

## Cycle view of the study programme

B1 Or Th Pr Au Cr

### Compulsory courses (B1 : 4Cr, B2 : 18Cr)

MATH0112-1	<i>Preparation for the final thesis</i> - COLLÉGIALITÉ	B1	Q2	-	-	-	4
<i>Notice</i> : this course can be taken either in block 1 or block 2.							
SMEM0012-1	<i>Final thesis</i> - COLLÉGIALITÉ	B2	TA	-	-	-	18

### Optional courses (B1 : 56Cr, B2 : 42Cr)

In agreement with the Jury, choose courses not already taken for a total of 68 credits from the lists below, a minimum of 44 credits from the Mathematical list to be acquired throughout the cycle: (B1 : 56Cr, B2 : 12Cr)

#### Mathematics

- [...] at least 44 credits from the courses of Mathematics
- [...] the remainder of the courses not chosen from the 'Mathematics' list

#### Other disciplines

- [...] maximum 12 credits from the courses of other disciplines (B1)
- Notice* : compatibility of the timetable with the courses in the Mathematics list cannot be guaranteed.
- [...] the remainder of the courses not chosen from the 'Other subjects' list

#### Other courses

- [...] a maximum of 10 credits in the curriculum of the University of Liège or another institution (B1)
- [...] The course programme at the University of Liège or another institution

### Choose one focus from the following : (B2 : 1Nbr)

#### Research Focus (B2 : 30Cr)

In agreement with the Jury, choose complementary courses not already selected for a total of 30 credits from the study programmes of the ULiege. (B2 : 30Cr)

- [...] courses for a total of 30 credits

#### Teaching focus (B2 : 30Cr)

AESS0246-1	<i>Analysis of scholastic institutions and educational policies</i> - Annelise VOISIN	B2	Q2	15	-	-	1
AESS0248-1	<i>Elements of sociology of education</i> - JeanFrançois GUILLAUME	B2	Q2	10	-	-	1
AESS0140-1	<i>Professional ethics and training to neutrality and citizenship</i> - Anne HERLA	B2	Q2	25	-	-	2
AESS0202-1	<i>General didactics: course and exercises ; observation placements ; reflexive practices</i> - Annick FAGNANT - [10h Internship]	B2	TA	30	10	[+]	4
AESS0004-1	<i>Media education</i> - Jérémy HAMERS	B2	Q1	15	-	-	1
AESS0249-1	<i>Interdisciplinary seminar</i> - Annick FAGNANT	B2	Q1	15	-	-	1
AESS0143-1	<i>Educational Psychology of adolescents and young adults</i> - Annick FAGNANT, Christelle GOFFIN	B2	Q1	15	-	-	2
AESS0339-1	<i>Understand and manage the diversity of public schools</i> - Ariane BAYE	B2	TA	10	15	-	3
AESS1214-1	<i>Special didactics in mathematics : course and exercises (1st part)</i> - Kevin BALHAN	B2	TA	40	-	-	3
AESS1215-1	<i>Special didactics in mathematics : placements (1st part)</i> - <i>Observation placements</i> - Kevin BALHAN - [10h Internship]	B2	TA			[+]	3
	- <i>Teaching placements</i> - Kevin BALHAN - [20h Internship]					[+]	

	- Reflexive practical work - Kevin BALHAN			-	5	-		
AESS2214-1	Special didactics in mathematics : course and exercises (2nd part) - Kevin BALHAN	B2	TA	35	-	-		4
AESS2215-1	Special didactics in mathematics : placements (2nd part) - Teaching placements - Kevin BALHAN - [20h Internship] - Reflexive practical work - Kevin BALHAN - Extra-scholar teaching activities - Kevin BALHAN	B2	TA		-	-	[+]	5
					-	5	-	
					-	10	-	

#### Professional focus in Statistics (B2 : 30Cr)

Only accessible to students who have chosen this focus before the academic year 2019-2020.

