

Programme jointly offered by Ghent University, Vrije Universiteit Brussel  
Master of Science in Biomedical Engineering

Language of instruction: English

Programme version 16

## 1 General Courses

58 credits

The interuniversity program Master of Science in Biomedical Engineering is jointly organized with the Vrije Universiteit Brussel (VUB).

- The references next to the courses indicate where the courses are organized:
- Courses marked with 'j' are jointly organized by UGent and VUB;
  - Courses marked with 'p' are organized in parallel, both at UGent and at VUB;
  - Courses marked with 'u' are organized by UGent;
  - Courses marked with 'v' are organized by VUB.

Nr	Course	CRDT	Ref	MT1	Session	Study
1	E074300 Hospital Technology <i>Sunny Eloot -- Department of Internal Medicine and Pediatrics</i>	7	j	1	A:1	210
2	E015590 Leadership in Health Care <i>Johan Stiens -- Vrije Universiteit Brussel</i>	3	j	1	A:1	90
3	E010371 Medical Imaging <i>Stefaan Vandenberghe -- Department of Electronics and Information Systems</i>	6	j	1	A:1	180
4	E092815 Hospital Project <i>Alain Kalmar -- Department of Electronics and Information Systems</i>	3	p	1	B:1, A:2	90
5	E010382 Neuro-Engineering Science <i>Pieter van Mierlo -- Department of Electronics and Information Systems</i>	3	u	1	A:2	90
6	E010600 Micro- and Nanotechnologies for Medical Device Design and Fabrication <i>Maaïke Op de Beeck -- Department of Electronics and Information Systems</i>	5	j	1	A:2	140
7	E027770 Data Analytics in Healthcare and Connected Care <i>Sofie Van Hoecke -- Department of Electronics and Information Systems</i>	6	p	1	A:2	180
8	E092802 Biomedical Product Development <i>Ewout Vansteenkiste -- Department of Physics and Astronomy</i>	6	p	1	A:J	180
9	E003280 Clinical Study Design and Biostatistics <i>Barbara Vanderstraeten -- Department of Human Structure and Repair</i>	3	u	2	A:1	90
10	E015571 Clinical Decision Support Systems <i>Jef Vandemeulebroucke -- Vrije Universiteit Brussel</i>	3	v	2	A:2	90
11	E027880 Introduction to Medical Device Legislation <i>Patrick Segers -- Department of Electronics and Information Systems</i>	3	u	2	A:2	90

### 1.1 General Courses Biomedical Robotics and Biomaterials

10 credits

Subscribe to 10 credit units from the following list.

The student chooses in which master's year the courses below are taken.

Nr	Course	CRDT	Ref	MT1	Session	Study
1	E063671 Biomaterials and Tissue Engineering <i>Peter Dubruel -- Department of Organic Chemistry</i>	5	j		A:1	150
2	E010610 Biomedical Robotics and Assistive Technologies <i>Joost Geeroms -- Vrije Universiteit Brussel</i>	5	v		A:1	150

## 2 Elective Courses

6 credits

Subscribe to 6 credit units from the following list. Subject to approval by the faculty.

Nr	Course	CRDT	Ref	MT1	Session	Study
1	E092923 Computational Bio-Fluid Mechanics <i>Charlotte Debbaut -- Department of Electronics and Information Systems</i>	6	u		A:1	180

2	E092892	Computational Tissue and Structure Mechanics <i>Nele Famaey -- Department of Electronics and Information Systems</i>	6	u		A:1	180
3	E010620	Computational Neurophysiology <i>Sarah Verhulst -- Department of Information Technology</i>	6	j		A:1	180
4	E078231	Computational and Numerical Methods in Medical Physics <i>Brent van der Heyden -- Department of Electronics and Information Systems</i>	6	u		A:1	180

### 3 Elective Courses

29 credits

Subscribe to 29 credit units from no less than 1 and no more than 6 modules from the following list. Subject to approval by the faculty.

- 10 credit units in year 1
- 19 credit units in year 2

#### 3.1 Elective Courses Biomedical Engineering

Nr	Course	CRDT	Ref	MT1	Session	Study
1	E099300 Industry Internship Engineering and Architecture [en, nl] <i>Patrick Segers -- Department of Electronics and Information Systems</i>	6	u		A:J	180
2	E099400 Research Internship <i>Patrick Segers -- Department of Electronics and Information Systems</i>	6	u		A:J	180
3	E099400 Research Internship <i>Patrick Segers -- Department of Electronics and Information Systems</i>	3	u		B:J	90
4	E092913 Modeling in Medicine and Biomedical Engineering: Case Studies <i>Patrick Segers -- Department of Electronics and Information Systems</i>	3	u		A:1	90
5	E074500 Molecular Scale Modelling in Bio(medical) Engineering <i>Ahmadreza Mehdipour -- Department of Applied Physics</i>	6	u		A:1	180
6	E022250 Bioelectromagnetism <i>Wout Joseph -- Department of Information Technology</i>	4	u		C:2	120
7	E076221 Manufacturing Planning and Control <i>Birger Raa -- Department of Industrial Systems Engineering and Product Design</i>	6	u		A:1	180
8	E075310 Ethics, Engineering and Society [nl] <i>Sepe Segers -- Department of Philosophy and Moral Sciences</i>	3	u		A:2	90
9	E006400 Wave Physics in Living Matter <i>Wout Joseph -- Department of Information Technology</i>	6	u		A:2	180

