MATH1BA

2019 - 2020

Bachelor in Mathematics

At Louvain-la-Neuve - 180 credits - 3 years - Day schedule - In french
Dissertation/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 acronym: **math1ba** - Francophone Certification Framework: 6

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MATH1BA - Introduction

Introduction

Introduction

The Bachelor's in Mathematics offers:

- a basic training in algebra, geometry, analysis and physics;
- an introduction to more advanced topics: complex analysis, differential equations, differential geometry, measure theory, group theory, multilinear and commutative algebra, etc.;
- teaching which opens the way to applied mathematics: numerical and computational methods, probability and statistics, mechanics, etc.;
- progressive learning and a programme which leaves time for high-quality personal work;
- close and high-quality supervision: supervised exercises, laboratory exercises, group and individual work, tutorial sessions;
- the opportunity to carry out a first personal research project under the supervision of a teacher.

Your profil

You :

- love mathematics and have a sense of the precision and rigour of reasoning
- wish to develop your analytical skills and apply your capacity for reasoning and your spirit of abstraction in order to understand, model and solve complex situations in every field of application of mathematics;
- are committed to research and hope to carry out a first project in collaboration with internationally renowned researchers;
- plan to teach mathematics in secondary school and wish to acquire a solid training in fundamental mathematics

Your futur job

Training in mathematics aims to master advanced mathematical tools and to develop skills such as the capacity for abstract thinking, the analysis and modelling of complex situations, the sense of precision and of rigour in reasoning, and aptitude for communication. These skills can prove invaluable in fundamental mathematical research, in teaching mathematics, as well as in many other professions where mathematics interacts with other disciplines such as physics, chemistry, biology, pharmacology, climatology, meteorology, astronomy, computing, cryptography, statistics and biostatistics, telecommunications, finance, actuarial science, etc.

Your programme

The programme for the Bachelor in Mathematics is composed of 180 credits spread over three years. It is formed of general training (150 credits) and of an additional module minor or a minor introducing other fields (30 credits).

The first-year programme (60 credits in the major) is identical to the first-year programme for Bachelor in Physics, thus allowing transfer to this programme.

By the end of the course the student will have acquired the disciplinary foundations needed to pursue studies in mathematics or in closely related fields (physics. statistics, actuarial science, computing).

> # MATH1BA - Teaching profile

Learning outcomes

By the end of the course the student will have acquired the knowledge of the discipline and the transferable skills needed to pursue studies in mathematics or in closely related fields (physics. statistics, actuarial science, computing). This knowledge and skill-set will also be developed by the end of the Master programme in the many and varied contexts and problems that come from other fields (economics and finance, actuarial science, statistics and biostatistics, computing and cryptography, telecommunications, biochemistry and pharmacology, physics and astronomy, climatology and meteorology).

The programme offers a broad education in the fundamental fields of mathematics and an introduction to closely related fields (especially physics, but also statistics, applied mathematics, and computing).

During the Bachelor programme, future graduates in mathematics will be able to bring to bear a critical, constructive and innovative view on the present-day world and its problems. They will have developed their educational and personal plans, which they will pursue during the Master programme with increasing independence.

On successful completion of this programme, each student is able to :

1) recognise and understand a basic foundation of mathematics.

- Choose and use the basic tools of calculation to solve mathematical problems.
- Recognise the fundamental concepts of important current mathematical theories.
- Establish the main connections between these theories, analyse them and explain them through the use of examples.

2) identify, by use of the abstract and experimental approach specific to the exact sciences, the unifying features of different situations and experiments in mathematics or in closely related fields (probability and statistics, physics, computing).

- Follow an abstract reasoning in order to solve problems concerning mathematics and their applications.

3) show evidence of abstract thinking and of a critical spirit.

- Argue within the context of the axiomatic method Recognise the key arguments and the structure of a proof.
- Construct and draw up a proof independently.
- Evaluate the rigour of a mathematical or logical argument and identify any possible flaws in it.
- Distinguish between the intuition and the validity of a result and the different levels of rigorous understanding of this same result.

4) communicate in a clear, precise and rigorous way, in French and in English.

- Write a mathematical text in French according to the conventions of the discipline.
- Structure an oral presentation in French, highlight key elements, identify techniques and concepts and adapt the presentation to the listeners' level of understanding.
- Communicate in English (level C1 for reading comprehension, level B2 for listening comprehension and for oral and written expression, CEFR).

5) learn in an independent manner.

- Find relevant sources in the mathematical literature.
- Read and understand an advanced mathematical text and locate it correctly in relation to knowledge acquired.

Programme structure

The programme leading to the Bachelor in Mathematics is composed of 180 credits spread over three years of study and organised as follows:

- a general education, called the major, of 150 credits;
- a minor of 30 credits.

