

**GCE2M**

2013 - 2014

Master [120] in Civil Engineering

**At Louvain-la-Neuve - 120 credits - 2 years - Day schedule - In french**Dissertation/Graduation Project : **YES** - Internship : **optional**Activities in English: **optional** - Activities in other languages : **NO**Activities on other sites : **NO**Main study domain : **Sciences de l'ingénieur**Organized by: **Ecole Polytechnique de Louvain (EPL)**Programme code: **gce2m** - European Qualifications Framework (EQF): 7**Table of contents**

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## GCE2M - Introduction

## GCE2M - Admission

***For the specific conditions of this program : refer to the French version***

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

## GCE2M - Information

### Learning outcomes

The Master's degree in civil engineering aims to train engineers who will be able to meet future technological challenges in the scientific and technical fields relating to civil and environmental engineering, within an ever-changing European and global context.

Upon graduating, students will be familiar with the mathematical and physical methods relating to the five basic fields of civil and environmental engineering (building ; hydraulics ; geotechnics ; structures and materials ; environment) and will have acquired advanced training in some of these disciplines via project work and elective courses.

Every year, a cutting-edge project will be proposed in one of the following : hydraulics, geotechnics and structures. Concurrently, a project integrating the other two disciplines will ensure interdisciplinarity.

Students have a choice between seven options.

The first five offer a choice of courses in each of the five abovementioned fields, viz. Construction and Architecture, Hydraulics, Geotechnics, Structures and Environment, so that students can target their training.

A sixth option is made up of a series of courses emphasizing Advanced topics in civil engineering.

The objective of the seventh option in Management is to familiarize the engineering student with the basics of company management.

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

**de démontrer la maîtrise d'un corpus de connaissances en sciences fondamentales, disciplinaires et polytechniques, lui permettant de résoudre des problèmes posés**

1. Identifier et mettre en œuvre les concepts, lois, raisonnements applicables à une problématique donnée dans les disciplines du génie civil :
  - Structures : conception et calcul (béton, métal, bois, matériaux composites, ... ) ;
  - Géotechnique : mécanique des sols, fondations, écoulements souterrains, ... ;
  - Hydraulique en charge et à surface libre ;
  - Ouvrages d'art (ponts, barrages, tunnels, ...)
2. Identifier et utiliser les outils de modélisation et de calcul adéquats pour résoudre cette problématique
3. Vérifier la vraisemblance et confirmer la validité des résultats obtenus au regard de la nature du problème posé

**d'organiser, mener à son terme et valider une démarche d'ingénierie visant à répondre à un besoin ou à une problématique spécifique**

1. Analyser le problème à résoudre dans toutes ses dimensions, faire le tri des informations disponibles, identifier les contraintes (réglementaires, techniques, sécuritaires, budgétaires, humaines, environnementales, contraintes d'exécution de l'ouvrage...) liées à la réalisation d'un projet de génie civil afin de rédiger le cahier des charges
2. Modéliser le problème et concevoir une ou plusieurs solution(s) technique(s) originales répondant à ce cahier des charges
3. Évaluer et classer les solutions au regard des critères figurant dans le cahier des charges (efficacité, faisabilité, qualité, fiabilité, ergonomie et sécurité dans l'environnement considéré) et des contraintes de réalisation (main d'oeuvre, matériaux, sécurité sur le chantier, accessibilité au chantier, budget...)
4. Implémenter et tester une solution sous la forme de plans, d'une maquette, d'un modèle réduit à tester en laboratoire ou d'un modèle numérique.

