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 55 credits of the compulsory courses (including the master thesis), 30 credits technical training and 35 credits optional courses (30 of which counts towards the professional focus). Ideally, students enrolling in the master program should have acquired the skills and knowledge corresponding to the 40 credits in "Biomedical" offered as part of the bachelor program in engineering.

**Compulsory Courses (B2 : 25Cr)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Lecturer</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATFE0016-1</td>
<td>Master thesis (including introduction to research methodology) - Davide RUFFONI</td>
<td>- [750h Proj.]</td>
<td>25</td>
</tr>
</tbody>
</table>

**Elective courses (B1 : 60Cr, B2 : 35Cr)**

**Single focus (B2 : 30Cr)**

**Professional focus (B1 : 30Cr)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Lecturer</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GBIO0029-1</td>
<td>Bioelectronics (english language) - JeanMichel REDOUTÉ - [20h Labo., 20h Proj.]</td>
<td>B1 Q1 30 15 - [+] 5</td>
<td></td>
</tr>
<tr>
<td>GBIO0012-2</td>
<td>Biomechanics (english language) - Davide RUFFONI - [1d FW]</td>
<td>B1 Q1 26 26 - [+] 5</td>
<td></td>
</tr>
<tr>
<td>GBIO0008-2</td>
<td>Medical imaging (english language) - Christophe PHILLIPS - [8h Labo., 1d FW]</td>
<td>B1 Q2 33 12 - [+] 5</td>
<td></td>
</tr>
<tr>
<td>GBIO0027-1</td>
<td>Integrated project in biomedical engineering (english language) - Liesbet GERIS, Davide RUFFONI</td>
<td>B1 TA 30 90 - 10</td>
<td></td>
</tr>
</tbody>
</table>

**Corequisite:**
- GBIO0001-1 - Biophysique et biochimie
- GBIO0025-1 - Biologie générale et cellulaire
- GBIO0026-1 - Physiologie des systèmes

**Technical courses**

**Choose one of the following options: (B1 : 25Cr, B2 : 5Cr)**

**Electronics (B1 : 25Cr, B2 : 5Cr)**

Choose 30 credits in the following list: (B1 : 25Cr, B2 : 5Cr)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Lecturer</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYST0017-1</td>
<td>Advanced topics in systems and control (english language) - Guillaume DRION</td>
<td>- Q1 26 26 - 5</td>
<td></td>
</tr>
<tr>
<td>SYST0003-1</td>
<td>Linear control systems (english language) - Theory - Guillaume DRION - Control system design in time domain and frequency domain - Guillaume DRION - [6h Labo.]</td>
<td>- Q1 26 6 - [+] 5</td>
<td></td>
</tr>
<tr>
<td>ELEN0074-1</td>
<td>Sensors, microsensors and instrumentation (english language) - Philippe VANDERBEMDEN - [20h Labo.]</td>
<td>- Q2 30 - [+] 5</td>
<td></td>
</tr>
<tr>
<td>ELEN0071-1</td>
<td>Applied digital signal processing (english language) - Pierre SACRÉ - [40h Proj.]</td>
<td>- Q2 39 13 - [+] 5</td>
<td></td>
</tr>
<tr>
<td>ELEN0037-1</td>
<td>Microelectronics and IC design (english language) - JeanMichel REDOUTÉ - [40h Proj.]</td>
<td>- Q2 30 20 - [+] 5</td>
<td></td>
</tr>
<tr>
<td>INFO0064-2</td>
<td>Embedded systems (english language) - Bernard BOIGELOT</td>
<td>- Q1 25 20 - 3</td>
<td></td>
</tr>
</tbody>
</table>

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INFO2055-1  *Embedded systems project* (english language) -
Bernard BOIGELOT - [60h Proj.]

**Informatics (B1 : 25Cr, B2 : 5Cr)**

Choose 30 credits in the following list : (B1 : 25Cr, B2 : 5Cr)

- SYST0033-1  *Linear control systems* (english language) -
  - Theory - Guillaume DRION
  - Control system design in time domain and frequency domain -
    Guillaume DRION - [6h Labo.]
  - Q1 26 6 -
  - + 20

- INFO0939-1  *High performance scientific computing* (english language) -
  Christophe GEUZAIN - [20h Proj.]
  - Q1 30 15 [+]
  - 5

- MATH0462-1  *Discrete optimization* (english language) -
  Quentin LOUVEAUX - [25h Proj.]
  - Q2 30 20 [+]
  - 5

- ELEN0060-2  *Information and coding theory* (english language) -
  Louis WEHENKEL - [30h Proj.]
  - Q2 30 15 [+]
  - 5

- ELEN0071-1  *Applied digital signal processing* (english language) -
  Pierre SACRE - [40h Proj.]
  - Q2 39 13 [+]
  - 5

