Cycle view of the study programme

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 one of the three professional foci 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 (B1 : 40Cr, B2 : 25Cr)

- **INFO0085-1**  
  **Compilers (english language)** - Pascal FONTAINE  
  Corequisite: INFO0016-1 - Introduction to the theory of computation  
  INFO0012-2 - Computation structures  
  INFO0940-1 - Operating systems  
  B1 Q2 25 - [+ 5

- **INFO0016-1**  
  **Introduction to the theory of computation** (english language) - Quentin LOUVEAUX  
  Corequisite: INFO0940-1 - Operating systems  
  B1 Q1 26 26 - 5

- **INFO00940-1**  
  **Operating systems (english language)** - Laurent MATHY  
  Prerequisite: INFO0016-1 - Introduction to the theory of computation  
  Corequisite: INFO0902-1 - Structures des données et algorithmes  
  B1 Q2 30 6 [+ 5

- **ELEN0062-1**  
  **Introduction to machine learning (english language)** - Pierre GEURTS, Louis WEHENKEL  
  B1 Q1 30 5 [+ 5

- **ELEN0060-2**  
  **Information and coding theory (english language)** - Louis WEHENKEL  
  Corequisite: INFO0010-4 - Introduction to computer networking  
  B1 Q2 30 15 [+ 5

- **GEST3162-1**  
  **Principles of management (english language)** - François PICHault, Willem STANDAERT  
  B1 Q1 30 - [+ 5

- **PROJ0010-1**  
  **Software project engineering and management (english language)** - Benoît DONNET, Bernard HAUZEUR, Guy LEDUC, Laurent MATHY  
  Corequisite: INFO0062-1 - Object-oriented programming  
  B1 TA 20 - [+ 10

- **ATFE0015-1**  
  **Master thesis (english language)** - COLLÉGIALITÉ, Laurent MATHY  
  B2 TA - - [+ 25

Optional courses (B1 : 20Cr, B2 : 35Cr)

Students will choose one of the focus below and will carry it on during the second bloc (B1 : 15Cr, B2 : 15Cr)

Compulsory Courses on "Computer systems security" (B1 : 15Cr, B2 : 15Cr)

- **INFO0031-1**  
  **Network Engineering (english language)** - Benoît DONNET, Guy LEDUC  
  Corequisite: INFO0010-4 - Introduction to computer networking  
  B1 Q2 30 - [+ 5

- **INFO0045-3**  
  **Introduction to computer security (english language)** - Benoît DONNET  
  Corequisite: INFO0010-4 - Introduction to computer networking  
  INFO0902-1 - Structures des données et algorithmes  
  B1 Q1 30 6 [+ 5
Students choosing this focus shall select, in addition to 10 credits of compulsory courses, 45 credits of elective courses inside or outside the focus. However, for his/her whole master program (block 1 and block 2), a total of 20 credits of options must be taken inside the focus. The regulation allows students to choose elective courses during the block of their choice, in accordance with the prerequisites and co-requisites. Students must also be attentive to schedule constraints. (B1 : 5Cr, B2 : 15Cr)

INFO0064-2  *Embedded systems* (english language) - Bernard BOIGELOT  
- Q1  25  20  -  3

INFO2055-1  *Embedded systems project* (english language) - Bernard BOIGELOT  
- Q2  -  -  [+]

Corequisite : INFO0064-2  - Embedded systems

INFO2051-1  *Object-oriented programming on mobile devices* (english language) - Laurent MATHY  
- Q1  15  10  [+]

INFO0056-1  *Securing Networks* (english language) - [12h Labo., 30h Proj.] (Even years)  
- Q2  30  -  [+]

Corequisite : INFO0010-4  - Introduction to computer networking  
INFO0045-3  - Introduction to computer security

INFO0939-1  *High performance scientific computing* (english language) - Christophe GEUZAIN - [20h Proj.]  
- Q1  30  15  [+]

INFO8002-1  *Large-scale data systems* (english language) - Gilles LOUPPE, Gilles LOUPPE  
- Q1  25  10  [+]