The major includes the following subjects:

- disciplinary courses: analysis, algebra, geometry;
- courses in closely related disciplines: physics, mechanics, computing and numerical analysis, probability and statistics;
- seminar on mathematical current events and on physics in the first year, review work in the third year;
- introductory courses (one course to be chosen): biology, chemistry, earth sciences, economics;
- human sciences (philosophy and religious studies) and languages.

The first-year programme (60 credits in the major) is identical to that for the first year of Bachelor in Physics. At the end of the first year, there is automatic authorisation for transfer to the Bachelor in Physical Sciences.

In the second and third years, students complete their major programme (50 credits in the second year and 40 credits in the third) either with the additional module minor in mathematics or with another minor to which they have access, chosen on the basis of a project developed in conjunction with their study adviser.

Students who have a degree with more than three years of study, and especially those with a teacher training certificate (upper secondary education), may request personalised admission so as to benefit from a reduced programme. Their programme will be established in conjunction with the study adviser on the basis of the skills the student has already acquired.

MATH1BA Detailled programme

Programme by subject

Year

1 2 3

○ *Majeure (150 credits)*

○ Analyse (30 credits)

						1	2	3
○ LMAT1121	Diffenrential and integral calculus	Tom Claeys	30h+30h	5 Credits	1q	x		
○ LMAT1122	Mathematical analysis : differentiation	Augusto Ponce Jean Van Schaftingen	45h+45h	8 Credits	2q	x		
○ LMAT1221	Mathematical analysis : integration 🔸	Heiner Olbermann	30h+30h	5 Credits	1q		x	
○ LMAT1222	Complex analysis 1 🔸	Luc Haine	30h+15h	5 Credits	2q		x	
○ LMAT1321	Functional analysis and partial differential equations 🔸	Jean Van Schaftingen Michel Willem (compensates Jean Van Schaftingen)	45h+45h	7 Credits	1q			x

○ Algèbre et géométrie (26 credits)

						1	2	3
○ LMAT1131	Linear Algebra	Enrico Vitale	45h+45h	8 Credits	1q	x		
○ LMAT1231	Multilinear algebra and group theory 🔸	Marino Gran (compensates Tim Van der Linden) Tim Van der Linden	30h+30h	5 Credits	1q		x	
○ LMAT1141	Geometry I	Pascal Lambrechts	45h+30h	7 Credits	2q	x		
○ LMAT1241	Geometry II 🔸	Pierre Bieliavsky	45h+30h	6 Credits	2q		x	

○ Physique et physique mathématique (13 credits)

						1	2	3
○ LMAT1161	Notions de physique mathématique	Luc Haine	30h+30h	5 Credits	2q	x		
○ LPHYS1111	Mechanics 1	Jan Govaerts	45h+45h	8 Credits	1q	x		

○ Analyse numérique et Informatique (16 credits)

						1	2	3
○ LINFO1101	Introduction à la programmation	Kim Mens Siegfried Nijssen Charles Pecheur	30h+30h	6 Credits	1q	x		
○ LMAT1151	Numerical analysis : tools and software of calculus	Jean Van Schaftingen	30h+45h	5 Credits	1q		x	
○ LMAT1351	Approximations : methods et theory 🔸	Tom Claeys	30h+30h	5 Credits	1q			x

○ Probabilités et statistiques (16 credits)

						1	2	3
○ LMAFY1101	Data exploration and introduction to statiscal inference	Anouar El Ghouch	30h+30h	5 Credits	2q	x		
○ LMAT1271	Calculation of probability and statistical analysis 🔸	Mickaël De Backer (compensates Rainer von Sachs) Rainer von Sachs	30h+30h	6 Credits	2q		x	
○ LMAT1371	Probability Theory 🔸	Johan Segers	30h +22.5h	5 Credits	2q			x

Year

1 2 3

Séminaires et travaux de synthèse (6 credits)

LMAT1381	Personal project and seminary 📒	Marino Gran Augusto Ponce	30h	6 Credits	2q			x

Anglais (9 credits)

LANG1861	English: reading and listening comprehension of scientific texts	Ahmed Adrioueche (coord.) Catherine Avery Fanny Desterbecq Amandine Dumont	10h	3 Credits	2q	x		
LANG1862	English: reading and listening comprehension of scientific texts 📒	Ahmed Adrioueche (coord.) Amandine Dumont Ariane Halleux (coord.)	30h	3 Credits	1q		x	
LANG1863	English for Students in Sciences (Upper-Intermediate level) 📒	Ahmed Adrioueche (coord.) Catherine Avery (coord.) Amandine Dumont (coord.) Maïté Dupont (compensates Colleen Starrs) Sandrine Jacob (coord.) Sabrina Knorr Nevin Serbest Colleen Starrs Françoise Stas (coord.)	30h	3 Credits	1 ou 2q			x

