aérospatiale

## Third Year

### Compulsory courses

| | | | | | |
|---|---|---|---|---|---|
| [...] | One general education course, chosen from the University's course programme. This choice must be approved by the President of the Board of Studies. | | | | |
| MECA0027-1 | *Structure Optimization* - Claude FLEURY | 30 | 30 | - | **5** |
| ASTG0001-1 | *Training in the workplace/ industrial internships* - N... - [40d Internship] | - | - | [+] | **8** |
| *Notice : The compulsory training course (8 ECTS) lasts two months (effectively 40 days) and is taken responsibility for by a training course committee consisting of a superviser from the University of Liège academic staff, a superviser in industry, and a second member of the university's academic staff designated by the department (or its president). The committee will evaluate the training programme on the basis of a training report, an oral presentation and the comments of the superviser in industry.* | | | | | |
| ATFE0001-1 | *Final work* - COLLÉGIALITÉ | - | - | - | **20** |

### Optional courses

Choose courses totalling 24 ECTS from the following :

| | | | | | |
|---|---|---|---|---|---|
| AERO0012-1 | *Exterior Balistics and dynamics of space rockets* - Gaëtan KERSCHEN | 15 | 15 | - | **3** |
| AERO0018-1 | *Space Experiment Development* - Pierre ROCHUS | 15 | 15 | - | **3** |
| AERO0020-1 | *Theoretical training for piloting a private aircraft* - Claude FLEURY | 30 | - | - | **3** |
| ASTR0003-1 | *Astromechanics Basics and Artificial Satellite Orbits* - Gaëtan KERSCHEN | 20 | 10 | - | **3** |
| ASTR0004-2 | *Astrophysics and Space Techniques* - Jean SURDEJ - [5d Peda. Tr.] | 30 | 15 | [+] | **5** |
| CHIM0064-3 | *Aerospace materials and composite materials* - Jean-Marie LIÉGEOIS | 30 | - | - | **3** |
| ELEN0075-1 | *Analog Electronics* - Benoît VANDERHEYDEN | 30 | 30 | - | **5** |
| ELEN0008-1 | *Principles of analog and digital telecommunications systems* - Marc VAN DROOGENBROECK | 30 | 30 | - | **5** |
| INFO0026-2 | *Computer Graphics* - Eric BÉCHET | 15 | 15 | - | **3** |
| MECA0004-1 | *Vehicle performance and behaviour* - Pierre DUYSINX | 30 | 30 | - | **5** |
| MECA0015-1 | *Hydraulic Machines* - Olivier LÉONARD | 30 | 30 | - | **5** |
| MECA0031-2 | *Kinematics and Dynamics of Mechanisms* - Olivier BRULS | 30 | 30 | - | **5** |
| MECA0032-1 | *Flow in Turbomachines* - Olivier LÉONARD | 30 | 30 | - | **5** |
| MECA0058-1 | *Fracture mechanics, damage and fatigue* - Ludovic NOELS | 30 | 30 | - | **5** |
| MECA0062-1 | *Vibration Testing and Experimental Modal Analysis* - Jean-Claude GOLINVAL | 30 | 30 | - | **5** |
| MECA0084-1 | *Random Vibrations and Fourier Analysis* | 30 | 30 | - | **5** |
| MECA0105-1 | *Combustion in Rocket Engines* - Philippe NGENDAKUMANA | 15 | 15 | - | **3** |
| MECA0127-1 | *Active Structures* - André PREUMONT | 30 | 30 | - | **5** |
| META0016-1 | *Metallic Materials for Aerospace Applications* - Jacqueline LECOMTE#BECKERS | 20 | 10 | - | **3** |
| [...] | Courses totalling a maximum of 5 ECTS chosen from the Electromechanics Study Path courses or from the list of Electromechanics Study Path option courses. | | | | |

