

Faculty of Applied Sciences



MECA2

Ingénieur civil mécanicien (Diploma of the Second Cycle (Ingénieur civil) in Mechanical Engineering)



Programme management

MECA Département de mécanique

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Study objectives

The study programme in Mechanical Engineering aims to provide in-depth training in all the subjects linked to the mechanical industry. These can be classified in four groups: Technology and Production Techniques ; System Dynamics ; Thermics and Energetics and Mechanics of Liquids and Solids. The job possibilities resulting from these studies are very numerous as the training is particularly polyvalent in nature : for example, mechanical construction (automobile industry or aeronautics), the techniques for forming materials (plastics, metals and alloyage...), as well as the creation and study bureaux and centres of scientific research.

Admission conditions

The programme leading to a degree in Civil Chemical Engineering is accessible to all students holding the first 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 study programme for the technical years (second study cycle) comprises :

- A) General and polyvalent course.
- B) Specialised courses in mechanics. These are grouped together in ten coherent collections called "subject groups" :
 - The "basic subject groups" comprise the courses judged as being fundamental for the studies in Mechanical Engineering. These courses, the content of which provides the groundings for many other specialised courses, are compulsory.
 - Each of the nine other so-called "specialised" groups is composed of courses forming a logical ensemble, leading to a complete training programme in this domain.
 - Within each subject group, certain courses form the associated "shortened module"; they are compulsory.
 - Within each subject group, the non-compulsory courses form a collection of "options", that the student will choose depending on his centres of interest, all the while mindful of the conformity of his programme with the rules imposed by the programme Management Committee.
- C) An end of course thesis, corresponding to 30 credits (representing a little less than half a year's work).

Instructions

The student is obliged to follow all the courses of the subject group, as well as the compulsory courses of each of the nine specialised subjects. The student is nevertheless authorised to only take one of the two compulsory courses "Thermic Cycles" and "Internal Combustion Motors".

The programme of each student (grouping together all the different types of studies) must correspond to a total minimum volume of 165 credits of course attendance (courses, exercises, seminars and laboratory work). The student will carry out an apprenticeship in industry which may count for 3 credits (around 30 hours of course work), for a minimal duration of four weeks, in line with the procedure established by the programme Management Committee.

In order to attain the imposed minimum total of 165 credits of course work/attendance, the student will complete his general and polyvalent courses and his compulsory subjects in the specialised courses with options. By way of example, considering

that the student needs to choose a minimum of 45 credits of options, these courses will be chosen as a priority from the nine specialised subject groups of the programme. It is possible for certain options to be chosen outside of these subject groups, from among the courses offered by the Faculty of Applied Sciences. The choice may even be extended to the whole range of courses offered by the University or by other universities.

The choice of options by each student will be submitted to one of the three study advisors appointed for this function by the programme management Committee. The student's course programmes and their conformity with the regulation established by the programme Management Committee will then be examined for approval on the part of the "Collège", composed of three Advisors for the options and the President of the programme Management Committee. The Committee will take the final decision in case of disagreement or doubt.

Subject "branches"

The specialised study programme is clearly divided up into different subject "branches". By subject "branch", we mean a collection of course options covering the different aspects of a special scientific, technical or industrial domain. These courses are chosen by the programme Committee and selected from the nine subject groups of the Mechanical Engineering programme or from elsewhere on the programmes offered by the Faculty of Applied Sciences, by the University or by other universities. Each study "branch" includes recommended courses and suggested courses, depending on their importance for the particular target studies. However, it is not a question of restrictive rules but rather of proposals and the student remains free to organise his own coherent choice of options, provided this is in line with the regulation of the programme Committee. To date, six different study "branches" are available :

- Aeronautics
- Mechanical Construction
- Metal Formation
- Polymer formation
- Energy
- Biomechanics

Details of the study branches are available at the Secretary's office of the Mechanics Department.