Cours au choix (5 credits)

L'étudiant·e choisit une UE parmi

LBIO1110	Life : diversity and evolution	Patrick Dumont Thierry Hance Caroline Nieberding (coord.)	30h+10h	5 Credits	1q	x		
LCHM1112	General Chemistry	Yaroslav Filinchuk	30h +22.5h	5 Credits	1q	x		
LECGE1115	Political Economics	Pierre Dehez Rigas Oikonomou	45h+15h	5 Credits	1q	x		
LGEO1111	Earth and society : perspectives from geography	Marie-Laurence De Keersmaecker Bas van Wesemael	30h+15h	5 Credits	2q	x		
LPHYS1112A	Mechanics 2 and thermodynamics : Mechanics 2	Thierry Fichefet Vincent Lemaitre	30h +22.5h	5 Credits	2q	x		

Sciences humaines

Philosophie

L'étudiant choisit
De 2 à 4 CREDITS parmi

LSC1120A	Philosophy	Alexandre Guay Olivier Sartenaer	30h	2 Credits	1q		x	
LFILO1250A	Logic (partim)	Peter Verdée	45h	4 Credits	2q		x	

Sciences religieuses (2 credits)

Students choose 2 credits from the following courses

LTECO2100	Sociétés, cultures, religions : Biblical readings	Hans Ausloos	15h	2 Credits	1q			x
LTECO2200	Societies-cultures-religions : Human Questions	Régis Burnet Dominique Martens	15h	2 Credits	1 ou 2q			x
LTECO2300	Societies, cultures, religions : Ethical questions	Marcela Lobo Bustamante	15h	2 Credits	1q			x

Year
1 2 3

Bloc au choix

L'étudiant complète son programme en choisissant des cours des 2 blocs suivants (il est conseillé à l'étudiant de s'inscrire à au moins 9 crédits par bloc annuel). Cependant, avoir suivi tous les cours du bloc Statistique et Informatique est recommandé si vous souhaitez vous inscrire au master en science des données, orientation statistique.

Bloc Mathématique

LMAT1223	Differential equations	Heiner Olbermann	30h+15h	5 Credits	2q		x
LMAT1261	Mécanique lagrangienne et hamiltonienne	Christian Hagendorf	22.5h +30h	5 Credits	1q	x	
LMAT1323	Topology	Pedro Dos Santos Santana Forte Vaz	30h+15h	4 Credits	1q	x	
LMAT1322	Real and harmonic analysis	Augusto Ponce	30h+30h	5 Credits	2q		x
LMAT1342	Geometry 3	Luc Haine	30h+30h	5 Credits	1q		x
LMAT1331	Commutative algebra	Marino Gran	30h+15h	4 Credits	2q		x

Bloc Statistique et Informatique

NB : Il est recommandé de suivre LEPL1402 avant les autres cours de la liste ci-dessous :

LEPL1402	Informatique 2	Ramin Sadre Pierre Schaus	30h+30h	5 Credits	1q	x	
LINFO1225	Conception orientée objet et gestion de données	Kim Mens	30h+30h	5 Credits	2q	x	
LINMA1702	Optimization models and methods I	François Glineur	30h +22.5h	5 Credits	2q	x	
LSINF1121	Algorithmics and data structures	Pierre Schaus	30h+30h	5 Credits	1q		x

Cours au choix

L'étudiant choisit un des deux cours suivants :

LBIRA2101	Biometry : analysis of the variance	Xavier Draye (coord.) Bernadette Govaerts	30h+15h	4 Credits	1q		x
LINGE1222	Multivariate Statistical Analysis	Johan Segers Nathan Uyttendaele (compensates Johan Segers)	30h+15h	4 Credits	2q		x

Approfondissement ou Mineure (30 credits)

L'étudiant complète sa formation en choisissant un approfondissement ou une mineure dans la liste proposée pour le bachelier en sciences mathématiques. Il répartit les unités d'enseignement dans le 2e et le 3e bloc annuel, de manière à ce que son programme annuel totalise 60 crédits.

o	Approfondissement ou Mineure (1e partie)			Credits		x	
o	Approfondissement ou Mineure (2e partie)			Credits			x

List of available minors

Students will choose the additional module minor in mathematics or another introductory and/or access minor arranged by the University.