**Optional course commun to all electromechanical study paths**

| | | | | | |
|---|---|---|---|---|---|
| ASTR0003-2 | (pas organisé en 2008-2009) *Astromechanics Basics and Artificial Satellite Orbits* - Gaëtan KERSCHEN | 20 | 20 | - | **5** |
| CHIM0064-2 | *Aerospace Materials (Composites)* - Jean-Marie LIÉGEOIS | 20 | - | - | **2,5** |
| ESHY0019-1 | *Applied Meteorology* - N... | 15 | - | - | **2,5** |
| MATH0024-1 | *Further Study of Digital Analysis (Equations with Partial Derivatives)* - Jean-André ESSERS | 30 | 30 | - | **5** |
| MECA0016-1 | *Use of Means of Transport* - Jean MARCHAL | 5 | - | - | **2** |
| MECA0474-2 | *Mechanical CAD / CAM* - Eric BÉCHET | 15 | 15 | - | **2,5** |
| MECA0059-1 | *Optimization Methods for Mechanical Constructions* - Jacques RONDAL | 10 | 20 | - | **2,5** |
| MECA0083-1 | *Fluid-Structure Interaction* - Grigorios DIMITRIADIS | 15 | 15 | - | **2,5** |
| MECA0131-1 | *Theory and Advanced Applications of Roller Bearings* - Jean-Luc BOZET | 20 | 10 | - | **2,5** |
| MECA0135-1 | *Heating and Air Conditioning Equipment Gauging and Energy Management* - Jean-Pascal BOURDOUXHE | 15 | 15 | - | **2,5** |
| GEST1069-1 | *Introduction to entrepreneurship* - Bernard SURLEMONT | 30 | - | - | **2,5** |
| ECON0878-1 | *Microeconomy applied to the engineering science* - Jean-Pierre HANSEN | 30 | - | - | **2,5** |
| ECON0099-1 | (pas organisé en 2008-2009) *Industrial strategy: economic case analysis* - Jean-Pierre HANSEN | 30 | - | - | **2,5** |

énergétique

## Third Year

### Compulsory courses

| | | | | | |
|---|---|---|---|---|---|
| [...] | One general education course, chosen from the University's course programme. This choice must be approved by the President of the Board of Studies. | | | | |
| ASTG0004-1 | *Industrial training* - N... - [40d Internship]<br>*Notice* : Two months, effectively 40 days. | - | - | [+] | **8** |
| ATFE0001-1 | *Final work* - COLLÉGIALITÉ | - | - | - | **20** |

### Optional courses

Choose courses totalling 30 ECTS from the following :

| | | | | | |
|---|---|---|---|---|---|
| CHIM0071-1 | *Reduction of pollutants from combustion* - Angélique LÉONARD | 15 | 15 | - | **3** |
| ELEC0016-1 | *Electric Energy Networks* - Jean-Louis LILIEN | 30 | 30 | - | **5** |
| GENU0018-1 | *Nuclear Engineering and Nuclear Power Plant Technology* - Philippe MATHIEU | 15 | 15 | - | **3** |
| MECA0034-1 | *Rational Use of Energy, Air-conditioning in buildings and vehicles* - N... - Suppl : Philippe ANDRE | 30 | 30 | - | **5** |
| MECA0034-3 | *Rational Use of Energy, Air-conditioning in buildings and vehicles (part)* - N... - Suppl : Philippe ANDRE | 15 | 15 | - | **2,5** |
| MECA0447-1 | *Heat exchangers, constructive and fundamental aspects* - Philippe NGENDAKUMANA | 15 | 15 | - | **2,5** |
| MECA0046-2 | *Heat exchangers, Heat exchangers networks and rational use of energy* - Georges HEYEN | 15 | 15 | - | **2,5** |
| MECA0066-1 | *Turbine engines using compressible fluids, users' perspective* - Olivier LÉONARD | 15 | 15 | - | **2,5** |
| MECA0066-2 | *Turbine engines using compressible fluids, developers' perspective* - Olivier LÉONARD | 15 | 15 | - | **2,5** |
| MECA0096-1 | *Hydroelectric Power Plants and Economic Aspects* - [2d FW] | 15 | - | [+] | **3** |
| MECA0099-1 | *Vehicle Energy Management* - Pierre DUYSINX | 30 | 30 | - | **5** |
| MECA0099-2 | *Vehicle Energy Management (partim)* - Pierre DUYSINX | 15 | 15 | - | **2,5** |
| MECA0124-1 | *Combustion Modelling* - Philippe NGENDAKUMANA | 30 | 30 | - | **5** |
| MECA0450-1 | *Renewable energies* - Philippe MATHIEU | 30 | 30 | - | **5** |
| META0034-1 | *Metallic Material Behaviour in Energy Systems* - Jacqueline LECOMTE#BECKERS | 15 | 15 | - | **3** |

