

#### Block view of the study programme

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#### Block 1

Depending on your track record or your professional/research focus, some prerequisites/corequisites of your first year program might appear in bloc 2. You are therefore invited to go through the list of courses suggested in bloc 2 even if you enroll for the first time in this master program.

To complete their curriculum, students must earn or validate the 65 credits of the compulsory courses (including the master thesis), choose 30 credits from the professional focus and take 25 credits of optional courses.

Ideally, students enrolling in the master program should have acquired the skills and knowledge corresponding to the 40 credits in "Computer science" offered as part of the bachelor program in engineering.

#### Compulsory courses from the core curriculum

|            |                                                                                                                                                                                                                                                                                                                                                        |    |    |    |     |    |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|-----|----|
| INFO0085-1 | <i>Compilers</i> (english language) - Pascal FONTAINE - [75h Proj.]<br><b>Corequisite :</b><br>INFO0940-1 - Operating systems<br>INFO0012-2 - Computation structures<br>INFO0016-1 - Introduction to the theory of computation                                                                                                                         | Q2 | 25 | -  | [+] | 5  |
| ELEN0062-1 | <i>Introduction to machine learning</i> (english language) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.]                                                                                                                                                                                                                                               | Q1 | 30 | 5  | [+] | 5  |
| INFO0016-1 | <i>Introduction to the theory of computation</i> (english language) - Quentin LOUVEAUX                                                                                                                                                                                                                                                                 | Q1 | 26 | 26 | -   | 5  |
| INFO0940-1 | <i>Operating systems</i> (english language) - Laurent MATHY - [30h Proj.]<br><b>Corequisite :</b><br>INFO0912-1 - Parallel Programming<br>INFO0012-2 - Computation structures                                                                                                                                                                          | Q2 | 30 | 6  | [+] | 5  |
| ELEN0060-2 | <i>Information and coding theory</i> (english language) - Louis WEHENKEL - [30h Proj.]                                                                                                                                                                                                                                                                 | Q2 | 30 | 15 | [+] | 5  |
| GEST3162-1 | <i>Principles of management</i> (english language) - Michaël PARMENTIER, Willem STANDAERT - [25h Proj.]                                                                                                                                                                                                                                                | Q1 | 30 | -  | [+] | 5  |
| PROJ0010-1 | <i>Software project engineering and management</i> (english language) - Benoît DONNET, Bernard HAUZEUR, Guy LEDUC, Laurent MATHY - [280h Proj.]<br><b>Prerequisite :</b><br>INFO0062-1 - Object-oriented programming<br><b>Corequisite :</b><br>INFO0010-4 - Introduction to computer networking<br>INFO0902-1 - Structures des données et algorithmes | TA | 20 | -  | [+] | 10 |

#### Optional courses from the core curriculum

Choose remaining credits in the lists below :

##### Optional courses outside the focus

##### Computer Science foundation courses

The following courses are corequisite to some compulsory courses of the master program. They must be taken as a priority, unless they were already taken as part of the bachelor of science in engineering, or unless the corresponding knowledge and skills have been acquired previously.

|            |                                                                                                    |    |    |    |     |   |
|------------|----------------------------------------------------------------------------------------------------|----|----|----|-----|---|
| INFO0902-1 | <i>Data structures and algorithms</i> - Pierre GEURTS - [40h Proj.]                                | Q2 | 26 | 20 | [+] | 5 |
| INFO0010-4 | <i>Introduction to computer networking</i> (english language) - Guy LEDUC - [12h Labo., 40h Proj.] | Q1 | 32 | 2  | [+] | 5 |
| INFO0012-2 | <i>Computation structures</i> (english language) - Pascal FONTAINE, Laurent MATHY - [40h Proj.]    | Q1 | 26 | 26 | [+] | 5 |
| INFO0062-1 | <i>Object-oriented programming</i> (english language) - Bernard BOIGELOT - [20h Proj.]             | Q2 | 25 | 20 | [+] | 5 |