> Additionnal module in Mathematics *[https://www.uclouvain.be/en-prog-2019-app-lmath100p]*
> Approfondissement en statistique et sciences des données *[https://www.uclouvain.be/en-prog-2019-app-lstat100p]*
> Minor in Economics *[https://www.uclouvain.be/en-prog-2019-min-lecon100i]*
> Minor in Antiquity: Egypt, Eastern World, Greece, Rome *[https://www.uclouvain.be/en-prog-2019-min-lanti100i]*
> Minor in Applied Mathematics *[https://www.uclouvain.be/en-prog-2019-min-lfsa136i]*
> Minor in Arabic language and Islamic civilization *[https://www.uclouvain.be/en-prog-2019-min-lisla100i]*
> Minor in Biomedical Engineering *[https://www.uclouvain.be/en-prog-2019-min-lfsa134i]*
> Minor in Biomedicine (openness) *[https://www.uclouvain.be/en-prog-2019-min-wsbim100i]*
> Minor in Chinese studies *[https://www.uclouvain.be/en-prog-2019-min-lchin100i]*
> Minor in Christian Theology *[https://www.uclouvain.be/en-prog-2019-min-ltheo100i]*
> Minor in Computer Sciences *[https://www.uclouvain.be/en-prog-2019-min-linfo100i]*
> Minor in Culture and Creation *[https://www.uclouvain.be/en-prog-2019-min-lcucr100i]*
> Minor in Development and Environment *[https://www.uclouvain.be/en-prog-2019-min-ldenv100i]*
> Minor in Economics (open) *[https://www.uclouvain.be/en-prog-2019-min-loeco100i]*
> Minor in Education (*) *[https://www.uclouvain.be/en-prog-2019-min-lfopa100i]*
> Minor in European Studies *[https://www.uclouvain.be/en-prog-2019-min-leuro100i]*
> Minor in French Studies (*) *[https://www.uclouvain.be/en-prog-2019-min-lfran100i]*
> Minor in Gender Studies *[https://www.uclouvain.be/en-prog-2019-min-lgenr100i]*
> Minor in Geography *[https://www.uclouvain.be/en-prog-2019-min-lgeog100i]*
> Minor in History *[https://www.uclouvain.be/en-prog-2019-min-lhist100i]*
> Minor in History of Art and Archeology *[https://www.uclouvain.be/en-prog-2019-min-larke100i]*
> Minor in Human and Social Sciences *[https://www.uclouvain.be/en-prog-2019-min-lhuso100i]*
> Minor in Information and Communication (*) *[https://www.uclouvain.be/en-prog-2019-min-lcomu100i]*
> Minor in Information and Communication Studies and Technologies *[https://www.uclouvain.be/en-prog-2019-min-lstic100i]*
> Minor in Law (access) *[https://www.uclouvain.be/en-prog-2019-min-ladrt100i]*
> Minor in Law (openness) *[https://www.uclouvain.be/en-prog-2019-min-lodrt100i]*
> Minor in Linguistics *[https://www.uclouvain.be/en-prog-2019-min-lling100i]*
> Minor in Literary Studies *[https://www.uclouvain.be/en-prog-2019-min-llitt100i]*
> Minor in Mangement (basic knowledge) *[https://www.uclouvain.be/en-prog-2019-min-lgesa100i]*
> Minor in Mechanics *[https://www.uclouvain.be/en-prog-2019-min-lfsa137i]*
> Minor in Medieval Studies *[https://www.uclouvain.be/en-prog-2019-min-lmedi100i]*
> Minor in Musicology *[https://www.uclouvain.be/en-prog-2019-min-lmusi100i]*
> Minor in Oriental Studies *[https://www.uclouvain.be/en-prog-2019-min-lori100i]*
> Minor in Philosophy *[https://www.uclouvain.be/en-prog-2019-min-lisp100i]*
> Minor in Physics *[https://www.uclouvain.be/en-prog-2019-min-lphys100i]*
> Minor in Political Sciences *[https://www.uclouvain.be/en-prog-2019-min-lspol100i]*
> Minor in Population and Development Studies *[https://www.uclouvain.be/en-prog-2019-min-lsped100i]*
> Minor in Sciences of Religions (openness) *[https://www.uclouvain.be/en-prog-2019-min-lreli100i]*
> Minor in Scientific Culture *[https://www.uclouvain.be/en-prog-2019-min-lcusc100i]*
> Minor in Sociology and Anthropology *[https://www.uclouvain.be/en-prog-2019-min-lsoca100i]*
> Minor in Statistics, Actuarial Sciences and Data Sciences *[https://www.uclouvain.be/en-prog-2019-min-lstat100i]*
> Minor in Sustainable Development (*) *[https://www.uclouvain.be/en-prog-2019-min-ldvld100i]*
> Minor in Urban Architecture *[https://www.uclouvain.be/en-prog-2019-min-larch100i]*
> Minor in entrepreneurship (*) *[https://www.uclouvain.be/en-prog-2019-min-lmpme100i]*

(*) This program is the subject of access criteria

Course prerequisites

A document entitled en-prerequis-2019-math1ba.pdf specifies the activities (course units - CU) with one or more pre-requisite(s) within the study programme, that is the CU whose learning outcomes must have been certified and for which the credits must have been granted by the jury before the student is authorised to sign up for that activity.

