

## Block view of the study programme

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### Block 1

*Notice* : ONLY AVAILABLE TO STUDENTS REGISTERED BEFORE THE 2021-2022 ACADEMIC YEAR.

#### Compulsory course

SMEM0011-1 *Final thesis* - COLLÉGIALITÉ TA - - - **16**

#### Optional courses

In agreement with the Jury, choose courses not already taken for a total of 44 credits from the two lists below:

##### Mathematics

[...] maximum 32 credits from :

##### Mathematical analysis

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

##### Discrete mathematics

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

MATH0076-1 - Projet de mathématiques discrètes

#### 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)<br><b>Corequisite :</b><br>MATH2021-1 - High-dimensional statistics | Q1 | 20 | 10 | [+] | <b>3</b>  |
| STAT0078-1 | <i>Practice of statistical consultancy</i> - Marie ERNST - [20h Mon. WS] (Odd years)<br><b>Corequisite :</b><br>MATH2022-2 - Monte Carlo methods in statistics     | Q2 | 20 | -  | [+] | <b>4</b>  |
| GEST5006-1 | <i>SAS Certification applied analytics</i> (english language) - Michael SCHYNS   | Q2 | 15 | 25 | -   | <b>4</b>  |
| MATH2022-2 | <i>Monte Carlo methods in statistics, 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

Notice : compatibility of the timetable with the courses in the Mathematics list cannot be guaranteed.

[...] maximum 10 credits among:

#### 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)<br>- <i>Algorithmics</i> - Laurent MATHY - [40h Proj.]<br>- <i>Software patterns</i> - Laurent MATHY - [30h Proj.] | Q2 |    |    |     | <b>6</b> |
|            |   |    | 14 | 14 | [+] |          |
|            |   |    | 10 | 10 | [+] |          |
| 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 | [+] | 5 |
| INFO0085-1                        | <i>Compilers</i> (english language) - Pascal FONTAINE - [75h Proj.]   | Q2 | 25 | -  | [+] | 6 |
| MATH0462-1                        | <i>Discrete optimization</i> (english language) - Quentin LOUVEAUX - [25h Proj.]  | Q2 | 30 | 20 | [+] | 6 |
| INFO8006-1                        | <i>Introduction to artificial intelligence</i> (english language) - Gilles LOUPPE - [45h Proj.]   | Q1 | 25 | 20 | [+] | 6 |
| MATH0461-2                        | <i>Introduction to numerical optimization</i> (english language) - Quentin LOUVEAUX - [25h Proj.]   | Q1 | 30 | 20 | [+] | 6 |
| <b>Astrophysics and astronomy</b> |   |    |    |    |     |   |
| ASTR0204-2                        | <i>Astrophysics and geophysics</i> - MarcAntoine DUPRET, Valérie VAN GROOTEL  | Q1 | 30 | 30 | -   | 8 |
| SPAT0012-1                        | (pas organisé en 2022-2023) <i>General relativity, Part 1: Introduction</i> - N...  | Q1 | 20 | -  | -   | 2 |
| SPAT0012-2                        | (pas organisé en 2022-2023) <i>General relativity, Part 2: Mathematics methods</i> - N...<br><b>Corequisite :</b><br>SPAT0012-1 - Relativité générale               | Q1 | 20 | -  | -   | 3 |
| SPAT0012-3                        | (pas organisé en 2022-2023) <i>General relativity, Part 3: supplement</i> - N...<br><b>Corequisite :</b><br>SPAT0012-2 - Relativité générale                        | Q2 | 20 | -  | -   | 3 |
| SPAT0044-1                        | <i>Stellar structure and evolution I</i> (english language) - MarcAntoine DUPRET  | Q1 | 35 | -  | -   | 4 |
| SPAT0045-1                        | <i>Stellar structure and evolution II</i> (english language) - MarcAntoine DUPRET   | Q2 | 20 | 20 | -   | 4 |
| <b>Finance and management</b>     |   |    |    |    |     |   |
| GEST0832-4                        | <i>Financial Markets</i> - Georges HÜBNER   | Q1 | 40 | 15 | -   | 5 |
| FINA0053-1                        | <i>Investments and Portfolio Management</i> (english language) - Georges HÜBNER - Suppl : Laurent BODSON<br><b>Corequisite :</b><br>GEST0832-4 - Marchés financiers | Q2 | 30 | -  | -   | 5 |
| MQGE0001-6                        | <i>Operations Research</i> (english language) - Yves CRAMA  | Q1 | 45 | -  | -   | 5 |
| LOGI0010-1                        | <i>Supply Chain Management</i> (english language) - Yasemin ARDA<br><b>Corequisite :</b><br>MQGE0001-6 - Operations Research  | Q2 | 45 | -  | -   | 5 |
| MQGE0007-1                        | <i>Financial Mathematics and Stochastic Calculus</i> (english language) - Célia PAQUAY<br><b>Corequisite :</b><br>GEST0832-4 - Marchés financiers                   | Q2 | 30 | -  | -   | 5 |
| LOGI0012-1                        | <i>Logistics and Transportation</i> (english language) - Sabine LIMBOURG  | Q2 | 30 | -  | -   | 5 |
| LOGI0013-1                        | <i>Operation Planning</i> (english language) - Yasemin ARDA<br><b>Corequisite :</b><br>LOGI0010-1 - Supply Chain Management   | Q2 | 30 | -  | -   | 5 |
| FINA0052-1                        | <i>Financial Derivatives</i> (english language) - Julien HAMBUECKERS - Suppl : Fabien BONIVER<br><b>Corequisite :</b><br>GEST0832-4 - Marchés financiers            | Q2 | 30 | -  | -   | 5 |
| FINA0064-1                        | <i>Financial Risk Modeling</i> (english language) - Julien HAMBUECKERS<br><b>Corequisite :</b>  | Q1 | 30 | -  | -   | 5 |

|            |   |    |    |   |   |          |
|------------|---|----|----|---|---|----------|
|            | MQGE0007-1 - Financial Mathematics and Stochastic Calculus                          |    |    |   |   |          |
|            | FINA0053-1 - Investments and Portfolio Management                                   |    |    |   |   |          |
| FINA0051-1 | <i>Banking and Insurance</i> (english language) - Fabien BONIVER,<br>Georges HÜBNER | Q2 | 30 | - | - | <b>5</b> |
|            | <b>Corequisite :</b><br>GEST0832-4 - Marchés financiers                             |    |    |   |   |          |

#### Physics

|            |   |    |    |    |     |          |
|------------|---|----|----|----|-----|----------|
| 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> |
| 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> |

#### Bloc d'aménagement du programme de l'année

### Additional ECTS Master in mathematics (60 ECTS)

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