ELME2 Ingénieur civil électromécanicien (Diploma of the Second Cycle (Ingénieur civil) in Electromechanical Engineering)

Programme management

ELME Commission interdépartementale de gestion des programmes électricité et mécanique
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Study objectives

The programmes leading to the degree in Civil Electro-mechanics Engineering - Mecatronics orientation and Energy orientation - aim to train engineers with a pluridisciplinary profile, capable of managing interface problems posed by the integration of several subject areas within a given equipment or system. The Mechatronics orientation puts the focus on studies in electronics, mechanical production and automatics, the Energy orientation put the focus on electricity, thermodynamics and energetics..

Admission conditions

The programme leading to a degree in Civil Electro-mechanics Engineering is accessible to all students holding the first university study cycle diploma ("candidature") in Civil Engineering. Industrial engineers and certain university degree holders in subjects relating to the Exact Sciences may also be entitled access, as may students with a foreign degree judged as being equivalent.

Admission procedure

The University admission and enrolment procedures are detailed in the section : "Access to studies" on the web page : http://www.ucl.ac.be/etudes/libres/acces.html

General structure of the programme

The choice of the Energy or Mechatronics orientations is made right from the start of the 1st year, with the possibility of a reorientation at the end of the 1st quadrimester. The individual work tasks and projects play an important role in the study programme, in the form of actvities attached to the course subjects, in the form of a pluridisciplinary project (integrated project in mechatronics) and in the form of an end of course project.

Programme content

1. Programme composition

The Civil Electro-mechanic Engineering degree may be obtained either in the " Mechatronic " orientation or in the " Energy " orientation.

"Mechatronics" orientation
General and polyvalent courses
General courses

FSA2140	Eléments de droit industriel[22.5h] (2 credits) (in French)	Gilbert Demez
FSA2300	Religious Science Questions[15h] (2 credits) (in French)	Bernard Van Meenen
INMA2701	Applied mathematics : Signals and systems[30h+30h] (5 credits) (in French)	Luc Vandendorpe, Vincent Wertz
INGI2716	Computer science 3[30h+30h] (5 credits) (in French)	Marc Lobelle
Two courses to be chosen from among :		
FSA2230	Introduction to management and to business economics[30h+15h] (4 credits) (in French)	Paul Belleflamme, Benoît Gailly
FSA2240	Gestion financière et comptable[30h+15h] (4 credits) (in French)	Philippe Grégoire

FSA2250	Project management[15h+15h] (3 credits) (in French)	Jean-Pierre Decostre
FSA2323	none[30h+15h] (4 credits) (in French)	Jean-Pierre Hansen, Yves Smeers

Polyvalent courses

MECA2855	Thermodynamics and energetics.[45h+30h] (6 credits) (in French)	Michel Giot, Hervé Jeanmart, Miltiadis Papalexandris
MECA2901	Continuum mechanics.[30h+30h] (5 credits) (in French)	François Dupret
MECA2100	Deformable solid mechanics.[45h+45h] (7 credits) (in French)	Issam Doghri

Specialised courses

These include a collection of courses managed by the MECA, ELEC, INMA and INFO Departments, as well as an integrated interdisciplinary project. The programme details are given in point 2.

Options

Each student will make a choice of technical courses leading to a programme comprising at least 170 credits , throughout the duration of the three years. This programme may include courses from KULeuven; it must be approved by the ELME degree programme Mangement Committee.

Language course

During the second study cycle, the students may follow various language courses, organised by the ILV. These courses represent a minimum of 30 hours (3 credits) within the total volume of the optional part of their programme.
A specific course, aimed at improving the linguistic skills and professional interactive communication capacities of the students, is especially organised for the FSA students.

ANGL2470	English communication skills for engineers[30h] (3 credits)	Ahmed Adrioueche, Henri November, Severine Schmit

Apprenticeship

The students are encouraged to carry out an apprenticeship in a firm for a minimal duration of four weeks during their second cycle of studies. This apprenticeship represents 3 ECTS of the calculated volume of their programme. It is subject to the prior approval of the apprenticeship supervisor from the programme Management Committee and will conclude with a report. it will be ratified by an evaluation specifying "has/has not satisfied the requirements".

End of course project

This piece of work represents an individual work load equivalent to half a year's work (25 credits).

