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.

Compulsory Courses (B1 : 35Cr, B2 : 25Cr)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title (english language)</th>
<th>Instructor(s)</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO0085-1</td>
<td>Compilers</td>
<td>Pascal FONTAINE</td>
<td>75h Proj.</td>
</tr>
<tr>
<td>INFO0016-1</td>
<td>Introduction to the theory of computation</td>
<td>Louis WEHENKEL</td>
<td>[40h Proj.]</td>
</tr>
<tr>
<td>INFO0902-1</td>
<td>Structures des données et algorithmes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INFO0012-2</td>
<td>Computation structures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INFO0940-1</td>
<td>Operating systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEN0061-1</td>
<td>Introduction to machine learning</td>
<td>Pierre GEURTS, Louis WEHENKEL</td>
<td>[40h Proj.]</td>
</tr>
<tr>
<td>INFO0016-1</td>
<td>Introduction to the theory of computation</td>
<td>Quentin LOUVEAUX</td>
<td></td>
</tr>
<tr>
<td>ELEN0060-2</td>
<td>Information and coding theory</td>
<td>Louis WEHENKEL</td>
<td>[30h Proj.]</td>
</tr>
<tr>
<td>PROJ0010-1</td>
<td>Software project engineering and management</td>
<td>Benoît DONNET, Bernard HAUZEUR, Guy LEDUC, Laurent MATHY</td>
<td>[280h Proj.]</td>
</tr>
<tr>
<td>GEST3162-1</td>
<td>Principles of management</td>
<td>François PICHault, Willem STANDAERT</td>
<td>[25h Proj.]</td>
</tr>
<tr>
<td>ATFE0002-1</td>
<td>Master thesis</td>
<td>COLLEGIALITE, Laurent MATHY</td>
<td>[750h Proj.]</td>
</tr>
</tbody>
</table>

Optional courses (B1 : 25Cr, B2 : 35Cr)

Choose one focus among the three below : (B1 : 15Cr, B2 : 15Cr)

Professional focus on "Computer systems security" (B1 : 15Cr, B2 : 15Cr)

Students choosing this focus shall select, in addition to 10 credits of compulsory courses, 50 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.

Compulsory Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title (english language)</th>
<th>Instructor(s)</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO0031-1</td>
<td>Network Engineering</td>
<td>Benoît DONNET, Guy LEDUC</td>
<td>[12h Labo., 30h Proj.]</td>
</tr>
<tr>
<td>INFO0045-3</td>
<td>Introduction to computer security</td>
<td>Benoît DONNET</td>
<td>[10h Labo., 30h Proj.]</td>
</tr>
<tr>
<td>INFO0010-4</td>
<td>Introduction to computer networking</td>
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<td></td>
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</tbody>
</table>

Choose 20 credits in the following list : (B1 : 5Cr, B2 : 15Cr)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title (english language)</th>
<th>Instructor(s)</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO0064-2</td>
<td>Embedded systems</td>
<td>Bernard BOIGELOT</td>
<td></td>
</tr>
<tr>
<td>INFO2055-1</td>
<td>Embedded systems project</td>
<td>Bernard BOIGELOT</td>
<td>[60h Proj.]</td>
</tr>
</tbody>
</table>
Corequisite :
INFO0064-2 - Embedded systems

INFO2051-1  
*Object-oriented programming on mobile devices (english language)* - Laurent MATHY - [90h Proj.]

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

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

INFO0939-1  
*High performance scientific computing (english language)* - Christophe GEUZAINE - [20h Proj.]

INFO8002-1  
*Large-scale data systems (english language)* - Gilles LOUPPE - [45h Proj.]

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

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 - [12h Labo., 30h Proj.] (Odd years)

Corequisite :
INFO0010-4 - Introduction to computer networking

INFO8013-1  
*Advanced Computer Security (english language)* - Benoît DONNET, Laurent MATHY - [20h Labo., 30h Proj.] (Odd years)

Corequisite :
INFO0045-3 - Introduction to computer security

INFO9016-1  
(pas organisé en 2021-2022) *Advanced Databases (english language)*

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

Students choosing this focus shall select, in addition to 5 credits of compulsory courses, 55 credits of elective courses inside or outside the focus. However, for his/her whole master program (block 1 and block 2), a total of 25 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.

