

MECA2M

2014 - 2015

Master [120] in Mechanical Engineering

At Louvain-la-Neuve - 120 credits - 2 years - Day schedule - In frenchDissertation/Graduation Project : **YES** - Internship : **optional**Activities in English: **optional** - Activities in other languages : **NO**Activities on other sites : **NO**Organized by: **Ecole Polytechnique de Louvain (EPL)**Programme code: **meca2m** - European Qualifications Framework (EQF): 7**Table of contents**

Introduction	2
Teaching profile	3
- Learning outcomes	3
- Programme structure	4
- Detailed programme	5
- Programme by subject	5
Information	16
- Admission	16
- Teaching method	19
- Evaluation	19
- Mobility and/or Internationalisation outlook	19
- Possible trainings at the end of the programme	20
- Contacts	20

MECA2M - Introduction

Introduction

MECA2M - Teaching profile

Learning outcomes

The objective of the Master's course in Mechanical engineering is to train engineers who should be capable of mastering complex and varied scientific, technological and human problems related to mechanical engineering.

Upon graduating, students will have acquired the requisite basic knowledge in all the main fields of Mechanical engineering (fluid mechanics and transfer phenomena, computational methods in applied mechanics, mechanics of materials and structures, applied dynamics, mechanical manufacturing and production, mechanical design, thermal machinery, thermodynamics and energetics). Their education will have been both theoretical and practical, notably via laboratory and project work.

Students may choose to have a standard degree, by choosing their elective courses to make up a basic curriculum in Mechanics. They may also choose to specialize, by following one of many specific streams.

On successful completion of this programme, each student is able to :

de démontrer la maîtrise d'un solide corpus de connaissances en sciences fondamentales et sciences de l'ingénieur, lui permettant d'appréhender et de résoudre des problèmes qui relèvent de la mécanique.

1.1 Identifier et mettre en oeuvre les concepts, lois, raisonnements applicables à une problématique donnée relevant de :

- la mécanique des milieux
- l'énergie, la thermodynamique et la thermique
- la modélisation mathématique et la simulation numérique
- la gestion de projet
- la robotique, les systèmes et l'automatisation

1.2 Identifier et utiliser les outils de modélisation et de calcul adéquats pour résoudre ces problématique.

1.3 Vérifier la vraisemblance et confirmer la validité des résultats obtenus au regard de la nature du problème posé (ordre de grandeur, unités...).

d'organiser et de mener à son terme une démarche d'ingénierie appliquée au développement d'un produit (et/ou d'un service) répondant à un besoin ou à une problématique particulière dans le domaine de la mécanique.

2.1. Analyser le problème à résoudre ou le besoin fonctionnel à rencontrer, formuler le cahier des charges dans un domaine où les contraintes techniques et économiques sont prises en compte.

2.2. Modéliser le problème et concevoir une ou plusieurs solutions techniques en y intégrant les aspects mécaniques répondant au cahier des charges.

2.3. Évaluer et classer les solutions au regard de l'ensemble des critères figurant dans le cahier des charges : efficacité, faisabilité, qualité, ergonomie et sécurité.

2.4. Implémenter et tester une solution sous la forme d'une maquette, d'un prototype et/ou d'un modèle numérique.

2.5. Formuler des recommandations pour améliorer le caractère opérationnel de la solution étudiée.

d'organiser et de mener à son terme un travail de recherche pour appréhender un phénomène physique ou une problématique inédite relevant de la mécanique.

3.1. Se documenter et résumer l'état des connaissances actuelles dans le domaine de la mécanique.

3.2. Proposer une modélisation et/ou un dispositif expérimental permettant de simuler le comportement du système, en testant les hypothèses relatives au phénomène étudié.

3.3. Mettre en forme un rapport de synthèse visant à expliciter les potentialités d'innovation théoriques et/ou technique résultant de ce travail de recherche.

de contribuer, en équipe, à la réalisation d'un projet pluridisciplinaire et de le mener à son terme en tenant compte des objectifs, des ressources, allouées et des contraintes qui le caractérisent.

4.1. Cadrer et expliciter les objectifs d'un projet compte tenu des enjeux et contraintes qui caractérisent l'environnement du projet.

- 4.2. S'engager collectivement sur un plan de travail, un échéancier.
- 4.3. Fonctionner dans un environnement pluridisciplinaire conjointement avec d'autres acteurs porteurs de différents points de vue.
- 4.4. Prendre des décisions en équipe lorsqu'il y a des choix à faire : que ce soit sur les solutions techniques ou sur l'organisation du travail pour faire aboutir le projet.

communiquer efficacement oralement et par écrit (en français et dans une ou plusieurs langues étrangères) en vue de mener à bien les projets qui lui sont confiés dans son environnement de travail.

- 5.1 Identifier les besoins du client : questionner, écouter les dimensions de sa demande et pas seulement les aspects techniques.
- 5.2 Argumenter et convaincre en s'adaptant au langage de ses interlocuteurs : collègues, techniciens, clients, supérieurs hiérarchiques.
- 5.3 Communiquer sous forme graphique et schématique ; interpréter un schéma, présenter un travail, structurer des informations.
- 5.4 Lire, analyser et exploiter des documents techniques (normes, plans, cahier des charges...)
- 5.5 Rédiger des documents écrits en tenant compte des exigences contextuelles et des conventions sociales en la matière.
- 5.6 Faire un exposé oral convaincant, en utilisant les techniques modernes de communication.

de faire preuve de rigueur, d'ouverture, d'esprit critique et d'éthique dans son travail. Tout en tirant parti des innovations technologiques et scientifiques à sa disposition, il prendra le recul nécessaire pour valider la pertinence socio-technique d'une hypothèse ou d'une solution.