|                                  |                                                                                                                                                                                                                                                                               |    |    |    |     |   |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|-----|---|
| INFO9012-1                       | <i>Parallel Programming</i> (english language) - Pascal FONTAINE                                                                                                                                                                                                              | Q2 | 25 | 25 | -   | 5 |
| <b>Computer systems security</b> |                                                                                                                                                                                                                                                                               |    |    |    |     |   |
| INFO0031-1                       | <i>Network Engineering</i> (english language) - Benoît DONNET, Guy LEDUC - [12h Labo., 30h Proj.]                                                                                                                                                                             | Q2 | 30 | -  | [+] | 5 |
| INFO0045-3                       | <i>Introduction to computer security</i> (english language) - Benoît DONNET - [10h Labo., 30h Proj.]<br><b>Corequisite :</b><br>INFO0010-4 - Introduction to computer networking<br>INFO0012-2 - Computation structures<br>INFO0902-1 - Structures des données et algorithmes | Q1 | 30 | 6  | [+] | 5 |
| INFO0056-1                       | <i>Securing Networks</i> (english language) - Guy LEDUC - [12h Labo., 30h Proj.] (Even years)<br><b>Corequisite :</b><br>INFO0010-4 - Introduction to computer networking<br>INFO0045-3 - Introduction to computer security                                                   | Q2 | 30 | -  | [+] | 5 |
| INFO0939-1                       | <i>High performance scientific computing</i> (english language) - Christophe GEUZAINE - [20h Proj.]                                                                                                                                                                           | Q1 | 30 | 15 | [+] | 5 |
| INFO8002-1                       | <i>Topics in Distributed Systems</i> (english language) - Bernard BOIGELOT, Christophe DEBRUYNE, Pascal FONTAINE, Guy LEDUC, Laurent MATHY - [35h Proj.] (Odd years)                                                                                                          | Q2 | 30 | -  | [+] | 5 |
| INFO8012-1                       | <i>Digital Forensics</i> (english language) - Benoît DONNET, Laurent MATHY - [12h Labo., 30h Proj.] (Even years)<br><b>Corequisite :</b><br>INFO0010-4 - Introduction to computer networking<br>INFO0085-1 - Compilers<br>INFO0940-1 - Operating systems                      | Q2 | 30 | -  | [+] | 5 |
| INFO8011-1                       | <i>Network infrastructures</i> (english language) - Benoît DONNET, Guy LEDUC, Laurent MATHY - [8h Labo., 30h Proj.]<br><b>Corequisite :</b><br>INFO0010-4 - Introduction to computer networking                                                                               | Q1 | 30 | -  | [+] | 5 |
| INFO8013-1                       | <i>Advanced Computer Security</i> (english language) - Benoît DONNET, Laurent MATHY - [20h Labo., 30h Proj.] (Odd years)<br><b>Corequisite :</b><br>INFO0045-3 - Introduction to computer security                                                                            | Q2 | 20 | -  | [+] | 5 |
| <b>Intelligent Systems</b>       |                                                                                                                                                                                                                                                                               |    |    |    |     |   |
| INFO8010-1                       | <i>Deep learning</i> (english language) - Gilles LOUPPE - [60h Proj.]<br><b>Corequisite :</b><br>ELEN0062-1 - Introduction to machine learning                                                                                                                                | Q2 | 30 | -  | [+] | 5 |
| ELEN0016-2                       | <i>Computer vision</i> (english language) - Anthony CIOPPA, Adrien DELIÈGE, Marc VAN DROOGENBROECK - Suppl : Thomas HOYOUN - [50h Proj.]                                                                                                                                      | Q1 | 30 | 10 | [+] | 5 |
| INFO9015-1                       | <i>Logic for Computer Science</i> (english language) - Pascal FONTAINE                                                                                                                                                                                                        | Q1 | 24 | 20 | -   | 5 |
| INFO0948-2                       | <i>Introduction to intelligent robotics</i> (english language) - Pierre SACRÉ - [80h Proj.]                                                                                                                                                                                   | Q2 | 30 | 4  | [+] | 5 |
| INFO2049-1                       | <i>Web and Text Analytics</i> (english language) - Ashwin ITTOO                                                                                                                                                                                                               | Q1 | 30 | -  | -   | 5 |
| GBIO0002-1                       | <i>Genetics and bioinformatics</i> (english language) - Franck DEQUIEDT, Kristel VAN STEEN - [15h Proj.]                                                                                                                                                                      | Q1 | 30 | 15 | [+] | 5 |
| INFO8003-1                       | <i>Reinforcement learning</i> (english language) - Damien ERNST - [45h Proj.]                                                                                                                                                                                                 | Q2 | 25 | 10 | [+] | 5 |
| INFO8004-1                       | <i>Advanced Machine learning</i> (english language) - Pierre GEURTS, Gilles LOUPPE, Louis WEHENKEL - [20h Proj.]<br><b>Corequisite :</b><br>INFO8010-1 - Deep learning<br>ELEN0062-1 - Introduction to machine learning                                                       | Q2 | 25 | -  | [+] | 5 |

### Master Msc. in computer science and engineering, professional focus in intelligent systems

|            |                                                                                                                                                                         |    |    |    |     |   |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|-----|---|
| INFO8006-1 | <i>Introduction to artificial intelligence</i> (english language) - Gilles LOUPPE - [45h Proj.]                                                                         | Q1 | 25 | 20 | [+] | 5 |
| INFO9014-1 | <i>Knowledge representation and reasoning</i> (english language) - Christophe DEBRUYNE - [45h Proj.]<br><b>Corequisite :</b><br>INFO9015-1 - Logic for Computer Science | Q2 | 24 | 20 | [+] | 5 |
| INFO9023-1 | <i>Machine Learning Systems Design</i> (english language) - Thomas VRANCKEN - [17h Labo., 18h Proj.]                                                                    | Q2 | 17 | -  | [+] | 5 |
| INFO9030-1 | <i>Explainable Artificial Intelligence</i> (english language) - Vân Anh HUYNH THU - [50h Proj.]                                                                         | Q2 | 24 | -  | [+] | 5 |