"Energy" orientation

General and polyvalent courses

General courses

FSA2140	Eléments de droit industriel[22.5h] (2 credits) (in French)	Gilbert Demez
FSA2300	Religious Science Questions[15h] (2 credits) (in French)	Bernard Van Meenen
INMA2701	Applied mathematics : Signals and systems[30h+30h] (5 credits) (in French)	Luc Vandendorpe, Vincent Wertz
INGI2716	Computer science 3[30h+30h] (5 credits) (in French)	Marc Lobelle

Two courses to be chosen from among :

FSA2230	Introduction to management and to business economics[30h+15h] (4 credits) (in French)	Paul Belleflamme, Benoît Gailly
FSA2240	Gestion financière et comptable[30h+15h] (4 credits) (in French)	Philippe Grégoire
FSA2250	Project management[15h+15h] (3 credits) (in French)	Jean-Pierre Decostre
FSA2323	none[30h+15h] (4 credits) (in French)	Jean-Pierre Hansen, Yves Smeers

Polyvalent courses

MAPR2805	Introduction to materials science[45h] (4 credits) (in French)	Jean-Christophe Charlier, Roger Legras (coord.), Thomas Pardoen
MECA2100	Deformable solid mechanics.[45h+45h] (7 credits) (in French)	Issam Doghri

The students will only follow [30 hours + 30 hours]

MECA2855	Thermodynamics and energetics.[45h+30h] (6 credits) (in French)	Michel Giot, Hervé Jeanmart, Miltiadis Papalexandris

Specialised courses

These include a collection of courses managed by the MECA, ELEC and INMA Departments. The programme details are given in point 2.

Options

Each student will make a choice of technical courses leading to a programme comprising at least 170 credits throughout the duration of the three years. This programme may include courses from KULeuven; it must be approved by the ELME programme Management Committee.

Language course

During the second cycle, the students may follow various language courses, organised by the ILV. These courses represent a minimum of 30 hours (3 credits) of the total volume of the optional part of their programme.
A specific course aimed at improving the linguistic skills and professional interactive communication capacities of the students, is especially organised for the FSA students.

ANGL2470	English communication skills for engineers[30h] (3 credits)	Ahmed Adrioueche, Henri November, Severine Schmit

Apprenticeship

The students are encouraged to carry out an apprenticeship in a firm for a minimal duration of four weeks during their second cycle of studies. This apprenticeship represents 3 ECTS of the calculated volume of their programme. It is subject to the prior approval of the apprenticeship supervisor from the programme Management Committee and will conclude with a report. it will be ratified by an evaluation specifying "has/has not satisfied the requirements".

End of course project

This piece of work represents an individual work load equivalent to half a year's work (25 credits).

2. Programme per year of studies

The programmes listed below only present the compulosry courses. In ELME 22 or ELME 23, the students must take semi-optional courses and options. For the former, they need to choose a certain number of courses from an imposed list in two domains : Economics (for all students) and Automatics (only for the Mechatronics orientation).

1. Economics : choice of two courses from among the following four :

FSA2230	Introduction to management and to business economics[30h+15h] (4 credits) (in French)	Paul Belleflamme, Benoît Gailly
FSA2240	Gestion financière et comptable[30h+15h] (4 credits) (in French)	Philippe Grégoire
FSA2250	Project management[15h+15h] (3 credits) (in French)	Jean-Pierre Decostre
FSA2323	none[30h+15h] (4 credits) (in French)	Jean-Pierre Hansen, Yves Smeers

2. Automatics : the mechatronicians will choose only one course in Automatics from among the following five :

MECA2671	Automatic : Theory and implementation[30h+45h] (6 credits) (in French)	Michel Gevers, Vincent Wertz
INMA2370	Modelling and analysis of dynamical systems[30h+30h] (5 credits) (in French)	Georges Bastin, Vincent Wertz
ELEC2875	SYSTEM IDENTIFICATION[30h+30h] (5 credits) (in French)	Michel Gevers
INMA2360	Advanced methods in automatic control[30h+22.5h] (5 credits) (in French)	Georges Bastin, Michel Gevers (coord.), Vincent Wertz
INMA2361	Nonlinear systems[30h+22.5h] (5 credits) (in French)	Rodolphe Sepulchre

As far as the options are concerned, each student will make a choice of optional courses leading to a programme comprising at least 175 credits throughout the duration of the three years. The student may, subject to the agreement of the ELME programme Management Committee, modify the spreading of the volume between ELME 22 and ELME 23, by inverting the compulsory or optional courses. The programme of each student will be submitted to the ELME programme Management Committe for approval.

