Block view of the study programme

		Or	Th	Pr	Au	Cr

Block 1

Certain prerequisites/corequisites of your first-year programme may 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 programme.

To complete their curriculum, students must earn or validate the 90 credits of compulsory courses (including the master's thesis) and 30 credits from the research focus.
Ideally, students enrolling in the master programme should have acquired the skills and knowledge corresponding to the 40 credits in "Physics" offered as part of the bachelor programme in engineering.

Compulsory courses from the core curriculum

Applied physics

ELEN0004-1	*Semiconductor devices* (english language) - Benoît VANDERHEYDEN **Corequisite :** ELEN0076-1 - Electromagnetism	Q1	26	26	-	**5**
CHIM9308-1	*Physical chemistry* (english language) - N... **Corequisite :** PHYS0211-3 - Mécanique quantique	Q1	26	14	-	**4**
CHIM0698-1	*Introduction to the Physical Chemistry of Nanomaterials* (english language) - Cédric GOMMES	Q2	20	10	-	**3**
MECA0008-1	*Microfluidics* (english language) - Tristan GILET - [16h Labo., 14h Proj.]	Q2	22	8	[+]	**5**
MECA0446-2	*Continuum Mechanics* (english language) - JeanPhilippe PONTHOT - [50h Proj.]	Q2	26	26	[+]	**5**
MECA0023-1	*Advanced solid mechanics* (english language) - JeanPhilippe PONTHOT - [30h Proj.] **Corequisite :** MECA0036-2 - Finite Element Method	Q1	26	26	[+]	**5**

Mathematical and numerical methods

MATH0024-1	*Modelling with partial differential equations* (english language) - Maarten ARNST, Romain BOMAN - [25h Proj.] **Corequisite :** MECA0025-3 - Mécanique des fluides	Q1	30	20	[+]	**4**
INFO0939-1	*High performance scientific computing* (english language) - Christophe GEUZAINE - [20h Proj.]	Q1	30	15	[+]	**4**
MATH0471-3	*Multiphysics integrated computational project* (english language) - - Romain BOMAN, Christophe GEUZAINE - [30h Proj.] - - Romain BOMAN, Christophe GEUZAINE - [40h Proj.] **Corequisite :** MATH0024-1 - Modelling with partial differential equations INFO0939-1 - High performance scientific computing MATH2015-1 - Perturbation methods	TA	 33 11	 - -	 [+] [+]	**7**
MATH2015-1	*Perturbation methods* (english language) - Vincent DENOËL	Q2	15	15	-	**3**
SYST0022-1	*Linear Systems Design* (english language) - Guillaume DRION, Pierre SACRÉ - [15h Proj.]	Q2	26	26	[+]	**5**

Experimental methods

ELEN0074-1	*Sensors, microsensors and instrumentation* (english language) - Philippe VANDERBEMDEN - [20h Labo.]	Q2	30	-	[+]	**5**
APRI0006-1	*Personal experimental project* (english language) - Tristan GILET - [60h Proj.]	TA	6	6	[+]	**5**

Block 2

Compulsory courses from the core curriculum

Innovation and management

GEST3162-1	*Principles of management* (english language) - Michaël PARMENTIER, Willem STANDAERT - [25h Proj.]	Q1	30	-	[+]	**5**

Master's thesis

ATFE9007-1	*Master's thesis* - Benoît VANDERHEYDEN - [750h Proj.]	TA	-	-	[+]	**25**

Focus courses

Choose one of the following four options:

Electronics and materials

Remark : with the agreement of the President of the Jury, students may choose to take CHIM0664-1 Electrochemical energy conversion and storage [15h Laboratory work] (3 credits) instead of CHIM0664-2 Electrochemical energy conversion and storage (2 credits)

ELEN0069-1	*Nanoelectronics / Optoelectronics* (english language) - Benoît VANDERHEYDEN - [40h Proj.]	Q2	30	-	[+]	**5**
ELEN0047-1	*Superconductivity* (english language) - Philippe VANDERBEMDEN - [15h Labo.]	Q1	30	-	[+]	**5**
ELEN0446-1	*Physics of electrical insulating materials* (english language) - Philippe VANDERBEMDEN - [15h Labo.]	Q1	15	-	[+]	**3**
CHIM0664-2	*Electrochemical energy conversion and storage, partim 1* (english language) - Nathalie JOB	Q1	15	-	-	**2**

Fluids

PHYS3133-1	*Complex fluids and non-Newtonian flows* (english language) - Vincent TERRAPON	Q1	26	26	-	**5**
PHYS0961-1	*Irreversibility, instabilities and chaos* (english language) - Pierre DAUBY	Q1	30	30	-	**5**
OCEA0071-1	*Geophysical fluid dynamics - part 1* (english language) - JeanMarie BECKERS	Q2	30	15	-	**5**

Solids

MECA0464-1	*Large deformation of solids* (english language) - Romain BOMAN, JeanPhilippe PONTHOT - [60h Proj.]	Q1	26	26	[+]	**5**
MECA0058-1	*Fracture mechanics, damage and fatigue* (english language) - Ludovic NOELS - [75h Proj.]	Q1	30	10	[+]	**5**
MECA0516-1	*Mechanical properties of biological and bioinspired materials* (english language) - Davide RUFFONI - [4h Labo.]	Q1	26	22	[+]	**5**

Mathematical and numerical methods

MECA0470-1	*New methods in computational mechanics and physics* (english language) - Maarten ARNST, Eric BÉCHET, Ludovic NOELS - [40h Proj.]	Q2	20	-	[+]	**5**
INFO8010-1	*Deep learning* (english language) - Gilles LOUPPE - [60h Proj.]	Q2	30	-	[+]	**5**

