# Cycle view of the study programme

| | | Bl | Or | Th | Pr | Au | Cr |

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 all the 50 credits of the compulsory courses (including the master thesis), 30 credits from of the professional focus, 15 credits from the list of transversal methodology courses, and 25 credits of other optional courses.

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.

## Focus courses (B1 : 25Cr, B2 : 5Cr)

[...] 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.

| Code | Course | Bl | Or | Th | Pr | Au | Cr |
|---|---|---|---|---|---|---|---|
| ELEN0004-1 | *Semiconductor devices* (english language) - Benoît VANDERHEYDEN | B1 | Q1 | 26 | 26 | - | **5** |
| ELEN0037-1 | *Microelectronics and IC design* (english language) - JeanMichel REDOUTÉ - [40h Proj.] | B1 | Q2 | 30 | 20 | [+] | **5** |
| ELEN0074-1 | *Sensors, microsensors and instrumentation* (english language) - Philippe VANDERBEMDEN - [20h Labo.] | B1 | Q2 | 30 | - | [+] | **5** |
| SYST0020-1 | *Introduction to microsystems and microtechnology* (english language) - Tristan GILET, JeanMichel REDOUTÉ - [4h Labo., 20h Proj.] | B1 | Q2 | 24 | 18 | [+] | **5** |
| ELEN0017-1 | *Analysis and Design of Telecommunications Systems* (english language) - Marc VAN DROOGENBROECK | B1 | Q1 | 26 | 26 | - | **5** |
| ELEN0447-1 | *High-frequency electronics* (english language) - JeanMichel REDOUTÉ, Benoît VANDERHEYDEN - [10h Labo.] | B2 | Q1 | 26 | 12 | [+] | **5** |

## Compulsory courses from the core curriculum (B1 : 20Cr, B2 : 30Cr)

| Code | Course | Bl | Or | Th | Pr | Au | Cr |
|---|---|---|---|---|---|---|---|
| ELEN0448-1 | *Applied Electricity and Electronics* (english language) - JeanMichel REDOUTÉ, Philippe VANDERBEMDEN | B1 | Q1 | 26 | 26 | - | **5** |
| INFO0064-2 | *Embedded systems* (english language) - Bernard BOIGELOT<br>**Corequisite :**<br>APRI0007-1 - Major project in electrical engineering | B1 | Q1 | 25 | 20 | - | **3** |
| ELEC0055-2 | *Element of power Electronics, Part A* (english language) - Fabrice FREBEL<br>**Corequisite :**<br>ELEC0431-2 - Electromagnetic energy conversion | B1 | Q1 | 30 | 6 | - | **3** |
| APRI0007-1 | *Major project in electrical engineering* (english language) - Marc BIRON, Bernard BOIGELOT, Guillaume DRION, JeanMichel REDOUTÉ - [300h Proj.]<br>**Corequisite :**<br>ELEC0431-2 - Electromagnetic energy conversion<br>ELEC0052-2 - Mesures électriques : fondements et applications<br>ELEC0053-2 - Circuits électriques<br>ELEC0055-2 - Element of power Electronics<br>INFO0064-2 - Embedded systems | B1 | TA | 20 | - | [+] | **9** |
| GEST3162-1 | *Principles of management* (english language) - Thomas PIRSOUL, Willem STANDAERT - [25h Proj.] | B2 | Q1 | 30 | - | [+] | **5** |
| ATFE0014-1 | *Master Thesis* (english language) - COLLÉGIALITÉ, Marc VAN DROOGENBROECK - [750h Proj.] | B2 | TA | - | - | [+] | **25** |

## Optional courses from the core curriculum (B1 : 15Cr, B2 : 25Cr)

Choose three among the following transversal courses that can be spread over the 2 blocks (B1 : 15Cr)

### Transversal courses

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ELEN0060-2 | *Information and coding theory* (english language) - Louis WEHENKEL - [30h Proj.] | B1 | Q2 | 30 | 15 | [+] | **5** |
| INFO8003-1 | *Reinforcement learning* (english language) - Damien ERNST - [45h Proj.] | B1 | Q2 | 25 | 10 | [+] | **5** |
| ELEN0062-1 | *Introduction to machine learning* (english language) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.] | B1 | Q1 | 30 | 5 | [+] | **5** |
| INFO0062-1 | *Object-oriented programming* (english language) - Bernard BOIGELOT - [20h Proj.] | B1 | Q2 | 25 | 20 | [+] | **5** |
| INFO0939-1 | *High performance scientific computing* (english language) - Christophe GEUZAINE - [20h Proj.] | B1 | Q1 | 30 | 15 | [+] | **5** |
| MATH0461-2 | *Introduction to numerical optimization* (english language) - Quentin LOUVEAUX - [25h Proj.] | B1 | Q1 | 30 | 20 | [+] | **5** |
| MATH0462-1 | *Discrete optimization* (english language) - Quentin LOUVEAUX - [25h Proj.] | B1 | Q2 | 30 | 20 | [+] | **5** |