Compulsory Courses

INFO8010-1  
*Deep learning (english language)* - Gilles LOUPPE - [55h Proj.]  
B1 Q1 25 10 [+] 5

Choose 25 credits in the following list : (B1 : 10Cr, B2 : 15Cr)

ELEN0016-2  
*Computer vision (english language)* - Marc VAN DROOGENBROECK - [50h Proj.]

INFO0948-2  
*Introduction to intelligent robotics (english language)* - Pierre SACCÉ - [80h Proj.]

INFO2049-1  
*Web and Text Analytics (english language)* - Ashwin ITTOO

GBIO0002-1  
*Genetics and bioinformatics (english language)* - Franck DEQUÉD, Kristel VAN STEEN - [15h Proj.]

DROI1357-1  
*European law, (big) data and artificial intelligence applications seminar (english language)* - - Suppl : Ljupcho GROZDANOVSKI

INFO8003-1  
*Optimal decision making for complex problems (english language)* - Damien ERNST - [45h Proj.]  
B2 Q2 25 10 [+] 5

University of Liège - Academic Affairs Department  
Date of data : 10/05/2022 - Page 2 / 7
INFO8004-1  Advanced Machine learning (english language) -  
Pierre GEURTS, Gilles LOUPPE, Louis WEHENKEL - [45h Proj.]  
Q2 25  -  [+] 5

INFO9014-1  Knowledge representation and reasoning (english language) -  
Christophe DEBRUYNE  
Corequisite :  INFO9015-1 - Logic for Computer Science  
Q2 24 20  -  5

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

Students choosing this focus shall select, in addition to 27 credits of compulsory courses, 33 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.

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

Compulsory Courses

FINA0001-1  Financial statement analysis and financing an enterprise -  
Wouter TORSIN  
B1 Q2 45  -  -  5

TECH0763-2  Industrial technologies - Sabine DANTHINE, Brigitte EVRARD, Angélique LÉONARD, Dominique TOYE  
Q1 45  -  -  5

LOGI0010-1  Supply Chain Management (english language) - Yasemin ARDA  
B1 Q2 45  -  -  5

ERAS0011-1  Business Simulation (english language) - Anne CHANTEUX - [50h Mon. WS]  
B2 Q1  -  -  [+] 2

GRHO0001-4  Strategic Human Resources Management - François PICHault  
B2 Q1 45  -  -  5

DROI2003-2  Legal management of a company and its employees  
- Droit des sociétés - Frédéric DAERDEN,  
- Droit fiscal - Isabelle RICHELLE - [5h Conf.]  
B2 Q2 25  -  -  5

Choose one of the three following courses : (B2 : 3Cr)

LANG1936-1  Elementary Dutch 1 - Fanny NSITA  
B2 TA 30  -  -  3

LANG1933-1  Elementary German 1 - Marie MAWTHIN  
B2 Q2 30  -  -  3

LANG1934-1  Elementary Spanish 1 - Alexis ALVAREZ BARBOSA  
B2 TA 30  -  -  3

Choose remaining credits in the lists below : (B1 : 10Cr, B2 : 20Cr)

MATH0500-1  Introduction to numerical algorithmic - Quentin LOUVEAUX - [6h Labo., 45h Proj.]  
B1 Q1 24 14  [+] 5

INFO0902-1  Data structures and algorithms - Pierre GEURTS - [40h Proj.]  
B1 Q2 26 20  [+] 5

INFO0010-4  Introduction to computer networking (english language) -  
Guy LEDUC - [12h Labo., 40h Proj.]  
B1 Q1 35 2  [+] 5

INFO0012-2  Computation structures (english language) - Pascal FONTAINE, Laurent MATHY - [40h Proj.]  
B1 Q1 26 26  [+] 5

