

Faculty of Engineering and Architecture  
Master of Science in Computer Science Engineering

Language of instruction: English

Programme version 9

## 1 General Courses 60 credits

Nr	Course	CRDT	Ref	MT1	Session	Study
1	E034140 Parallel Computer Systems Lieven Eeckhout -- Department of Electronics and Information Systems	6		1	A:1	180
2	E017930 Parallel and Distributed Software Systems Jan Fostier -- Department of Information Technology	6		1	A:1	180
3	E017920 Design of Multimedia Applications Glenn Van Wallendael -- Department of Electronics and Information Systems	6		1	A:2	180
4	E031710 Research Project Joris Walraevens -- Department of Telecommunications and Information Processing	3		1	A:1	90
5	E033710 Design Project Femke De Backere -- Department of Information Technology	9		1	A:J	270
6	E012320 Mobile and Broadband Access Networks Mario Pickavet -- Department of Information Technology	6		1	B:2	180
7	E003600 Information Theory Heidi Steendam -- Department of Telecommunications and Information Processing	6		1	B:2	180
8	E011322 Queueing Analysis and Simulation Joris Walraevens -- Department of Telecommunications and Information Processing	6		1	A:1	180
9	E061330 Machine Learning Joni Dambre -- Department of Electronics and Information Systems	6		1	B:1	180
10	E019400 Information Security Eric Laermans -- Department of Information Technology	6		1	B:2	180

## 2 Elective Courses 36 credits

Subscribe to 36 credit units from 1 elective path from the following list. Subject to approval by the faculty.

### 2.1 Elective Path 1 36 credits

Subscribe to 36 credit units from no less than 1 and no more than 3 modules (2.1.1, 2.1.2, 2.1.3) from the following list. Subject to approval by the faculty.

#### 2.1.1 Major, minor 18 credits

Subscribe to at least 1 major or minor from the following list. Subject to approval by the faculty.

Students can combine two majors or combine a major with a minor. A combination of two minors is not allowed.

##### 2.1.1.1 Major Artificial Intelligence 18 credits

Subscribe to no less than 18 credit units from the following list, with no less than 12 credit units with reference a. Subject to approval by the faculty.

Nr	Course	CRDT	Ref	MT1	Session	Study
1	E061360 Reinforcement Learning	6	a			180
2	E061341 Natural Language Processing Thomas Demeester -- Department of Information Technology	6	a		A:2	180
3	E018230 Recommender Systems Toon De Pessemier -- Department of Information Technology	6	a		A:2	180
4	E061350 Deep Generative Models Bart Dhoedt -- Department of Information Technology	4	a		A:2	120
5	E016340 Probabilistic Graphical Models Aleksandra Pizurica -- Department of Telecommunications and Information Processing	4	a		A:2	120

6	E061460	Computer Vision: Theory and Applications	6	a		180
7	E019370	Robotics Tony Belpaeme -- Department of Electronics and Information Systems	6		A:1	180
8	E031800	AI Research Seminar Thomas Demeester -- Department of Information Technology	3		A:1	90
9	E061370	Data Visualization for and with AI Jefrey Lijffijt -- Department of Electronics and Information Systems	3		A:1	90
10	E018240	Big Data Technology Dieter De Witte -- Department of Electronics and Information Systems	4		A:1	120
11	E018700	Data Quality Antoon Bronselaer -- Department of Telecommunications and Information Processing	3		A:1	90
12	E003710	Game Theory and Multiagent Systems Heidi Steendam -- Department of Telecommunications and Information Processing	6		A:1	180
13	E016360	Cognitive and Brain-Inspired Artificial Intelligence	3			90
14	E010220	Speech Processing Kris Demuyck -- Department of Electronics and Information Systems	4		A:2	120

#### 2.1.1.2 Major Data Engineering

18 credits

Subscribe to no less than 18 credit units from the following list, with 12 credit units with reference a. Subject to approval by the faculty.