**d'organiser et mener à son terme un travail de recherche pour appréhender un phénomène physique ou une problématique inédite relevant d'un domaine du génie civil**

1. Se documenter et résumer l'état des connaissances actuelles dans le domaine considéré
2. Proposer une modélisation et/ou un dispositif expérimental permettant de simuler et de tester des hypothèses relatives au phénomène étudié
3. Mettre en forme un rapport de synthèse rédigé de telle manière que les résultats et productions présentés soient exploitables ultérieurement et par d'autres personnes, expliciter s'il y a lieu les potentialités d'innovation théoriques et/ou technique résultant de ce travail de recherche

**de participer efficacement à une démarche de projet, en s'intégrant à une équipe ou en conduisant celle-ci à la réalisation finale**

1. Cadrer et expliciter les objectifs d'un projet compte tenu des enjeux et des contraintes (urgence, qualité, ressources, budget ...) qui caractérisent l'environnement du projet
2. S'engager collectivement sur un plan de travail, un échéancier et des rôles à tenir

3. Fonctionner dans un environnement pluridisciplinaire, conjointement avec d'autres acteurs porteurs de différents points de vue : gérer des points de désaccord ou des conflits
4. Prendre des décisions en équipe lorsqu'il y a des choix à faire, et assumer les conséquences de ces décisions, que ce soit sur les solutions techniques ou sur l'organisation du travail pour faire aboutir le projet.

### **de communiquer les résultats de son travail sous forme de rapports, plans, présentations ou autres documents adaptés à son interlocuteur**

1. Identifier clairement les besoins des « clients » ou des usagers, qui sont souvent des collectivités privées ou publiques pour des projets de génie civil : questionner, écouter et comprendre toutes les dimensions de la demande et pas seulement sur les aspects techniques
2. Argumenter et convaincre en s'adaptant au langage et au niveau de connaissances de ses interlocuteurs : techniciens, collègues, clients, supérieurs hiérarchiques
3. Communiquer sous forme graphique et schématique ; interpréter un schéma, présenter les résultats d'un travail, structurer des informations
4. Lire, analyser et exploiter des documents techniques (normes, plans, cahier de charge...)
5. Rédiger des documents écrits en tenant compte des exigences contextuelles et des conventions sociales en la matière
6. Faire un exposé oral efficace, en utilisant les techniques modernes de communication

### **d'agir avec professionnalisme et rigueur, tout en intégrant les questions et choix éthiques dans l'exercice de ses responsabilités.**

1. Appliquer les normes en vigueur dans sa discipline (terminologie, unités de mesure, normes de qualité et de sécurité...)
2. Trouver des solutions qui vont au-delà des enjeux strictement techniques, en intégrant les enjeux de développement durable et la dimension éthique d'un projet
3. Faire preuve d'esprit critique vis-à-vis d'une solution technique pour en vérifier la robustesse et minimiser les risques qu'elle présente au regard du contexte de sa mise en œuvre
4. S'auto-évaluer et développer de manière autonome les connaissances nécessaires pour rester compétent dans son domaine

## Teaching method

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. Features favouring interdisciplinarity :

The Master's degree in civil engineering is intrinsically interdisciplinary, thanks to a comprehensive project (integrated project in civil engineering), common options with the Master's in architecture (design and architecture), and partly common options with the Master's in applied physics, chemistry and materials, mechanical, and biomedical (environment) engineering, as well as town planning and territorial development streams. Moreover, a student who so wishes has the possibility to acquire knowledge in non-technical fields via elective courses.

. Variety of teaching situations :

The pedagogy implemented in the engineering Master's curriculum is aligned with that of the engineering Bachelor's curriculum: active learning, a balanced mix of group and individual work, and substantial time devoted to the development of non-technical competencies.

Via a pedagogy which emphasizes projects integrating various disciplines, the training will develop students' critical mind in designing, modelling and experimental laboratory testing.

A salient feature of the curriculum is the immersion of students in the research laboratories of the various instructors (during teaching laboratory sessions, case studies, projects and final thesis), which allows them to become familiar with up-to-date methods in the related fields, and to learn through the questioning approach which is inherent to research.

The final project amounts to half the workload of the final year. It offers the opportunity of in-depth analysis of a given topic and, through its sheer size and context, provides a true introduction to the professional life of an engineer or researcher.

. Variety of learning situations :

The student will encounter a variety of pedagogical tools tailored to the various disciplines : formal lectures, individual projects in small groups, tutorials, project-based learning, case studies, experimental laboratory work, computer simulations, teachware, industrial or research training, visits to construction sites and industries, end of studies trip, individual and group work, seminars given by outside scientists, etc. For some topics, e-learning will allow students to acquire knowledge at their own rhythm and carry out 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, etc. Students will have access to the most up-to-date computing tools (hardware, network software) in carrying out their assignments.