These activities are identified in the study programme: their title is followed by a yellow square.

As the prerequisites are a requirement of enrolment, there are none within a year of a course.

The prerequisites are defined for the CUs for different years and therefore influence the order in which the student can enrol in the programme's CUs.

In addition, when the panel validates a student's individual programme at the beginning of the year, it ensures the consistency of the individual programme:

- It can change a prerequisite into a corequisite within a single year (to allow studies to be continued with an adequate annual load);
- It can require the student to combine enrolment in two separate CUs it considers necessary for educational purposes.

For more information, please consult regulation of studies and exams.

The programme's courses and learning outcomes

For each UCLouvain training programme, a reference framework of learning outcomes specifies the competences expected of every graduate on completion of the programme. You can see the contribution of each teaching unit to the programme's reference framework of learning outcomes in the document *"In which teaching units are the competences and learning outcomes in the programme's reference framework developed and mastered by the student?"*

The document is available by clicking this link after being authenticated with your UCLouvain account.

Programme type

MATH1BA - 1ST ANNUAL UNIT

⊙ Mandatory	⊠ Optional	
△ Courses not taught during 2019-2020	⊘ Periodic courses not taught during 2019-2020	
⊕ Periodic courses taught during 2019-2020	🟨 Activity with requisites	

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

⊙ *Majeure*

⊙ Analyse

⊙ LMAT1121	Diffenrential and integral calculus	Tom Claeys	30h+30h	5 Credits	1q
⊙ LMAT1122	Mathematical analysis : differentiation	Augusto Ponce Jean Van Schaftingen	45h+45h	8 Credits	2q

⊙ Algèbre et géométrie

⊙ LMAT1131	Linear Algebra	Enrico Vitale	45h+45h	8 Credits	1q
⊙ LMAT1141	Geometry I	Pascal Lambrechts	45h+30h	7 Credits	2q

⊙ Physique et physique mathématique

⊙ LMAT1161	Notions de physique mathématique	Luc Haine	30h+30h	5 Credits	2q
⊙ LPHYS1111	Mechanics 1	Jan Govaerts	45h+45h	8 Credits	1q

⊙ Analyse numérique et Informatique

⊙ LINFO1101	Introduction à la programmation	Kim Mens Siegfried Nijssen Charles Pecheur	30h+30h	6 Credits	1q

Probabilités et statistiques

LMAFY1101	Data exploration and introduction to statiscal inference	Anouar El Ghouch	30h+30h	5 Credits	2q

Anglais

LANG1861	English: reading and listening comprehension of scientific texts	Ahmed Adrioueche (coord.) Catherine Avery Fanny Desterbecq Amandine Dumont	10h	3 Credits	2q

Cours au choix

L'étudiant·e choisit une UE parmi

LBIO1110	Life : diversity and evolution	Patrick Dumont Thierry Hance Caroline Nieberding (coord.)	30h+10h	5 Credits	1q
LCHM1112	General Chemistry	Yaroslav Filinchuk	30h +22.5h	5 Credits	1q
LECGE1115	Political Economics	Pierre Dehez Rigas Oikonomou	45h+15h	5 Credits	1q
LGEO1111	Earth and society : perspectives from geography	Marie-Laurence De Keersmaecker Bas van Wesemael	30h+15h	5 Credits	2q
LPHYS1112A	Mechanics 2 and thermodynamics : Mechanics 2	Thierry Fichefet Vincent Lemaitre	30h +22.5h	5 Credits	2q

MATH1BA - 2ND ANNUAL UNIT

O Mandatory		⌧ Optional
△ Courses not taught during 2019-2020		⊘ Periodic courses not taught during 2019-2020
⊕ Periodic courses taught during 2019-2020		🟨 Activity with requisites

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

O *Majeure*

O Analyse

O LMAT1221	Mathematical analysis : integration 🟨	Heiner Olbermann	30h+30h	5 Credits	1q
O LMAT1222	Complex analysis 1 🟨	Luc Haine	30h+15h	5 Credits	2q

O Algèbre et géométrie

O LMAT1231	Multilinear algebra and group theory 🟨	Marino Gran (compensates Tim Van der Linden) Tim Van der Linden	30h+30h	5 Credits	1q
O LMAT1241	Geometry II 🟨	Pierre Bieliavsky	45h+30h	6 Credits	2q