Complete your programme with 25 credits chosen among any of the courses listed above (that are not already part of your programme) or in the list below (this choice must be approved by the President of the cycle's Jury). (B2 : 25Cr)

Remark : the courses ELEC0431-2, ELEC0052-2 et ELEC0053-2 (see the list "Fundamentals of Electrical Engineering" are corequisite to some compulsory courses of the master program. They must be taken prioritarily, unless they were already taken as part of the bachelor in engineering, or unless the corresponding knowledge and skills have been acquired previously.

### Fundamentals of Electrical Engineering

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ELEC0431-2 | *Electromagnetic energy conversion* (english language) - Christophe GEUZAINE - [15h Labo.] | B2 | Q2 | 30 | 15 | [+] | **5** |
| ELEC0052-2 | *Electric measurements: foundations and applications* - Philippe VANDERBEMDEN - [24h Labo.] | B2 | Q1 | 30 | 6 | [+] | **5** |
| ELEC0053-2 | *Electric circuits* - Bertrand CORNÉLUSSE | B2 | Q2 | 26 | 26 | - | **5** |

Remark : the course units ASTG0019-1 et ASTG0026-1 are mutually exclusive.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ASTG0019-1 | *Internship (distinct from master's thesis)* (english language) - JeanMichel REDOUTÉ - [40d FW] | B2 | TA | - | - | [+] | **10** |
| ASTG0026-1 | *Internship (linked to master's thesis)* (english language) - COLLÉGIALITÉ, Marc VAN DROOGENBROECK - [80d FW] | B2 | TA | - | - | [+] | **2** |

### Smart grids

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ELEC0449-1 | *Practices and evolution of the electric power and energy industry* (english language) - Bertrand CORNÉLUSSE, Damien ERNST, Louis WEHENKEL - [12h Proj., 6d FW]<br>**Prerequisite :**<br>ELEC0447-1 - Analysis of electric power and energy systems<br>ELEC0018-1 - Energy markets and regulation | B2 | TA | - | - | [+] | **5** |
| CHIM0664-1 | *Electrochemical energy conversion and storage* (english language)<br>- *part 1* - Nathalie JOB<br>- *part 2* - Nathalie JOB - [15h Labo.] | B2 | Q1<br>15<br>- | -<br>- | -<br>[+] | | **3** |

### Electronic systems and devices

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| GBIO0029-1 | *Bioelectronics* (english language) - JeanMichel REDOUTÉ - [20h Labo., 20h Proj.] | B2 | Q1 | 30 | 15 | [+] | **5** |
| ELEN0069-1 | *Nanoelectronics / Optoelectronics* (english language) - Benoît VANDERHEYDEN - [40h Proj.]<br>**Corequisite :**<br>ELEN0004-1 - Semiconductor devices | B2 | Q2 | 30 | - | [+] | **5** |
| ELEN0445-1 | *Microgrids* (english language) - Bertrand CORNÉLUSSE - [24h Proj., | B2 | Q1 | 18 | 18 | [+] | **5** |

1d FW]

| ELEN0047-1 | *Superconductivity* (english language) - Philippe VANDERBEMDEN - [15h Labo.] | B2 | Q1 | 30 | - | [+] | **5** |
|---|---|---|---|---|---|---|---|

**Neuromorphic engineering**

| GBIO0008-2 | *Medical imaging* (english language) - Christophe PHILLIPS - [8h Labo., 1d FW] | B2 | Q2 | 33 | 12 | [+] | **5** |
|---|---|---|---|---|---|---|---|
| INFO8004-1 | *Advanced Machine learning* (english language) - Pierre GEURTS, Gilles LOUPPE, Louis WEHENKEL - [20h Proj.] **Corequisite :** INFO8010-1 - Deep learning ELEN0062-1 - Introduction to machine learning | B2 | Q2 | 25 | - | [+] | **5** |
| INFO8006-1 | *Introduction to artificial intelligence* (english language) - Gilles LOUPPE - [45h Proj.] | B2 | Q1 | 25 | 20 | [+] | **5** |
| INFO8010-1 | *Deep learning* (english language) - Gilles LOUPPE - [60h Proj.] | B2 | Q2 | 30 | - | [+] | **5** |
| GNEU0004-1 | *Computational cognitive modelling* (english language) - Alessio FRANCI | B2 | Q1 | 26 | 26 | - | **5** |

[...] Possibility to choose 10 credits of courses in the ULiège programmes or from the UNIC course catalog : this choice must have the approval of the cycle's juryPresident

# Bridging courses Master in electrical engineering

*Notice* : 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.