Programme content

1. Programme composition

General and polyvalent courses

General courses

<u>FSA2140</u>	Eléments de droit industriel[22.5h] (2 credits) (in French)	Gilbert Demez
<u>FSA2300</u>	Religious Science Questions[15h] (2 credits) (in French)	Bernard Van Meenen
<u>FSA2323</u>	none[30h+15h] (4 credits) (in French)	Jean-Pierre Hansen, Yves Smeers
<u>FSA2240</u>	Gestion financière et comptable[30h+15h] (4 credits) (in French)	Philippe Grégoire
<u>ANGL2470</u>	English communication skills for engineers[30h] (3 credits)	Ahmed Adriouèche, Henri November, Severine Schmit

Polyvalent courses

<u>ELEC2751</u>	Electrical circuits and measurements[15h+15h] (3 credits) (in French)	Christian Eugène
<u>ELEC2753</u>	POWER ELECTRICAL ENGINEERING[30h+30h] (5 credits) (in French)	Hervé Buyse, Francis Labrique, Ernest Matagne
<u>INMA2701</u>	Applied mathematics : Signals and systems[30h+30h] (5 credits) (in French)	Luc Vandendorpe, Vincent Wertz
<u>INGI2716</u>	Computer science 3[30h+30h] (5 credits) (in French)	Marc Lobelle
<u>MAPR2805</u>	Introduction to materials science[45h] (4 credits) (in French)	Jean-Christophe Charlier, Roger Legras (coord.), Thomas Pardoën
<u>MAPR2806</u>	Introduction to process engineering[30h] (3 credits) (in French)	Denis Dochain
<u>MECA2261</u>	Seminar on engineering.[15h] (1 credits) (in French)	Yannic Wera
<i>The student is obliged to follow one of the two polyvalent courses listed below (according to choice) :</i>		
<u>MAPR2300</u>	Process Control[30h+37.5h] (5 credits) (in French)	Georges Bastin, Denis Dochain
<u>ELEC2510</u>	Linear Control Systems[30h+37.5h] (5 credits) (in French)	Georges Bastin, Denis Dochain

In addition the student will follow a polyvalence course to be chosen from the list below. This choice may even include two polyvalence courses or be extended to other courses in the FSA, subject to the agreement of the MECA degree programme Management Committee.

<u>AMCO2172</u>	Soil Mechanics[30h+22.5h] (5 credits) (in French)	Jacques De Jaeger, Jean-François Thimus
<u>AMCO2361</u>	Building physics 1: thermal characteristics, acoustics, and lighting[30h+15h] (4 credits) (in French)	Marcelo Blasco, André De Herde, Elisabeth Gratia, Peter Wouters
<u>AMCO2363</u>	Building physics II: utilities - Part A: design - Part B: dimensioning[45h+15h] (4 credits) (in French)	Jacques Claessens, Christian Eugène, Jean-Claude Samin, Jean-Marie

<u>ELEC2520</u>	ELECTRIC POWER SYSTEMS[30h+30h] (5 credits) (in French)	Seynhaeve Noël Janssens
<u>ELEC2752</u>	Electronics[30h+15h] (4 credits) (in French)	Hervé Buyse
<u>ELEC2760</u>	Design and optimization of digital circuits and systems[30h+30h] (5 credits) (in French)	Jean-Jacques Quisquater, Charles Trullemans
<u>ELEC2930</u>	Introduction to telecommunication[30h+15h] (4 credits) (in French)	Auguste Laloux
<u>ELEC2795</u>	Telecommunications 2 : Digital transmission and radiocommunications[30h+30h] (5 credits) (in French)	Christophe Craeye, Luc Vandendorpe
<u>MAPR2110</u>	Introduction to materials physics[45h+30h] (6 credits) (in French)	Patrick Bertrand, Jean-Christophe Charlier (coord.), Arnaud Delcorte, Xavier Gonze, Luc Piraux, Gian-Marco Rignanese
<u>MAPR2320</u>	Process development in industrial organic chemistry[30h+15h] (4 credits) (in French)	Christian Bailly, Fernand Thyron
<u>MAPR2392</u>	Physics of polymeric materials[30h+30h] (5 credits) (in French)	Christian Bailly, Sophie Demoustier, Jacques Devaux, Pierre Godard, Alain Jonas, Roger Legras (coord.), Bernard Nysten
<u>MAPR2430</u>	Inorganic industrial chemical processes[30h+15h] (4 credits) (in French)	Juray De Wilde
<u>MAPR2460</u>	INTRODUCTION TO MATERIALS CHARACTERIZATION[30h+15h] (4 credits) (in French)	Patrick Bertrand (coord.), Jacques Devaux, Alain Jonas, Bernard Nysten
<u>MAPR2473</u>	METALLURGICAL PHYSICO-CHEMISTRY[30h+60h] (7 credits) (in French)	Francis Delannay (coord.), Pascal Jacques
<i>The "Civil Mechanical Engineering" students may follow parts A + B [30 hours + 60 hours] (7 credits) or only part A [30 hours + 30 hours] (5 credits).</i>		
<u>INMA2702</u>	Applied mathematics : Optimization[30h+15h] (4 credits) (in French)	Vincent Blondel, François Glineur (supplée Vincent Blondel)
<u>MATH2172</u>	Analyse numérique Ib Résolution numérique des équations (in French)	
<u>MECA2600</u>	Introduction to nuclear engineering and reactor technology.[30h+30h] (5 credits) (in French)	Ernest Mund
<u>MECA2645</u>	Major technological hazards in industrial activity.[30h] (3 credits) (in French)	Michel Giot, Ernest Mund
<u>MECA2646</u>	Reliability and probabilistic risk analysis.[30h] (3 credits) (in French)	Ernest Mund, Yves Smeers
<u>FSA2220</u>	Introduction to life science[60h] (6 credits) (in French)	Spyridon Agathos, Georges Bastin, Jean Lebacq, Philippe Lefevre (coord.), Vincent Legat, Yves-Jacques Schneider