O Analyse numérique et Informatique

O LMAT1151	Numerical analysis : tools and software of calculus	Jean Van Schaftingen	30h+45h	5 Credits	1q

O Probabilités et statistiques

O LMAT1271	Calculation of probability and statistical analysis 🟨	Mickaël De Backer (compensates Rainer von Sachs) Rainer von Sachs	30h+30h	6 Credits	2q

O Anglais

O LANG1862	English: reading and listening comprehension of scientific texts 🟨	Ahmed Adriaoueche (coord.) Amandine Dumont Ariane Halleux (coord.)	30h	3 Credits	1q

O Sciences humaines

O Philosophie
L'étudiant choisit
De 2 à 4 CREDITS parmi

⌧ LSC1120A	Philosophy	Alexandre Guay Olivier Sartenaer	30h	2 Credits	1q
⌧ LFILO1250A	Logic (partim)	Peter Verdée	45h	4 Credits	2q

O Bloc au choix

L'étudiant complète son programme en choisissant des cours des 2 blocs suivants (il est conseillé à l'étudiant de s'inscrire à au moins 9 crédits par bloc annuel). Cependant, avoir suivi tous les cours du bloc Statistique et Informatique est recommandé si vous souhaitez vous inscrire au master en science des données, orientation statistique.

⌧ Bloc Mathématique

⌧ LMAT1261	Mécanique lagrangienne et hamiltonienne 🟨	Christian Hagendorf	22.5h +30h	5 Credits	1q
⌧ LMAT1323	Topology 🟨	Pedro Dos Santos Santana Forte Vaz	30h+15h	4 Credits	1q

⌧ Bloc Statistique et Informatique
NB : Il est recommandé de suivre LEPL1402 avant les autres cours de la liste ci-dessous :

⌧ LEPL1402	Informatique 2 🟨	Ramin Sadre Pierre Schaus	30h+30h	5 Credits	1q
⌧ LINFO1225	Conception orientée objet et gestion de données 🟨	Kim Mens	30h+30h	5 Credits	2q
⌧ LINMA1702	Optimization models and methods I	François Glineur	30h +22.5h	5 Credits	2q

○ *Approfondissement ou Mineure*

L'étudiant complète sa formation en choisissant un approfondissement ou une mineure dans la liste proposée pour le bachelier en sciences mathématiques. Il répartit les unités d'enseignement dans le 2e et le 3e bloc annuel, de manière à ce que son programme annuel totalise 60 crédits.

○	Approfondissement ou Mineure (1e partie)			Credits	

MATH1BA - 3RD ANNUAL UNIT

⚪ Mandatory	⊗ Optional
△ Courses not taught during 2019-2020	⊘ Periodic courses not taught during 2019-2020
⊕ Periodic courses taught during 2019-2020	🟨 Activity with requisites

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

⚪ *Majeure*

⚪ Analyse

⚪ LMAT1321	Functional analysis and partial differential equations 🟨	Jean Van Schaftingen Michel Willem (compensates Jean Van Schaftingen)	45h+45h	7 Credits	1q

⚪ Analyse numérique et Informatique

⚪ LMAT1351	Approximations : methods et theory 🟨	Tom Claeys	30h+30h	5 Credits	1q

⚪ Probabilités et statistiques

⚪ LMAT1371	Probability Theory 🟨	Johan Segers	30h +22.5h	5 Credits	2q

⚪ Séminaires et travaux de synthèse

⚪ LMAT1381	Personal project and seminary 🟨	Marino Gran Augusto Ponce	30h	6 Credits	2q

⚪ Anglais

⚪ LANG1863	English for Students in Sciences (Upper-Intermediate level) 🟨	Ahmed Adrioueche (coord.) Catherine Avery (coord.) Amandine Dumont (coord.) Maïté Dupont (compensates Colleen Starrs) Sandrine Jacob (coord.) Sabrina Knorr Nevin Serbest Colleen Starrs Françoise Stas (coord.)	30h	3 Credits	1 ou 2q

⚪ Sciences humaines

⚪ Sciences religieuses
Students choose 2 credits from the following courses

⊗ LTECO2100	Sociétés, cultures, religions : Biblical readings	Hans Ausloos	15h	2 Credits	1q
⊗ LTECO2200	Societies-cultures-religions : Human Questions	Régis Burnet Dominique Martens	15h	2 Credits	1 ou 2q
⊗ LTECO2300	Societies, cultures, religions : Ethical questions	Marcela Lobo Bustamante	15h	2 Credits	1q

⚪ Bloc au choix
L'étudiant complète son programme en choisissant des cours des 2 blocs suivants (il est conseillé à l'étudiant de s'inscrire à au moins 9 crédits par bloc annuel). Cependant, avoir suivi tous les cours du bloc Statistique et Informatique est recommandé si vous souhaitez vous inscrire au master en science des données, orientation statistique.

