Université de Liège

Study programmes 2014-2015
Faculty of Applied Sciences
Master in Engineering Physics, research focus

First Year

Optional courses

Choose courses totalling 60 ECTS from the list below. The course not follwed in the 1st year must be followed in the 2nd year :

		Or	Th	Pr	Au	Cr
MECA0036-2	*Finite Element Method* (english language) - JeanPhilippe PONTHOT - [40h Proj.]	Q2	30	30	[+]	**5**
MATH0024-1	*Equations with partial derivatives* - Maarten ARNST	Q1	30	30	-	**5**
MATH0461-2	*Introduction to numerical optimization* (english language) - Quentin LOUVEAUX - [25h Proj.]	Q2	30	20	[+]	**5**
SYST0003-1	*Linear control systems* (english language) - Rodolphe SEPULCHRE - Suppl : Raphaël FONTENEAU	Q1	30	30	-	**5**
INFO0939-1	*High performance scientific computing* (english language) - Christophe GEUZAINE - [20h Proj.]	Q1	30	15	[+]	**5**
MATH0471-2	*Multiphysics computational project : development of a partial differential equation solver* - Romain BOMAN, Christophe GEUZAINE	Q2	20	30	-	**5**
PHYS0069-1	*Introduction to statistical physics* - Nicolas VANDEWALLE	Q2	30	30	-	**5**
CHIM0202-3	*Physical chemistry* - Edwin DE PAUW, Bernard LEYH	Q2	30	30	-	**5**
PHYS0048-1	*Coherent and Incoherent Optics* - Serge HABRAKEN	Q1	30	30	-	**5**
SPAT0048-4	*Physics of the earth's atmosphere and environment* - JeanClaude GÉRARD, Denis GRODENT	TA	45	15	-	**5**
PHYS0961-1	*Irreversibility, instabilities and chaos* - Pierre DAUBY	Q1	30	30	-	**5**
ELEN0074-1	*Sensors, microsensors and instrumentation* (english language) - Philippe VANDERBEMDEN	Q2	30	30	-	**5**
APRI0006-1	*Personal experimental project* (english language) - COLLÉGIALITÉ, Tristan GILET	TA	-	60	-	**5**

Students studying for the Bachelors in Civil Engineering who have not chosen the appropriate option :

* must take all the so-called "prerequisite" courses hereafter, if they were not taken during the 1st cycle. These courses must be taken during the 1st year of the masters and some 1st-year compulsory courses must be rolled over to the 2nd year.
* must subsequently reduce the number of courses they choose to take in the 2nd year of the masters. If all the "prerequisite" courses must be taken, it will be impossible for them to choose which courses they take.
* cannot choose the professional "management" focus.

The program adapted by these students has to receive the preliminary agreement of the Jury.

Compulsory prerequisites

PHYS2026-1	*Physics 4 : Microscopic physics (part a : waves optics, part b : introduction to nuclear physics)* - Ngoc Duy NGUYEN	Q2	30	30	-	**5**
MECA0445-2	*Heat transfer* - Pierre DEWALLEF, Vincent TERRAPON - [4h Labo., 9h Proj.]	Q2	30	26	[+]	**5**
PHYS0211-3	*Quantum Mechanics* - John MARTIN	Q1	30	30	-	**5**
MECA0446-2	*Continuum Mechanics* - JeanPhilippe PONTHOT - [50h Proj.]	Q2	30	30	[+]	**5**
ELEN0076-1	*Electromagnetism* - Patricia ROUSSEAUX, Benoît VANDERHEYDEN	Q1	30	30	-	**5**

Compulsory courses

INFO0061-3	*Computers organization* - Bernard BOIGELOT	Q2	25	20	-	**5**
MECA0001-2	*Mechanics of materials* - JeanPierre JASPART - Suppl : Laurent DUCHENE - [2h Labo., 12h Proj.]	Q1	30	28	[+]	**5**
SYST0002-2	*Modelling and analysis of systems* - Rodolphe SEPULCHRE - Suppl : Erik QUAEGHEBEUR - [15h Proj.]	Q1	30	30	[+]	**5**
MECA0445-2	*Heat transfer* - Pierre DEWALLEF, Vincent TERRAPON - [4h Labo., 9h Proj.]	Q2	30	26	[+]	**5**
MECA0025-3	*Fluid Mechanics* - Eric DELHEZ - [30h Proj.]	Q2	30	30	[+]	**5**
MECA0446-2	*Continuum Mechanics* - JeanPhilippe PONTHOT - [50h Proj.]	Q2	30	30	[+]	**5**
ELEN0076-1	*Electromagnetism* - Patricia ROUSSEAUX, Benoît VANDERHEYDEN	Q1	30	30	-	**5**
MECA0036-2	*Finite Element Method* (english language) - JeanPhilippe PONTHOT - [40h Proj.]	Q2	30	30	[+]	**5**
MATH0024-1	*Equations with partial derivatives* - Maarten ARNST	Q1	30	30	-	**5**
MATH0461-2	*Introduction to numerical optimization* (english language) - Quentin LOUVEAUX	Q2	30	20	[+]	**6**