INFO8012-1  *Digital Forensics* (english language) - [12h Labo., 30h Proj.] (Even years)  
- Q2  30  -  [+]

Corequisite : INFO0040-1  - Operating systems  
INFO0085-1  - Compilers  
INFO0010-4  - Introduction to computer networking

INFO8011-1  *Network infrastructures* (english language) - Benoît DONNET, Guy LEDUC, Laurent MATHY  
- Q1  30  -  [+]

Corequisite : INFO0010-4  - Introduction to computer networking

INFO8013-1  *Advanced Computer Security* (english language) - Benoît DONNET, Laurent MATHY  
- Q2  20  -  [+]

Corequisite : INFO0045-3  - Introduction to computer security

INFO9016-1  (pas organisé en 2021-2022)  *Advanced Databases* (english language)  
- Q2  24  20  -  5

Professional focus on "Intelligent Systems" (B1 : 15Cr, B2 : 15Cr)

**Compulsory Courses**

INFO8010-1  *Deep learning* (english language) - Gilles LOUPPE  
- Q1  25  10  [+]

SYST0003-1  *Linear control systems* (english language) - Guillaume DRION  
- Theory - Guillaume DRION  
- Control system design in time domain and frequency domain - Guillaume DRION  
- 20  [+]  5

Students choosing this focus shall select, in addition to 10 credits of compulsory courses, 45 credits of elective courses inside or outside the focus. However, for his/her whole master program (block 1 and block 2), a total of 20 credits of options must be taken inside the focus. The regulation allows students to choose elective courses during the block of their choice, in accordance with the prerequisites and co-requisites. Students must also be attentive to schedule constraints. (B1 : 5Cr, B2 : 15Cr)

ELEN0016-2  *Computer vision* (english language) - Marc VAN DROOGENBROECK  
- Q1  30  10  [+]

University of Liège - Academic Affairs Department  
Date of data : 25/12/2021 - Page 2 / 6
### Professional focus on "Management" (B1 : 15Cr, B2 : 15Cr)

Registration to this focus only with a file (contact : C. Puit)

#### Compulsory Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester</th>
<th>Credits</th>
<th>Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINA0001-1</td>
<td>Financial statement analysis and financing an enterprise</td>
<td>B1</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>FINA0017-1</td>
<td>General accounting (Evening classes)</td>
<td>B1</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>LOGI0010-1</td>
<td>Supply Chain Management (english language)</td>
<td>B1</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>ERAS0011-1</td>
<td>Business Simulation (english language)</td>
<td>B2</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>GRHO0001-4</td>
<td>Strategic Human Resources Management</td>
<td>B2</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>DROI2003-2</td>
<td>Legal management of a company and its employees</td>
<td>B2</td>
<td>45</td>
<td></td>
</tr>
</tbody>
</table>

Students choosing this focus shall select, in addition to 27 credits of compulsory courses, 28 credits of elective courses inside or outside the focus. One of the 3 language courses belonging to the focus must necessarily be chosen as an option in either block 1 or block 2, for 3 credits. The regulation allows students to choose elective courses during the block of their choice, in accordance with the prerequisites and co-requisites. Students must also be attentive to schedule constraints. (B2 : 3Cr)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester</th>
<th>Credits</th>
<th>Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>LANG1936-1</td>
<td>Elementary Dutch 1 - Fanny NSITA</td>
<td>B2</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>LANG1933-1</td>
<td>Elementary German 1 - Marie MAWHIN</td>
<td>B2</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>LANG1934-1</td>
<td>Elementary Spanish 1 - Alexis ALVAREZ BARBOSA</td>
<td>B2</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

Choose remaining credits in the lists below : (B1 : 5Cr, B2 : 20Cr)

### 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

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*University of Liège - Academic Affairs Department*

