Study programmes 2014-2015

Faculty of Applied Sciences

# Master in Mechanical Engineering, professional focus in sustainable car technologies

## First Year

### Compulsory courses

#### Mechanical design and production

| | | Or | Th | Pr | Au | Cr |
|---|---|---|---|---|---|---|
| MECA0444-1 | *Mechanical design* - JeanFrançois DEBONGNIE | Q1 | 30 | 30 | - | **5** |
| APRI0005-3 | *Integrated mechanical project* - 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 | *Mechanical Computer-Aided-Design* (english language) - Eric BÉCHET | TA | 30 | 30 | - | **5** |
| MECA0462-2 | *Materials selection* (english language) - Jacqueline LECOMTEBECKERS, Davide RUFFONI - [1d FW] | Q1 | 30 | 30 | [+] | **5** |

### Optional courses

#### Mecatronic

Choose at least 10 ECTS from the following courses :

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

#### Computational mechanics

Choose at least 10 ECTS from the following courses :

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|---|---|---|---|---|---|---|
| MECA0029-1 | *Theory of vibration* (english language) - JeanClaude GOLINVAL | Q1 | 30 | 30 | - | **5** |
| MECA0031-2 | *Kinematics and dynamics of mechanisms* (english language) - Olivier BRULS | Q2 | 30 | 30 | - | **5** |
| MECA0023-1 | *Advanced solid mechanics* (english language) - JeanPhilippe PONTHOT | Q1 | 30 | 30 | - | **5** |
| MECA0010-1 | *Stochastic modelling* (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. |

**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 | *Finite Element Method* (english language) - JeanPhilippe PONTHOT - [40h Proj.] | Q2 | 30 | 30 | [+] | **5** |
| MECA0155-2 | *Dynamics of Mechanical Systems* - JeanClaude GOLINVAL - [5h Labo., 10h Proj.] | Q1 | 30 | 30 | [+] | **5** |
| MECA0012-6 | *Solid mechanics* - Laurent DUCHENE - [15h Proj.] | Q2 | 30 | 30 | [+] | **5** |
| MECA0018-2 | *Industrial Forming Processes* - JeanFrançois DEBONGNIE - [15h Labo., 0,5d FW, 11h Proj.] | Q2 | 30 | - | [+] | **5** |

| | | | | | | |
|---|---|---|---|---|---|---|
| MECA0002-1 | *Applied Thermodynamics and Introduction to Heat Engines* - Olivier LÉONARD | Q1 | 30 | 30 | - | **5** |
| MECA0445-2 | *Heat transfer* - Pierre DEWALLEF, Vincent TERRAPON - [4h Labo., 9h Proj.] | Q2 | 30 | 26 | [+] | **5** |

## Second Year

### Compulsory courses

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|---|---|---|---|---|---|---|
| ATFE0013-1 | *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)* - COLLÉGIALITÉ | | - | - | - | **25** |

### Optional courses

Choose one of the following courses :

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

| | | | | | | |
|---|---|---|---|---|---|---|
| LANG1957-1 | *Dutch for Engeneering Students* (dutch language) - Claudine COLIN | TA | 60 | - | - | **5** |
| LANG1958-1 | *German for Engineering Students* (german language) - Françoise CARL | TA | 60 | - | - | **5** |

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

### Compulsory courses

**Module 1 : Vehicle dynamics and safety**

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|---|---|---|---|---|---|---|
| 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.