

Cycle view of the study programme

B1 Or Th Pr Au Cr

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 60 credits of the compulsory courses (including the master thesis), 30 credits of the professional focus (students have to choose one of the 3 options) and 30 credits optional courses. 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 (B1 : 35Cr, B2 : 25Cr)

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|------------|--|----|----|----|----|-----|----|
| GBIO0029-1 | <i>Bioelectronics</i> (english language) - JeanMichel REDOUTÉ - [20h Labo., 20h Proj.] | B1 | Q1 | 30 | 15 | [+] | 5 |
| GBIO0012-2 | <i>Biomechanics</i> (english language) - Davide RUFFONI - [1d FW] | B1 | Q1 | 26 | 26 | [+] | 5 |
| GBIO0008-2 | <i>Medical imaging</i> (english language) - Christophe PHILLIPS - [8h Labo., 1d FW] | B1 | Q2 | 33 | 12 | [+] | 5 |
| GBIO0014-2 | <i>In silico medicine</i> - Thomas DESAIVE | B1 | Q2 | 30 | 30 | - | 5 |
| GBIO0027-1 | <i>Medical device design projects</i> (english language) - Liesbet GERIS, Davide RUFFONI - [8h Labo., 1d FW] Corequisite : GBIO0001-1 - Biophysique et biochimie GBIO0025-1 - Biologie générale et cellulaire GBIO0026-1 - Physiologie des systèmes | B1 | TA | 30 | 90 | [+] | 10 |
| GEST3162-1 | <i>Principles of management</i> (english language) - François PICHAULT, Willem STANDAERT - [25h Proj.] | B1 | Q1 | 30 | - | [+] | 5 |
| ATFE0016-1 | <i>Master thesis (including introduction to research methodology)</i> - Davide RUFFONI - [750h Proj.] | B2 | TA | - | - | [+] | 25 |

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

Single focus (B1 : 25Cr, B2 : 5Cr)

Professional focus (B1 : 25Cr, B2 : 5Cr)

Choose one of the following options (25 credits during B1 and 5 credits during B2): (B1 : 25Cr, B2 : 5Cr)

Biomechanics, Biomaterials & Tissues Engineering (B1 : 25Cr, B2 : 5Cr)

| | | | | | | | |
|------------|--|----|----|----|----|-----|---|
| BIOC0430-1 | <i>Interactions materials - living systems</i> (english language) - Dorien VAN HEDE | B1 | Q1 | 25 | - | - | 3 |
| MECA0139-1 | <i>Additive manufacturing and 3D printing</i> (english language) - Anne MERTENS | B1 | Q1 | 26 | 26 | - | 5 |
| PROT0430-3 | <i>Biomedical robotics and active prostheses</i> (english language) - Olivier BRULS | B1 | Q1 | 15 | 10 | - | 3 |
| GBIO0018-2 | <i>Introduction to tissue engineering</i> (english language) - Liesbet GERIS | B1 | Q2 | 20 | 5 | - | 4 |
| MECA0008-1 | <i>Microfluidics</i> (english language) - Tristan GILET - [16h Labo., 14h Proj.] | B1 | Q2 | 22 | 8 | [+] | 5 |
| MECA0036-2 | <i>Finite Element Method</i> (english language) - JeanPhilippe PONTHOT - [40h Proj.] | B1 | Q2 | 26 | 26 | [+] | 5 |
| BIOM0631-1 | <i>Human movement analysis</i> (english language) - Olivier BRULS, Cédric SCHWARTZ - [15h Proj.] | B2 | Q1 | 33 | 14 | [+] | 5 |

In silico medicine (B1 : 25Cr, B2 : 5Cr)

| | | | | | | | |
|------------|--|----|----|----|---|-----|---|
| ELEN0062-1 | <i>Introduction to machine learning</i> (english language) - | B1 | Q1 | 30 | 5 | [+] | 5 |
|------------|--|----|----|----|---|-----|---|

EURTS, Louis WEHENKEL - [40h Proj.]

| | | | | | | | |
|------------|---|----|----|----|----|-----|---|
| INFO0939-1 | <i>High performance scientific computing</i> (english language) - Christophe GEUZAINÉ - [20h Proj.] | B1 | Q1 | 30 | 15 | [+] | 5 |
| MECA0036-2 | <i>Finite Element Method</i> (english language) - JeanPhilippe PONTHOT - [40h Proj.] | B1 | Q2 | 26 | 26 | [+] | 5 |
| INFO8010-1 | <i>Deep learning</i> (english language) - Gilles LOUPPE - [60h Proj.] | B1 | Q2 | 30 | - | [+] | 5 |
| SYST0022-1 | <i>Linear Systems Design</i> (english language) - Guillaume DRION, Pierre SACRÉ - [15h Proj.] | B1 | Q2 | 26 | 26 | [+] | 5 |
| GBIO0033-1 | <i>Advances in in silico medicine</i> (english language) - Liesbet GERIS | B2 | Q1 | 26 | 26 | - | 5 |