*Date of data : 25/12/2021 - Page 3 / 6*
knowledge and skills have been acquired previously.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor(s)</th>
<th>Credits</th>
<th>Semester</th>
<th>Period</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO0902-1</td>
<td><em>Data structures and algorithms</em> - Pierre GIURTS - [40h Proj.]</td>
<td>Pierre GIURTS</td>
<td>B1</td>
<td>Q2</td>
<td>20</td>
<td>[+]</td>
</tr>
<tr>
<td>INFO010-4</td>
<td><em>Introduction to computer networking</em> (english language) - Guy LEDUC - [12h Labo., 40h Proj.]</td>
<td>Guy LEDUC</td>
<td>B1</td>
<td>Q1</td>
<td>2</td>
<td>[+]</td>
</tr>
<tr>
<td>INFO012-2</td>
<td><em>Computation structures</em> (english language) - Pascal FONTAINE, Laurent MATHY - [40h Proj.]</td>
<td>Pascal FONTAINE, Laurent MATHY</td>
<td>B1</td>
<td>Q1</td>
<td>26</td>
<td>[+]</td>
</tr>
<tr>
<td>INFO062-1</td>
<td><em>Object-oriented programming</em> (english language) - Bernard BOIGELOT - [20h Proj.]</td>
<td>Bernard BOIGELOT</td>
<td>B1</td>
<td>Q2</td>
<td>25</td>
<td>[+]</td>
</tr>
<tr>
<td>INFO012-1</td>
<td><em>Parallel Programming</em> (english language) - Pascal FONTAINE</td>
<td>Pascal FONTAINE</td>
<td>B1</td>
<td>Q2</td>
<td>25</td>
<td>-</td>
</tr>
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</table>

### Computer systems security

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor(s)</th>
<th>Credits</th>
<th>Semester</th>
<th>Period</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO0045-3</td>
<td><em>Introduction to computer security</em> (english language) - Benoît DONNET - [10h Labo., 30h Proj.]</td>
<td>Benoît DONNET</td>
<td>-</td>
<td>Q1</td>
<td>30</td>
<td>[+]</td>
</tr>
</tbody>
</table>

**Corequisite:**
- INFO0902-1 - Structures des données et algorithmes
- INFO0012-2 - Computation structures
- INFO0010-4 - Introduction to computer networking

<table>
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<th>Period</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO1045-5</td>
<td><em>Securing Networks</em> (english language) - [12h Labo., 30h Proj.] (Even years)</td>
<td>-</td>
<td>-</td>
<td>Q2</td>
<td>30</td>
<td>[+]</td>
</tr>
</tbody>
</table>

**Corequisite:**
- INFO0045-3 - Introduction to computer security
- INFO0010-4 - Introduction to computer networking

### High performance scientific computing

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor(s)</th>
<th>Credits</th>
<th>Semester</th>
<th>Period</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO939-1</td>
<td><em>High performance scientific computing</em> (english language) - Christophe GEUZAIN - [20h Proj.]</td>
<td>Christophe GEUZAIN</td>
<td>-</td>
<td>Q1</td>
<td>15</td>
<td>[+]</td>
</tr>
</tbody>
</table>

### Large-scale data systems

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor(s)</th>
<th>Credits</th>
<th>Semester</th>
<th>Period</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO8002-1</td>
<td><em>Large-scale data systems</em> (english language) - Gilles LOUPPE, Gilles LOUPPE - [45h Proj.]</td>
<td>Gilles LOUPPE</td>
<td>-</td>
<td>Q1</td>
<td>25</td>
<td>[+]</td>
</tr>
</tbody>
</table>

### Digital Forensics

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Semester</th>
<th>Period</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO8012-1</td>
<td><em>Digital Forensics</em> (english language) - [12h Labo., 30h Proj.] (Even years)</td>
<td>-</td>
<td>-</td>
<td>Q2</td>
<td>30</td>
<td>[+]</td>
</tr>
</tbody>
</table>

**Prerequisite:**
- INFO0040-1 - Operating systems

**Corequisite:**
- INFO0085-1 - Compilers
- INFO0010-4 - Introduction to computer networking

### Network infrastructures

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Semester</th>
<th>Period</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO8011-1</td>
<td><em>Network infrastructures</em> (english language) - Benoît DONNET, Guy LEDUC, Laurent MATHY - [12h Labo., 30h Proj.] (Odd years)</td>
<td>Benoît DONNET, Guy LEDUC, Laurent MATHY</td>
<td>-</td>
<td>Q1</td>
<td>30</td>
<td>[+]</td>
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</tbody>
</table>

