

## Cycle view of the study programme

B1 Or Th Pr Au Cr

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.

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. 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 from the core curriculum (B1 : 35Cr, B2 : 25Cr)

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 (Service Learning)</i> (english language) - Liesbet GERIS, Davide RUFFONI - [8h Labo., 1d FW]	B1	TA	30	90	[+]	10
<b>Corequisite :</b>							
GBIO0026-1 - Physiologie des systèmes							
GBIO0025-1 - Biologie générale et cellulaire							
GBIO0001-1 - Biophysique et biochimie							
GEST3162-1	<i>Principles of management</i> (english language) - Michaël PARMENTIER, 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

### Optional courses from the core curriculum (B2 : 30Cr)

#### 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	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

LABO0432-3	<i>Techniques for cells and tissue cultures</i> - Erik MAQUOI, MarieJulie NOKIN	B2	Q2	8	20	-	2
<b>Biomechanics, Biomaterials &amp; Tissues Engineering</b>							
CHIM9319-1	<i>Chemistry and technology of polymers</i> (english language) - Antoine DEBUIGNE, Klaus KECKANTOINE - [10h Proj., 12h Labo.]	B2	Q2	30	-	[+]	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
<b>In silico medicine</b>							
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) - Anthony CIOPPA, Adrien DELIÈGE, 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
MATH0024-1	<i>Modelling with partial differential equations</i> (english language) - Maarten ARNST, Romain BOMAN - [25h Proj.]	B2	Q1	30	20	[+]	5
MECA0010-1	<i>Uncertainty quantification and stochastic modelling</i> (english language) - Maarten ARNST - [28h Proj.]	B2	Q1	16	16	[+]	5
<b>Neural systems</b>							
ELEN0448-1	<i>Applied Electricity and Electronics</i> (english language) - JeanMichel REDOUTÉ, Philippe VANDERBEMDEN	B2	Q1	26	26	-	5
ELEN0037-1	<i>Microelectronics and IC design</i> (english language) - JeanMichel REDOUTÉ - [40h Proj.]	B2	Q2	30	20	[+]	5
GNEU0002-1	<i>Brain Inspired Computing</i> (english language) - Alessio FRANCI - [20h Proj.]	B2	Q2	25	20	[+]	5
GNEU0003-1	<i>Neuromorphic Signal Processing</i> (english language) - Alessio FRANCI - [20h Proj.]	B2	Q2	25	20	[+]	5
GNEU0004-1	<i>Computational cognitive modelling</i> (english language) - Alessio FRANCI	B2	Q1	26	26	-	5
GBIO0036-1	<i>Experimental Neurophysiology for Engineers</i> (english language) - [15h Proj.]	B2	Q1	20	20	[+]	5
<b>Other optional courses</b>							
PROJ0011-2	<i>Personal student project</i> (english language) - Liesbet GERIS, Grégoire LÉONARD - [150h Proj.]	B2	TA	-	-	[+]	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
ELEN0449-1	<i>Computer Vision understanding</i> (english language) - Anthony CIOPPA - [50h Proj.]	B2	Q2	24	10	[+]	5
MATH0461-2	<i>Introduction to numerical optimization</i> (english language) - Quentin LOUVEAUX - [25h Proj.]	B2	Q1	30	20	[+]	5
MATH0462-1	<i>Discrete optimization</i> (english language) - Quentin LOUVEAUX - [25h Proj.]	B2	Q2	30	20	[+]	5
MECA0031-2	<i>Kinematics and dynamics of mechanisms</i> (english language) - Olivier BRULS - [40h Proj.]	B2	Q2	30	20	[+]	5

MECA0473-1	<i>Metallic materials engineering</i> - Anne MERTENS	B2	Q1	26	26	-	5
PHYS0904-4	<i>Physics of materials</i> - Luc COURARD, Anne MERTENS - [1d FW]	B2	Q2	26	26	[+]	5
[...]	Or choose a maximum of 30 credits from the following list :						
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
GNEU0001-1	<i>Principles of Neuroengineering</i> (english language) - Guillaume DRION, Alessio FRANCI, Christophe PHILLIPS, Pierre SACRÉ - [26h Labo., 15h Proj.]	B2	Q1	26	-	[+]	5
PHYS0128-1	<i>Magnetic Resonance Imaging - the Basics</i> (english language) - Laurent LAMALLE - [3d FW]	B2	Q2	15	-	[+]	3
GBIO0034-1	<i>Neuroimaging data analysis</i> (english language) - Christophe PHILLIPS	B2	Q1	10	5	-	2
SYST0017-1	<i>Neurodynamics</i> (english language) - Pierre DAUBY, Guillaume DRION	B2	Q1	26	26	-	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

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

**Focus courses (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) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.]	B1	Q1	30	5	[+]	5
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)**

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
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>Neurodynamics</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]	B1	Q2	15	-	[+]	3
GBIO0034-1	<i>Neuroimaging data analysis</i> (english language) - Christophe PHILLIPS	B1	Q1	10	5	-	2
GBIO0035-1	<i>Advanced Magnetic Resonance Imaging</i> (english language)	B2	Q1	-	-	-	5

## Bridging courses 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 : For holders of a master's degree in industrial sciences or a master's degree in industrial engineering sciences (all specializations), the volume of the supplementary program may be reduced to 15 credits. (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	[+]	<b>5</b>
GBIO0021-1	<i>Laboratory Project</i> - Thomas DESAIVE, Liesbet GERIS - [16h Labo., 8h Proj.]	B0	Q2	-	44	[+]	<b>5</b>
GBIO0013-1	<i>Phénomènes de transport en biologie</i> - Dominique TOYE - [25h Proj.]	B0	Q2	26	26	[+]	<b>5</b>
GBIO0005-1	<i>Introduction to cognitive neurosciences</i> - Gilles VANDEWALLE	B0	Q1	26	26	-	<b>5</b>