- ELEN0062-1  *Introduction to machine learning* (english language) -
  Pierre GEURTS, Louis WEHENKEL - [40h Proj.]
  - Q1 30 5 [+]
  - 5

**Mechanical Engineering (B1 : 25Cr, B2 : 5Cr)**

Choose 30 credits in the following list : (B1 : 25Cr, B2 : 5Cr)

- MECA0036-2  *Finite Element Method* (english language) -
  JeanPhilippe PONTHOT - [40h Proj.]
  - Q2 26 26 [+]
  - 5

- MECA0031-2  *Kinematics and dynamics of mechanisms* (english language) -
  Olivier BRULS - [40h Proj.]
  - Q2 30 20 [+]
  - 5

- MECA0008-1  *Microfluidics* (english language) - Tristan GILET - [16h Labo., 14h Proj.]
  - Q2 22 8 [+]
  - 5

- MECA0010-1  *Reliability and stochastic modeling of engineering systems* (english language) -
  Maarten ARNST - [28h Proj.]
  - Q1 16 16 [+]
  - 5

- MECA0462-2  *Materials selection* (english language) - Anne MERTENS, Davide RUFINI - [30h Proj., 1d FW]
  - Q1 26 26 [+]
  - 5

- MECA0139-1  *Additive manufacturing and 3D printing* (english language) -
  Anne MERTENS
  - Q1 26 26
  - 5

**Chemistry/Materials (B1 : 25Cr, B2 : 5Cr)**

Choose 30 credits in the following list : (B1 : 25Cr, B2 : 5Cr)

- CHIM0604-2  *Chemistry and organic materials* - Lionel DELAUCHE
  - Q2 33 19
  - 5

- CHIM9277-1  *Chemical reactor engineering* - Dominique TOYE - [15h Labo.]
  - Q1 35 15 [+]
  - 4
### Basics in bioengineering

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GBIO0001-1</td>
<td>Biophysics and Biochemistry</td>
<td>5</td>
</tr>
<tr>
<td>GBIO0025-1</td>
<td>General and cell biology</td>
<td>5</td>
</tr>
<tr>
<td>GBIO0026-1</td>
<td>Systems physiology</td>
<td>5</td>
</tr>
</tbody>
</table>

Choose 5 credits: (B1 : 5Cr)

[...]

The remaining credits (5 ECTS) can be chosen in amongst the optional or technical courses that have not yet been followed

Other optional courses and Internship

Choose 30 credits from the following list. The thematic structuring is indicative only. (B2 : 30Cr)

#### Compulsory internship (choose between the 3 ECTS and 8 ECTS version)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTG0024-1</td>
<td>Immersion internship</td>
<td>8</td>
</tr>
<tr>
<td>ASTG9007-1</td>
<td>Observation internship</td>
<td>3</td>
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#### Imaging and instrumentation

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH0049-1</td>
<td>Morphological Characterization of Unordered Systems</td>
<td>5</td>
</tr>
<tr>
<td>ELEN0071-1</td>
<td>Applied digital signal processing</td>
<td>5</td>
</tr>
<tr>
<td>ELEN0004-1</td>
<td>Semiconductor devices</td>
<td>5</td>
</tr>
<tr>
<td>MATH0461-2</td>
<td>Introduction to numerical optimization</td>
<td>5</td>
</tr>
<tr>
<td>ELEN0016-2</td>
<td>Computer vision</td>
<td>5</td>
</tr>
<tr>
<td>ELEC0017-1</td>
<td>Electromagnetic Compatibility</td>
<td>5</td>
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<tr>
<td>PHYS0128-1</td>
<td>Magnetic Resonance Imaging - the Basics</td>
<td>3</td>
</tr>
<tr>
<td>ELEC0041-1</td>
<td>Modelling and design of electromagnetic systems</td>
<td>5</td>
</tr>
<tr>
<td>ELEC0054-1</td>
<td>Application of electrical measurement systems</td>
<td>5</td>
</tr>
<tr>
<td>ELEN0062-1</td>
<td>Introduction to machine learning</td>
<td>5</td>
</tr>
<tr>
<td>STAT0722-1</td>
<td>Introduction to medical statistics</td>
<td>2</td>
</tr>
<tr>
<td>INFO0009-2</td>
<td>Database (general organisation)</td>
<td>5</td>
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# Study programmes 2021-2022