Nr	Course	CRDT	Ref	MT1	Session	Study
1	E018610 Database Design [nl] Guy De Tré -- Department of Telecommunications and Information Processing	4	a		A:1	120
2	E018240 Big Data Technology Dieter De Witte -- Department of Electronics and Information Systems	4	a		A:1	120
3	E017310 Cloud Storage and Computing Bruno Volckaert -- Department of Information Technology	4	a		A:2	120
4	E018250 Big Data Algorithms	3				90
5	E034150 Blockchain Technologies and Applications Bjorn De Sutter -- Department of Electronics and Information Systems	3			A:1	90
6	E018700 Data Quality Antoon Bronselaer -- Department of Telecommunications and Information Processing	3			A:1	90
7	E018130 NoSQL Databases Antoon Bronselaer -- Department of Telecommunications and Information Processing	3			A:2	90
8	E018160 Knowledge Graphs Pieter Colpaert -- Department of Electronics and Information Systems	3			A:2	90
9	E061370 Data Visualization for and with AI Jefrey Lijffijt -- Department of Electronics and Information Systems	3			A:1	90

#### 2.1.1.3 Major Cybersecurity

18 credits

Subscribe to 18 credit units from the following list. Subject to approval by the faculty.

Nr	Course	CRDT	Ref	MT1	Session	Study
1	E017942 Software Hacking and Protection Bjorn De Sutter -- Department of Electronics and Information Systems	6			A:1	180
2	E017950 Secure Software and Systems Bart Coppens -- Department of Electronics and Information Systems	6			A:2, B:2	180
3	E008710 Network Security	6				180

#### 2.1.1.4 Major Internet-of-Things / Robotics

18 credits

Subscribe to no less than 18 credit units from the following list, with 12 credit units with reference a. Subject to approval by the faculty.

Nr	Course	CRDT	Ref	MT1	Session	Study
1	E019370 Robotics Tony Belpaeme -- Department of Electronics and Information Systems	6	a		A:1	180
2	E019170 Internet of Things Jeroen Hoebeke -- Department of Information Technology	6	a		A:1	180
3	E003422 Fundamentals of Statistical Sensor Processing Hiep Luong -- Department of Telecommunications and Information Processing	6			A:1	180
4	E061670 Autonomous Vehicle Perception	3				90
5	E019380 Intelligent Robot Manipulation Francis wyffels -- Department of Electronics and Information Systems	3			A:1	90

6	E033702	Hardware-design Project Ioulia Tzouvadaki -- Department of Electronics and Information Systems	6			A:2	180
7	E032322	Sensor Based Measurement Systems Herbert De Smet -- Department of Electronics and Information Systems	3			A:2	90
8	E003710	Game Theory and Multiagent Systems Heidi Steendam -- Department of Telecommunications and Information Processing	6			A:1	180
9	E061380	Embedded Machine Learning	3				90

#### 2.1.1.5 Minor Operations Management

18 credits

[Subscribe to no less than 18 credit units from the following list, with 6 credit units with reference a.](#)

Nr	Course	CRDT	Ref	MT1	Session	Study	
1	E076221	Manufacturing Planning and Control Birger Raa -- Department of Industrial Systems Engineering and Product Design	6	a		A:1	180
2	E004255	Operations Research Models and Methods El-Houssaine Aghezzaf -- Department of Industrial Systems Engineering and Product Design	6			A:1	180
3	E060240	Quality Engineering and Industrial Statistics Stijn De Vuyst -- Department of Industrial Systems Engineering and Product Design	6			A:2	180
4	E076951	Engineering Economy Sofie Verbrugge -- Department of Information Technology	6			A:1	180

#### 2.1.1.6 Minor Biosystems

18 credits

[Subscribe to no less than 18 credit units from the following list, with no less than 8 credit units with reference a. Subject to approval by the faculty.](#)