	- [25h Proj.]					
INFO0939-1	*High performance scientific computing* (english language) - Christophe GEUZAINE - [20h Proj.]	Q1	30	15	[+]	**5**
MATH0471-2	*Multiphysics computational project : development of a partial differential equation solver* - Romain BOMAN, Christophe GEUZAINE	Q2	20	30	-	**5**
PHYS0069-1	*Introduction to statistical physics* - Nicolas VANDEWALLE	Q2	30	30	-	**5**
CHIM0202-3	*Physical chemistry* - Edwin DE PAUW, Bernard LEYH	Q2	30	30	-	**5**

Second Year

Compulsory courses

ATFE0016-1	*Final Work (including an introduction to research methodology)* - COLLÉGIALITÉ		-	-	-	**25**

Common core courses

Choose the course that was not taken in the first year of the Master's degree among the following :

MECA0036-2	*Finite Element Method* (english language) - JeanPhilippe PONTHOT - [40h Proj.]	Q2	30	30	[+]	**5**
MATH0024-1	*Equations with partial derivatives* - Maarten ARNST	Q1	30	30	-	**5**
MATH0461-2	*Introduction to numerical optimization* (english language) - Quentin LOUVEAUX - [25h Proj.]	Q2	30	20	[+]	**5**
SYST0003-1	*Linear control systems* (english language) - Rodolphe SEPULCHRE - Suppl : Raphaël FONTENEAU	Q1	30	30	-	**5**
INFO0939-1	*High performance scientific computing* (english language) - Christophe GEUZAINE - [20h Proj.]	Q1	30	15	[+]	**5**
MATH0471-3	*Multiphysics computational project : development of a partial differential equation solver* - Romain BOMAN, Christophe GEUZAINE	Q2	30	30	-	**5**
PHYS0069-1	*Introduction to statistical physics* - Nicolas VANDEWALLE	Q2	30	30	-	**5**
CHIM0202-3	*Physical chemistry* - Edwin DE PAUW, Bernard LEYH	Q2	30	30	-	**5**
PHYS0048-1	*Coherent and Incoherent Optics* - Serge HABRAKEN	Q1	30	30	-	**5**
SPAT0048-4	*Physics of the earth's atmosphere and environment* - JeanClaude GÉRARD, Denis GRODENT	TA	45	15	-	**5**
PHYS0961-1	*Irreversibility, instabilities and chaos* - Pierre DAUBY	Q1	30	30	-	**5**
ELEN0074-1	*Sensors, microsensors and instrumentation* (english language) - Philippe VANDERBEMDEN	Q2	30	30	-	**5**
APRI0006-1	*Personal experimental project* (english language) - COLLÉGIALITÉ, Tristan GILET	TA	-	60	-	**5**

Optional courses

Choose one module from :

Electronic physics

[...] Choose courses totalling 20 ECTS from the following :

"Electronic physics" list

ELEN0004-1	*Physical Electronics* (english language) - Benoît VANDERHEYDEN	Q1	30	30	-	**5**
ELEN0047-1	*Superconductivity* - Philippe VANDERBEMDEN	Q1	30	30	-	**5**
ELEN0038-1	*Integrated electronics of microsystems* (english language) - Michael KRAFT		30	30	-	**5**
PHYS0046-2	*Quantum physics and applications to Condensed Matter* - Philippe GHOSEZ, Matthieu VERSTRAETE		30	30	-	**5**
ELEN0069-1	*Nanoelectronics / Optoelectronics* - Benoît VANDERHEYDEN	Q2	30	30	-	**5**
PHYS0236-2	*Lasers in physics and applications* - Serge HABRAKEN	Q2	30	30	-	**5**
PHYS3003-1	*Functional Materials : theory and modeling* (english language) - Philippe GHOSEZ		20	10	-	**2,5**
PHYS3004-1	*Nanomaterials : theory and modeling* (english language) - JeanYves RATY	Q1	20	10	-	**2,5**

[...] Choose one placement or courses totaling 10 ECTS from the following lists : "Physical Electronics", "Fluid Mechanics", "Solid Mechanics", "Space Science" and "Mathematical, digital and multiphysical methods".