## Faculty of Applied Sciences

### Master of Science (MSc) in Biomedical Engineering

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Lecture Hours</th>
<th>Labo. Hours</th>
<th>Project Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tristan GILET, JeanMichel REDOUTÉ - [4h Labo., 20h Proj.]</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>PROTO430-3</td>
<td><em>Biomedical robotics and active prostheses</em> (english language)</td>
<td>B2 Q1</td>
<td>15</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Olivier BRULS (Odd years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Davide RUFFONI - [4h Labo.]</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>CHIM0625-1</td>
<td><em>Molecular mechanics and molecular dynamics</em> - Frédéric KERFF</td>
<td>B2 Q1</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>MECA0464-1</td>
<td><em>Large deformation of solids</em> (english language) - Romain BOMAN, JeanPhilippe PONTHOT</td>
<td>B2 Q1</td>
<td>26</td>
<td>26</td>
<td>[+ 5]</td>
</tr>
<tr>
<td></td>
<td>[50h Proj.]</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>CHIM0698-1</td>
<td><em>Physical Chemistry of Interfaces</em> (english language) - Cédric GOMMES</td>
<td>B2 Q2</td>
<td>20</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>PHYS0038-2</td>
<td><em>Introduction into polymer physics including plasturgy</em> (english language)</td>
<td>B2 Q1</td>
<td>30</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Klaus KECKANTOINE, Klaus KECKANTOINE</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>- Stéphanie LAMBERT - [12h Labo.]</td>
<td></td>
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<tr>
<td>BIOL0114-3</td>
<td><em>Electronic microscopies</em></td>
<td>B2 Q2</td>
<td>15</td>
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<tr>
<td></td>
<td>- Part A - Philippe COMPÈRE</td>
<td></td>
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<tr>
<td></td>
<td>- Part B - Philippe COMPÈRE</td>
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</tr>
<tr>
<td>CHIM0668-1</td>
<td><em>Agitation and mixture</em> - Dominique TOYE - [5h Labo.]</td>
<td>B2 Q1</td>
<td>30</td>
<td>5</td>
<td>[+ 4]</td>
</tr>
<tr>
<td>MECA0473-1</td>
<td><em>Metallic materials engineering</em> - Anne MERTENS</td>
<td>B2 Q1</td>
<td>26</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>MECA0012-6</td>
<td><em>Solid mechanics</em> - Laurent DUCHENE - [15h Proj.]</td>
<td>B2 Q2</td>
<td>26</td>
<td>26</td>
<td>[+ 5]</td>
</tr>
<tr>
<td>MECA0023-1</td>
<td><em>Advanced solid mechanics</em> (english language) - JeanPhilippe PONTHOT</td>
<td>B2 Q1</td>
<td>26</td>
<td>26</td>
<td>[+ 5]</td>
</tr>
<tr>
<td></td>
<td>[30h Proj.]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GBIO0014-2</td>
<td><em>Modeling of physiological systems and clinical applications</em> - Thomas DESAIVE</td>
<td>B2 Q1</td>
<td>30</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>GBIO0015-1</td>
<td><em>A tour in genetic epidemiology</em> (english language) - Kristel VAN STEEN - [60h Proj.]</td>
<td>B2 Q2</td>
<td>15</td>
<td>15</td>
<td>[+ 3]</td>
</tr>
<tr>
<td>BIIOC0718-2</td>
<td><em>Structure-function of biomolecules</em> - Mireille DUMOULIN</td>
<td>B2 Q2</td>
<td>15</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Kristel VAN STEEN - [35h Proj.]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maarten ARNST, Romain BOMAN - [25h Proj.]</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Christophe GEUZAIN - [20h Proj.]</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*Course codes refer to specific study programmes.*
Additional ECTS Master in biomedical engineering

Optional courses (B0 : 60Cr)

Each student’s programme will be determined by the jury depending on their prior training. If an applicant does not meet certain prerequisites, his or her programme may include up to 60 additional course credits essentially taken from the list below : (B0 : 60Cr)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>ECTS Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>G BIO0025-1</td>
<td>General and cell biology - Christel PEQUEUX</td>
<td>B0 Q2 26 26 5</td>
</tr>
<tr>
<td>G BIO0026-1</td>
<td>Systems physiology - Philippe KOLH</td>
<td>B0 Q2 26 26 5</td>
</tr>
<tr>
<td>G BIO0002-1</td>
<td>Genetics and bioinformatics (english language) - Frank DEQUEUDT, Kristel VAN STEEN</td>
<td>B0 Q1 30 15 [+ 5]</td>
</tr>
<tr>
<td>G BIO0011-1</td>
<td>Biological Systems Modelling - Pierre DAUBY, Liesbet GERIS</td>
<td>B0 Q2 26 26 5</td>
</tr>
<tr>
<td>G BIO0001-1</td>
<td>Biophysics and Biochemistry - Mireille DUMOULIN, Liesbet GERIS - [6h Proj.]</td>
<td>B0 Q1 29 23 [+ 5]</td>
</tr>
<tr>
<td>G BIO0021-1</td>
<td>Laboratory Project - Thomas DESAIVE, Liesbet GERIS - [16h]</td>
<td>B0 TA 44 [+ 5]</td>
</tr>
</tbody>
</table>
To this list may be added, up to a limit of 60 credits, other technical classes depending on the skills the student has acquired.