## Evaluation

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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

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### 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 (<https://eng.kuleuven.be/>).

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 (<https://www.magalhaes-network.net/>).

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 (<https://www.uclouvain.be/international.html>).

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

- International possibilities (for UCL students)

Besides intensive courses which are one component of international relations, EPL 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 months 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.

## Possible trainings at the end of the programme

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Accessible complementary Master's degrees

Accessible Ph. D. curricula

## GCE2M - Contacts

### Curriculum Managment

Entite de la structure GCE

Acronyme	<b>GCE</b>
Dénomination	Civil and environmental engineering
Adresse	Place du Levant, 1 bte L5.05.01 1348 Louvain-la-Neuve Tél 010 47 21 12 - Fax 010 47 21 79
Secteur	Secteur des sciences et technologies ( <b>SST</b> )
Institut	Institute of Mechanics, Materials and Civil Engineering ( <b>iMMC</b> )
Pôle	Civil and environmental engineering ( <b>GCE</b> )

**Academic Supervisor :** [Sandra SOARES FRAZAO](#)

### Jury

Président du Jury : **Piotr SOBIESKI**

Secrétaire du Jury : **Sandra SOARES FRAZAO**

### Usefull Contacts

Secrétariat : **Viviane DELMARCELLE**

## GCE2M - Detailed programme

### Programme structure

The Master's curriculum in civil engineering will consist of at least 120 credits covering two years, with a minimum of 60 credits per year, and comprising :

- a core curriculum (64 credits)
- a specialization curriculum (30 credits)
- one option (at least 15 credits) from amongst the seven proposed options (Advanced topics in civil engineering, Hydraulics, Geotechnics, Structures, Environment, Building and architecture, Management).
- elective courses if necessary.

The final thesis is generally written during the last year. However, depending on their specific training objectives, 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 elective courses, while conforming to 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 submitted for acceptance by the relevant 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 study

> [Tronc commun du master ingénieur civil des constructions](#) [ en-prog-2013-gce2m-lgce220t.html ]

> [Professional focus](#) [ en-prog-2013-gce2m-lgce220s ]

#### Options courses

- > [Options du master ingénieur civil des constructions](#) [ en-prog-2013-gce2m-lgce909r.html ]
  - > [Option en méthodes avancées en génie civil.](#) [ en-prog-2013-gce2m-lgce222o.html ]
  - > [Option en géotechnique](#) [ en-prog-2013-gce2m-lgce223o.html ]
  - > [Option en environnement](#) [ en-prog-2013-gce2m-lgce224o.html ]
  - > [Option en hydraulique](#) [ en-prog-2013-gce2m-lgce225o.html ]
  - > [Option en structure](#) [ en-prog-2013-gce2m-lgce226o.html ]
  - > [Option en construction et architecture](#) [ en-prog-2013-gce2m-lgce227o.html ]
  - > [Business risks and opportunities](#) [ en-prog-2013-gce2m-lgce228o.html ]
  - > [Option facultaire en création de petites et moyennes entreprises](#) [ en-prog-2013-gce2m-lfsa221o.html ]
- > [Cours au choix du master ingénieur civil des constructions](#) [ en-prog-2013-gce2m-lgce221o.html ]

### Programme by subject

#### Core courses [62.0]

● Mandatory

△ Courses not taught during 2013-2014

⊕ Periodic courses taught during 2013-2014

⊗ Optional

⊙ Periodic courses not taught during 2013-2014

‡ Two years course

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

					Year	
					1	2
● LGCE2990	Travail de fin d'études	N.	28 Credits	1	2	x



Year

1 2

**o Formation générale et polyvalente**

○ LFSA1290	Introduction to financial and accounting management	Gerrit Sarens	30h+15h	4 Credits	2q	x	x
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**o 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

