Vue bloc du programme des cours

Bloc 1

Depending on your track record or your professional/research focus, some prerequisites/corequisites of your first year program might appear in bloc 2. You are therefore invited to go through the list of courses suggested in bloc 2 even if you enroll for the first time in this master program.

To complete their curriculum, students must earn or validate the 65 credits of the compulsory courses (including the master thesis), choose one option for 25 credits and 30 credits from one of the two professional foci. Ideally, students enrolling in the master program should have acquired the skills and knowledge corresponding to the 40 credits in "Electrical engineering" offered as part of the bachelor program in engineering.

Compulsory courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Instructor(s)</th>
<th>Credits</th>
<th>Pr</th>
<th>Au</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYST0003-1</td>
<td>Linear control systems (anglais)</td>
<td>Guillaume DRION</td>
<td>30</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INFO0062-1</td>
<td>Object-oriented programming (anglais)</td>
<td>Bernard BOIGELOT</td>
<td>30</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC0055-2</td>
<td>Electronic control systems (anglais)</td>
<td>Fabrice FREBEL</td>
<td>30</td>
<td>6</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Corequis: ELEC0431-2 - Electromagnetic energy conversion</td>
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<tr>
<td>INFO0064-2</td>
<td>Embedded systems (anglais)</td>
<td>Bernard BOIGELOT</td>
<td>30</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEN0017-1</td>
<td>Analysis and Design of Telecommunications Systems (anglais)</td>
<td>Marc VAN DROOGENBROECK</td>
<td>30</td>
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<tr>
<td>ELEN0037-1</td>
<td>Microelectronics and IC design (anglais)</td>
<td>Michael KRAFT</td>
<td>30</td>
<td>20</td>
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</tr>
<tr>
<td>APR10007-1</td>
<td>Major project in electronics (including fundamentals of project management) (anglais)</td>
<td>Marc BIRON, Bernard BOIGELOT, Guillaume DRION, Fabrice FREBEL, Christophe GEUZAIN</td>
<td>30</td>
<td>20</td>
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<tr>
<td></td>
<td>Corequis: INFO0064-2 - Embedded systems</td>
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<tr>
<td></td>
<td>SYST0003-1 - Linear control systems</td>
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<td></td>
<td>ELEC0055-2 - Electronic control systems</td>
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<tr>
<td></td>
<td>ELEC0053-2 - Circuits électriques</td>
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<tr>
<td></td>
<td>ELEC0052-2 - Analyse et conception des systèmes de mesures électriques</td>
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</tr>
<tr>
<td></td>
<td>ELEC0431-2 - Electromagnetic energy conversion</td>
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</tr>
</tbody>
</table>

Optional courses

Choose one of the following options :

- Signal processing and control 1

Choose 25 crédits from the following :

- The subjects ELEC0431-2, ELEC0052-2 et ELEC0053-2 are corequisite to some compulsory courses of the master program. They must be taken as a priority, unless they were already taken as part of the bachelor in engineering, or unless the corresponding knowledge and skills have been acquired previously.

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Pr</th>
<th>Au</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEN0002-2</td>
<td>Introduction to audio and video techniques (anglais)</td>
<td>30</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Corequis: ELEN0071-1 - Digital Signal Processing</td>
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</tr>
<tr>
<td>ELEN0060-2</td>
<td>Information and coding theory (anglais)</td>
<td>30</td>
<td>15</td>
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<td></td>
</tr>
<tr>
<td>ELEN0071-1</td>
<td>Digital Signal Processing (anglais)</td>
<td>45</td>
<td>15</td>
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</tr>
<tr>
<td>INFO0012-3</td>
<td>Computation structures (anglais)</td>
<td>30</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH0461-2</td>
<td>Introduction to numerical optimization (anglais)</td>
<td>30</td>
<td>20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[...] Remark : students who would have taken some of these courses previously in their program must replace them by other courses from the faculty of engineering; this choice must be approved by the
President of the cycle's Jury.

Electronic systems and devices 1

Choose 25 credits from the followings:

- The subjects ELEC0431-2, ELEC0052-2 et ELEC0053-2 are corequisite to some compulsory courses of the master program. They must be taken as a priority, unless they were already taken as part of the bachelor in engineering, or unless the corresponding knowledge and skills have been acquired previously.