#### Other optional courses

|            |                                                                                                                                                                                                                                                        |    |    |    |     |   |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|-----|---|
| INFO9015-1 | <i>Logic for Computer Science</i> (english language) - Pascal FONTAINE                                                                                                                                                                                 | Q1 | 24 | 20 | -   | 5 |
| INFO9016-1 | <i>Advanced Databases</i> (english language) - Christophe DEBRUYNE - [20h Proj.]                                                                                                                                                                       | Q1 | 24 | 20 | [+] | 5 |
| INFO0064-2 | <i>Embedded systems</i> (english language) - Bernard BOIGELOT                                                                                                                                                                                          | Q1 | 25 | 20 | -   | 3 |
| INFO2055-1 | <i>Embedded systems project</i> (english language) - Bernard BOIGELOT - [60h Proj.]<br><b>Corequisite :</b><br>INFO0064-2 - Embedded systems                                                                                                           | Q2 | -  | -  | [+] | 2 |
| INFO2051-1 | <i>Object-oriented programming on mobile devices</i> (english language) - Laurent MATHY - [90h Proj.]                                                                                                                                                  | Q1 | 15 | 10 | [+] | 5 |
| INFO0060-1 | <i>Introduction to computer systems verification</i> (english language) - Bernard BOIGELOT, Pascal FONTAINE - [20h Proj.]<br><b>Corequisite :</b><br>INFO0016-1 - Introduction to the theory of computation<br>INFO9015-1 - Logic for Computer Science | Q2 | 20 | 20 | [+] | 5 |
| 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 | 14 | 14 | [+] | 5 |
| MATH0461-2 | <i>Introduction to numerical optimization</i> (english language) - Quentin LOUVEAUX - [25h Proj.]                                                                                                                                                      | Q1 | 30 | 20 | [+] | 5 |
| MATH0462-1 | <i>Discrete optimization</i> (english language) - Quentin LOUVEAUX - [25h Proj.]                                                                                                                                                                       | Q2 | 30 | 20 | [+] | 5 |
| GBIO0030-1 | <i>Computational approaches to statistical generics</i> (english language) - Kristel VAN STEEN - [35h Proj.]<br><b>Prerequisite :</b><br>GBIO0002-1 - Genetics and bioinformatics                                                                      | Q2 | 25 | 15 | [+] | 5 |
| MECA0524-1 | <i>CAD &amp; Geometric Algorithms</i> - Eric BÉCHET - [60h Proj.]                                                                                                                                                                                      | Q1 | 20 | 20 | [+] | 5 |
| INFO0004-2 | <i>Object-oriented programming projects</i> (english language) - Laurent MATHY - [90h Proj.]                                                                                                                                                           | Q2 | 20 | -  | [+] | 5 |
| GBIO0031-1 | <i>Learning from genomic data</i> (english language) - Kristel VAN STEEN - [150h Proj.]                                                                                                                                                                | Q2 | -  | -  | [+] | 5 |
| INFO0054-1 | <i>Functional programming</i> - Christophe DEBRUYNE - [20h Proj.]                                                                                                                                                                                      | Q1 | 24 | 24 | [+] | 5 |
| ELEN0449-1 | <i>Computer Vision understanding</i> (english language) - Anthony CIOPPA - [50h Proj.]                                                                                                                                                                 | Q2 | 24 | 10 | [+] | 5 |

#### Internships and projects (maximum 15 credits)

|            |                                                                                                    |    |   |   |     |   |
|------------|----------------------------------------------------------------------------------------------------|----|---|---|-----|---|
| PROJ0011-1 | <i>Personal student project</i> (english language) - Bernard BOIGELOT, COLLÉGIALITÉ - [150h Proj.] | TA | - | - | [+] | 5 |
|------------|----------------------------------------------------------------------------------------------------|----|---|---|-----|---|

#### Compulsory courses within the focus

### Master Msc. in computer science and engineering, professional focus in intelligent systems

|            |                                                                                               |    |    |    |     |   |
|------------|-----------------------------------------------------------------------------------------------|----|----|----|-----|---|
| INFO8010-1 | <i>Deep learning</i> (english language) - Gilles LOUPPE - [60h Proj.]                         | Q2 | 30 | -  | [+] | 5 |
| SYST0022-1 | <i>Linear Systems Design</i> (english language) - Guillaume DRION, Pierre SACRÉ - [15h Proj.] | Q2 | 26 | 26 | [+] | 5 |

#### Optional courses within the focus

Students choosing this focus shall select, in addition to 10 credits of compulsory courses, 5 credits of elective courses inside the focus. The remaining credits can be taken inside or outside the focus.