Neural systems (B1 : 25Cr, B2 : 5Cr)

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|------------|--|----|----|----|----|-----|---|
| GNEU0001-1 | <i>Principles of Neuroengineering</i> (english language) - Guillaume DRION, Alessio FRANCI, Christophe PHILLIPS, Pierre SACRÉ - [26h Labo., 15h Proj.] | B1 | Q1 | 26 | - | [+] | 5 |
| ELEN0062-1 | <i>Introduction to machine learning</i> (english language) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.] | B1 | Q1 | 30 | 5 | [+] | 5 |
| ELEN0074-1 | <i>Sensors, microsensors and instrumentation</i> (english language) - Philippe VANDERBEMDEN - [20h Labo.] | B1 | Q2 | 30 | - | [+] | 5 |
| SYST0022-1 | <i>Linear Systems Design</i> (english language) - Guillaume DRION, Pierre SACRÉ - [15h Proj.] | B1 | Q2 | 26 | 26 | [+] | 5 |
| SYST0017-1 | <i>Advanced topics in systems and control</i> (english language) - Pierre DAUBY, Guillaume DRION | B1 | Q1 | 26 | 26 | - | 5 |
| PHYS0128-1 | <i>Magnetic Resonance Imaging - the Basics</i> (english language) - Laurent LAMALLE - [3d FW] | B2 | Q1 | 15 | - | [+] | 3 |
| GBIO0034-1 | <i>Neuroimaging data analysis</i> (english language) - Christophe PHILLIPS | B2 | Q1 | 10 | 5 | - | 2 |

Optional courses and compulsory Internship

Choose 30 credits from the following list: (B2 : 30Cr)

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

| | | | | | | | |
|------------|--|----|----|---|---|---|---|
| ASTG0024-1 | <i>Immersion internship</i> (english language) - Liesbet GERIS | B2 | TA | - | - | - | 8 |
| ASTG9007-1 | <i>Observation internship</i> (english language) - Liesbet GERIS | B2 | TA | - | - | - | 3 |

Optional courses

The thematic structuring is indicative only. You can choose amongst all the listed courses regardless of the option chosen in the professional focus.

The subjects GBIO0001-1, GBIO0025-1 et GBIO0026-1 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 in engineering, or unless the corresponding knowledge and skills have been acquired previously.

Biomedical engineering & sciences

| | | | | | | | |
|------------|--|----|----|----|----|-----|---|
| GBIO0001-1 | <i>Biophysics and Biochemistry</i> - Mireille DUMOULIN, Liesbet GERIS - [6h Proj.] | B2 | Q1 | 29 | 23 | [+] | 5 |
| GBIO0016-1 | <i>Introduction to systems and synthetic biology</i> (english language) - Frank DELVIGNE, Philippe JACQUES | B2 | Q2 | 26 | 26 | - | 5 |
| GBIO0022-1 | <i>Biomimicry</i> (english language) - Philippe COMPÈRE, Tristan GILET, Davide RUFFONI - [45h Proj.] | B2 | TA | 15 | - | [+] | 5 |
| GBIO0025-1 | <i>General and cell biology</i> - Christel PEQUEUX | B2 | Q2 | 36 | 10 | - | 5 |
| GBIO0026-1 | <i>Systems physiology</i> - Philippe KOLH | B2 | Q2 | 26 | 26 | - | 5 |

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|------------|--|----|----|----|----|-----|---|
| LABO0432-1 | <i>Techniques for cells and tissue cultures</i> - Erik MAQUOI | B2 | Q1 | 8 | 20 | - | 2 |
| SBIM0495-2 | <i>Molecular and cellular basis of disease</i> (english language) - Jo CAERS, Pierre CLOSE, Charlotte CORNIL, Laurence DELACROIX, Mireille DUMOULIN, Keith DURKIN, Carla GOMES DA SILVA, Céline KEMPENEERS, Vincent SEUTIN, Sabine WISLET - [40h Pers. Res.] | B2 | Q2 | 20 | 10 | [+] | 7 |

