Two-Year Master Program (120 ECTS)

First year (Full English)

Compulsory Courses

		Or	Th	Pr	Au	Cr
SYST0003-1	*Linear control systems* (english language) - Rodolphe SEPULCHRE - Suppl : Raphaël FONTENEAU	Q1	30	30	-	**5**
INFO0062-2	*Object-Oriented Programming* - Bernard BOIGELOT	Q2	30	30	-	**5**
	Notice : temporarily in French for 2014-2015.					
ELEC0055-2	*Electronic control systems* (english language) - Christophe GEUZAINE	Q1	30	6	-	**3**
INFO0064-2	*Embedded systems* (english language) - Bernard BOIGELOT	Q1	25	20	-	**3**
ELEN0017-1	*Analysis and Design of Telecommunications Systems* (english language) - Marc VAN DROOGENBROECK	Q1	30	30	-	**5**
ELEN0037-1	*Microelectronics and IC design* (english language) - Michael KRAFT		30	30	-	**5**
APRI0007-1	*Major project in electronics (including fundamentals of project management)* - Marc BIRON, Bernard BOIGELOT, Christophe GEUZAINE		20	80	-	**9**

Optional courses

Choose one of the three following options :

Option "Signals, processing and control"

ELEN0002-2	*Introduction to audio and video techniques* (english language) - JeanJacques EMBRECHTS - [6h Labo.]	Q1	30	20	[+]	**5**
ELEN0060-2	*Information and coding theory* (english language) - Louis WEHENKEL - [30h Proj.]	Q2	30	15	[+]	**5**
ELEN0071-1	*Digital Signal Processing* (english language) - Jacques VERLY - [40h Proj.]		45	15	[+]	**5**
INFO0012-3	*Computation structures* (english language) - Pierre WOLPER - [50h Proj.]	Q1	30	25	[+]	**5**
MATH0461-2	*Introduction to numerical optimization* (english language) - Quentin LOUVEAUX - [25h Proj.]	Q2	30	20	[+]	**5**

Option "Electronic systems and devices"

ELEN0004-1	*Physical Electronics* (english language) - Benoît VANDERHEYDEN	Q1	30	30	-	**5**
ELEN0038-1	*Integrated electronics of microsystems* (english language) - Michael KRAFT		30	30	-	**5**
ELEN0074-1	*Sensors, microsensors and instrumentation* (english language) - Philippe VANDERBEMDEN	Q2	30	30	-	**5**
ELEN0078-2	*Acoustics and electroacoustics* (english language) - JeanJacques EMBRECHTS - [6h Labo.]	Q2	30	22	[+]	**5**
INFO0012-3	*Computation structures* (english language) - Pierre WOLPER - [50h Proj.]	Q1	30	25	[+]	**5**

Option "Electric power and energy systems"

ELEC0014-3	*Electric Energy Transmission and Distribution* - JeanLouis LILIEN - [2,5d FW]	Q1	30	15	[+]	**5**
	Notice : temporarily in French for 2014-2015.					
ELEC0018-1	*Energy Market* (english language) - Damien ERNST	Q1	45	15	-	**5**
ELEC0029-2	*Electric power systems analysis and operation* (english language) - Thierry VAN CUTSEM	Q2	30	30	-	**5**
ELEC0041-1	*Modelling and design of electromagnetic systems* (english language) - Patrick DULAR, Christophe GEUZAINE	TA	30	30	-	**5**
MATH0461-2	*Introduction to numerical optimization* (english language) - Quentin LOUVEAUX - [25h Proj.]	Q2	30	20	[+]	**5**

Notice : students who, for their

bachelor's degree, took one or more of the compulsory courses must replace them in priority by other courses from the faculty of engineering ; this choice must be approved by the President of the cycle's jury.