- ELEN0004-1  *Semiconductor devices* (anglais) - Benoît VANDERHEYDEN  
  Q1 30 30 - 5

- ELEN0038-1  *Microsystems* (anglais) - Michael KRAFT - [20h Labo., 40h Proj.]  
  Q2 30 5 [+ ] 5

- ELEN0074-1  *Sensors, microsensors and instrumentation* (anglais) - Philippe VANDERBEMDEN - [20h Labo.]  
  Q2 30 - [+ ] 5

- ELEN0078-2  *Acoustics and electroacoustics* (anglais) - JeanJacques EMBRECHTS - [8h Labo.]  
  Q2 30 22 [+ ] 5

- INFO0012-3  *Computation structures* (anglais) - Pierre WOLFER - [50h Proj.]  
  Corequis : INFO0061-3 - Organisation des ordinateurs  
  INFO2009-2 - Introduction à l'informatique  

- Remark : students who would have taken some of these courses previously in their program must replace them by other courses from the faculty of engineering; this choice must be approved by the President of the cycle's Jury.

Electric power and energy systems 1

Choose 25 credits from the following:

- The subjects ELEC0431-2, ELEC0052-2 et ELEC0053-2 are corequisite to some compulsory courses of the master program. They must be taken as a priority, unless they were already taken as part of the bachelor in engineering, or unless the corresponding knowledge and skills have been acquired previously.

- ELEC0014-3  *Introduction to electric power and energy systems* (anglais) - Thierry VAN CUTSEM - [1j T. t.]  
  Q1 28 12 [+ ] 4

- ELEC0018-1  *Energy market* (anglais) - Damien ERNST  
  Q2 45 15 - 5

- ELEC0029-2  *Electric power systems analysis* (anglais) - Thierry VAN CUTSEM - [25h Proj.]  
  Q2 16 4 [+ ] 3

- ELEC0041-1  *Modelling and design of electromagnetic systems* (anglais) - Patrick DULAR, Christophe GEUZAINÉ  
  Q2 30 30 - 5

- MATH0461-2  *Introduction to numerical optimization* (anglais) - Quentin LOUVEAUX - [25h Proj.]  
  Q1 30 20 [+ ] 5

- ELEC0445-1  *High Voltage Direct Current (HVDC) grids* (anglais) - Patricia ROUSSEAUX  
  Corequis : ELEC0014-3 - Introduction to electric power and energy systems  

- Remark : students who would have taken some of these courses previously in their program must replace them by other courses from the faculty of engineering; this choice must be approved by the President of the cycle's Jury.

Bloc 2

Depending on your track record or your professional/research focus, some prerequisites/corequisites of your first year program might appear in bloc 2. You are therefore invited to go through the list of courses suggested in bloc 2 even if you enroll for the first time in this master program.

Compulsory courses

- GEST3162-1  *Principles of management* (anglais) - Michael GHILISSEN,  
  Q1 25 25 - 5
Optional courses

Choose one of the following focus :

Professional focus in Electrical Engineering

Carry on the option begun

Carry on the option chosen in Bloc 1 (Signal processing and control, Electronic systems and devices, or Electric power and energy systems) for at least 15 ECTS (if no internship is made) or 10 ECTS (if an internship is made), by complementing the compulsory Bloc 2 course from this option with additional courses from the same option.

Thematic optional courses

Signal processing and control 2

Compulsory course

ELEN0062-1  Introduction to machine learning (anglais) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.]

Optional courses

Choose 10 credits from the following list :

ELEN0016-2  Computer vision (anglais) - Marc VAN DROOGENBROECK - [50h Proj.]

ELEN0019-2  Audio signal processing : principles and experiments (anglais) - JeanJacques EMBRECHTS - [24h Labo., 30h Proj.]

Prérequis : ELEN0002-2 - Introduction to audio and video techniques

ELEN0072-1  Statistical signal processing (anglais) - Jacques VERLY - [40h Proj.]

Prérequis : ELEN0071-1 - Digital Signal Processing

ELEN0074-1  Sensors, microsensors and instrumentation (anglais) - Philippe VANDERBEMDEN - [20h Labo.]

INFO0948-2  Introduction to intelligent robotics (anglais) - Renaud DETRY, Louis WEHENKEL - [80h Proj.]

MATH0462-1  Discrete optimization (anglais) - Quentin LOUVEAUX - [25h Proj.]

INFO0939-1  High performance scientific computing (anglais) - Christophe GEUZAIN - [20h Proj.]

GBIO0008-2  Medical imaging (anglais) - Christophe PHILLIPS - [8h Labo., 1j T. t.]

Remark : students who would have taken some of these courses previously in their program must replace them by other courses from the faculty of engineering; this choice must be approved by the President of the cycle's Jury.

Electronic systems and devices 2

Compulsory course

ELEN0062-1  Introduction to machine learning (anglais) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.]