|            |                                                                                                                                                                               |    |    |    |     |   |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|-----|---|
| ELEN0016-2 | <i>Computer vision</i> (english language) - Anthony CIOPPA, Adrien DELIÈGE, Marc VAN DROOGENBROECK - Suppl : Thomas HOYOUNX - [50h Proj.]                                     | Q1 | 30 | 10 | [+] | 5 |
| INFO0948-2 | <i>Introduction to intelligent robotics</i> (english language) - Pierre SACRÉ - [80h Proj.]                                                                                   | Q2 | 30 | 4  | [+] | 5 |
| INFO2049-1 | <i>Web and Text Analytics</i> (english language) - Ashwin ITTOO<br><b>Corequisite :</b><br>ELEN0062-1 - Introduction to machine learning                                      | Q1 | 30 | -  | -   | 5 |
| GBIO0002-1 | <i>Genetics and bioinformatics</i> (english language) - Franck DEQUIEDT, Kristel VAN STEEN - [15h Proj.]                                                                      | Q1 | 30 | 15 | [+] | 5 |
| DROI1357-1 | <i>European law, (big) data and artificial intelligence applications seminar</i> (english language) - Jérôme DE COOMAN, Ljupcho GROZDANOVSKI                                  | Q1 | 24 | -  | -   | 5 |
| INFO8003-1 | <i>Reinforcement learning</i> (english language) - Damien ERNST - [45h Proj.]                                                                                                 | Q2 | 25 | 10 | [+] | 5 |
| INFO8004-1 | <i>Advanced Machine learning</i> (english language) - Pierre GEURTS, Gilles LOUPPE, Louis WEHENKEL - [20h Proj.]                                                              | Q2 | 25 | -  | [+] | 5 |
| INFO8006-1 | <i>Introduction to artificial intelligence</i> (english language) - Gilles LOUPPE - [45h Proj.]                                                                               | Q1 | 25 | 20 | [+] | 5 |
| INFO9014-1 | <i>Knowledge representation and reasoning</i> (english language) - Christophe DEBRUYNE - [45h Proj.]<br><b>Corequisite :</b><br>INFO9015-1 - Logic for Computer Science       | Q2 | 24 | 20 | [+] | 5 |
| INFO9023-1 | <i>Machine Learning Systems Design</i> (english language) - Thomas VRANCKEN - [17h Labo., 18h Proj.]<br><b>Corequisite :</b><br>ELEN0062-1 - Introduction to machine learning | Q2 | 17 | -  | [+] | 5 |
| INFO9030-1 | <i>Explainable Artificial Intelligence</i> (english language) - Vân Anh HUYNH THU - [50h Proj.]                                                                               | Q2 | 24 | -  | [+] | 5 |

#### Block 2

#### Compulsory courses from the core curriculum

|            |                                                                                      |    |   |   |     |    |
|------------|--------------------------------------------------------------------------------------|----|---|---|-----|----|
| ATFE0015-1 | <i>Master thesis</i> (english language) - COLLÉGIALITÉ, Laurent MATHY - [750h Proj.] | TA | - | - | [+] | 25 |
|------------|--------------------------------------------------------------------------------------|----|---|---|-----|----|

#### Optional courses from the core curriculum

Choose remaining credits in the lists below :

#### Optional courses outside the focus

#### Computer Science foundation courses

The following courses are corequisite to some compulsory courses of the master program. They must be taken as a priority, unless they were already taken as part of the bachelor of science in engineering, or unless the corresponding knowledge and skills have been acquired previously.

#### Computer systems security

|            |                                                                                                   |    |    |   |     |   |
|------------|---------------------------------------------------------------------------------------------------|----|----|---|-----|---|
| INFO0031-1 | <i>Network Engineering</i> (english language) - Benoît DONNET, Guy LEDUC - [12h Labo., 30h Proj.] | Q2 | 30 | - | [+] | 5 |
| INFO0045-3 | <i>Introduction to computer security</i> (english language) - Benoît DONNET -                     | Q1 | 30 | 6 | [+] | 5 |

[10h Labo., 30h Proj.]

**Corequisite :**

INFO0010-4 - Introduction to computer networking

INFO0012-2 - Computation structures

INFO0902-1 - Structures des données et algorithmes

|            |                                                                                                                                                                      |    |    |    |     |   |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|-----|---|
| INFO0056-1 | <i>Securing Networks</i> (english language) - Guy LEDUC - [12h Labo., 30h Proj.] (Even years)                                                                        | Q2 | 30 | -  | [+] | 5 |
|            | <b>Corequisite :</b><br>INFO0010-4 - Introduction to computer networking<br>INFO0045-3 - Introduction to computer security                                           |    |    |    |     |   |
| INFO0939-1 | <i>High performance scientific computing</i> (english language) - Christophe GEUZAIN - [20h Proj.]                                                                   | Q1 | 30 | 15 | [+] | 5 |
| INFO8002-1 | <i>Topics in Distributed Systems</i> (english language) - Bernard BOIGELOT, Christophe DEBRUYNE, Pascal FONTAINE, Guy LEDUC, Laurent MATHY - [35h Proj.] (Odd years) | Q2 | 30 | -  | [+] | 5 |
| INFO8012-1 | <i>Digital Forensics</i> (english language) - Benoît DONNET, Laurent MATHY - [12h Labo., 30h Proj.] (Even years)                                                     | Q2 | 30 | -  | [+] | 5 |
|            | <b>Corequisite :</b><br>INFO0010-4 - Introduction to computer networking<br>INFO0085-1 - Compilers<br>INFO0940-1 - Operating systems                                 |    |    |    |     |   |
| INFO8011-1 | <i>Network infrastructures</i> (english language) - Benoît DONNET, Guy LEDUC, Laurent MATHY - [8h Labo., 30h Proj.]                                                  | Q1 | 30 | -  | [+] | 5 |
|            | <b>Corequisite :</b><br>INFO0010-4 - Introduction to computer networking                                                                                             |    |    |    |     |   |
| INFO8013-1 | <i>Advanced Computer Security</i> (english language) - Benoît DONNET, Laurent MATHY - [20h Labo., 30h Proj.] (Odd years)                                             | Q2 | 20 | -  | [+] | 5 |
|            | <b>Corequisite :</b><br>INFO0045-3 - Introduction to computer security                                                                                               |    |    |    |     |   |