Second year (Full English - Prospects 2015-2016)

Compulsory courses

ATFE0014-1	*Final Work (including an introduction to research methodology)* - COLLÉGIALITÉ		-	-	-	**25**
GEST3162-1	*Introduction to company management* (english language) - Michael GHILISSEN, François PICHAULT, Thierry PIRONET, Didier VAN CAILLIE	Q2	25	25	-	**5**

Choose one of the following foci :

Professional focus in sustainable car technologies

Compulsory courses

Module 1 : Vehicle dynamics and safety

MECA0492-2	*Vehicle dynamics* (english language) - Pierre DUYSINX	Q1	30	20	-	**4**
MECA0493-2	*Vehicle aerodynamics* (english language) - Grigorios DIMITRIADIS	Q1	15	10	-	**2**
MECA0494-3	*Driveline and braking systems* (english language) - JeanLuc BOZET, Olivier BRULS, Pierre DUYSINX	Q1	30	20	-	**4**
MECA0495-1	*Introduction to vehicle safety and body structure design* (english language) - Mustapha BELHABIB, Pierre DUYSINX, Ludovic NOELS	Q1	15	10	-	**2**
MECA0496-2	*Materials for automotive applications* (english language) - Jacqueline LECOMTEBECKERS, Ahmed RASSILI	Q1	30	20	-	**4**

Module 2 : Engine and electric propulsion systems

MECA0497-2	*Vehicle performance* (english language) - Mustapha BELHABIB, Pierre DUYSINX	Q1	15	10	-	**2**
MECA0498-2	*Internal combustion enignes* (english language) - Philippe NGENDAKUMANA	Q1	30	20	-	**4**
	Notice : students who have already taken the course MECA0041-1 in the 1st Master have to remplace the course MECA0498-1 by another course, with the approval of the cycle's Jury President.					
MECA0499-2	*Electric traction motors* (english language) - Johan GYSELINCK		15	10	-	**2**
MECA0500-2	*Hybrid electric and fuel cell vehicles* (english language) - Pierre DUYSINX, Nathalie JOB	Q1	30	20	-	**4**
MECA0501-1	*Thermal and Electrical Management of vehicles* (english language) - Vincent LEMORT		15	10	-	**2**
	Notice : Students who, during the 1st year of the master programme, have already followed a course that is equivalent to one of the courses offered in this specialisation, must substitute it with one or several courses chosen among the faculty's offering; these courses must be approved by the president of the panel for master studies.					

Research focus

Optional courses

Carry on the option for 15 ECTS

Notice : these 15 ECTS consist of a 5 ECTS course and optional courses for a minimum of 10 ECTS.

"Signals, processing and control" option

ELEN0062-1	*Applied Inductive Learning* (english language) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.]	Q1	30	5	[+]	**5**

Choose 10 ECTS from the following :

ELEN0016-2	*Digital image and video processing* (english language) - Marc VAN DROOGENBROECK - [20h Proj.]	Q1	30	10	[+]	**5**
ELEN0019-2	*Audio signal processing : principles and experiments* (english language) - JeanJacques EMBRECHTS - [24h Labo., 30h Proj.]	Q1	5	-	[+]	**5**
ELEN0072-1	*Statistical signal processing* (english language) - Jacques VERLY - [40h Proj.]		45	15	[+]	**5**
ELEN0074-1	*Sensors, microsensors and instrumentation* (english language) - Philippe VANDERBEMDEN	Q2	30	30	-	**5**
INFO0948-2	*Introduction to intelligent robotics* (english language) - Renaud DETRY - [80h Proj.]	Q2	30	4	[+]	**5**
INFO0939-1	*High performance scientific computing* (english language) - Christophe GEUZAINE - [20h Proj.]	Q1	30	15	[+]	**5**
GBIO0008-2	*Medical imaging* (english language) - Christophe PHILLIPS - [8h Labo., 1d FW]	Q2	33	12	[+]	**5**

"Electronic systems and devices" option

ELEN0062-1	*Applied Inductive Learning* (english language) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.]	Q1	30	5	[+]	**5**

Choose 10 ECTS from the following :

ELEC0017-1	*Electromagnetic compatibility* - Véronique BEAUVOIS, Christophe GEUZAINE	Q1	30	30	-	**5**
ELEC0054-1	*Application of Electrical Measuring Systems* - Philippe VANDERBEMDEN	Q1	30	30	-	**5**
ELEN0069-1	*Nanoelectronics / Optoelectronics* - Benoît VANDERHEYDEN	Q2	30	30	-	**5**
GBIO0029-1	*Bioelectronics* (english language) - Michael KRAFT		30	30	-	**5**
MECA0009-2	*Introduction to microtechnology* (english language) - Tristan GILET - [12h Labo., 18h Proj.]	Q2	14	16	[+]	**5**