**Corequisite:**
- INFO0010-4 - Introduction to computer networking

### Advanced Computer Security

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor(s)</th>
<th>Credits</th>
<th>Semester</th>
<th>Period</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO8013-1</td>
<td><em>Advanced Computer Security</em> (english language) - Benoît DONNET, Laurent MATHY - [20h Labo., 30h Proj.] (Odd years)</td>
<td>Benoît DONNET, Laurent MATHY</td>
<td>-</td>
<td>Q2</td>
<td>20</td>
<td>[+]</td>
</tr>
</tbody>
</table>

**Corequisite:**
- INFO0045-3 - Introduction to computer security

### Intelligent Systems

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor(s)</th>
<th>Credits</th>
<th>Semester</th>
<th>Period</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO8010-1</td>
<td><em>Deep learning</em> (english language) - Gilles LOUPPE - [55h Proj.]</td>
<td>Gilles LOUPPE</td>
<td>-</td>
<td>Q2</td>
<td>25</td>
<td>[+]</td>
</tr>
</tbody>
</table>

**Corequisite:**
- ELEN0062-1 - Introduction to machine learning

<table>
<thead>
<tr>
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<th>Course Title</th>
<th>Instructor(s)</th>
<th>Credits</th>
<th>Semester</th>
<th>Period</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEN0016-2</td>
<td><em>Computer vision</em> (english language) - Marc VAN DROOGENBROECK - [50h Proj.]</td>
<td>Marc VAN DROOGENBROECK</td>
<td>-</td>
<td>Q1</td>
<td>30</td>
<td>[+]</td>
</tr>
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</table>

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<tbody>
<tr>
<td>INFO9015-1</td>
<td><em>Logic for Computer Science</em> (english language) - Pascal FONTAINE</td>
<td>Pascal FONTAINE</td>
<td>-</td>
<td>Q1</td>
<td>24</td>
<td>20</td>
</tr>
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</table>

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<tr>
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<th>Credits</th>
<th>Semester</th>
<th>Period</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO0948-2</td>
<td><em>Introduction to intelligent robotics</em> (english language) - Pierre SACRÉ - [80h Proj.]</td>
<td>Pierre SACRÉ</td>
<td>-</td>
<td>Q2</td>
<td>30</td>
<td>4</td>
</tr>
</tbody>
</table>
## Corequisite:
- ENEL0062-1 - Introduction to machine learning
- ENEL0016-2 - Computer vision

### INFO2049-1
- **Web and Text Analytics**: (English language) - Ashwin ITTOO  
  - **Q1**: 30 - - 5

### GIBIO0002-1
- **Genetics and bioinformatics**: (English language) - Franck DEQUIEDT, Kristel VAN STEEN  
  - **Q1**: 30 15 [+-public] 5

### INFO8003-1
- **Optimal decision making for complex problems**: (English language) - Damien ERNST  
  - **Q2**: 25 10 [+public] 5

### INFO8004-1
- **Advanced Machine learning**: (English language) - Pierre GEURTS, Gilles LOUPPE, Louis WEHENKEL  
  - **Q2**: 25 - [+public] 5

### INFO8006-1
- **Introduction to artificial intelligence**: (English language) - Gilles LOUPPE  
  - **Q1**: 25 20 [+public] 5

### INFO9014-1
- **Knowledge representation and reasoning**: (English language) - Christophe DEBRUYNE  
  - **Q2**: 24 20 - 5