The "Civil Mechanical Engineering" students may follow parts A + B + C [60 hours] (6 credits) or only parts A + B [45 hours] (4.5 credits).

Specialised courses

Subject groups

The shortened modules in subject areas within the mechanics domain are constituted of all the course subjects which do not have the status of optional courses.

- 50.10. Basic subjects in Mechanics.
- 50.11. Mechanics of Liquids and Transfers.
- 50.12. Calculation Methods for Applied Mechanics.
- 50.13. Materials and Structures Mechanics.
- 50.14. Applied Dynamics.
- 50.15. Mechanical Production.
- 50.16. Conception and Projects in Mechanical Engineering.
- 50.17. Mechanical Fabrication .
- 50.18. Thermic Machines .
- 50.19. Thermodynamics and Energetics.

Language course

During the second cycle, the students must follow the course especially organised by the FSA : ANGL2470. This general course represents 3 credits and aims at improving the linguistic skills and the professional interactive communication capacities of the students.

Apprenticeship

The students are encouraged to do an apprenticeship in an enterprise for a minimal duration of four weeks, during their second study cycle. This apprenticeship represents 3 credits (30 hours) of the overall volume of their programme. It is subject to the prior approval of the degree programme Management Committee and concludes with a report. It will be ratified by an evaluation specifying "has/has satisfied the requirements".

2. Programme per year of studies

Before determining his study programme year by year, the student will choose, together with the aid of one of the three Department study advisors, the courses that he will take as options, in line with the rules for the MECA 2 programme constitution.

The programmes listed below only present the compulsory courses (general and polyvalent courses, and the basic course subjects and the shortened modules).

MECA 21 First year

First quadrimester

<u>INMA2701</u>	Applied mathematics : Signals and systems[30h+30h] (5 credits) (in French)	Luc Vandendorpe, Vincent Wertz
<u>ELEC2751</u>	Electrical circuits and measurements[15h+15h] (3 credits) (in French)	Christian Eugène
<u>MAPR2805</u>	Introduction to materials science[45h] (4 credits) (in French)	Jean-Christophe Charlier, Roger Legras (coord.), Thomas Pardoën
<u>MECA2901</u>	Continuum mechanics.[30h+30h] (5 credits) (in French)	François Dupret
<u>MECA2855</u>	Thermodynamics and energetics.[45h+30h] (6 credits) (in French)	Michel Giot, Hervé Jeanmart, Miltiadis Papalexandris
<u>MECA2200</u>	Mecanical construction project I.[45h] (3 credits) (in French)	David Johnson, Benoît Raucent
<i>This project will be spread over the two quadrimesters</i>		
<u>MECA2821</u>	Design of machinery.[30h+30h] (5 credits) (in French)	Bruno de Meester de Betzenbroeck, Benoît Raucent
<u>ANGL2470</u>	English communication skills for engineers[30h] (3 credits)	Ahmed Adriouèche, Henri November, Severine Schmit

This course will be spread over the two quadrimesters.