INFO0940-1  Operating systems (english language) - Laurent MATHY - [30h Proj.]  
B1 Q2 30 6  [+] 5

INFO8006-1  Introduction to artificial intelligence (english language) -  
Gilles LOUPPE - [45h Proj.]  
B1 Q1 25 20  [+] 5

Study programmes 2021-2022
Faculty of Applied Sciences
Master of Science (MSc) in Computer Science

University of Liège - Academic Affairs Department
Date of data : 10/05/2022 - Page 3 / 7
**Computer systems security**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor(s)</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO0031-1</td>
<td>Network Engineering (english language)</td>
<td>Benoît DONNET, Guy LEDUC</td>
<td>Q2 30</td>
<td>INFO0045-3, INFO0902-1, INFO0010-4, INFO0012-2</td>
</tr>
<tr>
<td>INFO0045-3</td>
<td>Introduction to computer security (english language)</td>
<td>Benoît DONNET</td>
<td>Q1 30</td>
<td>INFO0045-3, INFO0010-4, INFO0902-1</td>
</tr>
<tr>
<td>INFO0056-1</td>
<td>Securing Networks (english language)</td>
<td>Guy LEDUC</td>
<td>Q2 30</td>
<td>INFO0045-3, INFO0010-4</td>
</tr>
<tr>
<td>INFO0045-3</td>
<td>High performance scientific computing (english language)</td>
<td>Christophe GUZEAINE</td>
<td>Q1 30</td>
<td>INFO0045-3, INFO0010-4</td>
</tr>
<tr>
<td>INFO8002-1</td>
<td>Large-scale data systems (english language)</td>
<td>Gilles LOUPPE</td>
<td>Q1 25</td>
<td>INFO0045-3, INFO0010-4</td>
</tr>
<tr>
<td>INFO8012-1</td>
<td>Digital Forensics (english language)</td>
<td></td>
<td>Q2 30</td>
<td>INFO0045-3, INFO0010-4</td>
</tr>
<tr>
<td>INFO8011-1</td>
<td>Network infrastructures (english language)</td>
<td>Benoît DONNET, Guy LEDUC, Laurent MATHY</td>
<td>Q1 30</td>
<td>INFO0045-3, INFO0010-4</td>
</tr>
<tr>
<td>INFO8013-1</td>
<td>Advanced Computer Security (english language)</td>
<td>Benoît DONNET, Laurent MATHY</td>
<td>Q2 20</td>
<td>INFO0045-3, INFO0010-4</td>
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</tbody>
</table>

**Intelligent Systems**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor(s)</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO8010-1</td>
<td>Deep learning (english language)</td>
<td>Gilles LOUPPE</td>
<td>Q2 25</td>
<td>INFO0045-3, INFO0010-4</td>
</tr>
<tr>
<td>ELEN0016-2</td>
<td>Computer vision (english language)</td>
<td>Marc VAN DROOGENBROECK</td>
<td>Q1 30</td>
<td>INFO0045-3, INFO0010-4</td>
</tr>
<tr>
<td>INFO0948-2</td>
<td>Introduction to intelligent robotics (english language)</td>
<td>Pierre SACRÉ</td>
<td>Q2 30</td>
<td>INFO0045-3, INFO0010-4</td>
</tr>
<tr>
<td>INFO9015-1</td>
<td>Logic for Computer Science (english language)</td>
<td>Pascal FONTAINE</td>
<td>Q1 24</td>
<td>INFO0045-3, INFO0010-4</td>
</tr>
<tr>
<td>INFO2049-1</td>
<td>Web and Text Analytics (english language)</td>
<td>Ashwin ITTOO</td>
<td>Q1 30</td>
<td>INFO0045-3, INFO0010-4</td>
</tr>
<tr>
<td>GBIO0002-1</td>
<td>Genetics and bioinformatics (english language)</td>
<td>Franck DEQUIEDT, Kristel VAN STEEN</td>
<td>Q1 30</td>
<td>INFO0045-3, INFO0010-4</td>
</tr>
<tr>
<td>INFO8004-1</td>
<td>Advanced Machine learning (english language)</td>
<td>Pierre GEURTS, Gilles LOUPPE, Louis WEHENKEL</td>
<td>Q2 25</td>
<td>INFO0045-3, INFO0010-4</td>
</tr>
<tr>
<td>INFO9014-1</td>
<td>Knowledge representation and reasoning (english language)</td>
<td>Christophe DEBRUYNE</td>
<td>Q2 24</td>
<td>INFO0045-3, INFO0010-4</td>
</tr>
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</table>