"Electric power and energy systems" option

MECA0450-3	*Renewable energies* - Pierre DEWALLEF	Q1	30	30	-	**5**

Choose 10 ECTS from the following :

ELEC0436-1	*Energy Management Systems and optimal functions for electric power systems* - Patricia ROUSSEAUX	Q1	30	30	-	**5**
ELEC0047-1	*Power systems dynamics, control and stability* (english language) - Thierry VAN CUTSEM	Q1	30	30	-	**5**
ELEN0062-1	*Applied Inductive Learning* (english language) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.]	Q1	30	5	[+]	**5**
MATH0462-1	*Discrete optimization* (english language) - Quentin LOUVEAUX - [25h Proj.]	Q1	30	20	[+]	**5**
ELEC0440-1	*High Voltage Direct (HVDC) and grids* (english language)		18	18	-	**3**
ELEC0441-1	*Microgrids* (english language)		18	18	-	**3**
CHIM0664-1	*Storing and converting energy electrochemically* - Nathalie JOB	Q1	15	15	-	**3**

Choose 10 ECTS from the following :

This choice must be approved by the President of the cycles's Jury. Students who have already taken one or more optional courses cannot take again.

[...] Options

Internship

ASTG0019-1	*Internship (distinct from master's thesis)* - Philippe VANDERBEMDEN - [40h FW]		-	-	[+]	**10**
ASTG0026-1	*Internship (linked to master's thesis)* - [40d FW]		-	-	[+]	**5**

Optional courses

[...] One course to choose from the ULg courses programme ; this choice must have the approval of the cycle's jury President.

Second year (2014-2015 transitory program)

Compulsory courses

ATFE0014-1	*Final Work (including an introduction to research methodology)* - COLLÉGIALITÉ	-	-	-	**25**
[...]	One course to choose from the ULg courses' programme, including the list below ; this choice must have the approval of the cycle's Jury President.				

Choose one focus from the following :

Research Focus

Optional courses

Notice : the themactic structure is only given for information.

Choose courses totalling 30 ECTS out of the following :

Electricity and electronics						
ELEC0017-1	*Electromagnetic compatibility* - Véronique BEAUVOIS, Christophe GEUZAINE	Q1	30	30	-	**5**
ELEC0054-1	*Application of Electrical Measuring Systems* - Philippe VANDERBEMDEN	Q1	30	30	-	**5**
ELEN0038-1	*Integrated electronics of microsystems* (english language) - Michael KRAFT		30	30	-	**5**
ELEN0069-1	*Nanoelectronics / Optoelectronics* - Benoît VANDERHEYDEN	Q2	30	30	-	**5**
GBIO0029-1	*Bioelectronics* (english language) - Michael KRAFT		30	30	-	**5**
ELEN0078-2	*Acoustics and electroacoustics* (english language) - JeanJacques EMBRECHTS - [6h Labo.]	Q2	30	22	[+]	**5**
MECA0009-2	*Introduction to microtechnology* (english language) - Tristan GILET - [12h Labo., 18h Proj.]	Q2	14	16	[+]	**5**
Software, networks and security						
INFO0009-1	*Database (general organisation)* - Pierre WOLPER - [25h Proj.]	Q2	30	25	[+]	**5**
INFO0010-4	*Introduction to computer networking* (english language) - Guy LEDUC - [40h Proj.]	Q2	35	15	[+]	**5**
INFO0045-3	*Introduction to computer security* (english language) - Benoît DONNET - [8h Labo., 30h Proj.]	Q2	30	10	[+]	**5**
Modelling and Applied Mathematics						
ELEC0041-1	*Modelling and design of electromagnetic systems* (english language) - Patrick DULAR, Christophe GEUZAINE	TA	30	30	-	**5**
ELEN0062-1	*Applied Inductive Learning* (english language) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.]	Q1	30	5	[+]	**5**
GBIO0009-1	*Bioinformatics* (english language) - Kristel VAN STEEN	Q1	30	30	-	**5**
GBIO0011-1	*Modeling of biological systems* - Pierre DAUBY, Liesbet GERIS	Q2	30	30	-	**5**
INFO0939-1	*High performance scientific computing* (english language) - Christophe GEUZAINE - [20h Proj.]	Q1	30	15	[+]	**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**
INFO0948-2	*Introduction to intelligent robotics* (english language) - Renaud DETRY - [80h Proj.]	Q2	30	4	[+]	**5**
Signals						
ELEN0016-2	*Digital image and video processing* (english language) - Marc VAN DROOGENBROECK - [20h Proj.]	Q1	30	10	[+]	**5**
ELEN0019-2	*Audio signal processing : principles and experiments* (english language) - JeanJacques EMBRECHTS - [24h Labo., 30h Proj.]	Q1	5	-	[+]	**5**
ELEN0071-1	*Digital Signal Processing* (english language) - Jacques VERLY - [40h		45	15	[+]	**5**