- 6.1. Appliquer les normes et s'assurer de la robustesse de la solution dans les disciplines de la mécanique et de l'électricité.
- 6.2. Relativiser les solutions en élargissant le spectre à des enjeux non-techniques (le domaine de l'énergie et du climat, la prise en compte des aspects environnementaux et sociaux).
- 6.3. Faire preuve d'esprit critique vis-à-vis d'une solution technique.
- 6.4. Autoévaluer son propre travail.

Programme structure

The Master's curriculum in Mechanical engineering will require a minimum total of 120 credits covering two years, with a minimum of 60 credits per year, and comprising :

- a 44-credit core curriculum
- specialist courses in mechanics (30 credits)
- a possible specialization in one of the 9 suggested fields (aeronautics, mechanical production and manufacturing, energy, polymer working, metal working, biomechanics, numerical modelling in mechanics, management, setting up of small and medium-sized companies), with a maximum of 30 credits in said field
- elective courses, with a minimum total of 25 credits

The final thesis is generally written during the last year. However, students may choose to take any given course in the first or second year, subject to possible prerequisites. This will be the case in particular for students pursuing part of their education abroad.

If, in the course of his (her) former curriculum, a student has already been credited with a subject included in the compulsory core curriculum, or any training deemed equivalent, this subject will be replaced by any elective course within the imposed constraints. The student is responsible for checking whether the minimum total number of credits has been reached, as well as those of the specialized field, which will appear on the final diploma.

The student's curriculum will be scrutinized for acceptance by the Mechanical engineering diploma committee.

Whatever the focus or the options chosen, the programme of this master shall totalize 120 credits, spread over two years of studies each of 60 credits.

[> Core curriculum](#) [en-prog-2014-meca2m-lmeca220t.html]

[> Professional focus](#) [en-prog-2014-meca2m-lmeca220s]

Options courses

[> Options](#) [en-prog-2014-meca2m-lmeca903r.html]

[> Aeronautics](#) [en-prog-2014-meca2m-lmeca222o.html]

[> Dynamics, robotics et biomécanics](#) [en-prog-2014-meca2m-lmeca223o.html]

[> Energy](#) [en-prog-2014-meca2m-lmeca224o.html]

[> Disgn, manufacturing and mechamics of materials](#) [en-prog-2014-meca2m-lmeca226o.html]

[> Option en génie nucléaire](#) [en-prog-2014-meca2m-lmeca231o.html]

[> Lauching of small and medium-sized companies \(SMC\)](#) [en-prog-2014-meca2m-lmeca229o.html]

> [Business risks and opportunities](#) [en-prog-2014-meca2m-lmeca230o.html]
 > [Elective courses for the master in mechanical engineering](#) [en-prog-2014-meca2m-lmeca221o.html]

MECA2M Detailed programme

Programme by subject

CORE COURSES

- Mandatory
 △ Courses not taught during 2014-2015
 ⊕ Periodic courses taught during 2014-2015
 ☒ Optional
 ⊖ Periodic courses not taught during 2014-2015
 † Two years course

Click on the course title to see detailed informations (objectives, methods, evaluation...)

The student shall select

						Year	
						1	2
○ LMECA2990	GraduationProject/End of Studies Project	N.		28 Credits			x
○ LMECA2840	Mechanical construction project II.	Bruno Dehez, Benoît Herman (compensates Benoît Raucen), Benoît Raucen , Renaud Ronsse	45h+30h	6 Credits	1 + 2q	x	

○ Religion courses for student in exact sciences

The student shall select 2 credits from amongst

The student shall select

☒ LTECO2100	Questions of religious sciences: Biblical readings	Hans Ausloos	15h	2 Credits	1q	x	x
☒ LTECO2200	Questions of religious sciences: reflections about Christian faith	Dominique Martens	15h	2 Credits	2q	x	x
☒ LTECO2300	Questions of religious sciences: questions about ethics	Philippe Cochinaux	15h	2 Credits	1q	x	x

PROFESSIONAL FOCUS [30.0]

- Mandatory
 △ Courses not taught during 2014-2015
 ⊕ Periodic courses taught during 2014-2015
 ☒ Optional
 ⊖ Periodic courses not taught during 2014-2015
 † Two years course

Click on the course title to see detailed informations (objectives, methods, evaluation...)

						Year	
						1	2
○ LMECA2150	Thermal cycles.	Yann Bartosiewicz	30h+30h	5 Credits	1q	x	

						Year	
						1	2
○ LMECA2322	Fluid mechanics and transfer II.	Jean-François Remacle, Grégoire Winckelmans, Grégoire Winckelmans (compensates Jean-François Remacle)	30h+30h	5 Credits	1q	x	
○ LMECA2755	Industrial automation.	Bruno Dehez, Paul Fisette, Renaud Ronsse	30h+30h	5 Credits	1q	x	
○ LMECA2801	Machine design.	Benoît Raucant, Aude Simar	30h+30h	5 Credits	1q	x	
○ LMECA2220	Internal combustion engines.	Hervé Jeanmart	30h+30h	5 Credits	2q	x	
○ LMECA2410	Dynamics of elastic systems.	Jean-Pierre Coyette, Laurent Delannay	30h+30h	5 Credits	2q	x	

OPTIONS [54.0]

L'étudiant complète son programme avec des options et / ou des cours au choix. Il sélectionne