Biomechanics, Biomaterials & Tissues Engineering

| | | | | | | | |
|------------|---|----|----|----|----|-----|---|
| CHIM0604-2 | <i>Chemistry and organic materials</i> - Lionel DELAUDE | B2 | Q2 | 33 | 19 | - | 5 |
| CHIM9319-1 | <i>Chemistry and technology of polymers</i> (english language) - Antoine DEBUIGNE, Klaus KECKANTOINE - [10h Proj., 12h Labo.] | B2 | Q2 | 30 | - | [+] | 5 |
| CHIM9320-1 | <i>Introduction to chemical reaction engineering</i> - Nathalie JOB, Dominique TOYE | B2 | Q1 | 24 | 24 | - | 5 |
| MECA0018-2 | <i>Manufacturing processes</i> (english language) - Yves MARCHAL - [15h Labo., 11h Proj., 0,5d FW] | B2 | Q2 | 30 | - | [+] | 5 |
| MECA0462-2 | <i>Materials selection</i> (english language) - Anne MERTENS, Davide RUFFONI - [30h Proj., 1d FW] | B2 | Q1 | 26 | 26 | [+] | 5 |
| MECA0516-1 | <i>Mechanical properties of biological and bioinspired materials</i> (english language) - Davide RUFFONI - [4h Labo.] | B2 | Q1 | 26 | 22 | [+] | 5 |

In silico medicine

| | | | | | | | |
|------------|---|----|----|----|----|-----|---|
| BIOL0021-1 | <i>Biology of the systems</i> - Patrick MEYER - [10h Mon. WS] | B2 | Q1 | 10 | - | [+] | 2 |
| ELEN0016-2 | <i>Computer vision</i> (english language) - Marc VAN DROOGENBROECK - [50h Proj.] | B2 | Q1 | 30 | 10 | [+] | 5 |
| GBIO0015-1 | <i>A tour in genetic epidemiology</i> (english language) - Kristel VAN STEEN - [60h Proj.] | B2 | Q2 | 15 | 15 | [+] | 3 |
| GBIO0030-1 | <i>Computational approaches to statistical generics</i> (english language) - Kristel VAN STEEN - [35h Proj.] | B2 | Q2 | 25 | 15 | [+] | 5 |
| GBIO0031-1 | <i>Learning from genomic data</i> (english language) - Kristel VAN STEEN - [150h Proj.] | B2 | Q2 | - | - | [+] | 5 |
| MATH0024-1 | <i>Modelling with partial differential equations</i> (english language) - Maarten ARNST, Romain BOMAN - [25h Proj.] | B2 | Q1 | 30 | 20 | [+] | 5 |
| MATH0471-2 | <i>Multiphysics integrated computational project</i> (english language) - Romain BOMAN, Christophe GEUZAINÉ - [30h Proj.] | B2 | TA | 33 | - | [+] | 5 |
| MECA0010-1 | <i>Uncertainty quantification and stochastic modelling</i> (english language) - Maarten ARNST - [28h Proj.] | B2 | Q1 | 16 | 16 | [+] | 5 |

Neural systems

| | | | | | | | |
|------------|---|----|----|----|----|-----|---|
| ELEC0054-1 | <i>Advanced electrical measurement systems</i> (english language) - Philippe VANDERBEMDEN - [20h Labo.] | B2 | Q1 | 30 | 10 | [+] | 5 |
| ELEN0037-1 | <i>Microelectronics and IC design</i> (english language) - JeanMichel REDOUTÉ - [40h Proj.] | B2 | Q2 | 30 | 20 | [+] | 5 |
| ELEN0062-1 | <i>Introduction to machine learning</i> (english language) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.] | B2 | Q1 | 30 | 5 | [+] | 5 |
| ELEN0074-1 | <i>Sensors, microsensors and instrumentation</i> (english language) - Philippe VANDERBEMDEN - [20h Labo.] | B2 | Q2 | 30 | - | [+] | 5 |

Other optional courses

| | | | | | | | |
|------------|---|----|----|----|---|-----|---|
| PROJ0011-2 | <i>Personal student project</i> (english language) - Pierre DUYSINX, Liesbet GERIS, Grégoire LÉONARD - [150h Proj.] | B2 | TA | - | - | [+] | 5 |
| GNEU0001-1 | <i>Principles of Neuroengineering</i> (english language) - Guillaume DRION, Alessio FRANCI, Christophe PHILLIPS, | B2 | Q1 | 26 | - | [+] | 5 |

ACRÉ - [26h Labo., 15h Proj.]