Nr	Course	CRDT	Ref	MT1	Session	Study	
1	E092623	Modelling of Physiological Systems Patrick Segers -- Department of Electronics and Information Systems	5	a		A:2	150
2	E092662	From Genome to Organism Fransiska Malfait -- Department of Biomolecular Medicine	3	a		A:1	90
3	E074011	Quantitative Cell and Tissue Analysis An Hendrix -- Department of Human Structure and Repair	6	a		A:1	180
4	E063671	Biomaterials and Tissue Engineering Ruslan Dmitriev -- Department of Human Structure and Repair	5			A:1	150
5	E063682	Biomechanics Charlotte Debbaut -- Department of Electronics and Information Systems	6			A:1	180
6	E010371	Medical Imaging Stefaan Vandenberghe -- Department of Electronics and Information Systems	6			A:1	180

#### 2.1.2 Elective Courses Computer Science Engineering

18 credits

[Subscribe to 18 credit units from the following list. Subject to approval by the faculty.](#)

- The courses with reference 'AI' are from the major Artificial Intelligence
- The courses with reference 'DE' are from the major Data Engineering
- The courses with reference 'C' are from the major Cybersecurity
- The courses with reference 'IR' are from the major Internet-of-Things / robotics

[Students can subscribe to a maximum of 6 ECTS credits internship \(Research Internship E099400 and/or Industry Internship Engineering and Architecture E099300\).](#)

Nr	Course	CRDT	Ref	MT1	Session	Study	
1	E016330	Artificial Intelligence Aleksandra Pizurica -- Department of Telecommunications and Information Processing	6	AI		A:1	180
2	E031251	Design Methodology for FPGAs Dirk Stroobandt -- Department of Electronics and Information Systems	6			A:1	180
3	E012130	Modulation and Detection Nele Noels -- Department of Telecommunications and Information Processing	6			B:1	180
4	E030210	Analog Electronics [nl] Jeroen De Maeyer -- Department of Electromechanical, Systems and Metal Engineering	6			A:1	180
5	E018520	Compilers Bjorn De Sutter -- Department of Electronics and Information Systems	6			A:2	180
6	E010010	Signal Processing Nilesh Madhu -- Department of Electronics and Information Systems	6			A:2	180
7	E007920	Computer Control of Industrial Processes Clara-Mihaela Ionescu -- Department of Electromechanical, Systems and Metal Engineering	6				180
8	E012802	Broadband cable-TV and in-home networks Luc Martens -- Department of Information Technology	4			(A:1) <sup>d</sup>	120