Options

- > [Aeronautics](#) [en-prog-2014-meca2m-lmeca222o]
- > [Dynamics, robotics et biomécanics](#) [en-prog-2014-meca2m-lmeca223o]
- > [Energy](#) [en-prog-2014-meca2m-lmeca224o]
- > [Disgn, manufacturing and mechanics of materials](#) [en-prog-2014-meca2m-lmeca226o]
- > [Option en génie nucléaire](#) [en-prog-2014-meca2m-lmeca231o]
- > [Lauching of small and medium-sized companies \(SMC\)](#) [en-prog-2014-meca2m-lmeca229o]
- > [Business risks and opportunities](#) [en-prog-2014-meca2m-lmeca230o]
- > [Elective courses for the master in mecanical engineering](#) [en-prog-2014-meca2m-lmeca221o]

OPTIONS

L'étudiant peut choisir une ou plusieurs options parmi les suivantes.

AERONAUTICS

Ouverte aux étudiants ingénieurs civils mécaniciens et électromécaniciens, cette option reprend des cours sur l'application de la mécanique à l'aéronautique : structures aéronautiques, vibrations, aérodynamique, dynamique du vol...

Cet apprentissage se fait au travers de cours approfondis de mécanique des fluides et des solides, avec une attention particulière portée aux méthodes numériques.

Cette option est naturellement complétée par l'option en énergie, l'option en dynamique, robotique et biomécanique ainsi que l'option en conception, fabrication et mécanique des matériaux pour les problématiques de l'énergie dans l'aéronautique, la motorisation, les aspects dynamiques et l'importance des matériaux dans la conception et la maintenance des avions.

● Mandatory

△ Courses not taught during 2014-2015

⊕ Periodic courses taught during 2014-2015

⊗ Optional

⊖ Periodic courses not taught during 2014-2015

‡ Two years course

Click on the course title to see detailed informations (objectives, methods, evaluation...)

The student shall choose

De 20 à 30 credits parmi

						Year	
						1	2
⊗ LMECA2853	Turbulence.	Eric Deleersnijder, Grégoire Winckelmans	30h+30h	5 Credits	1q	x	x
⊗ LMECA2550	Aircraft propulsion systems.	Philippe Chatelain	30h+30h	5 Credits	1q	x	x
⊗ LMECA2520	Calculation of planar structures	Issam Doghri	30h+30h	5 Credits	1q	x	x
⊗ LMECA2830	Aerospace dynamics.	Philippe Chatelain	30h+30h	5 Credits	1q	x	x
⊗ LMECA2323	Aerodyamics of external flows.	Philippe Chatelain, Grégoire Winckelmans	30h+30h	5 Credits	2q	x	x
⊗ LMECA2195	Gasdynamics and reacting flows	Miltiadis Papalexandris	30h+30h	5 Credits	2q	x	x
⊗ LMECA2660	Numerical methods in fluid mechanics.	Grégoire Winckelmans	30h+30h	5 Credits	2q	x	x
⊗ LMECA2300	Advanced Numerical Methods	Christophe Craeye, Jonathan Lambrechts, Vincent Legat, Vincent Legat (compensates Jean-François Remacle), Jean-François Remacle	30h+30h	5 Credits	2q	x	x

DYNAMICS, ROBOTICS ET BIOMÉCANICS

Ouverte aux étudiants ingénieurs civils mécaniciens et électromécaniciens, cette option reprend des cours sur la dynamique, la robotique ainsi que la biomécanique.

Que ce soit l'analyse des vibrations, la mise au point d'un robot ou la conception et la production de composantes ou micro-composantes en bio-ingénierie (implants artificiels, valves, prothèses), cette option permet à l'étudiant d'aborder l'une ou plusieurs de ces applications sous un angle principalement mécanique.

Cette option est naturellement complétée par l'option en aéronautique, l'option en énergie, ainsi que l'option en conception, fabrication et mécanique des matériaux pour les étudiants intéressés dans les problématiques de la dynamique et de la robotique dans l'aéronautique et dans l'énergie. Le choix des matériaux est évidemment un point essentiel que ce soit pour la mise au point d'un robot ou le choix de bio-matériaux dans les problèmes de réhabilitation.

● Mandatory

△ Courses not taught during 2014-2015

⊕ Periodic courses taught during 2014-2015

⊗ Optional

⊖ Periodic courses not taught during 2014-2015

‡ Two years course

Click on the course title to see detailed informations (objectives, methods, evaluation...)

The student shall choose

De 20 à 30 credits parmi

						Year	
						1	2
⊗ LAUCE2185	Dynamics of structures	Jean-Pierre Coyette	30h+30h	5 Credits	1q	x	x
⊗ LMECA2170	Numerical Geometry	Vincent Legat, Vincent Legat (compensates Jean-François Remacle), Jean-François Remacle	30h+30h	5 Credits	1q	x	x
⊗ LMECA2355	Mechanical design in biomedical engineering	Olivier Cartiaux, Benoît Herman, Emilie Marchandise, Benoît Raucant, Khanh Tran Duy	30h+30h	5 Credits	1q	x	x
⊗ LMECA2215	Dynamics of transportation	Paul Fisette	30h+30h	5 Credits	1q	x	x
⊗ LGBIO2040	Biomechanics	François Henrotte (compensates Emilie Marchandise), Emilie Marchandise	30h+30h	5 Credits	2q	x	x
⊗ LINMA2875	System Identification	Julien Hendrickx	30h+30h	5 Credits	2q	x	x
⊗ LMECA2802	Mechanics of robots and multibody systems.	Paul Fisette	30h+30h	5 Credits	2q	x	x
⊗ LMECA2732	Introduction to robotics	Renaud Ronsse	30h+30h	5 Credits	2q	x	x

ENERGY

Ouverte aux étudiants ingénieurs civils mécaniciens et électromécaniciens, cette option reprend des cours sur la problématique de l'énergie dans le monde actuel.