ELME 21 First year

"Mechatronics" orientation

First quadrimester

INMA2701	Applied mathematics : Signals and systems[30h+30h] (5 credits) (in French)	Luc Vandendorpe, Vincent Wertz
MECA2855	Thermodynamics and energetics.[45h+30h] (6 credits) (in French)	Michel Giot, Hervé Jeanmart, Miltiadis Papalexandris
MECA2901	Continuum mechanics.[30h+30h] (5 credits) (in French)	François Dupret
ELEC2755	Electricity : Advanced topics[30h+30h] (5 credits) (in French)	Anne-Marie Anckaert, Danielle Janvier
ELEC2370	Measurements and electrical circuits[45h+30h] (7 credits) (in French)	Christian Eugène, Francis Labrique, Charles Trullemans
ELEC2101	Project in Electricity 1 : Electrical circuits[0h+60h] (5 credits) (in French)	Christian Eugène, Francis Labrique, Charles Trullemans

Second quadrimester

MECA2100	Deformable solid mechanics.[45h+45h] (7 credits) (in French)	Issam Doghri
MECA2953	Kinematics and dynamics of machinery.[22.5h+7.5h] (3 credits) (in French)	David Johnson

ELEC2310	Electromechanical converters[30h+30h] (5 credits) (in French)	Bruno Dehez (supplée N.), Francis Labrique
ELEC2102	Project in Electricity 2 : Physics of electricity[0h+60h] (5 credits) (in French)	Christophe Craeye, Christophe Craeye (supplée N.), Denis Flandre, Denis Flandre (supplée N.), Danielle Janvier, Danielle Janvier (coord.), Danielle Janvier (supplée N.)
ELEC2510	Linear Control Systems[30h+37.5h] (5 credits) (in French)	Georges Bastin, Denis Dochain
ELEC2530	Electronics I : Basic amplifiers circuits[30h+30h] (5 credits) (in French)	Jean-Didier Legat, Charles Trullemans
MECA2510	Dynamics of elastic systems.[30h+30h] (5 credits) (in French)	Jean-Pierre Coyette, David Johnson
MECA2321	Fluid mechanics and transfer II.[30h+30h] (5 credits) (in French)	Vincent Legat, Grégoire Winckelmans

"Energy" orientation

First quadrimester

INMA2701	Applied mathematics : Signals and systems[30h+30h] (5 credits) (in French)	Luc Vandendorpe, Vincent Wertz
MAPR2805	Introduction to materials science[45h] (4 credits) (in French)	Jean-Christophe Charlier, Roger Legras (coord.), Thomas Pardoen
MECA2901	Continuum mechanics.[30h+30h] (5 credits) (in French)	François Dupret
ELEC2370	Measurements and electrical circuits[45h+30h] (7 credits) (in French)	Christian Eugène, Francis Labrique, Charles Trullemans
ELEC2755	Electricity : Advanced topics[30h+30h] (5 credits) (in French)	Anne-Marie Anckaert, Danielle Janvier

The students will only follow [15 hours + 15 hours]

ELEC2101	Project in Electricity 1 : Electrical circuits[0h+60h] (5 credits) (in French)	Christian Eugène, Francis Labrique, Charles Trullemans
MECA2855	Thermodynamics and energetics.[45h+30h] (6 credits) (in French)	Michel Giot, Hervé Jeanmart, Miltiadis Papalexandris
MECA2200	Mecanical construction project I.[45h] (3 credits) (in French)	David Johnson, Benoît Raucent

Second quadrimester

INGI2716	Computer science 3[30h+30h] (5 credits) (in French)	Marc Lobelle
MECA2100	Deformable solid mechanics.[45h+45h] (7 credits) (in French)	Issam Doghri
MECA2953	Kinematics and dynamics of machinery.[22.5h+7.5h] (3 credits) (in French)	David Johnson
ELEC2310	Electromechanical converters[30h+30h] (5 credits) (in French)	Bruno Dehez (supplée N.), Francis Labrique
ELEC2102	Project in Electricity 2 : Physics of electricity[0h+60h] (5 credits) (in French)	Christophe Craeye, Christophe Craeye (supplée N.), Denis Flandre, Denis Flandre (supplée N.), Danielle Janvier, Danielle Janvier (coord.), Danielle Janvier (supplée N.)
MECA2200	Mecanical construction project I.[45h] (3 credits) (in French)	David Johnson, Benoît Raucent
MECA2321	Fluid mechanics and transfer II.[30h+30h] (5 credits) (in French)	Vincent Legat, Grégoire Winckelmans
MECA2510	Dynamics of elastic systems.[30h+30h] (5 credits) (in French)	Jean-Pierre Coyette, David Johnson