Optional courses
Choose 10 credits from the following list:

- **ELEC0017-1** *Electromagnetic Compatibility* (anglais) - Véronique BEAUVOIS, Christophe GEUZAINÉ - [30h Proj.]
- **ELEC0041-1** *Modelling and design of electromagnetic systems* (anglais) - Patrick DULAR, Christophe GEUZAINÉ
- **ELEC0054-1** *Application of electrical measurement systems* (anglais) - Philippe VANDERBEMDEN - [20h Labo.]
- **ELEN0069-1** *Nanoelectronics / Optoelectronics* (anglais) - Benoît VANDERHEYDEN - [40h Proj.]
  
  **Prérequis:**
  ELEN0004-1 - Semiconductor devices

- **GBIO0029-1** *Bioelectronics* (anglais) - Michael KRAFT - [20h Labo., 20h Proj.]
- **MECA0009-2** *Introduction to microtechnology* (anglais) - Tristan GILET - [8h Labo., 22h Proj.]

[...]

**Remark:** students who would have taken some of these courses previously in their program must replace them by other courses from the faculty of engineering; this choice must be approved by the President of the cycle's Jury.

**Electric power and energy systems 2**

**Compulsory course**

- **MECA0450-3** *Renewable energies* (anglais) - Pierre DEWALLEF - [24h Proj., 1j T.]

**Optional courses**

Choose 10 credits from the following list:

- **ELEC0436-1** *Electric Energy Management Systems* (anglais) - Patricia ROUSSEAUX - [12h Labo., 20h Proj.]
  
  **Prérequis:**
  ELEC0029-2 - Electric power systems analysis

- **ELEC0047-1** *Electric power systems dynamics, control and stability* (anglais) - Thierry VAN CUTSEM - [25h Proj.]
  
  **Prérequis:**
  ELEC0029-2 - Electric power systems analysis

- **ELEN0062-1** *Introduction to machine learning* (anglais) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.]

- **MATH0462-1** *Discrete optimization* (anglais) - Quentin LOUFFEAUX - [25h Proj.]

- **ELEN0445-1** *Microgrids* (anglais) - Bertrand CORNÉLUSSE
  
  **Prérequis:**
  ELEC0014-3 - Introduction to electric power and energy systems

- **CHIM0664-1** *Electrochemical energy conversion and storage* (anglais) - Nathalie JOB - [15h Labo.]

[...]

**Remark:** students who would have taken some of these courses previously in their program must replace them by other courses from the faculty of engineering; this choice must be approved by the President of the cycle's Jury.

**General optional courses**

Choose 15 credits from the list below:

- **ASTG0019-1** *Internship (distinct from master's thesis)* (anglais) - Christophe GEUZAINÉ - [40j T.]
  
  **Remarque:** the course units ASTG0019-1 and ASTG0026-1 are mutually exclusive.
ASTG0026-1  Internship (linked to master's thesis) (anglais) - COLLÉGIALITÉ, Christophe GEUZAINÉ - [80h T. t.]

INGE0012-1  Scientific research in engineering and its impact on innovation (anglais) - Rodolphe SEPULCHRE

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

Choose 15 credits from :

[...] The remaining credits can then be chosen amongst all the courses listed in the other Thematic optional courses, the internship, (regardless of the option). This choice must be approved by the President of the cycle's Jury. Students who have already taken one or more optional courses found in the list cannot take them again.

[...] or amongst the courses that have not been taken in Bloc 1. This choice must be approved by the President of the cycle's Jury. Students who have already taken one or more optional courses found in the list cannot take them again.

Professional focus in sustainable automotive engineering

PROJ0013-1  Innovation project in automotive engineering (anglais) - Olivier BRULS, Georges DE PELSEMAEKER, Grigorios DIMITRIADIS, Pierre DUYSINX, Vincent LEMORT - [80h Proj., 1j T. t.]
Corequis :
MECA0492-2 - Vehicle dynamics
MECA0497-2 - Vehicle performance

MECA0492-2  Vehicle dynamics (anglais) - Pierre DUYSINX
Corequis :
MECA0496-2 - Materials for automotive applications
MECA0494-3 - Vehicle components I
MECA0493-2 - Vehicle aerodynamics

MECA0493-2  Vehicle aerodynamics (anglais) - Grigorios DIMITRIADIS
Corequis :
MECA0496-2 - Materials for automotive applications
MECA0494-3 - Vehicle components I
MECA0492-2 - Vehicle dynamics