Cette discipline est abordée dans son entièreté, d'abord par l'étude des techniques de production et de conversion d'énergie (machines thermiques, énergie nucléaire, énergies renouvelables), ensuite par l'analyse des risques associés à la production d'énergie et des moyens de les minimiser (risques majeurs, pollution), et enfin par l'étude des enjeux et conséquences de la consommation énergétique.

Cette option est naturellement complétée par l'option en aéronautique pour les étudiants intéressés dans les problématiques de l'énergie et la motorisation dans l'aéronautique. C'est aussi le cas de l'option en dynamique, robotique et biomécanique ainsi que de l'option en conception, fabrication et mécanique des matériaux pour les étudiants intéressés dans les aspects dynamiques, l'automatisation et de l'importance des matériaux dans la conception et la maintenance des systèmes de production et de conversion d'énergie.

● Mandatory

△ Courses not taught during 2014-2015

⊕ Periodic courses taught during 2014-2015

⊗ Optional

⊙ Periodic courses not taught during 2014-2015

‡ Two years course

Click on the course title to see detailed informations (objectives, methods, evaluation...)

The student shall choose

De 19 à 30 credits parmi

						Year	
						1	2
⊗ LMECA2600	Introduction to nuclear engineering and reactor technology.	Hamid Aït Abderrahim	30h+30h	5 Credits	1q	x	x
⊗ LENVI2007	Renewable energies	Xavier Draye, Patrick Gerin (coord.), Hervé Jeanmart, Geoffrey Van Moeseke	30h	4 Credits	1q	x	x
⊗ LMECA2160	Combustion and fuels	Miltiadis Papalexandris	30h+30h	5 Credits	1q	x	x
⊗ LMECA2325	Biomass conversion	Patrick Gerin, Hervé Jeanmart	30h+30h	5 Credits	1q	x	x
⊗ LMECA2420	Advanced topics in energetics.	Yann Bartosiewicz, Hervé Jeanmart	30h	3 Credits	2q	x	x
⊗ LMECA2240	Testing of thermal machinery.	Hervé Jeanmart	15h+15h	2 Credits	2q	x	x
⊗ LMECA2780	Fluid compressors.	Tony Arts	30h+30h	5 Credits	2q	x	x
⊗ LMECA2711	Quality management and control.	Thibault Valentin	30h+30h	5 Credits	2q	x	x
⊗ LMECA2771	Thermodynamics of irreversible phenomena.	Miltiadis Papalexandris	30h+30h	5 Credits	2q	x	x

DISGN, MANUFACTURING AND MECHANICS OF MATERIALS

Ouverte aux étudiants ingénieurs civils mécaniciens et électromécaniciens, cette option reprend des cours sur la conception, la fabrication et l'importance des matériaux dans la mise au point d'un système mécanique. La compréhension des propriétés physiques et chimiques et du comportement des métaux, des polymères et des composites peut être abordée dans cette option. Ensuite, les grandes techniques de mise en forme de ces matériaux (moulage par injection ou compression, étirage, laminage, forgeage, extrusion, emboutissage) sont étudiées d'un point de vue thermo-mécanique et technologique. Enfin, la modélisation numérique de ces procédés est également abordée, avec une attention particulière portée aux techniques de soudure. Toutes les phases du processus de fabrication mécanique sont également étudiées, depuis l'étape de conception et la mise en place de techniques de fabrication appropriées jusqu'à la planification de la production et l'organisation des ateliers.

Cette option est naturellement complétée par l'option en aéronautique, l'option en énergie, ainsi que l'option en dynamique, robotique et biomécanique pour les étudiants intéressés dans les problématiques de la conception, de la fabrication et de l'importance des matériaux que ce soit dans l'aéronautique, l'énergie, les transports ou la bio-ingénierie.

● Mandatory

△ Courses not taught during 2014-2015

⊕ Periodic courses taught during 2014-2015

⊗ Optional

⊙ Periodic courses not taught during 2014-2015

‡ Two years course

Click on the course title to see detailed informations (objectives, methods, evaluation...)

The student select

De 20 à 30 crédits parmi

						Year	
						1	2
⊗ LMECA2860	Welding.	Bruno de Meester de Betzenbroeck	30h+30h	5 Credits	1q	x	x
⊗ LMAPR2481	Deformation and fracture of materials	Thomas Pardoën	30h+30h	5 Credits	1q	x	x
⊗ LMECA2453	Additional mechanical manufacturing and FAO	Aude Simar	30h+30h	5 Credits	1q	x	x
⊗ LMECA2141	Rheology.	Vincent Legat, Evelyne Van Ruymbeke	30h+30h	5 Credits	1q	x	x
⊗ LMECA2640	Mechanics of composite materials.	Issam Doghri, Frédéric Lani	30h+30h	5 Credits	2q	x	x
⊗ LMECA2330	Machine components	Laurent Delannay, Benoît Raucant, Renaud Ronsse, Thomas Servais (compensates Beno&icirc;t Raucant)	30h+30h	5 Credits	2q	x	x
⊗ LMECA2131	Introduction to nonlinear solid mechanics.	Issam Doghri	30h+30h	5 Credits	2q	x	x
⊗ LMAPR2482	Plasticity and metal forming	Laurent Delannay, Thomas Pardoën (coord.)	30h +22.5h	5 Credits	2q	x	x

OPTION EN GÉNIE NUCLÉAIRE

Commune aux masters ingénieur civil électromécanicien finalité spécialisée énergie et ingénieur civil mécanicien, cette option a pour objectif d'offrir une formation approfondie dans les principaux aspects du génie nucléaire. L'accès de cette option qui est organisée pour sa plus grande partie au Centre d'énergie nucléaire de Mol est conditionnée à une évaluation des compétences des candidats suivant les règles utilisées pour les candidatures aux échanges ERASMUS-SOCRATES.