#### 3.2 Elective Courses Neuro-engineering

Nr	Course	CRDT	Ref	MT1	Session	Study
1	E092841 Advanced Image and Signal Processing <i>Stefaan Vandenberghe -- Department of Electronics and Information Systems</i>	3	j		A:1	90
2	E027762 Applied Magnetic Resonance Imaging Physics <i>Pim Pullens -- Department of Electronics and Information Systems</i>	3	u		A:2	90
3	E900436 Neuro-physiological Signal Processing and Network Analysis <i>Jeroen Van Schependom -- Vrije Universiteit Brussel</i>	4	v		A:2	120
4	E092930 Translational Neuroscience <i>Christian Vanhove -- Department of Electronics and Information Systems</i>	3	u		A:2	90
5	E092960 Neural Interfaces, Neuromodulation and Minimally Invasive Neurotechnology <i>Vincent Keereman -- Department of Electronics and Information Systems</i>	3	u		A:2	90
6	E092970 Auditory Computation, Modelling and Devices <i>Sarah Verhulst -- Department of Information Technology</i>	3	u		A:2	90
7	E092852 Contrast Agents and Biomarkers for Imaging and Therapy <i>Christian Vanhove -- Department of Electronics and Information Systems</i>	3	u		A:1	90
8	E010620 Computational Neurophysiology <i>Sarah Verhulst -- Department of Information Technology</i>	6	j		A:1	180

#### 3.3 Elective Courses Biomechanics and Biomaterials

Nr	Course	CRDT	Ref	MT1	Session	Study
1	E092923 Computational Bio-Fluid Mechanics <i>Charlotte Debbaut -- Department of Electronics and Information Systems</i>	6	u		A:1	180
2	E092892 Computational Tissue and Structure Mechanics <i>Nele Famaey -- Department of Electronics and Information Systems</i>	6	u		A:1	180

3	C003120	Physics and Chemistry of Nanostructures <i>Zeger Hens -- Department of Chemistry</i>	6	u		B:2	180
4	D001923	Tissue Engineering <i>Ruslan Dmitriev -- Department of Human Structure and Repair</i>	6	u		A:1	180
5	E010630	Plasma Technology for Biomedical Applications <i>Nathalie De Geyter -- Department of Applied Physics</i>	6	u		A:1	180
6	E074500	Molecular Scale Modelling in Bio(medical) Engineering <i>Ahmadreza Mehdipour -- Department of Applied Physics</i>	6	u		A:1	180

### 3.4 Elective Courses Sensors and Medical Devices

Nr	Course	CRDT	Ref	MT1	Session	Study
1	E030761 Microphotonics <i>Dries Van Thourhout -- Department of Information Technology</i>	6	u		A:1	180
2	E030930 Biophotonics <i>Nicolas Le Thomas -- Department of Information Technology</i>	4	u		A:1	120
3	E008446 Sensors, Actuators and Electronic Microsystems <i>Herbert De Smet -- Department of Electronics and Information Systems</i>	6	u		A:2	180
4	E030610 Photonics [nl] <i>Günther Roelkens -- Department of Information Technology</i>	6	u		A:2	180
5	E900437 Micro and Nanobiotechnology <i>Externe lesgever -- Vrije Universiteit Brussel</i>	3	v		A:2	90
6	E092981 Biomedical Devices: Sensors, Stimulators and Drug Delivery <i>Johan Stiens -- Vrije Universiteit Brussel</i>	4	v		A:2	120
7	E027790 Control of Drug-Delivery Systems <i>Clara Ionescu -- Department of Electromechanical, Systems and Metal Engineering</i>	4	u		A:2	120

### 3.5 Elective Courses Radiation Physics

Nr	Course	CRDT	Ref	MT1	Session	Study
1	E027750 Measurement Techniques in Nuclear Science <i>Nico Buls -- Vrije Universiteit Brussel</i>	3	v		A:2	90
2	E025110 Nuclear Physics <i>Michel Sonck -- Vrije Universiteit Brussel</i>	3	v		A:2	90
3	E038110 Technology of Radiotherapy <i>Werner De Gerssem -- Department of Human Structure and Repair</i>	3	u		A:1	90
4	E027870 Medical Dosimetry <i>Nico Buls -- Vrije Universiteit Brussel</i>	3	v		A:1	90
5	E025490 Radiologic Techniques <i>Brent van der Heyden -- Department of Electronics and Information Systems</i>	3	u		A:1	90
6	E078220 Radioprotection and Regulations [nl] <i>Michel Sonck -- Vrije Universiteit Brussel</i>	3	v		A:2	90
7	E025470 Radiochemistry [nl] <i>Filip De Vos -- Department of Pharmaceutical Analysis</i>	3	u		A:2	90
8	E025480 Radiobiology and Radiopathology	3	u		A:2	90
9	E078231 Computational and Numerical Methods in Medical Physics <i>Brent van der Heyden -- Department of Electronics and Information Systems</i>	6	u		A:1	180