MECA0494-3  Vehicle components I (anglais) - Olivier BRULS, Pierre DUYSINX
Corequis :
MECA0496-2 - Materials for automotive applications
MECA0493-2 - Vehicle aerodynamics
MECA0492-2 - Vehicle dynamics

MECA0496-2  Materials for automotive applications (anglais)
Corequis :
MECA0494-3 - Vehicle components I
MECA0493-2 - Vehicle aerodynamics
MECA0492-2 - Vehicle dynamics

MECA0497-2  Vehicle performance (anglais) - Mustapha BELHABIB, Pierre DUYSINX - [1j T. t.]
Corequis :
MECA0501-1 - Thermal and Electrical Management of vehicles
MECA0500-2 - Hybrid electric and fuel cell vehicles
MECA0499-2 - Electric traction motors
MECA0498-2 - Internal combustion engines

MECA0498-2  Internal combustion engines (anglais) - Philippe NGENDAKUMANA
Corequis :
MECA0501-1 - Thermal and Electrical Management of vehicles
MECA0500-2 - Hybrid electric and fuel cell vehicles
MECA0499-2 - Electric traction motors
MECA0497-2 - Vehicle performance
MECA0499-2  *Electric traction motors* (anglais) - Johan GYSSELINCK  
**Corequis :**  
MECA0501-1 - Thermal and Electrical Management of vehicles  
MECA0500-2 - Hybrid electric and fuel cell vehicles  
MECA0498-2 - Internal combustion engines  
MECA0497-2 - Vehicle performance  

MECA0500-2  *Hybrid electric and fuel cell vehicles* (anglais) - Pierre DUY SinX, Nathalie Job  
**Corequis :**  
MECA0501-1 - Thermal and Electrical Management of vehicles  
MECA0499-2 - Electric traction motors  
MECA0498-2 - Internal combustion engines  
MECA0497-2 - Vehicle performance  

MECA0501-1  *Thermal and Electrical Management of vehicles* (anglais) - Vincent LEMORT  
**Corequis :**  
MECA0500-2 - Hybrid electric and fuel cell vehicles  
MECA0499-2 - Electric traction motors  
MECA0498-2 - Internal combustion engines  
MECA0497-2 - Vehicle performance  

**Research focus**  
À destination des étudiants qui ont suivi cette finalité en 2015-2016.  

**Bloc d’aménagement du programme de l’année**  

**Crédits supplémentaires Master en Ingénieur Civil Electricien**  

**Optional courses**  
The individual program of each transfer student will be established by the jury on the basis of his/her background. If some of the prerequisite are not met, this program will contain up to 60 additional credits mainly taken from the list below. Students who do not speak French will never be committed to take subjects/courses that are only taught in French.  

- **ELEC0431-2**  *Electromagnetic energy conversion* (anglais) - Christophe GEUZAINé  
  [15h Labo.]  
  Q2 30 15  [+]  5  

- **ELEC0052-2**  *Analyse et conception des systèmes de mesures électriques*  
  Philippe VANDERBEMDEN - [24h Labo.]  
  Q1 30 6  [+]  5  

- **ELEC0053-2**  *Circuits électriques* - Patricia ROUSSEAUX  
  Q2 30 30 -  5  

- **ELEN0040-1**  *Digital electronics* (anglais) - Michael KRAFT  
  Q2 30 30 -  5  

- **ELEN0076-1**  *Electromagnétisme* - Patricia ROUSSEAUX, Benoît VANDERHEYDEN  
  Q1 30 30 -  5  

- **ELEN0008-1**  *Principes des télécommunications analogiques et numériques* -  
  Marc VAN DROOGENBROECK  
  Q2 30 30 -  5  

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

- **ELEN0070-2**  *Signal processing* (anglais) - Jacques VERLY - [40h Proj.]  
  Q2 45 15  [+]  5  

(...)]  

Choisir maximum 20 crédits pour compléter le cursus  

**Priority courses**  

- **ELEC0431-2**  *Electromagnetic energy conversion* (anglais) - Christophe GEUZAINé - [15h Labo.]  
  Q2 30 15  [+]  5  

- **ELEC0052-2**  *Analyse et conception des systèmes de mesures électriques*  
  Philippe VANDERBEMDEN - [24h Labo.]  
  Q1 30 6  [+]  5  

- **ELEC0053-2**  *Circuits électriques* - Patricia ROUSSEAUX  
  Q2 30 30 -  5  

ULg : Administration de l’Enseignement et des Etudiants - Affaires Académiques  
Responsable de l’information : Monique Marcourt, Direction générale à l’Enseignement et à la Formation  
Date de validité des données : 17/05/2017 - Page 6 / 6