Choose 5 credits among the following two courses:

MECA0027-1	*Structural and multidisciplinary optimization* (english language) - Pierre DUYSINX, Patricia TOSSINGS - [18h Proj.]	Q1	30	12	[+]	**5**
MATH0461-2	*Introduction to numerical optimization* (english language) - Quentin LOUVEAUX - [25h Proj.]	Q1	30	20	[+]	**5**

Choose 15 credits among :

[...] - the courses listed above that are not yet part of your programme (such as courses from an option other than the one you chose),

[...] - or, subject to the approval of the President of the Jury, up to 10 credits can be chosen from the entire list

of courses taught at the University de Liège (other than the courses listed here) or from the UNIC course catalog.

Electronics and materials

PHYS3037-1	*Nanofabrication : principles and techniques* (english language) - Ngoc Duy NGUYEN, Alejandro SILHANEK	Q2	25	20	-	**5**
CHIM0664-1	*Electrochemical energy conversion and storage* (english language) - *partim 1* - Nathalie JOB - *partim 2* - Nathalie JOB - [15h Labo.]	Q1	 15 -	 - -	 - [+]	**3**
CHIM0697-1	*Heterogeneous catalysis* (english language) - Nathalie JOB, Motiar RAHAMAN - [10h Proj.]	Q1	20	20	[+]	**5**
ELEC0041-1	*Modelling and design of electromagnetic systems* (english language) - Christophe GEUZAINE (Odd years)	Q2	26	26	-	**5**
PHYS0981-1	*Quantum modelling of materials properties* (english language) - Philippe GHOSEZ	Q1	20	10	-	**5**

Fluids

AERO0004-1	*Turbulent Flows* (english language) - Vincent TERRAPON - [40h Proj.]	Q1	26	26	[+]	**5**
AERO0001-1	*Aerodynamics* (english language) - Thomas ANDRIANNE, Vincent TERRAPON - [2h Labo., 25h Proj.]	Q1	27	25	[+]	**5**
AERO0033-1	*Aerothermodynamics of high-speed flows* (english language) - Koen HILLEWAERT, Thierry MAGIN - [1d FW] **Corequisite :** AERO0001-1 - Aerodynamics	Q1	26	26	[+]	**5**
GCIV2035-1	*Fluvial hydrodynamics* - Pierre ARCHAMBEAU, Benjamin DEWALS - [30h Proj.]	Q2	26	26	[+]	**5**
AERO0030-1	*Computational fluid dynamics* (english language) - Vincent TERRAPON - [10h Labo.]	Q2	30	20	[+]	**5**

Solids

MECA0029-1	*Theory of vibration* (english language) - Loïc SALLES - [30h Proj.]	Q1	26	26	[+]	**5**

Mathematical and numerical methods

MECA0010-1	*Uncertainty quantification and stochastic modelling* (english language) - Maarten ARNST - [28h Proj.]	Q1	16	16	[+]	**5**
ELEN0062-1	*Introduction to machine learning* (english language) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.]	Q1	30	5	[+]	**5**
MECA0524-1	*CAD & Geometric Algorithms* - Eric BÉCHET - [60h Proj.]	Q1	20	20	[+]	**5**
PHYS0997-1	*Quantum information and computation* (english language) - François DAMANET	Q1	30	-	-	**5**

Experimental methods

BIOL0114-3	*Electronic microscopies* - *Part A* - Philippe COMPÈRE - *Part B* - Philippe COMPÈRE	Q2	 15 24	 - 13	 - -	**5**

Innovation and management

PROJ0011-2	*Personal student project* (english language) - Liesbet GERIS, Grégoire LÉONARD - [150h Proj.]	TA	-	-	[+]	**5**

Internship

ASTG0025-1	*Internship* (english language) - Tristan GILET	TA	-	-	-	**10**

Fundamentals of Engineering physics

The subjects MECA0036-2, ELEN0076-1, MECA0025-3 and PHYS0211-3 are corequisite to certain compulsory courses of the master programme. They must be taken as a priority, unless they have already taken as part of the bachelor in engineering, or unless the corresponding knowledge and skills were acquired previously.

MECA0036-2	*Finite Element Method* (english language) - JeanPhilippe PONTHOT - [40h Proj.]	Q2	26	26	[+]	**5**
ELEN0076-1	*Electromagnetism* (english language) - Benoît VANDERHEYDEN	Q1	26	26	-	**5**
MECA0025-3	*Fluid Mechanics* - Eric DELHEZ - [30h Proj.]	Q2	26	26	[+]	**5**
PHYS0211-3	*Quantum mechanics* - John MARTIN	Q1	26	26	-	**5**

Bloc d'aménagement du programme de l'année

Bridging courses (max 15 credits) Master in physical engineering (120 credits)

Optional courses

Additional block (15 credits) for students with a bachelor's degree in physics.

MECA0036-2	*Finite Element Method* (english language) - JeanPhilippe PONTHOT - [40h Proj.]	Q2	26	26	[+]	**5**
MECA0001-2	*Mechanics of materials* - JeanFrançois DEMONCEAU, Laurent DUCHENE - [2h Labo., 12h Proj.]	Q1	27	25	[+]	**5**
SYST0002-2	*Introduction to signals and systems* - Guillaume DRION, Alessio FRANCI - [15h Proj.]	Q2	26	26	[+]	**5**