

**Vue bloc du programme des cours**

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**Bloc 1**

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**

GBIO0029-1	<i>Bioelectronics</i> (anglais) - JeanMichel REDOUTÉ - [20h Labo., 20h Proj.]	Q1	30	15	[+]	<b>5</b>
GBIO0012-2	<i>Biomechanics</i> (anglais) - Davide RUFFONI - [1j T. t.]	Q1	26	26	[+]	<b>5</b>
GBIO0008-2	<i>Medical imaging</i> (anglais) - Christophe PHILLIPS - [8h Labo., 1j T. t.]	Q2	33	12	[+]	<b>5</b>
GBIO0014-2	<i>In silico medicine</i> - Thomas DESAIVE	Q2	30	30	-	<b>5</b>
GBIO0027-1	<i>Medical device design projects</i> (anglais) - Liesbet GERIS, Davide RUFFONI - [8h Labo., 1j T. t.]	TA	30	90	[+]	<b>10</b>
	<b>Corequis :</b>					
	GBIO0001-1 - Biophysique et biochimie					
	GBIO0025-1 - Biologie générale et cellulaire					
	GBIO0026-1 - Physiologie des systèmes					
GEST3162-1	<i>Principles of management</i> (anglais) - François PICHault, Willem STANDAERT - [25h Proj.]	Q1	30	-	[+]	<b>5</b>

**Elective courses**

**Single focus**

**Professional focus**

**Choose one of the following options :**

**Biomechanics, Biomaterials & Tissues Engineering**

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

**In silico medicine**

ELEN0062-1	<i>Introduction to machine learning</i> (anglais) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.]	Q1	30	5	[+]	<b>5</b>
INFO0939-1	<i>High performance scientific computing</i> (anglais) - Christophe GEUZAIN - [20h Proj.]	Q1	30	15	[+]	<b>5</b>
MECA0036-2	<i>Finite Element Method</i> (anglais) - JeanPhilippe PONTHOT - [40h Proj.]	Q2	26	26	[+]	<b>5</b>
INFO8010-1	<i>Deep learning</i> (anglais) - Gilles LOUPPE - [60h Proj.]	Q2	30	-	[+]	<b>5</b>
SYST0022-1	<i>Linear Systems Design</i> (anglais) - Guillaume DRION, Pierre SACRÉ - [15h Proj.]	Q2	26	26	[+]	<b>5</b>

#### Neural systems

GNEU0001-1	<i>Principles of Neuroengineering</i> (anglais) - Guillaume DRION, Alessio FRANCI, Christophe PHILLIPS, Pierre SACRÉ - [26h Labo., 15h Proj.]	Q1	26	-	[+]	5
ELEN0062-1	<i>Introduction to machine learning</i> (anglais) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.]	Q1	30	5	[+]	5
ELEN0074-1	<i>Sensors, microsensors and instrumentation</i> (anglais) - Philippe VANDERBEMDEN - [20h Labo.]	Q2	30	-	[+]	5
SYST0022-1	<i>Linear Systems Design</i> (anglais) - Guillaume DRION, Pierre SACRÉ - [15h Proj.]	Q2	26	26	[+]	5
SYST0017-1	<i>Advanced topics in systems and control</i> (anglais) - Pierre DAUBY, Guillaume DRION	Q1	26	26	-	5

#### Bloc 2

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

ATFE0016-1	<i>Master thesis (including introduction to research methodology)</i> - Davide RUFFONI - [750h Proj.]	TA	-	-	[+]	25
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#### Elective courses

##### Single focus

##### Professional focus

Choose one of the following options :

##### Biomechanics, Biomaterials & Tissues Engineering

BIOM0631-1	<i>Human movement analysis</i> (anglais) - Olivier BRULS, Cédric SCHWARTZ - [15h Proj.]	Q1	33	14	[+]	5
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##### In silico medicine

GBIO0033-1	<i>Advances in in silico medicine</i> (anglais) - Liesbet GERIS	Q1	26	26	-	5
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##### Neural systems