#### Intelligent Systems

|            |                                                                                                                                          |    |    |    |     |   |
|------------|------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|-----|---|
| INFO8010-1 | <i>Deep learning</i> (english language) - Gilles LOUPPE - [60h Proj.]                                                                    | Q2 | 30 | -  | [+] | 5 |
|            | <b>Corequisite :</b><br>ELEN0062-1 - Introduction to machine learning                                                                    |    |    |    |     |   |
| ELEN0016-2 | <i>Computer vision</i> (english language) - Anthony CIOPPA, Adrien DELIÈGE, Marc VAN DROOGENBROECK - Suppl : Thomas HOYOUN - [50h Proj.] | Q1 | 30 | 10 | [+] | 5 |
| INFO9015-1 | <i>Logic for Computer Science</i> (english language) - Pascal FONTAINE                                                                   | Q1 | 24 | 20 | -   | 5 |
| INFO0948-2 | <i>Introduction to intelligent robotics</i> (english language) - Pierre SACRÉ - [80h Proj.]                                              | Q2 | 30 | 4  | [+] | 5 |
| INFO2049-1 | <i>Web and Text Analytics</i> (english language) - Ashwin ITTOO                                                                          | Q1 | 30 | -  | -   | 5 |
| GBIO0002-1 | <i>Genetics and bioinformatics</i> (english language) - Franck DEQUIEDT, Kristel VAN STEEN - [15h Proj.]                                 | Q1 | 30 | 15 | [+] | 5 |
| INFO8003-1 | <i>Reinforcement learning</i> (english language) - Damien ERNST - [45h Proj.]                                                            | Q2 | 25 | 10 | [+] | 5 |
| INFO8004-1 | <i>Advanced Machine learning</i> (english language) - Pierre GEURTS, Gilles LOUPPE, Louis WEHENKEL - [20h Proj.]                         | Q2 | 25 | -  | [+] | 5 |
|            | <b>Corequisite :</b><br>INFO8010-1 - Deep learning<br>ELEN0062-1 - Introduction to machine learning                                      |    |    |    |     |   |
| INFO8006-1 | <i>Introduction to artificial intelligence</i> (english language) - Gilles LOUPPE - [45h Proj.]                                          | Q1 | 25 | 20 | [+] | 5 |
| INFO9014-1 | <i>Knowledge representation and reasoning</i> (english language) - Christophe DEBRUYNE - [45h Proj.]                                     | Q2 | 24 | 20 | [+] | 5 |
|            | <b>Corequisite :</b>                                                                                                                     |    |    |    |     |   |

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INFO9015-1 - Logic for Computer Science

|            |                                                                                                      |    |    |   |     |   |
|------------|------------------------------------------------------------------------------------------------------|----|----|---|-----|---|
| INFO9023-1 | <i>Machine Learning Systems Design</i> (english language) - Thomas VRANCKEN - [17h Labo., 18h Proj.] | Q2 | 17 | - | [+] | 5 |
|------------|------------------------------------------------------------------------------------------------------|----|----|---|-----|---|

|            |                                                                                                 |    |    |   |     |   |
|------------|-------------------------------------------------------------------------------------------------|----|----|---|-----|---|
| INFO9030-1 | <i>Explainable Artificial Intelligence</i> (english language) - Vân Anh HUYNH THU - [50h Proj.] | Q2 | 24 | - | [+] | 5 |
|------------|-------------------------------------------------------------------------------------------------|----|----|---|-----|---|