⊗ Bloc Mathématique

⊗ LMAT1223	Differential equations	Heiner Olbermann	30h+15h	5 Credits	2q
⊗ LMAT1322	Real and harmonic analysis 🟨	Augusto Ponce	30h+30h	5 Credits	2q
⊗ LMAT1342	Geometry 3 🟨	Luc Haine	30h+30h	5 Credits	1q
⊗ LMAT1331	Commutative algebra 🟨	Marino Gran	30h+15h	4 Credits	2q

⚘ Bloc Statistique et Informatique

NB : Il est recommandé de suivre LEPL1402 avant les autres cours de la liste ci-dessous :

⚘ LSINF1121	Algorithmics and data structures 🔲	Pierre Schaus	30h+30h	5 Credits	1q

⚘ Cours au choix

L'étudiant choisit un des deux cours suivants :

⚘ LBIRA2101	Biometry : analysis of the variance	Xavier Draye (coord.) Bernadette Govaerts	30h+15h	4 Credits	1q
⚘ LINGE1222	Multivariate Statistical Analysis	Johan Segers Nathan Uyttendaele (compensates Johan Segers)	30h+15h	4 Credits	2q

○ *Approfondissement ou Mineure*

L'étudiant complète sa formation en choisissant un approfondissement ou une mineure dans la liste proposée pour le bachelier en sciences mathématiques. Il répartit les unités d'enseignement dans le 2e et le 3e bloc annuel, de manière à ce que son programme annuel totalise 60 crédits.

○	Approfondissement ou Mineure (2e partie)			Credits	

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MATH1BA - Information

</div>

Admission

Decree of 7 November 2013 defining the landscape of higher education and the academic organization of studies.

The admission requirements must be met prior to enrolment in the University.

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

SUMMARY

- General requirements
- Specific requirements
- Special requirements

General requirements

Except as otherwise provided by other specific legal provisions, admission to undergraduate courses leading to the award of a Bachelor's degree will be granted to students with one of the following qualifications :

1. A Certificate of Upper Secondary Education issued during or after the 1993-1994 academic year by an establishment offering full-time secondary education or an adult education centre in the French Community of Belgium and, as the case may be, approved if it was issued by an educational institution before 1 January 2008 or affixed with the seal of the French Community if it was issued after this date, or an equivalent certificate awarded by the Examination Board of the French Community during or after 1994;

2. A Certificate of Upper Secondary Education issued no later than the end of the 1992-1993 academic year, along with official documentation attesting to the student's ability to pursue higher education for students applying for a full-length undergraduate degree programme;

3. A diploma awarded by a higher education institution within the French Community that confers an academic degree issued under the above-mentioned Decree, or a diploma awarded by a university or institution dispensing full-time higher education in accordance with earlier legislation;

4. A higher education certificate or diploma awarded by an adult education centre;

5. A pass certificate for one of the entrance examinations organized by higher education institutions or by an examination board of the French Community; this document gives admission to studies in the sectors, fields or programmes indicated therein;

6. A diploma, certificate of studies or other qualification similar to those mentioned above, issued by the Flemish Community of Belgium (this qualification does not grant exemption from the French language proficiency examination), the German Community of Belgium or the Royal Military Academy;

7. A diploma, certificate of studies or other qualification obtained abroad and deemed equivalent to the first four mentioned above by virtue of a law, decree, European directive or international convention;

Note:

Requests for equivalence must be submitted no later than 15 July 2019 to the Equivalence department (Service des équivalences) of the Ministry of Higher Education and Scientific Research of the French Community of Belgium.

The following two qualifications are automatically deemed equivalent to the Certificate of Upper Secondary Education (Certificat d'enseignement secondaire supérieur – CESS):

- European Baccalaureate issued by the Board of Governors of a European School,

- International Baccalaureate issued by the International Baccalaureate Office in Geneva.

These two qualifications do not, however, provide automatic exemption from the French language proficiency examination.

8. Official documentation attesting to a student's ability to pursue higher education (diplôme d'aptitude à accéder à l'enseignement supérieur - DAES), issued by the Examination Board of the French Community.

Specific requirements

Admission to undergraduate studies on the basis of accreditation of knowledge and skills obtained through professional or personal experience (Accreditation of Prior Experience)

Subject to the general requirements laid down by the authorities of the higher education institution, with the aim of admission to the undergraduate programme, the examination boards accredit the knowledge and skills that students have obtained through their professional or personal experience.

This experience must correspond to at least five years of documented activity, with years spent in higher education being partially taken into account: 60 credits are deemed equivalent to one year of experience, with a maximum of two years being counted. At the end of an assessment procedure organized by the authorities of the higher education institution, the Examination Board will decide whether a student has sufficient skills and knowledge to successfully pursue undergraduate studies.