PHYS0128-1	<i>Bases de l'imagerie par résonance magnétique nucléaire</i> (anglais) - Laurent LAMALLE - [3j T. t.]	Q1	15	-	[+]	3
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GBIO0034-1	<i>Neuroimaging data analysis</i> (anglais) - Christophe PHILLIPS	Q1	10	5	-	2
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Optional courses and compulsory Internship

Choose 30 credits from the following list :

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

ASTG0024-1	<i>Immersion internship</i> (anglais) - Liesbet GERIS	TA	-	-	-	8
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ASTG9007-1	<i>Observation internship</i> (anglais) - Liesbet GERIS	TA	-	-	-	3
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#### 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>Biophysique et biochimie</i> - Mireille DUMOULIN, Liesbet GERIS - [6h Proj.]	Q1	29	23	[+]	5
GBIO0016-1	<i>Introduction to systems and synthetic biology</i> (anglais) - Frank DELVIGNE, Philippe JACQUES	Q2	26	26	-	5
GBIO0022-1	<i>Biomimicry</i> (anglais) - Philippe COMPÈRE, Tristan GILET, Davide RUFFONI - [45h Proj.]	TA	15	-	[+]	5
GBIO0025-1	<i>Biologie générale et cellulaire</i> - Christel PEQUEUX	Q2	36	10	-	5
GBIO0026-1	<i>Physiologie des systèmes</i> - Philippe KOLH	Q2	26	26	-	5
LABO0432-1	<i>Techniques de culture de cellules et de tissus</i> - Erik MAQUOI	Q1	8	20	-	2
SBIM0495-2	<i>Molecular and cellular basis of disease</i> (anglais) - Jo CAERS, Pierre CLOSE, Charlotte CORNIL, Laurence DELACROIX, Mireille DUMOULIN, Keith DURKIN, Carla GOMES DA SILVA, Céline KEMPENEERS, Vincent SEUTIN, Sabine WISLET - [40h RP]	Q2	20	10	[+]	7

**Biomechanics, Biomaterials & Tissues Engineering**

CHIM0604-2	<i>Chimie et matériaux organiques</i> - Lionel DELAUDE	Q2	33	19	-	5
CHIM9319-1	<i>Chemistry and technology of polymers</i> (anglais) - Antoine DEBUIGNE, Klaus KECKANTOINE - [10h Proj., 12h Labo.]	Q2	30	-	[+]	5
CHIM9320-1	<i>Introduction au génie de la réaction chimique</i> - Nathalie JOB, Dominique TOYE	Q1	24	24	-	5
MECA0018-2	<i>Manufacturing processes</i> (anglais) - Yves MARCHAL - [15h Labo., 11h Proj., 0,5j T. t.]	Q2	30	-	[+]	5
MECA0462-2	<i>Materials selection</i> (anglais) - Anne MERTENS, Davide RUFFONI - [30h Proj., 1j T. t.]	Q1	26	26	[+]	5
MECA0516-1	<i>Mechanical properties of biological and bioinspired materials</i> (anglais) - Davide RUFFONI - [4h Labo.]	Q1	26	22	[+]	5