	Proj.]					
ELEN0072-1	*Statistical signal processing* (english language) - Jacques VERLY - [40h Proj.]		45	15	[+]	**5**
GBIO0008-2	*Medical imaging* (english language) - Christophe PHILLIPS - [8h Labo., 1d FW]	Q2	33	12	[+]	**5**
Energy transmission and electric networks						
ELEC0014-3	*Electric Energy Transmission and Distribution* - JeanLouis LILIEN - [2,5d FW]	Q1	30	15	[+]	**5**
ELEC0018-1	*Energy Market* (english language) - Damien ERNST	Q1	45	15	-	**5**
ELEC0029-2	*Electric power systems analysis and operation* (english language) - Thierry VAN CUTSEM	Q2	30	30	-	**5**
ELEC0047-1	*Power systems dynamics, control and stability* (english language) - Thierry VAN CUTSEM	Q1	30	30	-	**5**
ELEC0436-1	*Energy Management Systems and optimal functions for electric power systems* - Patricia ROUSSEAUX	Q1	30	30	-	**5**
Industrial management						
[...]	Industrial management course (to be chosen among courses on offer at the university : the selection must meet with the approval of the president of the jury)					
Placement						
ASTG0019-1	*Placement* - COLLÉGIALITÉ		-	-	-	**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.

Professional focus in management

Notice : The specialisation in management will be taught for the last time in 2014-2015.

Compulsory courses

GEST3001-1	*People management and organisation* - Jocelyne ROBERT	Q1	24	24	-	**4**
GEST3002-1	*Human Resources* - Jocelyne ROBERT	Q1	24	-	-	**2**
GEST3003-1	*Competitive strategy in the marketplace* (english language) - Michael GHILISSEN	Q1	16	16	-	**3**
GEST3004-1	*Marketing (operations and management)* (english language) - Michael GHILISSEN	Q1	16	16	-	**3**
GEST3005-2	*Accountancy and Finance* - Jacques BERWART		24	24	-	**4**
GEST3006-1	*Operations and supply chain management I* (english language) - Yasemin ARDA	Q1	16	16	-	**3**
GSTG3001-1	*Business plan* - COLLÉGIALITÉ		-	30	-	**4**
GSTG3002-1	*Functional analysis of a company* - COLLÉGIALITÉ - [30h Internship]		-	-	[+]	**4**

Optional courses

Choose one of the following courses :

GEST3010-1	*Operations and supply chain management II* - Sabine LIMBOURG	Q1	16	16	-	**3**
GEST3011-2	*ICT for Business* - Alain DUBOIS	Q1	16	16	-	**3**
GEST3012-1	*Financial and actuarial modelling* - Louis ESCH	Q1	16	16	-	**3**

Professional focus in sustainable car technologies

Compulsory courses

Module 1 : Vehicle dynamics and safety						
MECA0492-2	*Vehicle dynamics* (english language) - Pierre DUYSINX	Q1	30	20	-	**4**
MECA0493-2	*Vehicle aerodynamics* (english language) - Grigorios DIMITRIADIS	Q1	15	10	-	**2**
MECA0494-3	*Driveline and braking systems* (english language) - JeanLuc BOZET, Olivier BRULS, Pierre DUYSINX	Q1	30	20	-	**4**
MECA0495-1	*Introduction to vehicle safety and body structure design* (english language) - Mustapha BELHABIB, Pierre DUYSINX, Ludovic NOELS	Q1	15	10	-	**2**
MECA0496-2	*Materials for automotive applications* (english language) -	Q1	30	20	-	**4**