After this assessment, the Examination Board will determine the additional courses and possible exemptions constituting the supplementary requirements for the student's admission.

Special requirements

- 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 courses is always subject to students passing the special entrance examination. Contact the faculty office for the programme content and the examination arrangements.
- 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 medecine 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).

Note: students wishing to enrol for a **Bachelor's degree in Medicine** or a **Bachelor's degree in dental science** must first sit an aptitude test (fr).

Teaching method

Whenever possible, teachers in the School of Mathematics give priority to close supervision: small-group work, individual tuition, rapid and personalised feedback on activities, active participation of students in the School's teaching decisions. All the courses in the programme contribute to the acquisition of skills such as the capacity for abstract thinking and for reasoning. Other skills (aptitude for communication, independent learning, document research) are especially exercised in the third-year review work.

In the first year, tutorial sessions allow those students who wish to do so to take stock of topics considered in the course in a personalised way with the help of teachers. The Faculty also holds sessions on the issue of working methods as well as on ways of approaching different subjects and on time management.

For the three years, exercise sessions and laboratory sessions are held in small groups accompanied by assistants. Individual and/or group work is expected for some activities, especially in the third-year review work, with the help of assistants or teachers. Internet sites (the iCampus platform) are linked to most courses: they contain useful information as well as syllabi and other documents vital for students' work.

Evaluation

The evaluation methods comply with the regulations concerning studies and exams. More detailed explanation of the modalities specific to each learning unit are available on their description sheets under the heading "Learning outcomes evaluation method".

Assessment methods conform to academic regulations and procedures. More details on the methods employed in each teaching unit are available in their description sheet, under the heading 'Assessment methods for student learning'.

Different methods are in place in order to evaluate the knowledge and skills acquired in the course of the learning period; these are adapted to the following types of performance: continuous assessment, especially for practical exercises; assessment of personal work (reading, consultation of databases and bibliographical references, monograph and report writing); overall assessment (written and/or oral) during examination sessions; assessment of public presentations.

In the first year, compulsory tests contributing to the final mark for each subject are held one month after the beginning of classes in the first semester.

Mobility and/or Internationalisation outlook

Apart from exceptional cases, international mobility is recommended only in the Master programme. Students in the third year of the Bachelor will take care to participate in information sessions held for them by the Faculty from the first semester, so as to present their application file in conformity with the respective deadlines for the different types of mobility.

The Bachelor in Mathematics allows access to the following programmes:

- Master [120] in Mathematics, research or teaching focus;
- Master [60] in Mathematics;
- Master [120] en statistics, general ou Master [120] in statistics, biostatistics;
- Master [120] en sciences actuarielles.

Other training accessible at the end of the programme

With the choice of an appropriate minor and/or a programme of complementary training, the Bachelor in Mathematics allows access to certain course choices of Master [120] in physics, du Master [120] in computer science ou du Master [120] in economics, general.

Possible trainings at the end of the programme

Whatever the minor or course blocks selected, the Bachelor in Mathematics allows access to the following programmes:

- Master [120] in Mathematics, research or teaching focus;
- Master [60] in Mathematics;
- Master [120] in Actuarial Science;
- Master [120] in Data Science : Statistic

It also provides access through additional training or the choice of a appropriate minor to the programs:

- Master [120] in Statistic: General
- Master [120] in Statistic: Biostatistics

With the choice of an appropriate minor and/or a programme of complementary training, the Bachelor in Mathematics allows access to certain course choices of Master [120] in Physics, Master [120] in Computer Science or Master [120] in Economics: General.

En outre, des masters UCL (généralement orphelins) sont largement accessibles aux diplômés bacheliers UCL. Par exemple :

In addition, UCL master's programmes (usually orphaned) are widely available to UCL bachlors. For example:

- Master [120] in Population and Development Studies (direct access for any bachelor),
- Master [120] in European Studies (direct access for any bachelor with a minor in European Studies; on file for any other bachelor),
- ...

Contacts

Curriculum Management

Entity

Structure entity	SST/SC/MATH
Denomination	(MATH)
Faculty	Faculty of Science (SC)
Sector	Sciences and Technology (SST)
Acronym	MATH
Postal address	Chemin du Cyclotron 2 - bte L7.01.02
	1348 Louvain-la-Neuve
	Tel: +32 (0) 10 47 31 52 - Fax: +32 (0) 10 47 25 30
Web site	https://uclouvain.be/fr/facultes/sc/math

Academic supervisor: Pascal Lambrechts

Jury

- Pedro Vaz
- Tim Van der Linden

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- Julie Genbrugge