Plus de détails sur cette option sont disponibles sur le site du [SCK-CEN](#) de Mol.

● Mandatory

△ Courses not taught during 2014-2015

⊕ Periodic courses taught during 2014-2015

⊗ Optional

⊖ Periodic courses not taught during 2014-2015

‡ Two years course

Click on the course title to see detailed informations (objectives, methods, evaluation...)

Year

1 2

● Mandatory courses (11 credits)

Course ID	Course Title	Instructor	Hours	Credits	1	2
● LMECA2600	Introduction to nuclear engineering and reactor technology.	Hamid Aït Abderrahim	30h+30h	5 Credits	1q	x
● LMECA2648	Nuclear thermal-hydraulics.	Yann Bartosiewicz	40h+7.5h	6 Credits	2q	x

● Elective course

De 6 à 12 credits parmi

⊗ LBNEN2002	Introduction to Nuclear Physics & Measurements	N.		6 Credits		x
⊗ LBNEN2003	Safety of Nuclear Powerplants	N.		3 Credits		x
⊗ LBNEN2004	Operation and control	N.		3 Credits		x

LAUNCHING OF SMALL AND MEDIUM-SIZED COMPANIES (SMC)

Commune à la plupart des masters ingénieur civil, cette option a pour objectif de familiariser l'étudiant ingénieur civil avec les spécificités des P.M.E., de l'entrepreneuriat et de la création afin de développer chez lui les aptitudes, connaissances et outils nécessaires à la création d'entreprise. L'accès en est réservé uniquement à un nombre restreint d'étudiants sélectionnés sur base d'un dossier de motivation et d'interviews individuelles. Les dossiers de motivation pour cette filière doivent être introduits avant la rentrée académique de Master1 auprès du

Secrétariat CPME - Place des Doyens 1
1348 Louvain-la-Neuve (tél 010/47 84 59).

Les étudiants sélectionnés remplaceront le mémoire prévu dans le tronc commun par un mémoire spécifique en création d'entreprise (nombre de crédits inchangé).

● Mandatory

△ Courses not taught during 2014-2015

⊕ Periodic courses taught during 2014-2015

⊗ Optional

⊖ Periodic courses not taught during 2014-2015

‡ Two years course

Click on the course title to see detailed informations (objectives, methods, evaluation...)

Additional information relative to this specialization may be found at <http://www.uclouvain.be/cpme>. This specialization may not be chosen alongside the specialization in management. The student shall choose De 20 à 25 credits parmi

Year

1 2

● Compulsory courses

● LCPME2001	Entrepreneurship Theory (in French)	Frank Janssen	30h+20h	5 Credits	1q	x	
● LCPME2003	Business plan of the creation of a company (in French)	Frank Janssen	30h+15h	5 Credits	2q		x
● LCPME2002	Managerial, legal and economic aspects of the creation of a company (in French)	Régis Coeurderoy, Yves De Cordt	30h+15h	5 Credits	1q	x	x
● LCPME2004	Advanced seminar on Enterpreneurship (in French)	Frank Janssen	30h+15h	5 Credits	2q	x	x

⊗ Prerequisite CPME course

Students who have not taken a management course within their former curriculum shall include LCPME2000 in their current curriculum.

● LCPME2000	Venture creation financement and management I	Régis Coeurderoy, Olivier Giacomini, Paul Vanzeveren	30h+15h	5 Credits	1 + 2q	x	
-------------	---	--	---------	-----------	-----------	---	--

BUSINESS RISKS AND OPPORTUNITIES

Commune à la plupart des masters ingénieur civil, cette option a pour objectif de familiariser l'étudiant avec les principes de base de la gestion des entreprises.

● Mandatory

△ Courses not taught during 2014-2015

⊕ Periodic courses taught during 2014-2015

⊗ Optional

⊖ Periodic courses not taught during 2014-2015

⊞ Two years course

Click on the course title to see detailed informations (objectives, methods, evaluation...)

This specialization may not be chosen alongside the specialization in company launching (see further on). FSA 2240 is not included in this specialization for civil engineering students. The student shall choose De 16 à 20 credits parmi

						Year	
						1	2
⊗ LFSA2140	Elements of law for industry and research	Fernand De Visscher, Werner Derijcke, Bénédicte Inghels	30h	3 Credits	1q	x	x
⊗ LFSA2230	Introduction to management and to business economics	Benoît Gailly	30h+15h	4 Credits	2q	x	x
⊗ LFSA1290	Introduction to financial and accounting management	Thomas Lambert (compensates Gerrit Sarens), Gerrit Sarens	30h+15h	4 Credits	2q	x	x
⊗ LFSA2202	Ethics and ICT	Maxime Lambrecht, Olivier Pereira	30h	3 Credits	2q	x	x
⊗ LFSA2245	Environment and Business	Thierry Bréchet	30h	3 Credits	1q	x	x
⊗ LFSA2210	Organisation and human resources	John Cultiaux	30h	3 Credits	1q	x	x

⊗ Alternative to the "Business risks and opportunities" for computer science students

Computer science students who have already followed various courses of this discipline during their Bachelor's curriculum can select between 16 and 20 credits in the program "mineure en gestion pour les sciences informatiques" <http://www.uclouvain.be/xprog-2013-min-lgesc100i>

ELECTIVE COURSES FOR THE MASTER IN MECANICAL ENGINEERING

○ Mandatory

△ Courses not taught during 2014-2015

⊕ Periodic courses taught during 2014-2015

⊗ Optional

⊖ Periodic courses not taught during 2014-2015

‡ Two years course

Click on the course title to see detailed informations (objectives, methods, evaluation...)