**Optional courses (B0 : 30Cr)**

[...] Choose 1 to 30 credits from :

| ELEC0431-2 | *Electromagnetic energy conversion* (english language) - Christophe GEUZAINE - [15h Labo.] | B0 | Q2 | 30 | 15 | [+] | **5** |
|---|---|---|---|---|---|---|---|
| ELEC0052-2 | *Electric measurements: foundations and applications* - Philippe VANDERBEMDEN - [24h Labo.] | B0 | Q1 | 30 | 6 | [+] | **5** |
| ELEC0053-2 | *Electric circuits* - Bertrand CORNÉLUSSE | B0 | Q2 | 26 | 26 | - | **5** |
| ELEN0040-1 | *Digital electronics* (english language) - JeanMichel REDOUTÉ | B0 | Q2 | 26 | 26 | - | **5** |
| ELEN0076-1 | *Electromagnetism* - Benoît VANDERHEYDEN | B0 | Q1 | 26 | 26 | - | **5** |
| ELEN0008-1 | *Principles of analog and digital telecommunications systems* - Marc VAN DROOGENBROECK | B0 | Q2 | 26 | 26 | - | **5** |
| ELEN0075-3 | *Analog Electronics* - Benoît VANDERHEYDEN - [16h Labo.] | B0 | Q2 | 29 | 23 | [+] | **5** |

[...] Choose a maximum of 25 off-list credits

# Bridging courses Master in electrical engineering

that are only taught in French.

## Optional courses (B0 : 60Cr)

[...] Choose 31 to 60 credits from :

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ELEC0431-2 | *Electromagnetic energy conversion* (english language) - Christophe GEUZAINE - [15h Labo.] | B0 | Q2 | 30 | 15 | [+] | **5** |
| ELEC0052-2 | *Electric measurements: foundations and applications* - Philippe VANDERBEMDEN - [24h Labo.] | B0 | Q1 | 30 | 6 | [+] | **5** |
| ELEC0053-2 | *Electric circuits* - Bertrand CORNÉLUSSE | B0 | Q2 | 26 | 26 | - | **5** |
| ELEN0040-1 | *Digital electronics* (english language) - JeanMichel REDOUTÉ | B0 | Q2 | 26 | 26 | - | **5** |
| ELEN0076-1 | *Electromagnetism* - Benoît VANDERHEYDEN | B0 | Q1 | 26 | 26 | - | **5** |
| ELEN0008-1 | *Principles of analog and digital telecommunications systems* - Marc VAN DROOGENBROECK | B0 | Q2 | 26 | 26 | - | **5** |
| ELEN0075-3 | *Analog Electronics* - Benoît VANDERHEYDEN - [16h Labo.] | B0 | Q2 | 29 | 23 | [+] | **5** |

[...] Choose a maximum of 25 off-list credits

## Bridging courses M. electro-mech. engineer. (gen.)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ELEC0431-2 | *Electromagnetic energy conversion* (english language) - Christophe GEUZAINE - [15h Labo.] | B0 | Q2 | 30 | 15 | [+] | **5** |
| ELEC0052-2 | *Electric measurements: foundations and applications* - Philippe VANDERBEMDEN - [24h Labo.] | B0 | Q1 | 30 | 6 | [+] | **5** |
| ELEC0053-2 | *Electric circuits* - Bertrand CORNÉLUSSE | B0 | Q2 | 26 | 26 | - | **5** |
| ELEN0040-1 | *Digital electronics* (english language) - JeanMichel REDOUTÉ | B0 | Q2 | 26 | 26 | - | **5** |
| ELEN0076-1 | *Electromagnetism* - Benoît VANDERHEYDEN | B0 | Q1 | 26 | 26 | - | **5** |
| ELEN0008-1 | *Principles of analog and digital telecommunications systems* - Marc VAN DROOGENBROECK | B0 | Q2 | 26 | 26 | - | **5** |
| ELEN0075-3 | *Analog Electronics* - Benoît VANDERHEYDEN - [16h Labo.] | B0 | Q2 | 29 | 23 | [+] | **5** |