GHENT UNIVERSITY

Study Programme

Academic year 2024-2025

Programme jointly offered by Ghent University,The Complutense University of Madrid,Carlos III University of Madrid,Aix-Marseille University,Université de Lorraine,National Institute for Nuclear Science and Technology,University of Stuttgart,Czech Technical University in Prague

European Master of Science in Nuclear Fusion and Engineering Physics

Language of instruction: English

Programme version 6

1 General Courses 66 credits

The student takes the general courses at one of the universities mentioned below, in accordance with the mobility scheme as approved by the Steering Committee.
The first year is offered by the following partners: Universiteit Gent (Belgium), Aix-Marseille Université (France), Universidad Carlos III de Madrid and Universidad Complutense de Madrid (Spain), Universität Stuttgart (Germany), Université de Lorraine (France).
The second year is offered by the following partners: Universiteit Gent (Belgium), Aix-Marseille Université (France), Institut National des Sciences et Techniques Nucléaires (France), Universidad Carlos III de Madrid and Universidad Complutense de Madrid (Spain), Universität Stuttgart (Germany), Université de Lorraine (France), Czech Technical University (Czech Republic).
The student takes the first and second year at two different universities, in two countries.

More information: https://www.em-master-fusion.org/

1.1 General Courses Nuclear Fusion and Engineering Physics 42 credits

1.1.1 General Courses Ghent University 42 credits

42 credit units general courses, to be taken up in the first master year at Ghent University, in accordance with the mobility scheme as approved by the Steering Committee.
Meer informatie: https://www.em-master-fusion.org/

Nr	Course		CRDT	Ref	MT1	Session	Study
1	E025010	Atomic and Molecular Physics *Veronique Van Speybroeck -- Department of Applied Physics*	6		1	A:1	180
2	E026221	Plasma Physics *Geert Verdoolaege -- Department of Applied Physics*	6		1	A:1	180
3	E006900	Plasma Technology and Fusion Technology *Rino Morent -- Department of Applied Physics*	6		1	A:1	180
4	E045240	Computational Fluid Dynamics *Joris Degroote -- Department of Electromechanical, Systems and Metal Engineering*	6		1	A:2	180
5	E040430	Continuum Mechanics *Geert Verdoolaege -- Department of Applied Physics*	6		1	A:2	180
6	E026260	Magnetohydrodynamics of Plasmas *Roger Jaspers -- Department of Applied Physics*	6		1	A:2	180
7	E099030	Cross-Course Project *Filip Strubbe -- Department of Electronics and Information Systems*	6		1	B:2	180

1.1.2 General Courses Aix-Marseille Université 42 credits

42 credit units general courses, to be taken up in the first master year, at Aix-Marseille Université (France), in accordance with the mobility scheme as approved by the Steering Committee.
Meer informatie: https://www.em-master-fusion.org/

1.1.3 General Courses Universidades de Madrid 42 credits

42 credit units general courses, to be taken up in the first master year, at Universidad Carlos III de Madrid and Universidad Complutense de Madrid (Spain), in accordance with the mobility scheme as approved by the Steering Committee.
More information: https://www.em-master-fusion.org/

1.1.4 General Courses Université de Lorraine 42 credits

42 credit units general courses, to be taken up in the first master year, at Université de Lorraine (France), in accordance with the

mobility scheme as approved by the Steering Committee.
More information: https://www.em-master-fusion.org/

1.1.5 General Courses Universität Stuttgart — 42 credits

42 credit units general courses, to be taken up in the first master year, at Universität Stuttgart (Germany), in accordance with the mobility scheme as approved by the Steering Committee.
More information: https://www.em-master-fusion.org/

1.2 General Courses: Language and Culture — 12 credits

12 credit units from the language courses from the partner universities in accordance with the mobility scheme as approved by the Steering Committee, with:
- 6 credit units in year 1
- 6 credit units in year 2.