### 3.6 Elective Courses Artificial Intelligence and Digital Health

Nr	Course	CRDT	Ref	MT1	Session	Study
1	E900560 Techniques of Artificial Intelligence <i>Externe lesgever -- Vrije Universiteit Brussel</i>	6	v		A:2	180
2	E092841 Advanced Image and Signal Processing <i>Stefaan Vandenberghe -- Department of Electronics and Information Systems</i>	3	j		A:1	90
3	E900575 3D Graphics in Virtual Reality <i>Externe lesgever -- Vrije Universiteit Brussel</i>	5	v		A:2	150
4	E900580 Deep Learning <i>Externe lesgever -- Vrije Universiteit Brussel</i>	6	v		A:1	180
5	E900590 Reinforcement Learning <i>Externe lesgever -- Vrije Universiteit Brussel</i>	6	v		A:J	180

6	E900565	Statistical Foundations of Machine Learning <i>Externe lesgever -- Vrije Universiteit Brussel</i>	6	v	A:2	180
7	E061331	Machine Learning: Learning from Data <i>Joni Dambre -- Department of Electronics and Information Systems</i>	6	u	A:1	180
8	C003713	Introduction to Bioinformatics <i>Kathleen Marchal -- Department of Plant Biotechnology and Bioinformatics</i>	3	u	A:2	90
9	E900550	Advanced Methods in Bioinformatics <i>Externe lesgever -- Vrije Universiteit Brussel</i>	6	v	A:2	180

### 3.7 Elective Courses Ghent University or VUB

Choose no more than 9 credit units from

- the programme catalogue of Ghent University, including the list with [Ghent University Electives](#).
  - the programme catalogue of VUB (partner university in this programme)
  - the programme catalogue of KULeuven (as interuniversity guest student, only possible after prior approval by the Programme Board)
- Subject to approval by the Programme Board/Faculty.

## 4 Elective Courses

3 credits

Subscribe to no less than 3 and no more than 6 credit units from no less than 1 and no more than 2 elective modules from the following list. Subject to approval by the faculty.

This is a compulsory section within the space for elective courses. We want our students to broaden their horizon and consciously reflect on how they can learn more about and contribute to the Sustainable Development Goals (SDGs), as defined by the United Nations.

### 4.1 Elective Course Sustainable Development Goals

3 credits

Students can choose any course (equivalent to minimally 3 and maximally 6 credits) from any of the programmes of Ghent University or VUB which can be linked to the 17 SDGs, preferably outside the faculty of Engineering and Architecture.

### 4.2 Elective Courses Sustainable Development Goals: Integrated Portfolio

3 credits

Subscribe to no less than 3 and no more than 6 credit units from the following list. Subject to approval by the faculty.

Students can validate their participation in student-driven initiatives (that are recognized by the programme), directly related to WHO's SDG goals, into their curriculum. Students will create a portfolio of demonstrably acquired competencies, including a clear description of the work process. Examples of initiatives include Humasol projects (no internships), hackathons, (international) workshops, on-line courses, ... Activities require a priori approval by the programme and should have a documented, traceable and certified participation and completion.

Nr	Course	CRDT	Ref	MT1	Session	Study
1	E098010 Integrated Portfolio [en, nl] <i>Hiep Luong -- Department of Telecommunications and Information Processing</i>	6			A:J	180
2	E098010 Integrated Portfolio [en, nl] <i>Hiep Luong -- Department of Telecommunications and Information Processing</i>	3			B:J	90

## 5 Master's Dissertation

24 credits

Nr	Course	CRDT	Ref	MT1	Session	Study
1	E091103 Master's Dissertation	24		2	B:J	720

#### Teaching

When a course is not taught (solely) in the programme's language of instruction, the effectively used languages are indicated in square brackets following the course name, using the following ISO codes:

bg: Bulgarian	de: German	es: Spanish	ja: Japanese	pl: Polish	sh: Croatian/Serbian	zh: Chinese
cs: Czech	el: Greek	fr: French	nl: Dutch	pt: Portuguese	sl: Slovene	
da: Danish	en: English	it: Italian	no: Norwegian	ru: Russian	sv: Swedish	

#### Semester

Semesters are indicated by their number (1 or 2); semester 3 represents the summer period and J indicates a course spanning semesters 1 and 2. When a capital letter precedes a semester number, the course has multiple offerings. The letter indicates the offering concerned.

When a semester is shown in brackets, the course is not offered this year in the specific offering.

The offering frequency and first year of offering are indicated by the following codes:

a: bi-annually	c: annually, from 2027-2028	f: annually, from 2028-2029	i: annually, from 2029-2030
b: tri-annually	d: bi-annually, from 2027-2028	g: bi-annually, from 2028-2029	j: bi-annually, from 2029-2030
	e: tri-annually, from 2027-2028	h: tri-annually, from 2028-2029	k: tri-annually, from 2029-2030