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|------------|--|----|----|----|----|-----|---|
| INFO8006-1 | <i>Introduction to artificial intelligence</i> (english language) - Gilles LOUPPE - [45h Proj.] | B2 | Q1 | 25 | 20 | [+] | 5 |
| PHYS0128-1 | <i>Magnetic Resonance Imaging - the Basics</i> (english language) - Laurent LAMALLE - [3d FW] | B2 | Q1 | 15 | - | [+] | 3 |
| SYST0017-1 | <i>Advanced topics in systems and control</i> (english language) - Pierre DAUBY, Guillaume DRION | B2 | Q1 | 26 | 26 | - | 5 |
| SYST0020-1 | <i>Introduction to microsystems and microtechnology</i> (english language) - Tristan GILET, JeanMichel REDOUTÉ - [4h Labo., 20h Proj.] | B2 | Q2 | 24 | 18 | [+] | 5 |
| SYST0022-1 | <i>Linear Systems Design</i> (english language) - Guillaume DRION, Pierre SACRÉ - [15h Proj.] | B2 | Q2 | 26 | 26 | [+] | 5 |
| GBIO0033-1 | <i>Advances in in silico medicine</i> (english language) - Liesbet GERIS | B2 | Q1 | 26 | 26 | - | 5 |
| MECA0036-2 | <i>Finite Element Method</i> (english language) - JeanPhilippe PONTHOT - [40h Proj.] | B2 | Q2 | 26 | 26 | [+] | 5 |
| INFO0939-1 | <i>High performance scientific computing</i> (english language) - Christophe GEUZAINÉ - [20h Proj.] | B2 | Q1 | 30 | 15 | [+] | 5 |
| INFO8010-1 | <i>Deep learning</i> (english language) - Gilles LOUPPE - [60h Proj.] | B2 | Q2 | 30 | - | [+] | 5 |
| GBIO0018-2 | <i>Introduction to tissue engineering</i> (english language) - Liesbet GERIS | B2 | Q2 | 20 | 5 | - | 4 |
| MECA0008-1 | <i>Microfluidics</i> (english language) - Tristan GILET - [16h Labo., 14h Proj.] | B2 | Q2 | 22 | 8 | [+] | 5 |
| MECA0139-1 | <i>Additive manufacturing and 3D printing</i> (english language) - Anne MERTENS | - | Q1 | 26 | 26 | - | 5 |
| PROT0430-3 | <i>Biomedical robotics and active prostheses</i> (english language) - Olivier BRULS | B2 | Q1 | 15 | 10 | - | 3 |
| BIOC0430-1 | <i>Interactions materials - living systems</i> (english language) - Dorien VAN HEDE | B2 | Q1 | 25 | - | - | 3 |
| BIOM0631-1 | <i>Human movement analysis</i> (english language) - Olivier BRULS, Cédric SCHWARTZ - [15h Proj.] | B2 | Q1 | 33 | 14 | [+] | 5 |
| GNEU0004-1 | <i>Computational cognitive modelling</i> (english language) - Alessio FRANCI | B2 | Q1 | 26 | 26 | - | 5 |

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

Additional ECTS Master in biomedical engineering

Optional courses (B0 : 60Cr)

The program of each candidate will be determined by the Jury according to his previous training. If a candidate does not master certain prerequisites, his program may include up to 60 credits of additional courses mainly from the list below : (B0 : 60Cr)

| | | | | | | | |
|------------|--|----|----|----|----|-----|---|
| GBIO0025-1 | <i>General and cell biology</i> - Christel PEQUEUX | B0 | Q2 | 36 | 10 | - | 5 |
| GBIO0026-1 | <i>Systems physiology</i> - Philippe KOLH | B0 | Q2 | 26 | 26 | - | 5 |
| GBIO0002-1 | <i>Genetics and bioinformatics</i> (english language) - Franck DEQUIEDT, Kristel VAN STEEN - [15h Proj.] | B0 | Q1 | 30 | 15 | [+] | 5 |
| GBIO0011-1 | <i>Biological Systems Modelling</i> - Pierre DAUBY, Liesbet GERIS | B0 | Q2 | 26 | 26 | - | 5 |
| GBIO0001-1 | <i>Biophysics and Biochemistry</i> - Mireille DUMOULIN, Liesbet GERIS - [6h Proj.] | B0 | Q1 | 29 | 23 | [+] | 5 |

GBIO0021-1 *Laboratory Project* - Thomas DESAIVE, Liesbet GERIS - [16h Labo., 8h Proj.] B0 Q2 - 44 [+] **5**

GBIO0013-1 *Phenomenon of Transport in Biology* - Dominique TOYE B0 Q2 26 26 - **5**

GBIO0005-1 *Introduction to cognitive neurosciences* - Gilles VANDEWALLE B0 Q1 26 26 - **5**

[...] To this list may be added, within the limit of 60 credits, other technical courses depending on the skills acquired by the student.