mécatronique - productique

## Third Year

### Compulsory courses

| | | | | | |
|---|---|---|---|---|---|
| LOGI0001-1 | *Supply Chain Management, Supply Chain Management* - Yasemin ARDA | 45 | - | - | **4,5** |
| ELEC0055-1 | *Electronic control systems* - Christophe GEUZAINE - Suppl : Paul BLEUS | 30 | 30 | - | **5** |
| MECA0051-3 | *Total Quality Management* - Liviu MASALAR | 15 | 30 | - | **5** |
| ASTG0006-1 | *Placement* - N... - [40d Internship] | - | - | [+] | **8** |

*Notice : The compulsory training course (8 ECTS) lasts two months (effectively 40 days) and is taken responsibility for by a training course committee consisting of a superviser from the University of Liège academic staff, a superviser ifrom the world of socio-economics, and a second member of the university's academic staff designated by the department (or its president).*
*A brief report will be produced, based on a precise framework, and will be orally defended in public. The report and the defence will be graded by a group consisting of the training course committee and one of the following three :*

* *The department's President of the Board of Studies,*
* *The 3rd year jury President, or*
* *the 3rd year jury secretary.*

*If the training course approaches areas looked at in the End of Study work project, it must nonetheless be clearly distinct and will be evaluated on the basis of a separate report and defence.*
*With the approval of the President of the Board of Studies the training programme by attending a university abroad on a SOCRATES type stay.*

| | | | | | |
|---|---|---|---|---|---|
| ATFE0001-1 | *Final work* - COLLÉGIALITÉ | - | - | - | **20** |

**Optional courses**

Choose courses totalling 17.5 ECTS from the following :

| | | | | | |
|---|---|---|---|---|---|
| ELEN0043-1 | *Application of Robotic Vision* - Christian LAURENT | 15 | 15 | - | **2,5** |
| GEST0366-1 | *Advanced Operations Research* (english) - Yves CRAMA | 45 | - | - | **5** |
| INFO0058-1 | *Introduction to Artificial Intelligence* - Pascal GRIBOMONT | 15 | 15 | - | **2,5** |
| MECA0015-1 | *Hydraulic Machines* - Olivier LÉONARD | 30 | 30 | - | **5** |
| MECA0017-1 | *Control system for land vehicles* - Pierre DUYSINX | 30 | 30 | - | **5** |
| MECA0017-2 | *Control system for land vehicles (partim: vehicle dynamics)* - Pierre DUYSINX | 15 | 15 | - | **2,5** |
| MECA0038-1 | *Measurement uncertainties and dimensional metrology* - Liviu MASALAR | 30 | 30 | - | **5** |
| MECA0038-2 | *Measurement uncertainties and dimensional metrology* - Liviu MASALAR | 15 | 15 | - | **2,5** |
| MECA0063-1 | *Vehicle Architecture* - Pierre DUYSINX | 30 | 30 | - | **5** |
| MECA0068-2 | *Numerical controlled machine-tools and flexible manufacturing* - Liviu MASALAR | 15 | 15 | - | **2,5** |
| MECA0069-1 | *Series Production Methods* - Jean-François DEBONGNIE | 30 | 30 | - | **5** |
| MECA0089-1 | *Robotics: mechanical aspects* - Pierre DUYSINX | 15 | 15 | - | **2,5** |
| MECA0460-1 | *Introduction to safety and health at work on machines-tools. Risk analysis* - Liviu MASALAR | 15 | 15 | - | **3** |

Optional courses can be chosen from the list of courses in all the orientations involving electr-mechanical civil engineering.

[...] With the agreement of the President of the cycle's Jury students can choose courses to a maximum of 10 ECTS beyond the list of preferential options.

*Notice* : This choice must be made acording to the interest these courses have for the training programme or end of degree work.

métallurgie et science des matériaux

## Third Year

**Compulsory courses**

**Module Non technical education**

[...] One or more compulsory General Education course, totalling 4 ECTS, chosen from the University programme, and approved by the President of the Board of Studies.