**o Construction et architecture**

○ LAUCE2101	Projects elements in Civil Engineering 1	Jean-Louis Hilde, Pierre Mengeot	30h	3 Credits	1q	x	
○ LAUCE2350	Architecture civile	Denis Zastavni	40h	4 Credits	1q		x
○ LAUCE2363	Building physics II: utilities - Part A: design - Part B: dimensioning	Magali Bodart, Jean-Marie Seynhaeve, Geoffrey Van Moeseke	40h	4 Credits	2q	x	

**o Structure et matériaux**

○ LAUCE2031	DESIGN OF REINFORCED CONCRETE STRUCTURES	Jean-François Cap	25h +22.5h	4 Credits	1q	x	
○ LAUCE2032	DESIGN OF PRESTRESSED CONCRETE STRUCTURES	Jean-François Cap	20h+15h	3 Credits	2q	x	

**o Géotechnique**

○ LAUCE2173	Geotechnics methods & works	Jean-Francois Thimus	30h+15h	4 Credits	2q	x	
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**o Projet en génie civil**

○ LAUCE2140	Integrated project in civil engineering	Didier Bousmar, Alain Holeyman, Pierre Mengeot	15h+55h	6 Credits	1q		x
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**⊗ Re-alignment elective courses**

Les étudiants qui n'ont pas suivi le cours LMECA 1120 Introduction aux méthodes d'éléments finis (où un équivalent) sont invités à l'inclure dans leur programme en sus des 62 crédits

⊗ LMECA1120	Introduction to finite element methods.	Vincent Legat	30h+30h	5 Credits	2q	x	x
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## Professional focus [30.0]

○ Mandatory

△ Courses not taught during 2013-2014

⊕ Periodic courses taught during 2013-2014

⊗ Optional

⊖ Periodic courses not taught during 2013-2014

⊞ Two years course

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

Year

1 2

○ **Cours obligatoires (20 credits)**

○ LAUCE2102	<a href="#">ELEMENTS OF PROJECT OF CIVIL ENGINEERING II</a>	<a href="#">Pierre Latteur</a>	30h	3 Credits	2q	x	
○ LAUCE2151	<a href="#">Hydraulique appliquée</a>	<a href="#">Sandra Soares Frazao</a>	30h+30h	5 Credits	1q	x	
○ LAUCE2152	<a href="#">Hydraulics structures</a>	<a href="#">Didier Bousmar</a>	30h	3 Credits	2q	x	
○ LAUCE2171	<a href="#">Geotechnics</a>	<a href="#">Alain Holeyman, Ramiro Daniel Verástegui Flores</a>	45h+15h	5 Credits	1q	x	
○ LAUCE2182	<a href="#">Design and realisation of structure</a>	<a href="#">Catherine Doneux, Olivier Vassart</a>	30h+15h	4 Credits	1q	x	

⊗ **Cours au choix (10 credits)**

L'étudiant doit prendre 10 crédits dans cet ensemble. Pour ce faire il choisit soit le stage "long" LFSA 2995, ou le stage "court" LAUCE 2143 et les 3 autres cours. S'il prend le stage de 5 crédits couplé au mémoire il compensera la différence avec d'autres cours en accord avec sa commission de diplôme

⊗ LAUCE2103	<a href="#">Civil works management</a>	<a href="#">Bernard Cols</a>	20h	2 Credits	1q		x
⊗ LAUCE2104	<a href="#">SEMINARS RELATING TO THE CIVIL ENGINEERING WORKS - SEMINARS RELATING TO THE STRUCTURES</a>	<a href="#">Marc Demanet, Colette Grégoire</a>	30h	2 Credits	1q		x
⊗ LAUCE2143	<a href="#">Stage de prise de contact en entreprise</a>	N.		3 Credits		x	x
⊗ LAUCE2591	<a href="#">Droit de l'espace bâti et non bâti</a>	<a href="#">Charles-Hubert Born, Christophe Thiebaut</a>	30h	3 Credits	1q		x

⊗ **Company training periods**

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	<a href="#">Stage en entreprise</a>	<a href="#">Claude Oestges</a>	30h	10 Credits		x	x
⊗ LFSA2996	<a href="#">Stage en entreprise</a>	<a href="#">Claude Oestges</a>		5 Credits		x	x