More information: https://www.em-master-fusion.org/

1.2.1 General Courses Ghent University: Language and Culture — 6 credits

6 credit units courses language and culture from Ghent University, in accordance with the mobility scheme as approved by the Steering Committee.

1.2.1.1 General Courses Ghent University: Low Countries Studies — 3 credits

Subscribe to 3 credit units from the following list. Subject to approval by the faculty.

Nr	Course		CRDT	Ref	MT1	Session	Study
1	A005539	Low Countries Studies *Lieve Van Hoof -- Department of History*	3			A:2	90

1.2.1.2 General Courses Ghent University: Language and Culture — 3 credits

Subscribe to at least 3 credit units from the language courses from Ghent University.

1.2.2 General Courses: Language and Culture

12 credit units from the language courses from the partner universities (in accordance with the mobility scheme as approved by the Steering Committee), with 6 credit units in year 1 and 6 credit units in year 2.
More information: https://www.em-master-fusion.org/

1.3 General Course: Joint Experimentation and Analysis Session (Institute of Plasma Physics, Prague) — 6 credits

Compulsory for all students in year 2.

Nr	Course		CRDT	Ref	MT1	Session	Study
1	E901190	Joint Experimentation and Analysis Session *Peter Beyer -- Aix-Marseille University*	6		2	A:1	180

1.4 General Course: Joint Practicum (CEA, Cadarache) — 6 credits

Compulsory for all students in year 2.

Nr	Course		CRDT	Ref	MT1	Session	Study
1	E901194	Joint Practicum (CEA, Cadarache) *Peter Beyer -- Aix-Marseille University*	6		2	A:2	180

2 Elective Courses — 24 credits

The student takes 24 credit units elective courses at one of the universities mentioned below, in accordance with the mobility scheme as approved by the Steering Committee, with 12 credit units in year 1, and 12 credit units in year 2.
The student takes the first and second year at two different universities, in two countries.
The first year is offered by the following partners: Universiteit Gent (Belgium), Aix-Marseille Université (France), Universidad Carlos III de Madrid and Universidad Complutense de Madrid (Spain), Universität Stuttgart (Germany), Université de Lorraine (France).
The second year is offered by the following partners:
- Track Fusion Science: Universiteit Gent (Belgium), Universidad Carlos III de Madrid and Universidad Complutense de Madrid (Spain), Université de Lorraine (France) and Universität Stuttgart (Germany).
- Track Fusion Technology: Universiteit Gent (Belgium), Aix-Marseille Université (France), Institut National des Sciences et Techniques Nucléaires (France), Czech Technical University (Czech Republic), Universidad Carlos III de Madrid and Universidad Complutense de Madrid (Spain) and Universität Stuttgart (Germany).

More information: https://www.em-master-fusion.org/

2.1 Electives Ghent University — 12 credits

12 credit units elective courses, in accordance with the mobility scheme as approved by the Steering Committee, with either 12 credit units in year 1 or 12 credit units in year 2, either from Track Fusion Science, or from Track Fusion Technology.

2.1.1 Electives Ghent University: Track Fusion Science

Nr	Course		CRDT	Ref	MT1	Session	Study
1	E061330	Machine Learning *Joni Dambre -- Department of Electronics and Information Systems*	6			B:1	180
2	E006800	Modelling and Engineering of Nanoscale Materials *Louis Vanduyfhuys -- Department of Applied Physics*	6			A:1	180

3	E004021	Nonlinear Systems *Jasper De Bock -- Department of Electronics and Information Systems*	6		B:1	180
4	E024641	Physics of Semiconductor Devices *Benoit Bakeroot -- Department of Electronics and Information Systems*	6		B:2	180
5	E029040	Physical Chemistry *Iwan Moreels -- Department of Chemistry*	6		B:2	180
6	E066170	Physical Materials Science *Leo Kestens -- Department of Electromechanical, Systems and Metal Engineering*	6		C:1	180
7	E038020	Nuclear Reactor Theory: part 1 *Greet Maenhout -- Department of Electromechanical, Systems and Metal Engineering*	3		A:1	90
8	E038030	Nuclear Reactor Theory: part 2 *Matthias Vanderhaegen -- Department of Electromechanical, Systems and Metal Engineering*	3		A:1	90