The student complete his (her) curriculum with elective courses

Year

1 2

⊗ Cours de polyvalence

⊗ LMECA1451	Mechanical manufacturing.	Laurent Delannay, Aude Simar	30h+30h	5 Credits	1q	x	x
⊗ LAUCE1181	Mechanics of structures	Pierre Latteur	30h+30h	5 Credits	1q	x	x
⊗ LELEC2525	Introduction to electric and electronic circuits	Jean-Didier Legat, Michel Verleysen	30h+30h	5 Credits	1q △	x	x
⊗ LINMA1510	Linear Control	Denis Dochain	30h+30h	5 Credits	2q	x	x

⊗ General knowledge courses

Students can also include in their curriculum any course given at UCL, KULeuven or Von Karman Institute subject to approval of the program committee. Students can also include in their curriculum any course given at UCL or FIW / KULeuven subject to approval of the Diploma committee.

⊗ LMECA2645	Major technological hazards in industrial activity.	Denis Dochain, Alexis Dutrieux	30h	3 Credits	2q	x	x
⊗ LDROP2063	Environmental Law	Nicolas de Sadeleer, Damien Jans	30h	5 Credits	2q	x	x
⊗ LECGE1223	Production and Operations Management	Pierre Semal	30h	4 Credits	1q	x	x
⊗ LELEC2811	Instrumentation and sensors	David Bol, Laurent Francis	30h+30h	5 Credits	1q	x	x
⊗ LINMA2671	Automatic : Theory and implementation	Julien Hendrickx	30h+30h	5 Credits	1q	x	x
⊗ LMAPR2018	Rheometry and Polymer Processing	Christian Bailly, Evelyne Van Ruymbeke	30h +22.5h	5 Credits	2q	x	x
⊗ LMAPR2510	Mathematical ecology	Eric Deleersnijder, Emmanuel Hanert, Thierry Van Effelterre	30h +22.5h	5 Credits	2q	x	x
⊗ LMAPR2648	Sustainable treatment of industrial and domestic waste: Case studies	Spyridon Agathos, Damien Debecker, Olivier Françoisse, Patricia Luis Alconero, Olivier Noiset	30h+15h	5 Credits	1q	x	x
⊗ LPHY2150	Physique et dynamique de l'atmosphère et de l'océan I	Michel Crucifix, Thierry Fichet	45h+9h	6 Credits	1q	x	x
⊗ LPHY2153	Introduction à la physique du système climatique et à sa modélisation	Hugues Goosse (compensates Jean-Pascal van Ypersele de Strihou), Hugues Goosse, Jean-Pascal van Ypersele de Strihou	30h+15h	5 Credits	1q	x	x

⊗ Humanities

A list of interesting humanities courses is available at the secretariat of the program committee. Students may choose a maximum of 6 credits. This possibility is however not offered to students who have chosen to specialize in Management or Company launching.

A list of interesting humanities courses is available at the secretariat of the diploma committee. Students may choose a maximum of 6 credits. This possibility is however not offered to students who have chosen to specialize in Management or Company launching.

⌘ Languages

Students may include in their electives any language course of the Institute of Modern Languages (ILV) for a maximum of 3 credits within the 120 basic credits of their Masters. Their attention is drawn to the following professional insertion seminars:

Students may include in their electives any language course of the Institute of Modern Languages (ILV) for a maximum of 3 credits within the 120 basic credits of their Master's. Their attention is drawn to the following professional insertion seminars:

⌘ LNEER2500	Professional development seminar: Dutch - intermediate level	Isabelle Demeulenaere (coord.), Mariken Smit	30h	3 Credits	1 ou 2q	x	x
⌘ LNEER2600	Professional development seminar: Dutch - upper-intermediate level	Isabelle Demeulenaere, Marie-Laurence Lambrecht	30h	3 Credits	1 ou 2q	x	x
⌘ LALLE2500	Professional development seminar German	Caroline Klein, Ann Rinder (coord.)	30h	3 Credits	1 + 2q	x	x
⌘ LALLE2501	Professional development seminar-German	Caroline Klein, Ann Rinder (coord.)	30h	5 Credits	1 + 2q	x	x
⌘ LESPA2600	Professional development seminar - Spanish	Isabel Baeza Varela, Carmen Vallejo Villamor	30h	3 Credits	1 ou 2q	x	x
⌘ LESPA2601	Professional development seminar- Spanish	Paula Lorente Fernandez (coord.)	30h	5 Credits	1q	x	x

⌘ Company training periods (10 credits)

Students may include in their curriculum a company training period worth 10 credits. However, if this activity is related to their final thesis, they shall choose the 5-credit LFSA 2996 course.

Students may include in their curriculum a company training period worth 10 credits. However, if this activity is related to their final thesis, they shall choose the 5-credit FSA 2996 course.