9	E010310	Image Processing [nl] Wilfried Philips -- Department of Telecommunications and Information Processing	6		A:1	180
10	E011610	Performance Analysis of Telecommunication Systems Sabine Wittevrongel -- Department of Telecommunications and Information Processing	4		A:1	120
11	C003241	Fundamentals of Programming Languages [nl] Christophe Scholliers -- Department of Applied Mathematics and Computer Science	6		A:1	165
12	E012210	Advanced Modulation and Coding Heidi Steendam -- Department of Telecommunications and Information Processing	4		A:2	120
13	E016712	Computer Graphics Danilo Babin -- Department of Telecommunications and Information Processing	6		A:2	180
14	E004720	Network Modelling and Design Mario Pickavet -- Department of Information Technology	4		B:2	120
15	E004120	Optimisation Techniques [nl, en] Ljubomir Jovanov -- Department of Telecommunications and Information Processing	6		A:2, B:2	180
16	C003349	Discrete Algorithms [nl] Veerle Fack -- Department of Applied Mathematics and Computer Science	6		A:2	165
17	C003711	Computational Challenges in Bioinformatics Jan Fostier -- Department of Information Technology	6		A:2	180
18	E034500	Sustainable Computing Lieven Eeckhout -- Department of Electronics and Information Systems	3		A:2	90
19	E061390	Quantum Computing: Architecture and Algorithms Koen Bertels -- Department of Electronics and Information Systems	3		A:1	90
20	E061360	Reinforcement Learning	6	AI		180
21	E061341	Natural Language Processing Thomas Demeester -- Department of Information Technology	6	AI	A:2	180
22	E018230	Recommender Systems Toon De Pessemier -- Department of Information Technology	6	AI	A:2	180
23	E061350	Deep Generative Models Bart Dhoedt -- Department of Information Technology	4	AI	A:2	120
24	E016340	Probabilistic Graphical Models Aleksandra Pizurica -- Department of Telecommunications and Information Processing	4	AI	A:2	120
25	E061460	Computer Vision: Theory and Applications	6	AI		180
26	E019370	Robotics Tony Belpaeme -- Department of Electronics and Information Systems	6	AI, IR	A:1	180
27	E031800	AI Research Seminar Thomas Demeester -- Department of Information Technology	3	AI	A:1	90
28	E061370	Data Visualization for and with AI Jefrey Lijffijt -- Department of Electronics and Information Systems	3	AI	A:1	90
29	E018240	Big Data Technology Dieter De Witte -- Department of Electronics and Information Systems	4	AI	A:1	120
30	E018700	Data Quality Antoon Bronselaer -- Department of Telecommunications and Information Processing	3	AI	A:1	90
31	E003710	Game Theory and Multiagent Systems Heidi Steendam -- Department of Telecommunications and Information Processing	6	AI, IR	A:1	180
32	E016360	Cognitive and Brain-Inspired Artificial Intelligence	3	AI		90
33	E010220	Speech Processing Kris Demuyne -- Department of Electronics and Information Systems	4	AI	A:2	120
34	E018610	Database Design [nl] Guy De Tré -- Department of Telecommunications and Information Processing	4	DE	A:1	120
35	E018240	Big Data Technology Dieter De Witte -- Department of Electronics and Information Systems	4	DE	A:1	120
36	E017310	Cloud Storage and Computing Bruno Volckaert -- Department of Information Technology	4	DE	A:2	120
37	E018250	Big Data Algorithms	3	DE		90
38	E034150	Blockchain Technologies and Applications Bjorn De Sutter -- Department of Electronics and Information Systems	3	DE	A:1	90

39	E018700	Data Quality Antoon Bronselaer -- Department of Telecommunications and Information Processing	3	DE	A:1	90
40	E018130	NoSQL Databases Antoon Bronselaer -- Department of Telecommunications and Information Processing	3	DE	A:2	90
41	E018160	Knowledge Graphs Pieter Colpaert -- Department of Electronics and Information Systems	3	DE	A:2	90
42	E061370	Data Visualization for and with AI Jefrey Lijffijt -- Department of Electronics and Information Systems	3	DE	A:1	90
43	E017942	Software Hacking and Protection Bjorn De Sutter -- Department of Electronics and Information Systems	6	C	A:1	180
44	E017950	Secure Software and Systems Bart Coppens -- Department of Electronics and Information Systems	6	C	A:2, B:2	180
45	E008710	Network Security	6	C		180
46	E019170	Internet of Things Jeroen Hoebeke -- Department of Information Technology	6	IR	A:1	180
47	E003422	Fundamentals of Statistical Sensor Processing Hiep Luong -- Department of Telecommunications and Information Processing	6	IR	A:1	180
48	E061670	Autonomous Vehicle Perception	3	IR		90
49	E019380	Intelligent Robot Manipulation Francis wyffels -- Department of Electronics and Information Systems	3	IR	A:1	90
50	E033702	Hardware-design Project Ioulia Tzouvadaki -- Department of Electronics and Information Systems	6	IR	A:2	180
51	E032322	Sensor Based Measurement Systems Herbert De Smet -- Department of Electronics and Information Systems	3	IR	A:2	90
52	E061380	Embedded Machine Learning	3	IR		90
53	E099400	Research Internship Patrick Segers -- Department of Electronics and Information Systems	3		B:J	90
54	E099400	Research Internship Patrick Segers -- Department of Electronics and Information Systems	6		A:J	180
55	E099300	Industry Internship Engineering and Architecture [en, nl] Patrick Segers -- Department of Electronics and Information Systems	6		A:J	180

### 2.1.3 Elective Course Ghent University

Subscribe to no more than 9 credit units from the programmes of Ghent University, including the [Ghent University Elective Courses](#). Subject to approval by the faculty.