Fluid Mechanics

[...] Choose courses totalling 20 ECTS from the following :

"Mechanics of Fluids" list

PHYS0090-1	*Complex fluids and non-Newtonian flows* (english language) - Vincent TERRAPON	Q1	30	30	-	**5**
AERO0001-1	*Aerodynamics* (english language) - Thomas ANDRIANNE, Vincent TERRAPON	Q2	30	30	-	**5**
AERO0032-1	*Aeroelasticity and experimental aerodynamics* (english language) - Thomas ANDRIANNE, Grigorios DIMITRIADIS	Q1	30	30	-	**5**
MECA0032-1	*Flow in Turbomachines* - Olivier LÉONARD		30	30	-	**5**
ESHY0070-1	*Dynamics of lower atmospherical layers and air-sea interactions* - Louis FRANÇOIS	TA	30	15	-	**5**
OCEA0081-1	*Numerical Methods in Geophysics - Part 2* - JeanMarie BECKERS	Q2	15	30	-	**5**
OCEA0071-1	*Geophysical fluid dynamics - Part 1* - JeanMarie BECKERS	Q2	30	15	-	**5**
GBIO0014-2	*Modeling of physiological systems and clinical applications* - Thomas DESAIVE	Q1	30	30	-	**5**
MECA0008-1	*Microfluidics* (english language) - Tristan GILET	Q1	30	30	-	**5**
AERO0004-1	*Turbulent Flow* (english language) - Vincent TERRAPON	Q1	30	30	-	**5**
GBIO0022-1	*Biomimetism* (english language) - Liesbet GERIS, Tristan GILET, Eric PARMENTIER, Davide RUFFONI	TA	30	30	-	**5**
AERO0030-1	*Computational fluid dynamics* (english language) - Vincent TERRAPON	Q2	30	30	-	**5**

[...] Choose one placement or courses totaling 10 ECTS from the following lists : "Physical Electronics", "Fluid Mechanics", "Solid Mechanics", "Space Science" and "Mathematical, digital and multiphysical methods".

Solid Mechanics

[...] Choose courses totalling 20 ECTS from the following :

"Mechanics of Solids" list

MECA0023-1	*Advanced solid mechanics* (english language) - JeanPhilippe PONTHOT	Q1	30	30	-	**5**
MECA0027-1	*Structural and multidisciplinary optimization* - Pierre DUYSINX, Patricia TOSSINGS	Q1	30	30	-	**5**
MECA0058-1	*Fracture mechanics, damage and fatigue* (english language) - Ludovic NOELS	Q1	30	30	-	**5**
MECA0470-1	*New methods in computational mechanics* (english language) - Maarten ARNST, Eric BÉCHET, Ludovic NOELS	Q2	20	40	-	**5**
MECA0033-1	*Heat and Material Transfer Modelling* - N...		30	30	-	**5**
MECA0464-1	*Large deformation of solids* (english language) - JeanPhilippe PONTHOT	Q1	30	30	-	**5**
AERO0032-1	*Aeroelasticity and experimental aerodynamics* (english language) - Thomas ANDRIANNE, Grigorios DIMITRIADIS	Q1	30	30	-	**5**
MECA0029-1	*Theory of vibration* (english language) - JeanClaude GOLINVAL	Q1	30	30	-	**5**
MECA0502-1	*Mechanics of composites* (english language) - Michaël BRUYNEEL	Q1	30	30	-	**5**
GBIO0012-2	*Biomechanics* (english language) - Liesbet GERIS, Davide RUFFONI - [1d FW]	Q1	30	30	[+]	**5**
MECA0009-2	*Introduction to microtechnology* (english language) - Tristan GILET - [12h Labo., 18h Proj.]	Q2	14	16	[+]	**5**
MECA0010-1	*Stochastic modelling* (english language) - Maarten ARNST	Q2	30	30	-	**5**
GBIO0022-1	*Biomimetism* (english language) - Liesbet GERIS, Tristan GILET, Eric PARMENTIER, Davide RUFFONI	TA	30	30	-	**5**

[...] Choose one placement or courses totaling 10 ECTS from the following lists : "Physical Electronics", "Fluid Mechanics", "Solid Mechanics", "Space Science" and "Mathematical, digital and multiphysical methods".