	ECOMTEBECKERS, Ahmed RASSILI					
Module 2 : Engine and electric propulsion systems						
MECA0497-2	*Vehicle performance* (english language) - Mustapha BELHABIB, Pierre DUYSINX	Q1	15	10	-	**2**
MECA0498-2	*Internal combustion enignes* (english language) - Philippe NGENDAKUMANA	Q1	30	20	-	**4**
	Notice : students who have already taken the course MECA0041-1 in the 1st Master have to remplace the course MECA0498-1 by another course, with the approval of the cycle's Jury President.					
MECA0499-2	*Electric traction motors* (english language) - Johan GYSELINCK		15	10	-	**2**
MECA0500-2	*Hybrid electric and fuel cell vehicles* (english language) - Pierre DUYSINX, Nathalie JOB	Q1	30	20	-	**4**
MECA0501-1	*Thermal and Electrical Management of vehicles* (english language) - Vincent LEMORT		15	10	-	**2**
	Notice : Students who, during the 1st year of the master programme, have already followed a course that is equivalent to one of the courses offered in this specialisation, must substitute it with one or several courses chosen among the faculty's offering; these courses must be approved by the president of the panel for master studies.					

Adjusted programme for student of the Bachelors in Civil Engineering who have not taken the"Electricity and electronics"

Les bacheliers ingénieurs civils qui n'ont jamais choisi l'option "Electricité et électronique" dans leur cursus de bachelier :
- doivent suivre tous les cours dits "prérequis" figurant ci-après, s'ils ne les ont pas suivis en 1er cycle. Ces cours doivent être suivis pendant le Master 1 et certains cours de Master 1 doivent être reportés en Master 2.
- doivent remplacer certains cours du programme de Master 1 par les cours dits "de remplacement" figurant ci-après, s'ils ne les ont pas suivis en 1er cycle. Ces cours doivent être suivis idéalement pendant le master 1 et certains cours de master 1 doivent être reportés en master 2. Le choix des cours à option est donc réduit en conséquence.
Le programme adapté de ces étudiants doit recevoir l'accord préalable du Jury de Cycle.
Les bacheliers ingénieurs civils de l'ULg qui ont suivi l'option "Electricité et électronique" mais avec un autre approfondissement (c'est à dire qui ont suivi la mineure "Electricité et électronique" mais pas la majeure) doivent remplacer certains cours du programme de Master 1 par les cours dits "de remplacement"
figurant ci-après, s'ils ne les ont pas suivi en 1er cycle. Ces cours doivent être suivis idéalement pendant le master 1 et certains cours de master 1 doivent être reportés en Master 2. Le choix des cours à option est donc réduit en conséquence.

Compulsory prerequisites

ELEC0431-2	*Electromagnetic energy conversion* (english language) - Christophe GEUZAINE - [15h Labo.]	Q2	30	15	[+]	**5**
ELEC0052-1	*Analysis and Design of Electrical Measuring Systems* - Philippe VANDERBEMDEN	Q1	30	30	-	**5**
ELEC0053-2	*Electric circuits* - Patricia ROUSSEAUX	Q2	30	30	-	**5**
ELEN0040-1	*Digital Electronics* - Michael KRAFT - Suppl : Patricia ROUSSEAUX	Q2	30	30	-	**5**
ELEN0076-1	*Electromagnetism* - Patricia ROUSSEAUX, Benoît VANDERHEYDEN	Q1	30	30	-	**5**
Replacement course						
	Notice : Instead of the course ELEN0017-1					
ELEN0008-1	*Principles of analog and digital telecommunications systems* - Marc VAN DROOGENBROECK	Q2	30	30	-	**5**
	Notice : Instead of the course ELEN0062-1 if this course has already been choosen during the 1st cycle					
ELEN0075-3	*Analog Electronics* - Benoît VANDERHEYDEN - [16h Labo.]	Q2	30	24	[+]	**5**
	Notice : Instead of the course ELEN0071-1 (if option choice "Signals, processing and control")					
ELEN0070-2	*Signal processing* (english language) - Jacques VERLY - [40h Proj.]	Q2	45	15	[+]	**5**
	Notice : Instead of the course ELEN0004-1 (if option choice "Electronic systems and devices")					

ELEN0075-3 *Analog Electronics* - Benoît VANDERHEYDEN - [16h Labo.] Q2 30 24 [+] **5**