⌘ LFSA2995	Company Internship	Claude Oestges	30h	10 Credits		x	x
⌘ LFSA2996	Company Internship	N.		5 Credits		x	x

⌘ Formation au tutorat

⌘ LFSA2351A	Group dynamics	Piotr Sobieski (coord.)	15h+30h	3 Credits	1q	x	x
⌘ LFSA2351B	Group dynamics	Piotr Sobieski (coord.)	15h+30h	3 Credits	2q	x	x

MECA2M - Information

Admission

General and specific admission requirements for this program must be satisfied at the time of enrolling at the university..

- [University Bachelors](#)
- [Non university Bachelors](#)
- [Holders of a 2nd cycle University degree](#)
- [Holders of a non-University 2nd cycle degree](#)
- [Adults taking up their university training](#)
- [Personalized access](#)

University Bachelors

Diploma	Special Requirements	Access	Remarks
UCL Bachelors			
Bachelor in engineering	Major or minor in mechanics	Direct access	A student with no major in mechanics nor option deemed equivalent, yet with a minor in mechanics or an option deemed equivalent, shall submit a curriculum tailored to the situation, in agreement with an advisor who is a member of the Mechanical engineering diploma committee. To this end, the student may choose 15 credits amongst the electives of the Master's in mechanical engineering.
Bachelor in engineering		Access with additional training	A student with neither a Major nor a minor in mechanics, shall submit an application to the Mechanical engineering diploma committee, including a detailed past curriculum (courses and grades by year). The committee will propose a customized curriculum by drawing on the volume of elective courses of the Master's in mechanical engineering curriculum, and adding, if necessary, up to 15 additional credits.
		Direct access	
Others Bachelors of the French speaking Community of Belgium			
Bachelor in engineering	With specific options in former institution related to mechanics	Direct access	
Bachelor in engineering		Access with additional training	A student with no former option in mechanics shall submit an application to the Mechanical engineering diploma committee, including a detailed past curriculum (courses and grades by year). The committee will propose a customized curriculum by drawing on the volume of elective courses of the Master's in mechanical engineering curriculum, and

			adding, if necessary, up to 15 additional credits.
Bachelors of the Dutch speaking Community of Belgium			
Bachelor in engineering	With specific options in former institution related to mechanics	Direct access	
Bachelor in engineering		Access with additional training	A student with no former option in mechanics shall submit an application to the Mechanical engineering diploma committee, including a detailed past curriculum (courses and grades by year). The committee will propose a customized curriculum by drawing on the volume of elective courses of the Master's in mechanical engineering curriculum, and adding, if necessary, up to 15 additional credits.
Foreign Bachelors			
Bachelor in engineering	Bachelors from the Cluster network	Direct access	Conditions imposed on UCL Engineering Bachelor.
Bachelor in engineering	Other institutions	Access with additional training	The student shall submit an application to the Faculty of applied sciences, including a detailed past curriculum (courses and grades by year). The Faculty, after consulting the relevant programme committee, will decide as to the applicant's admissibility pursuant to rules relative to links between degrees. If necessary the Faculty can propose a customized curriculum, by drawing on the volume of elective courses of the relevant engineering Master's curriculum and, if necessary, up to 15 additional credits.

—

Non university Bachelors

Diploma	Access	Remarks
> Find out more about links to the university		
> BA en sciences industrielles - type long	Accès au master moyennant réussite d'une année préparatoire de max. 60 crédits	Type long

—

Holders of a 2nd cycle University degree

Diploma	Special Requirements	Access	Remarks
"Licenciés"			
Engineers considered equivalent to corresponding bachelors		Direct access	

Masters

Masters in engineering		Direct access	
------------------------	--	---------------	--

—

Holders of a non-University 2nd cycle degree

Diploma	Access	Remarks
---------	--------	---------

> Find out more about [links](#) to the university

> MA en sciences de l'ingénieur industriel (toutes finalités) > MA en sciences industrielles (toutes finalités)	Accès direct au master moyennant ajout éventuel de 15 crédits max	Type long
--	---	-----------

—

Adults taking up their university training

> See the website [Valorisation des acquis de l'expérience](#)

It is possible to gain admission to all masters courses via the validation of professional experience procedure.

—

Personalized access

Reminder : all Masters (apart from Advanced Masters) are also accessible on file.

—

Admission and Enrolment Procedures for general registration

Teaching method

Possibility for students to choose a strong specialization in any given field, with a varied choice of specializations within the main themes of mechanical engineering (aeronautics, mechanical manufacturing, energy, material forming, biomechanics, ...) or else to prefer a standard curriculum including elective courses.

Features intended to favour interdisciplinarity :

The curriculum is quite varied and leads to a wide range of scientific and technological fields.

Variety of teaching methods :

The pedagogy applied within this programme follows directly from that of the Bachelor's: active learning, balanced mix of group effort and individual work, time set aside for learning non-technical competencies.

This pedagogy stresses project work involving various subjects, and thereby aims to develop students' good judgment, allowing them to design, model, manufacture and experimentally assess all types of systems, prototypes, and devices.

A strong feature of the curriculum lies in the students' immersion into the instructors' research laboratories (on the occasion of course laboratory activities, case studies, projects or final theses), thereby allowing them to become familiar with cutting edge techniques and to learn the investigative approach of research work

The final thesis amounts to half the workload of the final year. It allows the student to investigate a given topic in depth and, due to its scope and context, can be considered as a true initiation to the professional life of an engineer or a researcher.

Diversity of learning situations :

The student will encounter diverse pedagogical tools adapted to various disciplines : formal lectures, project work, tutorials, problem-based learning, case studies, laboratory work, computer simulations, computer tutorials, industrial and research training, construction site and factory visits, cultural trips, group and personal activities, seminars, ...). For some subjects, e-learning will allow students to learn at their own rhythm and to experience virtual experimentation.