**Module General Education in Mettalurgy/Materials**

| | | | | | |
|---|---|---|---|---|---|
| CHIM0223-1 | *General inorganic chemistry : glasses, characterisation of non-crystalline solids.* - André RULMONT | 15 | - | - | **2** |
| CHIM0248-1 | *Advanced ceramic materials : synthesis, characterization and use* - Rudi CLOOTS | 15 | - | - | **2** |
| META0008-1 | *Selection of industrial materials* - Adrien MAGNÉE | 20 | 20 | - | **3** |
| META0013-1 | *Forming Theory (Including Powder Metallurgy) and Applications to Rolling* - Jacqueline LECOMTE#BECKERS | 30 | 80 | - | **6,5** |
| GEOL0276-1 | *Solid waste processing* - Stoyan GAYDARDZHIEV | 15 | 15 | - | **2,5** |
| ATFE0001-1 | *Final work* - COLLÉGIALITÉ | - | - | - | **20** |

**Optional courses**

**Choose one module from :**

**Module C : The Structure of materials**

| | | | | | |
|---|---|---|---|---|---|
| MECA0091-1 | *Material Secondary Forming Process Modelling* - Michel HOGGE | 15 | 15 | - | **2,5** |
| MECA0139-1 | *Rapid Prototyping* - Thierry DORMAL | 30 | - | - | **2,5** |
| META0014-1 | *Post-Rolling Treatment* - Jacqueline LECOMTE#BECKERS | 30 | 20 | - | **4,5** |
| META0027-1 | *Metal and Alloy Solidification* - Jacqueline LECOMTE#BECKERS | 15 | 15 | - | **2,5** |

**Module D : Using Materials**

| | | | | | |
|---|---|---|---|---|---|
| GCIV0184-2 | *Building Materials* - Luc COURARD | 30 | 30 | - | **4,5** |
| META0034-1 | *Metallic Material Behaviour in Energy Systems* - Jacqueline LECOMTE#BECKERS | 15 | 15 | - | **2,5** |
| META0040-1 | *Modern Microscopic Analysis Techniques in Material Sciences* - Jacqueline LECOMTE#BECKERS | 15 | 15 | - | **2,5** |

| | | | | | |
|---|---|---|---|---|---|
| META0300-1 | *Electrochemistry Applications to Material Industry* - Jean-Luc DELPLANCKE | 20 | 10 | - | **2,5** |

With the authorisation of the President of the Board of Studies, students can replace one course from this module

* with a course from another module.
* with a course from the list of preferred options below.

**Preferential options**

| | | | | | |
|---|---|---|---|---|---|
| META0021-1 | *Further Study of Steel Industry* - Jacqueline LECOMTE#BECKERS | 30 | - | - | **2,5** |
| META0030-1 | *Nuclear Materials I* (english) - Jacqueline LECOMTE#BECKERS | 15 | 15 | - | **2,5** |
| META0032-1 | *Metallic Material Surface Treatments and Tribomechanical Damage* - Adrien MAGNÉE | 15 | 15 | - | **2,5** |
| META0034-1 | *Metallic Material Behaviour in Energy Systems* - Jacqueline LECOMTE#BECKERS | 15 | 15 | - | **2,5** |
| META0035-1 | *Metallic Material Corrosion* - Jacqueline LECOMTE#BECKERS | 20 | 10 | - | **2,5** |
| META0036-1 | *Advanced Metallic Materials* - Jacqueline LECOMTE#BECKERS | 20 | 10 | - | **2,5** |

Choose an industrial training programme of 8 weeks (effectively 40 days) or, with the approval of the President of the Board of Studies, choose an equivalent volume of courses (8 ECTS) which have not already been taken from the following :

| | | | | | |
|---|---|---|---|---|---|
| ASTG0007-1 | (pas organisé en 2008-2009) *Industrial training* - N... - [40d Internship] | - | - | [+] | **8** |
| [...] | Courses from "Module C : mise à forme des matériaux" | | | | |
| [...] | Courses from "Module D : utilisation des matériaux" | | | | |
| [...] | Courses from "Options préférentielles" | | | | |
| [...] | Courses from "Cours à option communs à toutes les filières d'électomécanique" | | | | |