#### Other optional courses

|            |                                                                        |    |    |    |   |   |
|------------|------------------------------------------------------------------------|----|----|----|---|---|
| INFO9015-1 | <i>Logic for Computer Science</i> (english language) - Pascal FONTAINE | Q1 | 24 | 20 | - | 5 |
|------------|------------------------------------------------------------------------|----|----|----|---|---|

|            |                                                                                  |    |    |    |     |   |
|------------|----------------------------------------------------------------------------------|----|----|----|-----|---|
| INFO9016-1 | <i>Advanced Databases</i> (english language) - Christophe DEBRUYNE - [20h Proj.] | Q1 | 24 | 20 | [+] | 5 |
|------------|----------------------------------------------------------------------------------|----|----|----|-----|---|

|            |                                                               |    |    |    |   |   |
|------------|---------------------------------------------------------------|----|----|----|---|---|
| INFO0064-2 | <i>Embedded systems</i> (english language) - Bernard BOIGELOT | Q1 | 25 | 20 | - | 3 |
|------------|---------------------------------------------------------------|----|----|----|---|---|

|            |                                                                                     |    |   |   |     |   |
|------------|-------------------------------------------------------------------------------------|----|---|---|-----|---|
| INFO2055-1 | <i>Embedded systems project</i> (english language) - Bernard BOIGELOT - [60h Proj.] | Q2 | - | - | [+] | 2 |
|------------|-------------------------------------------------------------------------------------|----|---|---|-----|---|

#### Corequisite :

INFO0064-2 - Embedded systems

|            |                                                                                                       |    |    |    |     |   |
|------------|-------------------------------------------------------------------------------------------------------|----|----|----|-----|---|
| INFO2051-1 | <i>Object-oriented programming on mobile devices</i> (english language) - Laurent MATHY - [90h Proj.] | Q1 | 15 | 10 | [+] | 5 |
|------------|-------------------------------------------------------------------------------------------------------|----|----|----|-----|---|

|            |                                                                                                                           |    |    |    |     |   |
|------------|---------------------------------------------------------------------------------------------------------------------------|----|----|----|-----|---|
| INFO0060-1 | <i>Introduction to computer systems verification</i> (english language) - Bernard BOIGELOT, Pascal FONTAINE - [20h Proj.] | Q2 | 20 | 20 | [+] | 5 |
|------------|---------------------------------------------------------------------------------------------------------------------------|----|----|----|-----|---|

#### Corequisite :

INFO0016-1 - Introduction to the theory of computation

INFO9015-1 - Logic for Computer Science

|            |                                                                                                                                                                     |    |    |    |     |   |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|-----|---|
| 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 |    |    |     | 5 |
|            |                                                                                                                                                                     |    | 14 | 14 | [+] |   |
|            |                                                                                                                                                                     |    | 10 | 10 | [+] |   |

|            |                                                                                                   |    |    |    |     |   |
|------------|---------------------------------------------------------------------------------------------------|----|----|----|-----|---|
| MATH0461-2 | <i>Introduction to numerical optimization</i> (english language) - Quentin LOUVEAUX - [25h Proj.] | Q1 | 30 | 20 | [+] | 5 |
|------------|---------------------------------------------------------------------------------------------------|----|----|----|-----|---|

|            |                                                                                  |    |    |    |     |   |
|------------|----------------------------------------------------------------------------------|----|----|----|-----|---|
| MATH0462-1 | <i>Discrete optimization</i> (english language) - Quentin LOUVEAUX - [25h Proj.] | Q2 | 30 | 20 | [+] | 5 |
|------------|----------------------------------------------------------------------------------|----|----|----|-----|---|

|            |                                                                                                              |    |    |    |     |   |
|------------|--------------------------------------------------------------------------------------------------------------|----|----|----|-----|---|
| GBIO0030-1 | <i>Computational approaches to statistical generics</i> (english language) - Kristel VAN STEEN - [35h Proj.] | Q2 | 25 | 15 | [+] | 5 |
|------------|--------------------------------------------------------------------------------------------------------------|----|----|----|-----|---|

#### Prerequisite :

GBIO0002-1 - Genetics and bioinformatics

|            |                                                                   |    |    |    |     |   |
|------------|-------------------------------------------------------------------|----|----|----|-----|---|
| MECA0524-1 | <i>CAD &amp; Geometric Algorithms</i> - Eric BÉCHET - [60h Proj.] | Q1 | 20 | 20 | [+] | 5 |
|------------|-------------------------------------------------------------------|----|----|----|-----|---|

|            |                                                                                              |    |    |   |     |   |
|------------|----------------------------------------------------------------------------------------------|----|----|---|-----|---|
| INFO0004-2 | <i>Object-oriented programming projects</i> (english language) - Laurent MATHY - [90h Proj.] | Q2 | 20 | - | [+] | 5 |
|------------|----------------------------------------------------------------------------------------------|----|----|---|-----|---|

|            |                                                                                         |    |   |   |     |   |
|------------|-----------------------------------------------------------------------------------------|----|---|---|-----|---|
| GBIO0031-1 | <i>Learning from genomic data</i> (english language) - Kristel VAN STEEN - [150h Proj.] | Q2 | - | - | [+] | 5 |
|------------|-----------------------------------------------------------------------------------------|----|---|---|-----|---|

|            |                                                                   |    |    |    |     |   |
|------------|-------------------------------------------------------------------|----|----|----|-----|---|
| INFO0054-1 | <i>Functional programming</i> - Christophe DEBRUYNE - [20h Proj.] | Q1 | 24 | 24 | [+] | 5 |
|------------|-------------------------------------------------------------------|----|----|----|-----|---|

|            |                                                                                        |    |    |    |     |   |
|------------|----------------------------------------------------------------------------------------|----|----|----|-----|---|
| ELEN0449-1 | <i>Computer Vision understanding</i> (english language) - Anthony CIOPPA - [50h Proj.] | Q2 | 24 | 10 | [+] | 5 |
|------------|----------------------------------------------------------------------------------------|----|----|----|-----|---|

[...] With the agreement of the jury, choose 5 credits in any course programme of the University or from the UNIC course catalog.