#### Mathematics

##### Mathematical analysis

MATH0074-1	Theory of distributions - Françoise BASTIN (Odd years)			-	Q2	25	15	-	4
MATH0257-2	Complex analysis - JeanPierre SCHNEIDERS			-	Q1	30	30	-	6
MATH0220-2	Complements to complex analysis - JeanPierre SCHNEIDERS - [20h Mon. WS] (Odd years) <b>Prerequisite :</b> MATH0257-2 - Analyse complexe <b>Corequisite :</b> MATH0074-1 - Théorie des distributions			-	Q2	30	10	[+]	8
MATH0463-1	Functional analysis - Céline ESSER - [20h Mon. WS] (Even years)			-	Q1	30	10	[+]	8
MATH0512-1	Functional spaces and representational families - Céline ESSER, Samuel NICOLAY - [20h Mon. WS] (Even years)			-	Q1	30	10	[+]	8
MATH0513-1	Functional spaces relating to measurement theory - Samuel NICOLAY - [20h Mon. WS] (Even years)			-	Q2	30	10	[+]	8
MATH0209-3	Measure Theory - Samuel NICOLAY - [20h Mon. WS] (Odd years)			-	Q1	30	10	[+]	8
MATH0082-1	Research problems in analysis (english language) - Françoise BASTIN, Céline ESSER, Samuel NICOLAY, JeanPierre SCHNEIDERS - [20h Mon. WS]			-	TA	30	10	[+]	10

##### Discrete mathematics

MATH0075-1	Discrete mathematics - Emilie CHARLIER (Even years)			-	Q1	30	20	-	8
MATH0076-1	Discrete mathematics project - Emilie CHARLIER, Julien LEROY, Michel RIGO (Even years) <b>Corequisite :</b> MATH0075-1 - Mathématiques discrètes MATH0083-1 - Théorie ergodique			-	TA	-	-	-	4
MATH0083-1	Ergodic theory - Julien LEROY (Even years)			-	Q1	30	20	-	8
INFO0212-2	Algorithmics and computability - Emilie CHARLIER (Odd years)			-	Q1	30	20	-	8
MATH0470-1	Combinatorics on words (english language) - Julien LEROY (Odd years)			-	Q1	30	20	-	8
MATH0077-1	Project on combinations - Emilie CHARLIER, Julien LEROY, Michel RIGO (Odd years) <b>Corequisite :</b> INFO0212-2 - Algorithmique et calculabilité MATH0470-1 - Combinatorics on words			-	TA	-	-	-	4
MATH0078-1	Research problems in discrete mathematics - Emilie CHARLIER, Julien LEROY, Michel RIGO - [20h Mon. WS] <b>Corequisite :</b> MATH0077-1 - Projet de combinatoire MATH0076-1 - Projet de mathématiques discrètes			-	TA	30	10	[+]	10

##### Probability and statistics

STAT0725-2	<i>Bayesian statistics</i> - Philippe LAMBERT - [20h Mon. WS] (Even years)	-	Q2	30	10	[+]	<b>8</b>
STAT0723-2	<i>Linear models</i> - Gentiane HAESBROECK - [20h Mon. WS] (Even years)	-	Q2	30	10	[+]	<b>8</b>
STAT0082-1	<i>Complement to multivariate statistics</i> - Gentiane HAESBROECK - [10h Mon. WS] (Odd years)	-	Q1	20	10	[+]	<b>3</b>
	<b>Corequisite :</b> MATH2021-1 - High-dimensional data analysis						
STAT0078-1	<i>Practice of statistical consultancy</i> - Marie ERNST - [20h Mon. WS] (Odd years)	-	Q2	20	-	[+]	<b>4</b>
	<b>Corequisite :</b> MATH2022-2 - Large sample analysis : theory and practice						
GEST5006-1	<i>SAS Certification applied analytics</i> (english language) - Michael SCHYNS	-	Q2	15	25	-	<b>4</b>
MATH2022-2	<i>Large sample analysis : theory and practice, General course</i> (english language) - Arnout VAN MESSEM - [10h Proj.]	-	Q2	24	12	[+]	<b>8</b>
STAT0727-2	<i>Non-parametric statistics</i> - Amir ABOUBACAR - [20h Mon. WS] (Even years)	-	Q1	30	10	[+]	<b>8</b>
MATH0079-1	<i>Stochastic process</i> - Céline ESSER - [20h Proj.] (Odd years)	-	Q2	30	10	[+]	<b>8</b>
ELEN0062-1	<i>Introduction to machine learning</i> (english language) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.]	-	Q1	30	5	[+]	<b>8</b>
MATH0084-1	<i>Research problems in probability and statistics</i> (english language) - Amir ABOUBACAR, Céline ESSER, Gentiane HAESBROECK, Arnout VAN MESSEM - [20h Mon. WS]	-	TA	30	10	[+]	<b>10</b>