## 2.2 Elective Path 2

36 credits

Subscribe to 36 credit units from no less than 1 and no more than 2 elective modules from the following list. Subject to approval by the faculty.

### 2.2.1 Elective Courses Computer Science Engineering

36 credits

Subscribe to no more than 36 credit units from the following list. Subject to approval by the faculty.

- The courses with reference 'AI' are from the major Artificial Intelligence
- The courses with reference 'DE' are from the major Data Engineering
- The courses with reference 'C' are from the major Cybersecurity
- The courses with reference 'IR' are from the major Internet-of-Things / robotics

Students can subscribe to a maximum of 6 ECTS credits internship (Research Internship E099400 and/or Industry Internship Engineering and Architecture E099300).

Nr	Course	CRDT	Ref	MT1	Session	Study
1	E016330 Artificial Intelligence Aleksandra Pizurica -- Department of Telecommunications and Information Processing	6	AI		A:1	180
2	E031251 Design Methodology for FPGAs Dirk Stroobandt -- Department of Electronics and Information Systems	6			A:1	180
3	E012130 Modulation and Detection Nele Noels -- Department of Telecommunications and Information Processing	6			B:1	180
4	E030210 Analog Electronics [nl] Jeroen De Maeyer -- Department of Electromechanical, Systems and Metal Engineering	6			A:1	180
5	E018520 Compilers Bjorn De Sutter -- Department of Electronics and Information Systems	6			A:2	180
6	E010010 Signal Processing Nilesh Madhu -- Department of Electronics and Information Systems	6			A:2	180

7	E007920	Computer Control of Industrial Processes Clara-Mihaela Ionescu -- Department of Electromechanical, Systems and Metal Engineering	6			180
8	E012802	Broadband cable-TV and in-home networks Luc Martens -- Department of Information Technology	4		(A:1) <sup>d</sup>	120
9	E010310	Image Processing [nl] Wilfried Philips -- Department of Telecommunications and Information Processing	6		A:1	180
10	E011610	Performance Analysis of Telecommunication Systems Sabine Wittevrongel -- Department of Telecommunications and Information Processing	4		A:1	120
11	C003241	Fundamentals of Programming Languages [nl] Christophe Scholliers -- Department of Applied Mathematics and Computer Science	6		A:1	165
12	E012210	Advanced Modulation and Coding Heidi Steendam -- Department of Telecommunications and Information Processing	4		A:2	120
13	E016712	Computer Graphics Danilo Babin -- Department of Telecommunications and Information Processing	6		A:2	180
14	E004720	Network Modelling and Design Mario Pickavet -- Department of Information Technology	4		B:2	120
15	E004120	Optimisation Techniques [nl, en] Ljubomir Jovanov -- Department of Telecommunications and Information Processing	6		A:2, B:2	180
16	C003349	Discrete Algorithms [nl] Veerle Fack -- Department of Applied Mathematics and Computer Science	6		A:2	165
17	C003711	Computational Challenges in Bioinformatics Jan Fostier -- Department of Information Technology	6		A:2	180
18	E034500	Sustainable Computing Lieven Eeckhout -- Department of Electronics and Information Systems	3		A:2	90
19	E061390	Quantum Computing: Architecture and Algorithms Koen Bertels -- Department of Electronics and Information Systems	3		A:1	90
20	E061360	Reinforcement Learning	6	AI		180
21	E061341	Natural Language Processing Thomas Demeester -- Department of Information Technology	6	AI	A:2	180
22	E018230	Recommender Systems Toon De Pessemier -- Department of Information Technology	6	AI	A:2	180
23	E061350	Deep Generative Models Bart Dhoedt -- Department of Information Technology	4	AI	A:2	120
24	E016340	Probabilistic Graphical Models Aleksandra Pizurica -- Department of Telecommunications and Information Processing	4	AI	A:2	120
25	E061460	Computer Vision: Theory and Applications	6	AI		180
26	E019370	Robotics Tony Belpaeme -- Department of Electronics and Information Systems	6	AI, IR	A:1	180
27	E031800	AI Research Seminar Thomas Demeester -- Department of Information Technology	3	AI	A:1	90
28	E061370	Data Visualization for and with AI Jefrey Lijffijt -- Department of Electronics and Information Systems	3	AI	A:1	90
29	E018240	Big Data Technology Dieter De Witte -- Department of Electronics and Information Systems	4	AI	A:1	120
30	E018700	Data Quality Antoon Bronselaer -- Department of Telecommunications and Information Processing	3	AI	A:1	90
31	E003710	Game Theory and Multiagent Systems Heidi Steendam -- Department of Telecommunications and Information Processing	6	AI, IR	A:1	180
32	E016360	Cognitive and Brain-Inspired Artificial Intelligence	3	AI		90
33	E010220	Speech Processing Kris Demuyne -- Department of Electronics and Information Systems	4	AI	A:2	120
34	E018610	Database Design [nl] Guy De Tré -- Department of Telecommunications and Information Processing	4	DE	A:1	120
35	E018240	Big Data Technology Dieter De Witte -- Department of Electronics and Information Systems	4	DE	A:1	120
36	E017310	Cloud Storage and Computing Bruno Volckaert -- Department of Information Technology	4	DE	A:2	120