#### Internships and projects (maximum 15 credits)

|            |                                                                              |    |   |   |     |    |
|------------|------------------------------------------------------------------------------|----|---|---|-----|----|
| ASTG9005-1 | <i>Research Internship</i> (english language) - Benoît DONNET - [300h Proj.] | TA | - | - | [+] | 10 |
|------------|------------------------------------------------------------------------------|----|---|---|-----|----|

#### Prerequisite :

PROJ0010-1 - Software project engineering and management

|            |                                                                                       |    |   |   |     |    |
|------------|---------------------------------------------------------------------------------------|----|---|---|-----|----|
| ASTG0021-1 | <i>Technical company internship</i> (english language) - Laurent MATHY - [300h Proj.] | TA | - | - | [+] | 10 |
|------------|---------------------------------------------------------------------------------------|----|---|---|-----|----|

#### Prerequisite :

PROJ0010-1 - Software project engineering and management



*Notice* : the two company internships are mutually exclusive

|            |                                                                                                    |    |   |   |     |   |
|------------|----------------------------------------------------------------------------------------------------|----|---|---|-----|---|
| PROJ0011-1 | <i>Personal student project</i> (english language) - Bernard BOIGELOT, COLLÉGIALITÉ - [150h Proj.] | TA | - | - | [+] | 5 |
|------------|----------------------------------------------------------------------------------------------------|----|---|---|-----|---|

#### Optional courses within the focus

Students choosing this focus shall select 15 credits of elective courses inside the focus. The remaining credits can be taken inside or outside the focus.

|            |                                                                                                                                                                               |    |    |    |     |   |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|-----|---|
| ELEN0016-2 | <i>Computer vision</i> (english language) - Anthony CIOPPA, Adrien DELIÈGE, Marc VAN DROOGENBROECK - Suppl : Thomas HOYOUX - [50h Proj.]                                      | Q1 | 30 | 10 | [+] | 5 |
| INFO0948-2 | <i>Introduction to intelligent robotics</i> (english language) - Pierre SACRÉ - [80h Proj.]                                                                                   | Q2 | 30 | 4  | [+] | 5 |
| INFO2049-1 | <i>Web and Text Analytics</i> (english language) - Ashwin ITTOO<br><b>Corequisite :</b><br>ELEN0062-1 - Introduction to machine learning                                      | Q1 | 30 | -  | -   | 5 |
| GBIO0002-1 | <i>Genetics and bioinformatics</i> (english language) - Franck DEQUIEDT, Kristel VAN STEEN - [15h Proj.]                                                                      | Q1 | 30 | 15 | [+] | 5 |
| DROI1357-1 | <i>European law, (big) data and artificial intelligence applications seminar</i> (english language) - Jérôme DE COOMAN, Ljupcho GROZDANOVSKI                                  | Q1 | 24 | -  | -   | 5 |
| INFO8003-1 | <i>Reinforcement learning</i> (english language) - Damien ERNST - [45h Proj.]                                                                                                 | Q2 | 25 | 10 | [+] | 5 |
| INFO8004-1 | <i>Advanced Machine learning</i> (english language) - Pierre GEURTS, Gilles LOUPPE, Louis WEHENKEL - [20h Proj.]                                                              | Q2 | 25 | -  | [+] | 5 |
| INFO8006-1 | <i>Introduction to artificial intelligence</i> (english language) - Gilles LOUPPE - [45h Proj.]                                                                               | Q1 | 25 | 20 | [+] | 5 |
| INFO9014-1 | <i>Knowledge representation and reasoning</i> (english language) - Christophe DEBRUYNE - [45h Proj.]<br><b>Corequisite :</b><br>INFO9015-1 - Logic for Computer Science       | Q2 | 24 | 20 | [+] | 5 |
| INFO9023-1 | <i>Machine Learning Systems Design</i> (english language) - Thomas VRANCKEN - [17h Labo., 18h Proj.]<br><b>Corequisite :</b><br>ELEN0062-1 - Introduction to machine learning | Q2 | 17 | -  | [+] | 5 |
| INFO9030-1 | <i>Explainable Artificial Intelligence</i> (english language) - Văn Anh HUYNH THU - [50h Proj.]                                                                               | Q2 | 24 | -  | [+] | 5 |

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

### Bridging courses Master MSc. in Computer Science and Engineering (120 credits)

#### Compulsory Courses

Students that are admitted to the master of science in Computer Science and Engineering without having obtained a degree of bachelor in engineering must add to their programme the following list of courses, to be taken in the first year of the master.