#### Other fields

MATH0017-3	<i>Mathematical Logic and Set Theory</i> - Julien LEROY - [20h Mon. WS]	-	Q2	30	10	[+]	<b>8</b>
MATH0212-2	<i>General topology</i> - Céline ESSER - [10h Mon. WS]	-	Q2	30	20	[+]	<b>6</b>
MATH0465-1	<i>Algebraic Topology</i> - JeanPierre SCHNEIDERS - [20h Mon. WS] (Even years)	-	Q2	30	10	[+]	<b>8</b>
MATH0464-1	<i>Differential geometry II</i> - Pierre MATHONET - [20h Mon. WS] (Even years)	-	Q1	30	10	[+]	<b>8</b>
MATH0489-1	<i>Lie algebra</i> - Pierre MATHONET - [20h Mon. WS] (Odd years)	-	Q2	30	10	[+]	<b>8</b>
MATH2483-1	<i>History of mathematics</i> - Kevin BALHAN, Pierre MATHONET, Naïm ZENAÏDI	-	Q2	25	20	-	<b>4</b>

#### Other disciplines

##### Computer science

INFO2009-2	<i>Introduction to computer science</i> - Bernard BOIGELOT	-	Q1	24	14	-	<b>4</b>
INFO0061-4	<i>Computers organization</i> - Bernard BOIGELOT	-	Q2	15	15	-	<b>3</b>
INFO0009-2	<i>Database (general organisation)</i> - Christophe DEBRUYNE - [25h Proj.]	-	Q2	26	26	[+]	<b>6</b>
INFO0902-1	<i>Data structures and algorithms</i> - Pierre GEURTS - [40h Proj.]	-	Q2	26	20	[+]	<b>6</b>
INFO0027-2	<i>Programming techniques</i> (english language) - <i>Algorithmics</i> - Laurent MATHY - [40h Proj.] - <i>Software patterns</i> - Laurent MATHY - [30h Proj.]	-	Q2	14	14	[+]	<b>6</b>
INFO0054-1	<i>Functional programming</i> - Christophe DEBRUYNE - [15h Proj.]	-	Q1	28	24	[+]	<b>6</b>
INFO0062-1	<i>Object-oriented programming</i> (english language) - Bernard BOIGELOT - [20h Proj.]	-	Q2	25	20	[+]	<b>5</b>
INFO0085-1	<i>Compilers</i> (english language) - Pascal FONTAINE - [75h Proj.]	-	Q2	25	-	[+]	<b>6</b>
MATH0462-1	<i>Discrete optimization</i> (english language) - Quentin LOUVEAUX - [25h Proj.]	-	Q2	30	20	[+]	<b>6</b>