ELME 22 Second year

"Mechatronics" orientation

First quadrimester

ELEC2531	Electronics II : Digital electronic circuits[30h+30h] (5 credits) (in French)	Jean-Didier Legat, Charles Trullemans
ELEC2660	Power electronic[30h+30h] (5 credits) (in French)	Francis Labrique
ELEC2103	Project in Electricity 3 : Electronic systems[90h] (6 credits) (in French)	Jean-Didier Legat, Jean-Didier Legat (supplée N.), Luc Vandendorpe

This course is taught over the two quadrimesters

MECA2821	Design of machinery.[30h+30h] (5 credits) (in French)	Bruno de Meester de Betzenbroeck,

		Benoît Raucent
MECA2755	Industrial automation.[30h+30h] (5 credits) (in French)	Hervé Buyse, Paul Fisette, Jean-Claude Samin
ELEC2811	Instrumentation and sensors[30h+30h] (5 credits) (in French)	Hervé Buyse, Christian Eugène
Second quadrimester		
ELEC2313	Electronic control of electromechanical converters[30h+30h] (5 credits) (in French)	Bruno Dehez (supplée N.), Francis Labrique
ELEC2532	Electronics III : Analog electronic circuits[30h+30h] (5 credits) (in French)	Jean-Didier Legat, Charles Trullemans, Charles Trullemans (supplée Jean-Didier Legat)
ELEC2811	Instrumentation and sensors[30h+30h] (5 credits) (in French)	Hervé Buyse, Christian Eugène
INGI2315	Computer systems: real-time aspects[30h+15h] (4 credits) (in French)	Jean-Didier Legat, Marc Lobelle (coord.)
INGI2716	Computer science 3[30h+30h] (5 credits) (in French)	Marc Lobelle
MECA2451	Mechanical manufacturing.[45h+30h] (6 credits) (in French)	Bruno de Meester de Betzenbroeck, Jean-François Debongnie
MECA2845	Project work in mechatronics.[30h+45h] (6 credits) (in French)	Paul Fisette (coord.), Ernest Matagne, Benoît Raucent
"Energy" orientation		
First quadrimester		
ELEC2752	Electronics[30h+15h] (4 credits) (in French)	Hervé Buyse
ELEC2311	PHYSICS OF ELECTROMECHANICAL CONVERTERS[15h+22.5h] (3 credits) (in French)	Hervé Buyse, Ernest Matagne
ELEC2520	ELECTRIC POWER SYSTEMS[30h+30h] (5 credits) (in French)	Noël Janssens
MECA2150	Thermal cycles.[30h+30h] (5 credits) (in French)	Yann Bartosiewicz, Joseph Martin
MECA2160	Fuels and combustion.[30h+15h] (4 credits) (in French)	Miltiadis Papalexandris, Jacques Vandooren
MECA2322	Fluid mechanics and transfer II.[30h+30h] (5 credits) (in French)	Michel Giot, Grégoire Winckelmans
MECA2821	Design of machinery.[30h+30h] (5 credits) (in French)	Bruno de Meester de Betzenbroeck, Benoît Raucent
Second quadrimester		
MECA2451	Mechanical manufacturing.[45h+30h] (6 credits) (in French)	Bruno de Meester de Betzenbroeck, Jean-François Debongnie
ELEC2754	Electronics : advanced topics[15h+22.5h] (3 credits) (in French)	Hervé Buyse, Francis Labrique
MECA2220	Internal combustion engines.[30h+15h] (4 credits) (in French)	Hervé Jeanmart
MECA2780	Fluid compressors.[30h+15h] (4 credits) (in French)	Tony Arts

ELME 23 Third year

"Mechatronics" orientation		
First quadrimester		
FSA2140	Eléments de droit industriel[22.5h] (2 credits) (in French)	Gilbert Demez
FSA2300	Religious Science Questions[15h] (2 credits) (in French)	Bernard Van Meenen
"Energy" orientation		
First quadrimester		
FSA2140	Eléments de droit industriel[22.5h] (2 credits) (in French)	Gilbert Demez
FSA2300	Religious Science Questions[15h] (2 credits) (in French)	Bernard Van Meenen
Second quadrimester		
ELEC2930	Intoduction to telecommunication[30h+15h] (4 credits) (in French)	Auguste Laloux
MAPR2300	Process Control[30h+37.5h] (5 credits) (in French)	Georges Bastin, Denis Dochain

Evaluation

The evaluation is organised in the form of exams ; for the subjects including a thesis or a project, the evaluation also includes this work as well as a written and/or oral report. The end of course work presents the opportunity to verify the autonomy of the students in their individual work as well as their capacity to write a thesis and defend it in public.