### Other optional courses

### INFO9015-1
- **Logic for Computer Science**: (English language) - Pascal FONTAINE  
  - **Q1**: 24 20 - 5

### INFO9016-1
- **Advanced Databases**: (English language) - Laurent MATHY  
  - **Q2**: 24 20 - 5

### INFO0064-2
- **Embedded systems**: (English language) - Bernard BOIGELOT  
  - **Q1**: 25 20 - 3

### INFO2055-1
- **Embedded systems project**: (English language) - Bernard BOIGELOT  
  - **Q2**: - - [+public] 2

### INFO0016-1
- **Introduction to the theory of computation**  

### GIBIO0009-1
- **Topics in bioinformatics**: (English language) - Kristel VAN STEEN  
  - **Q2**: 25 15 [+public] 5

### MATH0461-2
- **Introduction to numerical optimization**: (English language) - Quentin LOUVEAUX  
  - **Q1**: 30 20 [+public] 5

### MATH0462-1
- **Discrete optimization**: (English language) - Quentin LOUVEAUX  
  - **Q2**: 30 20 [+public] 5

### GIBIO0030-1
- **Computational approaches to statistical generics**: (English language) - Kristel VAN STEEN  
  - **Q2**: 25 15 [+public] 5

### INGE0012-1
- **Scientific research in engineering and its impact on innovation**: (English language) - Rodolphe SEPULCHRE  
  - **Q2**: 26 26 - 5

### MECA0524-1
- **CAD & Geometric Algorithms**: (English language) - Eric BÉCHET  
  - **Q1**: 20 20 [+public] 5

### INFO0004-2
- **Object-oriented programming projects**: (English language) -  
  - **Q2**: 20 - [+public] 5
Study programmes 2021-2022
Faculty of Applied Sciences
Master of Science (MSc) in Computer Science and Engineering

MATHY - [90h Proj.]
GBIO0031-1 Learning from genomic data (english language) - Kristel VAN STEEN - Q2 - - [+ 5
- [150h Proj.]

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

Internships and projects (maximum 15 credits)
ASTG9005-1 Research Internship (english language) - Benoît DONNET - [300h Proj.]
B2 TA - - [+ 10
ASTG0021-1 Technical company internship (english language) - Laurent MATHY - [300h Proj.]
B2 TA - - [+ 10

Notice : the two company internships are mutually exclusive

PROJ0011-1 Personal student project (english language) - Bernard BOIGELOT, COLLEGIALITÉ - [150h Proj.]
TA - - [+ 5

Additional ECTS Master of science in computer science and engineering

Compulsory Courses (B0 : 46Cr)

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 Elements for calculating probabilities - Céline ESSER - [5h Proj.] B0 Q1 15 15 [+ 3
MATH0006-3 Introduction to numerical analysis (english language) - Olivier BLEUACH
B0 Q1 20 20 - 4
INFO0054-1 Functional programming - Christophe DEBRUYNE - [15h Proj.] B0 Q1 28 24 [+ 5
MATH0488-1 Elements of stochastic processes - Maarten ARNST, Vincent DENOËL, Pierre GEURTS - [30h Proj.]
B0 Q2 10 10 [+ 2
INFO0030-3 Programming Projects - Benoît DONNET - [100h Proj.] B0 Q2 20 - [+ 5
ELEN0040-1 Digital electronics (english language) - JeanMichel REDOUTÉ
B0 Q2 26 26 - 5
MATH0013-1 Algebra - Eric DELHEZ
B0 Q1 26 26 - 5
MECA0003-2 Rational Mechanics - Eric DELHEZ
B0 Q1 20 30 - 4
LANG6011-1 Remedial English for Computer Science (english language) - Adnan VESSEUR
B0 Q2 3 27 - 3
DROI0724-1 Law and engineering - Roman AYDOGDU, Christine BIQUET, Vanessa FRANSSEN, Fabienne KÉFER, Pascale LECOCQ, Bernard VANBRABANT, Cécile VERCHEVAL
B0 Q1 26 - - 2
GENV0002-1 Energy and sustainable development - Pierre DEWALLEF, Damien ERNST, Nathalie JEB, Sigrid REITTER - [20h Proj.]
B0 Q2 26 8 [+ 3
MATH0504-1 Applied mathematics - Benjamin DEWSAL, Christophe GUÉZAIN
B0 Q1 26 26 - 5

University of Liège - Academic Affairs Department
Date of data : 25/12/2021 - Page 6 / 6