2.1.2 Electives Ghent University: Track Fusion Engineering

Nr	Course		CRDT	Ref	MT1	Session	Study
1	C003123	Nuclear Instrumentation *Luc Van Hoorebeke -- Department of Physics and Astronomy*	6				180
2	E065340	Micro-analysis and Structure Determination in Materials Science *Roumen Petrov -- Department of Electromechanical, Systems and Metal Engineering*	6			A:1	180
3	E022230	Antennas and Propagation *Hendrik Rogier -- Department of Information Technology*	6			A:1	180
4	E024122	Computational Materials Physics *Stefaan Cottenier -- Department of Electromechanical, Systems and Metal Engineering*	6			A:2	180
5	E007920	Computer Control of Industrial Processes *Clara Ionescu -- Department of Electromechanical, Systems and Metal Engineering*	6			A:1	180
6	E061330	Machine Learning *Joni Dambre -- Department of Electronics and Information Systems*	6			B:1	180
7	E024641	Physics of Semiconductor Devices *Benoit Bakeroot -- Department of Electronics and Information Systems*	6			B:2	180
8	E006700	Thin Films: Physics and Technology *Diederik Depla -- Department of Solid State Sciences*	6			A:1	180
9	E038320	Nuclear Reactor Technology *Matthias Vanderhaegen -- Department of Electromechanical, Systems and Metal Engineering*	6			A:2[a]	180

2.1.3 Electives Ghent University

Subscribe to no more than 6 credit units from Ghent University's study programmes. Subject to approval by the faculty.

2.2 Electives Universidades de Madrid 12 credits

12 credit units elective courses at Universidad Carlos III de Madrid and Universidad Complutense de Madrid (Spain), in accordance with the mobility scheme as approved by the Steering Committee, either from Track Fusion Science, or from Track Fusion Technology.
More information: https://www.em-master-fusion.org/

2.3 Electives Université de Lorraine 12 credits

12 credit units elective courses at Université de Lorraine (only Track Fusion Science), in accordance with the mobility scheme as approved by the Steering Committee.
More information: https://www.em-master-fusion.org/

2.4 Electives Université Aix-Marseille, Institut Nationale des Sciences et Techniques Nucléaires 12 credits

12 credit units elective courses at Aix-Marseille Université/Institut Nationale des Sciences et Techniques Nucléaire (only track Fusion Technology), in accordance with the mobility scheme as approved by the Steering Committee.
More information: https://www.em-master-fusion.org/

2.5 Electives Universität Stuttgart 12 credits

12 credit units elective courses at Universität Stuttgart, in accordance with the mobility scheme as approved by the Steering Committee, either from Track Fusion Science, or from Track Fusion Technology.
More information: https://www.em-master-fusion.org/

2.6 Elective Courses Czech Technical University 12 credits

12 credit units elective courses at Czech Technical University in accordance with the mobility scheme as approved by the Steering Committee, from Track Fusion Technology.
More information: https://www.em-master-fusion.org/

3 Master's Dissertation

Nr	Course		CRDT	Ref	MT1	Session	Study

1	E091105	Master's Dissertation	30	2	A:J	900

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 cours name, using the following ISO codes:

bg: Bulgarian	de: German	es: Spanish	ja: Japanese	pl: Polish	sh: Kroatian/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 in 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 2025-2026	f: annually, from 2026-2027	i: annually, from 2027-2028
b: tri-annually	d: bi-annually, from 2025-2026	g: bi-annually, from 2026-2027	j: bi-annually, from 2027-2028
	e: tri-annually, from 2025-2026	h: tri-annually, from 2026-2027	k: tri-annually, from 2027-2028