

## Two-Year Master Program (120 ECTS)

### First Year

#### Compulsory courses

##### Mechanical design and production

MECA0444-1	<i>Mechanical design</i> - JeanFrançois DEBONGNIE	Q1	30	30	-	5
APRI0005-3	<i>Integrated mechanical project</i> - Maarten ARNST, Eric BÉCHET, JeanLuc BOZET, Olivier BRULS, JeanFrançois DEBONGNIE, Pierre DUYSINX, Tristan GILET, Jean STUTO - [5d FW]	TA	50	130	[+]	15

*Notice* : If the president of the cycle's panel agrees, in particular regarding the technical content, the master's integrated project can be part of an interdisciplinary project (e.g. project engineer, Eurobot, Eco-Shell Marathon, etc.). It is possible to have done the project between the third year of the bachelor's degree and the second year of the master's.

MECA0474-1	<i>Mechanical Computer-Aided-Design</i> (english language) - Eric BÉCHET	TA	30	30	-	5
MECA0462-2	<i>Materials selection</i> (english language) - Jacqueline LECOMTEBECKERS, Davide RUFFONI - [1d FW]	Q1	30	30	[+]	5

#### Optional courses

##### Mecatronic

Choose at least 10 ECTS from the following courses :

MECA0504-1	<i>Industrial automation</i> - Olivier BRULS, Pierre DUYSINX	Q2	30	30	-	5
ELEN0074-1	<i>Sensors, microsensors and instrumentation</i> (english language) - Philippe VANDERBEMDEN	Q2	30	30	-	5
MECA0009-2	<i>Introduction to microtechnology</i> (english language) - Tristan GILET - [12h Labo., 18h Proj.]	Q2	14	16	[+]	5
SYST0003-1	<i>Linear control systems</i> (english language) - Rodolphe SEPULCHRE - Suppl : Raphaël FONTENEAU	Q1	30	30	-	5

##### Computational mechanics

Choose at least 10 ECTS from the following courses :

MECA0029-1	<i>Theory of vibration</i> (english language) - JeanClaude GOLINVAL	Q1	30	30	-	5
MECA0031-2	<i>Kinematics and dynamics of mechanisms</i> (english language) - Olivier BRULS	Q2	30	30	-	5
MECA0023-1	<i>Advanced solid mechanics</i> (english language) - JeanPhilippe PONTHOT	Q1	30	30	-	5
MECA0010-1	<i>Stochastic modelling</i> (english language) - Maarten ARNST	Q2	30	30	-	5

#### Optional courses

[...] Des cours à choisir (10 crédits) dans les cours à option du 1er ou du 2e master de ce master ; ce choix doit recevoir l'approbation du Président de Jury de cycle.

### Second year

#### Compulsory courses

ATFE0013-1	<i>Final work (including an internship or a placement in a research centre under the supervision of the teacher responsible for the final work and including an introduction to research methodology)</i> - COLLÉGIALITÉ	-	-	-	-	25
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#### Optional courses

Choose one of the following courses :

- [...] the courses of the University
- [...] the courses below.

LANG1957-1	<i>Dutch for Engineering Students</i> (dutch language) - Claudine COLIN	TA	60	-	-	5
LANG1958-1	<i>German for Engineering Students</i> (german language) - Françoise CARL	TA	60	-	-	5

Notice : In any case, this course must have the approval of the cycle's Jury President.

Choose one focus from the following :

### Research Focus

#### Optional courses

Students choose courses totaling 30 ECTS from the optional courses list of Master 1 and Master 2. With the approval of the Jury's President, students can select 5 ECTS from the courses list of other Masters of the Faculty of Applied Sciences.

#### Courses out of modules

ASTG0114-1	<i>Observation placement</i> - Pierre DEWALLEF	TA	-	-	-	3
ASTG0115-1	<i>Traineeship</i> - Pierre DEWALLEF	TA	-	-	-	5

#### Mechanical engineering

MECA0067-1	<i>Special Technology Issues</i> - JeanFrançois DEBONGNIE	Q1	30	30	-	5
MECA0069-1	<i>Series Production Methods</i> - JeanFrançois DEBONGNIE	Q2	30	30	-	5
MECA0473-1	<i>Metallic materials Engineering</i> - Jacqueline LECOMTEBECKERS	Q1	30	30	-	5
MECA0138-1	<i>Welding and non-destructive tests</i> - Nathalie GERLACH, Adnen ben Mahmoud KECHAOU		30	30	-	5
MECA0139-2	<i>Techniques of additive manufacturing and 3D printing</i> - Thierry DORMAL		10	10	-	2,5
MECA0035-1	<i>Lubrifcation and tribology</i> - JeanLuc BOZET		30	30	-	5
MECA0467-1	<i>Turbomachines</i> - Olivier LÉONARD		30	30	-	5
MECA0509-1	<i>Sustainable engineering processes</i> (english language) - Georges PELSEMAEKER		15	30	-	5
MECA0051-2	<i>Total Quality Management</i> - JeanMichel COMPÈRE, JeanMarie RIGO	Q1	30	30	-	5
MECA0006-1	<i>Production systems of cold and heat</i> - Vincent LEMORT	Q1	30	30	-	5
CHIM0699-2	<i>Life cycle analysis - ecodesign</i> - Sandra BELBOOM, Angélique LÉONARD	Q1	10	30	-	3
MECA0502-1	<i>Mechanics of composites</i> (english language) - Michaël BRUYNEEL	Q1	30	30	-	5