Second quadrimester

<u>FSA2323</u>	none[30h+15h] (4 credits) (in French)	Jean-Pierre Hansen, Yves Smeers
<u>INGI2716</u>	Computer science 3[30h+30h] (5 credits) (in French)	Marc Lobelle
<u>MECA2953</u>	Kinematics and dynamics of machinery.[22.5h+7.5h] (3 credits) (in French)	David Johnson
<u>MECA2100</u>	Deformable solid mechanics.[45h+45h] (7 credits) (in French)	Issam Doghri
<u>MECA2321</u>	Fluid mechanics and transfer II.[30h+30h] (5 credits) (in French)	Vincent Legat, Grégoire Winckelmans
<u>MECA2451</u>	Mechanical manufacturing.[45h+30h] (6 credits) (in French)	Bruno de Meester de Betzenbroeck, Jean-François Debongnie
<u>MECA2510</u>	Dynamics of elastic systems.[30h+30h] (5 credits) (in French)	Jean-Pierre Coyette, David Johnson

MECA 22 Second year

First quadrimester

<u>FSA2300</u>	Religious Science Questions[15h] (2 credits) (in French)	Bernard Van Meenen
<i>This course may be followed in MECA 23.</i>		
<u>MECA2150</u>	Thermal cycles.[30h+30h] (5 credits) (in French)	Yann Bartosiewicz, Joseph Martin
<i>According to choice, with MECA 2220, Internal Combustion Motors.</i>		
<u>MECA2322</u>	Fluid mechanics and transfer II.[30h+30h] (5 credits) (in French)	Michel Giot, Grégoire Winckelmans
<u>MECA2840</u>	Mecanical construction project II.[30h+45h] (6 credits) (in French)	Paul Fisette, Benoît Raucent
<i>This project will be spread over the two quadrimesters</i>		
<u>MECA2120</u>	Introduction to finite element methods.[30h+30h] (5 credits) (in French)	Vincent Legat
<u>MECA2755</u>	Industrial automation.[30h+30h] (5 credits) (in French)	Hervé Buyse, Paul Fisette, Jean-Claude

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Second quadrimester

<u>ELEC2753</u>	POWER ELECTRICAL ENGINEERING[30h+30h] (5 credits) (in French)	Hervé Buyse, Francis Labrique, Ernest Matagne
<u>MECA2220</u>	Internal combustion engines.[30h+15h] (4 credits) (in French)	Hervé Jeanmart
<i>According to choice, with MECA 2150, Thermic Cycles.</i>		
<u>ELEC2510</u>	Linear Control Systems[30h+37.5h] (5 credits) (in French)	Georges Bastin, Denis Dochain
<i>According to choice, with MAPR 2300, Process Controls.</i>		
<u>MAPR2300</u>	Process Control[30h+37.5h] (5 credits) (in French)	Georges Bastin, Denis Dochain
<i>According to choice, with ELEC 2510 Linear Automatics.</i>		

MECA 23 This year

First quadrimester

<u>FSA2140</u>	Eléments de droit industriel[22.5h] (2 credits) (in French)	Gilbert Demez
<u>FSA2300</u>	Religious Science Questions[15h] (2 credits) (in French)	Bernard Van Meenen
<i>If this course was not followed in MECA 22.</i>		
<u>MAPR2806</u>	Introduction to process engineering[30h] (3 credits) (in French)	Denis Dochain

Second quadrimester

<u>FSA2240</u>	Gestion financière et comptable[30h+15h] (4 credits) (in French)	Philippe Grégoire
<u>MECA2261</u>	Seminar on engineering.[15h] (1 credits) (in French)	Yannic Wera

Evaluation

The courses (theory, practical exercises and laboratory work) are evaluated in accordance with the usual procedures. The points (/20) are transmitted to the MECA secretary before the deliberation. The total percentage obtained by the students is calculated bearing in mind the ponderations available at the MECA secretary's office. The end of course thesis is evaluated after the handing in of the written thesis and its oral presentation. The jury consists of the thesis promoter, two evaluators and a moderator selected by the MECA degree programme Management Committee.