University of Liège - Academic Affairs Department
Date of data: 10/05/2022 - Page 4 / 7
### Other optional courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Language</th>
<th>Credit Hours</th>
<th>Hours</th>
<th>ECTS</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>INFO2051-1</td>
<td>Object-oriented programming on mobile devices</td>
<td>English</td>
<td>Q1 15 10</td>
<td>[+ 5]</td>
<td></td>
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<tr>
<td>INF02064-2</td>
<td>Embedded systems</td>
<td>English</td>
<td>Q1 25 20</td>
<td></td>
<td>3</td>
<td></td>
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<tr>
<td>INFO2055-1</td>
<td>Embedded systems project</td>
<td>English</td>
<td>Q2</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>MECA0524-1</td>
<td>CAD &amp; Geometric Algorithms</td>
<td>English</td>
<td>Q1 20 20</td>
<td>[+ 5]</td>
<td></td>
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</tr>
<tr>
<td>GBIO0009-1</td>
<td>Topics in bioinformatics</td>
<td>English</td>
<td>Q1 25 15</td>
<td>[+ 5]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH0461-2</td>
<td>Introduction to numerical optimization</td>
<td>English</td>
<td>Q1 30 20</td>
<td>[+ 5]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH0462-1</td>
<td>Discrete optimization</td>
<td>English</td>
<td>Q2 30 20</td>
<td>[+ 5]</td>
<td></td>
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<tr>
<td>GBIO0030-1</td>
<td>Computational approaches to statistical generic</td>
<td>English</td>
<td>Q2 25 15</td>
<td>[+ 5]</td>
<td></td>
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<tr>
<td>GBIO0031-1</td>
<td>Learning from genomic data</td>
<td>English</td>
<td>Q2</td>
<td></td>
<td>5</td>
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</tr>
<tr>
<td>INGE0012-1</td>
<td>Scientific research in engineering and its impaction on innovation</td>
<td>English</td>
<td>Q2 26 26</td>
<td></td>
<td>5</td>
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</tr>
<tr>
<td>INFO9012-1</td>
<td>Parallel Programming</td>
<td>English</td>
<td>Q2 25 25</td>
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<td>5</td>
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</tr>
<tr>
<td>INFO9015-1</td>
<td>Logic for Computer Science</td>
<td>English</td>
<td>Q1 24 20</td>
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<td>5</td>
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</tr>
<tr>
<td>INFO9016-1</td>
<td>Advanced Databases</td>
<td>English</td>
<td>Q2 24 20</td>
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</table>

### Internships and projects (maximum 15 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Language</th>
<th>Notes</th>
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<tbody>
<tr>
<td>ASTG9005-1</td>
<td>Research Internship</td>
<td>English</td>
<td>B2 TA -</td>
</tr>
<tr>
<td>ASTG0021-1</td>
<td>Technical company internship</td>
<td>English</td>
<td>B2 TA -</td>
</tr>
</tbody>
</table>

Notice: the two company internships are mutually exclusive.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Language</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROJ0011-1</td>
<td>Personal student project</td>
<td>English</td>
<td>B2 TA -</td>
</tr>
</tbody>
</table>
Students that are admitted to the master of science in Computer Science without having obtained a degree of bachelor in Computer Science must add to their programme the following list of courses, to be taken in the first year of the master.