This variety of situations will help students to build their knowledge in an iterative and progressive manner, while developing their autonomy, organizational skills, time management, and capacity to use various modes of communication, ...The most advanced computer equipment (hardware, software, networks) is made available to assist students in their work.

The company launching specialization is based on an interactive approach and problem-based learning. Throughout the curriculum, students are required to perform group activities in multi-disciplinary groups. The final thesis is also multi-disciplinary and designed in such a way that groups of three students, ideally from three different faculties, should work on a company launching project.

This Master's features a leaning towards the industrial world. One should note, in particular, the possibility of choosing a 10-credit industrial traineeship.

Evaluation

The evaluation methods comply with the [regulations concerning studies and exams](#). More detailed explanation of the modalities specific to each learning unit are available on their description sheets under the heading "Learning outcomes evaluation method".

All learning activities are assessed as prescribed by the University internal regulations (see exam regulations), viz. written and oral exams, laboratory exams, individual or group work, public presentation of projects and final thesis.

Mobility and/or Internationalisation outlook

Global framework

The Faculty of Applied Sciences has taken part, since their inception, in all the various mobility programmes which have been set up at both the European and world levels.

The numerous contacts it has with professional circles, notably via its Advisory Board, have demonstrated to what extent employers are favourably impressed by a mobility experience in someone's CV. The ever-increasing internationalization of research via networks linking laboratories throughout the world, speaks in favour of encouraging this mobility.

Students' interest is aroused at the end of their Bachelor studies, notably via intensive courses such as those of the ATHENS () or BEST () networks.

In the course of the two-year Master's programme, students are encouraged to take part in a 1- or 2-semester exchange scheme

Within Belgium, the Faculty of Applied Sciences is involved in a privileged partnership with the Faculteit Ingenieurswetenschappen of the Katholieke Universiteit Leuven, with whom it has set up an exchange scheme relating to the first year of the Master's curriculum ().

At the European level, the Faculty of Applied Sciences is strongly involved in the CLUSTER excellence network (). This network encourages internal mobility, since this is a guarantee of quality as concerns both the level of teaching and the hosting of exchange students. Moreover, Cluster partners have signed an agreement recognizing each other's Bachelor's curricula. This agreement stipulates that all Bachelors of network institutions will have access to the Master's studies in any institution on a par with local students.

Outside Europe, the Faculty of Applied Sciences is a partner in the Magalhaes network, which groups about fifteen European universities together with the best South American science and technology universities ().

Besides these network partnerships, the Faculty has also signed a number of individual agreements with various universities in Europe, North America or elsewhere in the world. A list of these agreements may be found on the website of UCL International Relations ().

International possibilities (for UCL students)

UCL is also a partner in the TIME programme () which gives students the opportunity to obtain two engineering degrees, via a specifically tailored curriculum.

Double Master's degrees are operational with the following institutions :

- ENSMP France (subsidized by the Institut Français du Pétrole – IFP)
- Supaéro Toulouse (TIME programme)
- ENSICA Toulouse

Besides intensive courses which are one component of international relations, FAS students with outstanding results are encouraged to apply for 5- or 10-month exchange programmes. When taking place during the first Master's year, exchanges are generally 10 month's long. In the second year, they only last for a semester, either as courses or else research in a foreign laboratory as a complement to the final thesis.

Some other more specific exchange programmes have been set up with South America, where the academic year is naturally on an "austral" basis.

Students are informed about the various exchange programmes as from their second Bachelor's year. They are encouraged to prepare for their exchange in a timely manner, notably by taking language courses at the Modern Languages Institute of UCL.

The FAS's participation in the MERCATOR exchange programme should also be mentioned.

A double degree Master's with Clemson University (South Carolina) is also in preparation.

International appeal (for non residents)

The Master's in Mechanical Engineering proposes a complete and high level training in a universally recognized field, viz. "Mechanical Engineering". All the facets of the profession are covered, from the most theoretical (Fluid and solid mechanics, Transfer phenomena, System dynamics) through to the application of these theories to design, manufacturing and assembly of a wide range of products. Applications are countless (automobile industry, aviation, machinery, energetics, etc.). Various optional streams (aeronautics, mechanical production and manufacturing, energy, polymer working, metal working, biomechanics, numerical modelling in mechanics, etc.) allow the student to develop advanced competencies in a specific field. The student can also pursue a "standard" course (without any particular specialization) via a free choice of electives. Whatever the choice, the student will be on track for a well-defined profession, that of a professional Mechanical Engineer.

Possible trainings at the end of the programme

Accessible complementary Master's : Nuclear engineering

Accessible Ph.D. studies : via GRASMECH doctoral school

Contacts

Curriculum Management

Entité de la structure MECA

Acronyme	MECA
Dénomination	Commission de programme - Ingénieur civil mécanicien
Adresse	Place du Levant, 2 bte L5.04.03 1348 Louvain-la-Neuve Tél 010 47 22 00 - Fax 010 45 26 92
Secteur	Secteur des sciences et technologies (SST)
Faculté	Ecole Polytechnique de Louvain (EPL)
Commission de programme	Commission de programme - Ingénieur civil mécanicien (MECA)

Academic Supervisor : [Vincent LEGAT](#)

Jury

Président du Jury : **Jean-Didier LEGAT**

Secrétaire du Jury : **Vincent LEGAT**

Usefull Contacts

Secrétariat : **Isabelle HENNAU**