Space Sciences

[...] Choose courses totalling 20 ECTS from the following :

"Spatial Sciences" list

ELEN0017-1	*Analysis and Design of Telecommunications Systems* (english language) - Marc VAN DROOGENBROECK	Q1	30	30	-	**5**
ASTR0004-2	*Astrophysics and Space Techniques* - Jean SURDEJ - [5d Peda. Tr.]	Q1	30	15	[+]	**5**
AERO0024-1	*Astrodynamics* - Gaëtan KERSCHEN	Q1	30	30	-	**5**

AERO0018-3	*Space Experiment Development* - Pierre ROCHUS		30	30	-	**5**
ELEN0008-1	*Principles of analog and digital telecommunications systems* - Marc VAN DROOGENBROECK	Q2	30	30	-	**5**
SPAT0012-1	*General relativity* - Yves DE ROP	TA	60	-	-	**5**
SPAT0032-2	*Remote sensing* - Christian BARBIER	Q1	30	30	-	**5**
SPAT0039-1	*Spectroscopy in Astrophysics and Geophysics* - Jerôme LOICQ	TA	20	10	-	**2,5**
SPAT0001-1	*Plasma Physics* - Hervé LAMY, Anne THOUL	Q2	25	5	-	**2,5**
SPAT0021-1	*Introduction to astroparticles* - Joseph CUGNON	Q1	20	10	-	**2,5**
SPAT0035-1	*Space operations* (english language) - Grégor RAUW	Q1	30	10	-	**3**
SPAT0036-1	*Celestial mechanics and space trajectories* - Grégor RAUW	Q1	20	10	-	**2,5**

[...] Choose one placement or courses totaling 10 ECTS from the following lists : "Physical Electronics", "Fluid Mechanics", "Solid Mechanics", "Space Science" and "Mathematical, digital and multiphysical methods".

At most, and in agreement with the Jury, 5 of these credits may be selected in the program of another Master of the University.

"Mathematical, digital and multi-physical methods" list

ELEN0071-1	*Digital Signal Processing* (english language) - Jacques VERLY - [40h Proj.]		45	15	[+]	**5**
ELEN0060-2	*Information and coding theory* (english language) - Louis WEHENKEL - [30h Proj.]	Q2	30	15	[+]	**5**
OCEA0081-1	*Numerical Methods in Geophysics - Part 2* - JeanMarie BECKERS	Q2	15	30	-	**5**
MATH0462-1	*Discrete optimization* (english language) - Quentin LOUVEAUX - [25h Proj.]	Q1	30	20	[+]	**5**
SYST0017-1	*Non linear systems* - Rodolphe SEPULCHRE - Suppl : Alexandre MAUROY	Q1	30	30	-	**5**
ELEC0041-1	*Modelling and design of electromagnetic systems* (english language) - Patrick DULAR, Christophe GEUZAINE	TA	30	30	-	**5**
GBIO0011-1	*Modeling of biological systems* - Pierre DAUBY, Liesbet GERIS	Q2	30	30	-	**5**
MATH0049-1	*Morphological Characterization of Unordered Systems* - Silvia BLACHER		30	30	-	**5**
GBIO0013-1	*Transport phenomena in biology* - Dominique TOYE	Q1	30	30	-	**5**
SPAT0061-1	*Theory group and astroparticle* (english language) - Diego ARISTIZABAL SIERRA	Q2	30	-	-	**2,5**
SPAT0036-1	*Celestial mechanics and space trajectories* - Grégor RAUW	Q1	20	10	-	**2,5**
INFO2046-2	*Computational geometry* (english language) - Eric BÉCHET - [90h Proj.]	TA	30	-	[+]	**5**
ASTG0025-1	*Internship or placement in a research centre* - Benoît VANDERHEYDEN		-	-	-	**10**

Notice : Students who have, in their BAC studies, already taken one or more option courses found in this list must not take them again.

Compulsory courses

ATFE0016-1	*Final Work (including an introduction to research methodology)* - COLLÉGIALITÉ		-	-	-	**25**
PHYS0961-1	*Irreversibility, instabilities and chaos* - Pierre DAUBY	Q1	30	30	-	**5**

Compulsory courses

SYST0003-1	*Linear control systems* (english language) - Rodolphe SEPULCHRE - Suppl : Raphaël FONTENEAU	Q1	30	30	-	**5**
PHYS0048-1	*Coherent and Incoherent Optics* - Serge HABRAKEN	Q1	30	30	-	**5**
SPAT0048-4	*Physics of the earth's atmosphere and environment* - JeanClaude GÉRARD, Denis GRODENT	TA	45	15	-	**5**
ELEN0074-1	*Sensors, microsensors and instrumentation* (english language) - Philippe VANDERBEMDEN	Q2	30	30	-	**5**

Optional courses

[...] 2 courses to be chosen from the modules "Electronic Physics", "Fluid Mechanics", "Solid Mechanics" or "Spatial Sciences" of the regular programme of the 2nd Masters in Physical Engineering

With the agreement of the president of the jury students can replace max. 10 credit of compulsory courses with courses in the regular program of the second year in the Master's degree.