#### Mecatronic

ELEC0055-1	<i>Electronic control systems</i> (english language) - Christophe GEUZAINÉ	Q1	30	30	-	5
INFO0064-3	<i>Embedded systems</i> (english language) - Bernard BOIGELOT - [60h Proj.]	Q1	30	30	[+]	5
GBIO0012-2	<i>Biomechanics</i> (english language) - Liesbet GERIS, Davide RUFFONI - [1d FW]	Q1	30	30	[+]	5
GBIO0022-1	<i>Biomimetism</i> (english language) - Liesbet GERIS, Tristan GILET, Eric PARMENTIER, Davide RUFFONI	TA	30	30	-	5
MECA0008-1	<i>Microfluidics</i> (english language) - Tristan GILET	Q1	30	30	-	5
PROT0430-3	<i>Biomedical robotics and active prostheses</i> - Olivier BRULS	Q1	15	10	-	2
MECA0460-1	<i>Introduction to safety and health at work on machines-tools. Risk analysis</i> - JeanMarie RIGO		15	15	-	3
MECA0517-1	<i>Advanced industrial robotic</i> (english language) - Olivier BRULS - [25h Pr.]	Q2	20	-	[+]	5

#### Computational mechanics

MECA0464-1	<i>Large deformation of solids</i> (english language) - JeanPhilippe PONTHOT	Q1	30	30	-	5
MECA0058-1	<i>Fracture mechanics, damage and fatigue</i> (english language) - Ludovic NOELS	Q1	30	30	-	5
MECA0062-1	<i>Vibration testing and experimental modal analysis</i> (english language) - JeanClaude GOLINVAL	Q1	30	30	-	5
MECA0470-1	<i>New methods in computational mechanics</i> (english language) - Maarten ARNST, Eric BÉCHET, Ludovic NOELS	Q2	20	40	-	5
INFO2046-2	<i>Computational geometry</i> (english language) - Eric BÉCHET - [90h Proj.]	TA	30	-	[+]	5
MECA0027-1	<i>Structural and multidisciplinary optimization</i> - Pierre DUYSINX, Patricia TOSSINGS	Q1	30	30	-	5
MECA0502-1	<i>Mechanics of composites</i> (english language) - Michaël BRUYNEEL	Q1	30	30	-	5

#### Vehicles and transport

MECA0041-1	<i>Internal Combustion Engines</i> - Philippe NGENDAKUMANA - [1,5d FW]	Q2	30	30	[+]	5
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GCIV2166-1	<i>Fundamentals of transportation : sustainable transport</i> (english language) - Mario COOLS	Q1	20	15	-	2,5
CNAV0020-1	<i>Introduction to naval construction</i> - André HAGE, Philippe RIGO	Q1	40	30	-	5
MECA0004-3	<i>Vehicle performance and behaviour</i> - Mustapha BELHABIB, Pierre DUYSINX	Q2	30	30	-	5
MECA0478-4	<i>Electric, hybrid and non-conventional propulsion systems</i> - Pierre DUYSINX	Q1	30	30	-	5
<i>Notice</i> : prérequis : MECA0004-3						
MECA0063-1	(pas organisé en 2014-2015) <i>Vehicle Architecture</i>		30	30	-	5
[...]	Choose one course from the course's programme of the Faculty of Applied Sciences (with the approval of the cycle's Jury president)					

### Professional focus in management

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

#### Compulsory courses

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

#### Optional courses

Choose one of the following courses :

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

### Professional focus in sustainable car technologies

#### Compulsory courses

##### Module 1 : Vehicle dynamics and safety

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

##### Module 2 : Engine and electric propulsion systems

MECA0497-2	<i>Vehicle performance</i> (english language) - Mustapha BELHABIB, Pierre DUYSINX	Q1	15	10	-	2
MECA0498-2	<i>Internal combustion engines</i> (english language) - Philippe NGENDAKUMANA	Q1	30	20	-	4

*Notice* : students who have already taken the course MECA0041-1 in the 1st Master have to replace the course MECA0498-1 by another course, with the approval of the cycle's Jury President.

MECA0499-2	<i>Electric traction motors</i> (english language) - Johan GYSELINCK		15	10	-	2
MECA0500-2	<i>Hybrid electric and fuel cell vehicles</i> (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 "Mechanics" option

#### 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

MECA0036-2	<i>Finite Element Method</i> (english language) - JeanPhilippe PONTHOT - [40h Proj.]	Q2	30	30	[+]	5
MECA0155-2	<i>Dynamics of Mechanical Systems</i> - JeanClaude GOLINVAL - [5h Labo., 10h Proj.]	Q1	30	30	[+]	5
MECA0012-6	<i>Solid mechanics</i> - Laurent DUCHENE - [15h Proj.]	Q2	30	30	[+]	5
MECA0018-2	<i>Industrial Forming Processes</i> - JeanFrançois DEBONGNIE - [15h Labo., 0,5d FW, 11h Proj.]	Q2	30	-	[+]	5
MECA0002-1	<i>Applied Thermodynamics and Introduction to Heat Engines</i> - Olivier LÉONARD	Q1	30	30	-	5
MECA0445-2	<i>Heat transfer</i> - Pierre DEWALLEF, Vincent TERRAPON - [4h Labo., 9h Proj.]	Q2	30	26	[+]	5