**In silico medicine**

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

**Neural systems**

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

ELEN0074-1	<i>Sensors, microsensors and instrumentation</i> (anglais) - Philippe VANDERBEMDEN - [20h Labo.]	Q2	30	-	[+]	5
<b>Other optional courses</b>						
PROJ0011-2	<i>Personal student project</i> (anglais) - Pierre DUYSINX, Liesbet GERIS, Grégoire LÉONARD - [150h Proj.]	TA	-	-	[+]	5
GNEU0001-1	<i>Principles of Neuroengineering</i> (anglais) - Guillaume DRION, Alessio FRANCI, Christophe PHILLIPS, Pierre SACRÉ - [26h Labo., 15h Proj.]	Q1	26	-	[+]	5
INFO8006-1	<i>Introduction to artificial intelligence</i> (anglais) - Gilles LOUPPE - [45h Proj.]	Q1	25	20	[+]	5
PHYS0128-1	<i>Bases de l'imagerie par résonance magnétique nucléaire</i> (anglais) - Laurent LAMALLE - [3j T. t.]	Q1	15	-	[+]	3
SYST0017-1	<i>Advanced topics in systems and control</i> (anglais) - Pierre DAUBY, Guillaume DRION	Q1	26	26	-	5
SYST0020-1	<i>Introduction to microsystems and microtechnology</i> (anglais) - Tristan GILET, JeanMichel REDOUTÉ - [4h Labo., 20h Proj.]	Q2	24	18	[+]	5
SYST0022-1	<i>Linear Systems Design</i> (anglais) - Guillaume DRION, Pierre SACRÉ - [15h Proj.]	Q2	26	26	[+]	5
GBIO0033-1	<i>Advances in in silico medicine</i> (anglais) - Liesbet GERIS	Q1	26	26	-	5
MECA0036-2	<i>Finite Element Method</i> (anglais) - JeanPhilippe PONTHOT - [40h Proj.]	Q2	26	26	[+]	5
INFO0939-1	<i>High performance scientific computing</i> (anglais) - Christophe GEUZAINÉ - [20h Proj.]	Q1	30	15	[+]	5
INFO8010-1	<i>Deep learning</i> (anglais) - Gilles LOUPPE - [60h Proj.]	Q2	30	-	[+]	5
GBIO0018-2	<i>Introduction to tissue engineering</i> (anglais) - Liesbet GERIS	Q2	20	5	-	4
MECA0008-1	<i>Microfluidics</i> (anglais) - Tristan GILET - [16h Labo., 14h Proj.]	Q2	22	8	[+]	5
MECA0139-1	<i>Additive manufacturing and 3D printing</i> (anglais) - Anne MERTENS	Q1	26	26	-	5
PROT0430-3	<i>Biomedical robotics and active prostheses</i> (anglais) - Olivier BRULS	Q1	15	10	-	3
BIOC0430-1	<i>Interactions materials - living systems</i> (anglais) - Dorien VAN HEDE	Q1	25	-	-	3
BIOM0631-1	<i>Human movement analysis</i> (anglais) - Olivier BRULS, Cédric SCHWARTZ - [15h Proj.]	Q1	33	14	[+]	5
GNEU0004-1	<i>Computational cognitive modelling</i> (anglais) - Alessio FRANCI	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.					

#### Bloc d'aménagement du programme de l'année

### Crédits supplémentaires Master ingénieur civil biomédical

#### Cours au choix

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 :

GBIO0025-1	<i>Biologie générale et cellulaire</i> - Christel PEQUEUX	Q2	36	10	-	5
GBIO0026-1	<i>Physiologie des systèmes</i> - Philippe KOLH	Q2	26	26	-	5
GBIO0002-1	<i>Genetics and bioinformatics</i> (anglais) - Franck DEQUIEDT, Kristel VAN STEEN - [15h Proj.]	Q1	30	15	[+]	5
GBIO0011-1	<i>Modélisation des systèmes biologiques</i> - Pierre DAUBY, Liesbet GERIS	Q2	26	26	-	5

GBIO0001-1	<i>Biophysique et biochimie</i> - Mireille DUMOULIN, Liesbet GERIS - [6h Proj.]	Q1	29	23	[+]	<b>5</b>
GBIO0021-1	<i>Projet de laboratoire</i> - Thomas DESAIVE, Liesbet GERIS - [16h Labo., 8h Proj.]	Q2	-	44	[+]	<b>5</b>
GBIO0013-1	<i>Phénomènes de transport en biologie</i> - Dominique TOYE	Q2	26	26	-	<b>5</b>
GBIO0005-1	<i>Introduction aux neurosciences cognitives</i> - Gilles VANDEWALLE	Q1	26	26	-	<b>5</b>

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