Piotrkowski	37.5h +15h	5 Credits	1q
○ LPHY1312	Travaux dirigés	Michel Crucifix, Jean-Marc Gérard, Philippe Ruelle, Xavier Urbain	0h+60h	6 Credits	1+2q

○ Physique théorique et mathématique

○ LPHY1322	Quantum Physics 2	Christophe Ringeval	45h +22.5h	6 Credits	1q
○ LPHY1323	General Relativity	Jean-Marc Gérard	30h+15h	5 Credits	2q

○ Atomes et molécules, noyaux, particules

○ LPHY1331	Elementary nuclei and particules	Vincent Lemaître	30h+10h	4 Credits	2q
○ LPHY1341	Atoms and molecules	André Nauts, Xavier Urbain	30h+10h	4 Credits	2q
○ LPHY1342	Etat solide	Giacomo Bruno, Christophe Delaere	30h+20h	4 Credits	2q

○ Physique macroscopique et statistique

○ LPHY1351	Statistical and thermodynamic physics 2	Christian Hagendorf	30h +22.5h	4 Credits	2q
○ LPHY1352	Physics of fluids	Eric Deleersnijder, Vincent Legat	45h +22.5h	5 Credits	1q

○ Anglais

○ LANG1863	English for Political Science (Upper-Intermediate level)	Ahmed Adriouche (coord.), Fanny Desterbecq (coord.), Marielle Henriot (coord.), Susan Jackman, Sabrina Knorr (coord.), Nevin Serbest, Françoise Stas (coord.)	30h	2 Credits	
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○ Option

Tout en veillant au nombre de crédits requis, l'étudiant complète sa formation avec une mineure qu'il choisit dans la liste suivante : - Mineure d'approfondissement en sciences physiques - Mineure en géographie - Mineure en mathématiques. L'étudiant peut éventuellement choisir une autre mineure sur base d'un projet qu'il élabore avec le conseiller aux études en physique.

⊗ Mineure au choix

L'étudiant choisit ses cours en fonction des contraintes liées à la mineure et en concertation avec son conseiller aux études.

○	Cours de 3e année	N.		Credits	
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List of available minors

In addition to the major in Physics, the students have three other possibilities : either to opt for more in-depth studies in Physics (30 credits), with complements in the different sub-disciplines of Physics or to opt for a minor in Mathematics, Geography or Applied Sciences and Engineering : Applied Physics and Chemistry or to opt for another minor from the University programme list, on the basis of a project to be elaborated together with the study advisor.

> [Additionnal module in Physics](https://www.uclouvain.be/en-prog-2013-app-lphys100p) [<https://www.uclouvain.be/en-prog-2013-app-lphys100p>]

> [Minor in Geography](https://www.uclouvain.be/en-prog-2013-min-lgeog100i) [<https://www.uclouvain.be/en-prog-2013-min-lgeog100i>]

> [Minor in Mathematics](https://www.uclouvain.be/en-prog-2013-min-lmath100i) [<https://www.uclouvain.be/en-prog-2013-min-lmath100i>]