Compulsory Courses (B0 : 27Cr)

- **INFO9012-1** *Parallel Programming* (english language) - Pascal FONTAINE  
  B0 Q2 25 25 - 5
- **INFO0062-1** *Object-oriented programming* (english language) - Bernard BOIGELOT - [20h Proj.]  
  B0 Q2 25 20 [+ 5
- **INFO0054-1** *Functional programming* - Christophe DEBRUYNE - [15h Proj.]  
  B0 Q1 28 24 [+ 5
- **MATH2019-1** *Mathematics for computing 1* - Emilie CHARLIER, N...  
  B0 Q1 26 26 - 5
- **INFO0027-3** *Programming techniques, Software patterns* (english language) - Laurent MATHY - [30h Proj.]  
  B0 Q2 10 10 [+ 2
- **MATH0495-1** *Elements for calculating probabilities* - Céline ESSER - [5h Proj.]  
  B0 Q1 15 15 [+ 5

Optional courses (B0 : 3Cr)

Students who pass the entrance test may replace **LANG6011-1** with the advanced course **LANG0988-1** "Advanced for ICT studies". (B0 : 3Cr)

- **LANG6011-1** *Remedial English for Computer Science* (english language) - Adnan VESSEUR  
  B0 Q2 3 27 - 3
- **LANG0988-1** *Advanced English for ICT studies* (english language) - Christine FILOT, ISLV, Adnan VESSEUR  
  B0 Q1 5 25 - 3

Additonal ECTS Master in computer science (aimed at bachelors in computer science from non university higher education institution)

Compulsory Courses (B0 : 57Cr)

- **MATH0500-1** *Introduction to numerical algorithmic* - Quentin LOUVEAUX - [6h Labo., 45h Proj.]  
  B0 Q1 24 14 [+ 5
- **INFO0902-1** *Data structures and algorithms* - Pierre GEURTS - [40h Proj.]  
  B0 Q2 26 20 [+ 5
- **INFO9012-1** *Parallel Programming* (english language) - Pascal FONTAINE  
  B0 Q2 25 25 - 5
- **INFO0010-4** *Introduction to computer networking* (english language) - Guy LEDUC - [12h Labo., 40h Proj.]  
  B0 Q1 35 2 [+ 5
- **INFO0012-2** *Computation structures* (english language) - Pascal FONTAINE, Laurent MATHY - [40h Proj.]  
  B0 Q1 26 26 [+ 5
- **INFO0940-1** *Operating systems* (english language) - Laurent MATHY - [30h Proj.]  
  B0 Q2 30 6 [+ 5
- **INFO0062-1** *Object-oriented programming* (english language) - Bernard BOIGELOT - [20h Proj.]  
  B0 Q2 25 20 [+ 5
- **INFO0054-1** *Functional programming* - Christophe DEBRUYNE - [15h Proj.]  
  B0 Q1 28 24 [+ 5
- **MATH2019-1** *Mathematics for computing 1* - Emilie CHARLIER, N...  
  B0 Q1 26 26 - 5
- **INFO0027-3** *Programming techniques, Software patterns* (english language) - Laurent MATHY - [30h Proj.]  
  B0 Q2 10 10 [+ 2
- **MATH0495-1** *Elements for calculating probabilities* - Céline ESSER - [5h Proj.]  
  B0 Q1 15 15 [+ 5
- **INFO8006-1** *Introduction to artificial intelligence* (english language) - Gilles LOUPPE - [45h Proj.]  
  B0 Q1 25 20 [+ 5

Optional courses (B0 : 3Cr)

Students who pass the entrance test may replace **LANG6011-1** with the advanced course **LANG0988-1** "Advanced for ICT studies". (B0 : 3Cr)
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Schedule</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LANG6011-1</td>
<td>Remedial English for Computer Science (english language) - Adnan VESSEUR</td>
<td>B0 Q2 3 27</td>
<td>3</td>
</tr>
<tr>
<td>LANG0988-1</td>
<td>Advanced English for ICT studies (english language) - Christine FILOT, ISLV, Adnan VESSEUR</td>
<td>B0 Q1 5 25</td>
<td>3</td>
</tr>
</tbody>
</table>