37	E018250	Big Data Algorithms	3	DE		90
38	E034150	Blockchain Technologies and Applications Bjorn De Sutter -- Department of Electronics and Information Systems	3	DE	A:1	90
39	E018700	Data Quality Antoon Bronselaer -- Department of Telecommunications and Information Processing	3	DE	A:1	90
40	E018130	NoSQL Databases Antoon Bronselaer -- Department of Telecommunications and Information Processing	3	DE	A:2	90
41	E018160	Knowledge Graphs Pieter Colpaert -- Department of Electronics and Information Systems	3	DE	A:2	90
42	E061370	Data Visualization for and with AI Jefrey Lijffijt -- Department of Electronics and Information Systems	3	DE	A:1	90
43	E017942	Software Hacking and Protection Bjorn De Sutter -- Department of Electronics and Information Systems	6	C	A:1	180
44	E017950	Secure Software and Systems Bart Coppens -- Department of Electronics and Information Systems	6	C	A:2, B:2	180
45	E008710	Network Security	6	C		180
46	E019170	Internet of Things Jeroen Hoebeke -- Department of Information Technology	6	IR	A:1	180
47	E003422	Fundamentals of Statistical Sensor Processing Hiep Luong -- Department of Telecommunications and Information Processing	6	IR	A:1	180
48	E061670	Autonomous Vehicle Perception	3	IR		90
49	E019380	Intelligent Robot Manipulation Francis wyffels -- Department of Electronics and Information Systems	3	IR	A:1	90
50	E033702	Hardware-design Project Ioulia Tzouvadaki -- Department of Electronics and Information Systems	6	IR	A:2	180
51	E032322	Sensor Based Measurement Systems Herbert De Smet -- Department of Electronics and Information Systems	3	IR	A:2	90
52	E061380	Embedded Machine Learning	3	IR		90
53	E099400	Research Internship Patrick Segers -- Department of Electronics and Information Systems	3		B:J	90
54	E099400	Research Internship Patrick Segers -- Department of Electronics and Information Systems	6		A:J	180
55	E099300	Industry Internship Engineering and Architecture [en, nl] Patrick Segers -- Department of Electronics and Information Systems	6		A:J	180

### 2.2.2 Elective Courses Ghent University

Subscribe to no more than 9 credit units from the programmes of Ghent University, including the [Ghent University Elective Courses](#).  
Subject to approval by the faculty.

## 3 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 2024-2025	f: annually, from 2025-2026	i: annually, from 2026-2027
b: tri-annually	d: bi-annually, from 2024-2025	g: bi-annually, from 2025-2026	j: bi-annually, from 2026-2027
	e: tri-annually, from 2024-2025	h: tri-annually, from 2025-2026	k: tri-annually, from 2026-2027