INFO8006-1	<i>Introduction to artificial intelligence</i> (english language) - Gilles LOUPPE - [45h Proj.]	-	Q1	25	20	[+]	<b>6</b>
MATH0461-2	<i>Introduction to numerical optimization</i> (english language) - Quentin LOUVEAUX - [25h Proj.]	-	Q1	30	20	[+]	<b>6</b>
<b>Astrophysics and astronomy</b>							
ASTR0204-2	<i>Astrophysics and geophysics</i> - MarcAntoine DUPRET	-	Q1	30	30	-	<b>8</b>
SPAT0012-1	(pas organisé en 2021-2022) <i>General relativity, Part 1: Introduction</i>	-	Q1	20	-	-	<b>2</b>
SPAT0012-2	(pas organisé en 2021-2022) <i>General relativity, Part 2: Mathematics methods</i> <b>Corequisite :</b> SPAT0012-1 - Relativité générale	-	Q1	20	-	-	<b>3</b>
SPAT0012-3	(pas organisé en 2021-2022) <i>General relativity, Part 3: supplement</i> <b>Corequisite :</b> SPAT0012-2 - Relativité générale	-	Q2	20	-	-	<b>3</b>
SPAT0044-1	<i>Stellar structure and evolution I</i> (english language) - MarcAntoine DUPRET	-	Q1	35	-	-	<b>4</b>
SPAT0045-1	<i>Stellar structure and evolution II</i> (english language) - MarcAntoine DUPRET	-	Q2	20	20	-	<b>4</b>
<b>Finance and management</b>							
GEST0832-4	<i>Financial Markets</i> - Georges HÜBNER	-	Q2	40	15	-	<b>5</b>
FINA0053-1	<i>Investments and Portfolio Management</i> (english language) - Georges HÜBNER <b>Corequisite :</b> GEST0832-4 - Marchés financiers	-	Q2	30	-	-	<b>5</b>
MQGE0001-6	<i>Operations Research</i> (english language) - Yves CRAMA	-	Q1	45	-	-	<b>5</b>
LOGI0010-1	<i>Supply Chain Management</i> (english language) - Yasemin ARDA <b>Corequisite :</b> MQGE0001-6 - Operations Research	-	Q2	45	-	-	<b>5</b>
MQGE0007-1	<i>Financial Mathematics and Stochastic Calculus</i> (english language) - Célia PAQUAY <b>Corequisite :</b> GEST0832-4 - Marchés financiers	-	Q2	30	-	-	<b>5</b>
LOGI0012-1	<i>Logistics and Transportation</i> (english language) - Sabine LIMBOURG	-	Q2	30	-	-	<b>5</b>
LOGI0013-1	<i>Operation Planning</i> (english language) - Yasemin ARDA <b>Corequisite :</b> LOGI0010-1 - Supply Chain Management	-	Q2	30	-	-	<b>5</b>
FINA0052-1	<i>Financial Derivatives</i> (english language) - Julien HAMBUECKERS <b>Corequisite :</b> GEST0832-4 - Marchés financiers	-	Q2	30	-	-	<b>5</b>
FINA0064-1	<i>Financial Risk Modeling</i> (english language) <b>Corequisite :</b> FINA0053-1 - Investments and Portfolio Management MQGE0007-1 - Financial Mathematics and Stochastic Calculus	-	Q1	30	-	-	<b>5</b>
FINA0051-1	<i>Banking and Insurance</i> (english language) - Fabien BONIVER, Georges HÜBNER <b>Corequisite :</b> GEST0832-4 - Marchés financiers	-	Q2	30	-	-	<b>5</b>
<b>Physics</b>							
MECA0203-3	<i>Continuum Mechanics</i> - Pierre DAUBY - [20h Mon. WS]	-	Q1	30	10	[+]	<b>8</b>
PHYS0212-2	<i>Statistical physics</i> - Nicolas VANDEWALLE	-	Q2	30	30	-	<b>8</b>

PHYS0205-2	<i>Complement of physical statistics</i> - Nicolas VANDEWALLE - [20h Mon. WS]	-	Q2	30	10	[+]	<b>8</b>
PHYS3033-1	<i>Quantum physics I</i> - Thierry BASTIN	-	Q1	35	25	-	<b>8</b>
PHYS3034-1	<i>Quantum physics II</i> - Thierry BASTIN	-	Q2	20	10	-	<b>4</b>

**Additional ECTS Master in mathematics (120 ECTS)**

[...] The update course, worth a maximum of 60 credits, will be determined based on students' prior training.