|            |                                                                                                                                                                     |    |    |    |     |   |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|-----|---|
| MATH0495-1 | <i>Elements for calculating probabilities</i><br>- Part 1: Analysis tools for probabilities - Laurent LOOSVELDT<br>- Part 2: Probability theory - Laurent LOOSVELDT | Q1 | 6  | 6  | -   | 5 |
| MATH0006-3 | <i>Introduction to numerical analysis</i> (english language) - Quentin LOUVEAUX                                                                                     | Q1 | 20 | 20 | -   | 4 |
| INFO0054-1 | <i>Functional programming</i> - Christophe DEBRUYNE - [20h Proj.]                                                                                                   | Q1 | 24 | 24 | [+] | 5 |
| INFO0030-3 | <i>Programming Projects</i> - Benoît DONNET - [100h Proj.]                                                                                                          | Q2 | 20 | -  | [+] | 5 |

### Master Msc. in computer science and engineering, professional focus in intelligent systems

|            |                                                                                                                        |    |    |    |     |   |
|------------|------------------------------------------------------------------------------------------------------------------------|----|----|----|-----|---|
| ELEN0040-1 | <i>Digital electronics</i> (english language) - JeanMichel REDOUTÉ                                                     | Q2 | 26 | 26 | -   | 5 |
| MATH0013-1 | <i>Algebra</i> - Eric DELHEZ                                                                                           | Q1 | 26 | 26 | -   | 5 |
| MECA0003-2 | <i>Rational Mechanics</i> - Eric DELHEZ                                                                                | Q1 | 20 | 30 | -   | 5 |
| LANG6011-1 | <i>Remedial English for Computer Science</i> (english language) - Adnan VESSEUR                                        | Q2 | 3  | 27 | -   | 3 |
| DROI0101-1 | <i>Computer Law Contracts</i> - Benoît KOHL                                                                            | Q2 | 30 | -  | -   | 4 |
| GENV0002-1 | <i>Energy and sustainable development</i> - Pierre DEWALLEF, Damien ERNST, Motiar RAHAMAN, Sigrid REITER - [20h Proj.] | Q2 | 26 | 8  | [+] | 3 |
| MATH0504-1 | <i>Applied mathematics</i> - Benjamin DEWALS, Christophe GEUZAINÉ                                                      | Q1 | 26 | 26 | -   | 5 |

### Bridging courses Master MSc. in Computer Science and Engineering (120 credits)

#### Compulsory Courses

Students that are admitted to the master of science in Computer Science and Engineering without having obtained a degree of bachelor in engineering must add to their programme the following list of courses, to be taken in the first year of the master.

|            |                                                                                                                                                                     |    |    |    |     |   |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|-----|---|
| MATH0495-1 | <i>Elements for calculating probabilities</i><br>- Part 1: Analysis tools for probabilities - Laurent LOOSVELDT<br>- Part 2: Probability theory - Laurent LOOSVELDT | Q1 | 6  | 6  | -   | 3 |
| MATH0006-3 | <i>Introduction to numerical analysis</i> (english language) - Quentin LOUVEAUX                                                                                     | Q1 | 20 | 20 | -   | 4 |
| INFO0054-1 | <i>Functional programming</i> - Christophe DEBRUYNE - [20h Proj.]                                                                                                   | Q1 | 24 | 24 | [+] | 5 |
| INFO0030-3 | <i>Programming Projects</i> - Benoît DONNET - [100h Proj.]                                                                                                          | Q2 | 20 | -  | [+] | 5 |
| ELEN0040-1 | <i>Digital electronics</i> (english language) - JeanMichel REDOUTÉ                                                                                                  | Q2 | 26 | 26 | -   | 5 |
| MATH0013-1 | <i>Algebra</i> - Eric DELHEZ                                                                                                                                        | Q1 | 26 | 26 | -   | 5 |
| MECA0003-2 | <i>Rational Mechanics</i> - Eric DELHEZ                                                                                                                             | Q1 | 20 | 30 | -   | 4 |
| LANG6011-1 | <i>Remedial English for Computer Science</i> (english language) - Adnan VESSEUR                                                                                     | Q2 | 3  | 27 | -   | 3 |
| DROI0724-1 | <i>Law and engineering</i> - Roman AYDOGDU, Christine BIQUET, Vanessa FRANSSEN, Fabienne KÉFER, Pascale LECOCQ, Bernard VANBRABANT, Philippe VINCENT                | Q1 | 26 | -  | -   | 2 |
| GENV0002-1 | <i>Energy and sustainable development</i> - Pierre DEWALLEF, Damien ERNST, Motiar RAHAMAN, Sigrid REITER - [20h Proj.]                                              | Q2 | 26 | 8  | [+] | 3 |
| MATH0504-1 | <i>Applied mathematics</i> - Benjamin DEWALS, Christophe GEUZAINÉ                                                                                                   | Q1 | 26 | 26 | -   | 5 |