## Options

### Options du master ingénieur civil des constructions

- > Option en méthodes avancées en génie civil. [ en-prog-2013-gce2m-lgce222o ]
- > Option en géotechnique [ en-prog-2013-gce2m-lgce223o ]
- > Option en environnement [ en-prog-2013-gce2m-lgce224o ]
- > Option en hydraulique [ en-prog-2013-gce2m-lgce225o ]
- > Option en structure [ en-prog-2013-gce2m-lgce226o ]
- > Option en construction et architecture [ en-prog-2013-gce2m-lgce227o ]
- > Business risks and opportunities [ en-prog-2013-gce2m-lgce228o ]
- > Option facultaire en création de petites et moyennes entreprises [ en-prog-2013-gce2m-lfca221o ]
- > Cours au choix du master ingénieur civil des constructions [ en-prog-2013-gce2m-lgce221o ]

### OPTIONS DU MASTER INGÉNIEUR CIVIL DES CONSTRUCTIONS

#### OPTION EN MÉTHODES AVANCÉES EN GÉNIE CIVIL.

Cette option a pour objectif une formation approfondie des différents domaines du génie civil (hydraulique, géotechnique et structure), des développements en relation avec les recherches menées par le Pôle Génie civil et environnemental. Les aspects numériques sont particulièrement mis en avant dans ces enseignements.

○ Mandatory

△ Courses not taught during 2013-2014

⊕ Periodic courses taught during 2013-2014

⊗ Optional

⊖ Periodic courses not taught during 2013-2014

‡ Two years course

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

De 15 à 28 credits parmi

Year

1 2

						1	2
⊗ LAUCE2153	<a href="#">Fluvial hydraulics</a>	<a href="#">Sandra Soares Frazao,</a> <a href="#">Benoît Spinewine</a>	30h+30h	5 Credits	2q	x	x
⊗ LAUCE2154	<a href="#">Hydraulique numérique</a>	<a href="#">Benoît Spinewine</a>	20h+15h	3 Credits	1q	x	x
⊗ LAUCE2175	<a href="#">Geomaterials' behaviour</a>	N.	30h+15h	4 Credits	1q △	x	x
⊗ LAUCE2176	<a href="#">Geotechnical risks</a>	<a href="#">Alain Holeyman,</a> <a href="#">Jean-François Vanden</a> <a href="#">Berghe</a>	45h+15h	5 Credits	1q	x	x
⊗ LAUCE2185	<a href="#">Dynamic of structures</a>	<a href="#">Jean-Pierre Coyette</a>	30h+30h	5 Credits	1q	x	x
⊗ LMECA2300	<a href="#">Advanced Numerical Methods</a>	<a href="#">Christophe Craeye,</a> <a href="#">Jonathan Lambrechts,</a> <a href="#">Vincent Legat,</a> <a href="#">Jean-François Remacle</a>	30h+30h	5 Credits	2q	x	x
⊗ LMECA2520	<a href="#">Calcul de structures planes</a>	<a href="#">Issam Doghri</a>	30h+30h	5 Credits	1q	x	x
⊗ LMECA2410	<a href="#">Dynamics of elastic systems.</a>	<a href="#">Jean-Pierre Coyette,</a> <a href="#">Laurent Delannay</a>	30h+30h	5 Credits	2q	x	x

## OPTION EN GÉOTECHNIQUE

Cette option a pour objectif de fournir aux étudiants une formation avancée dans le domaine de la géotechnique. Dans ce but, les connaissances des étudiants relatives aux propriétés physiques et au comportement des géomatériaux sont d'abord complétées, faisant notamment appel à la notion d'état critique. Sont entre autres abordés la mécanique des roches, les lois de comportement statique et dynamique des sols, la modélisation numérique de ces lois et certains aspects plus particuliers comme l'hydrogéologie et le géoenvironnement. La gestion des risques géotechniques est couverte dans le cadre des séismes, des accidents environnementaux, ainsi que dans le cadre de la géotechnique des fonds marins (Offshore Geotechnics).

● Mandatory

△ Courses not taught during 2013-2014

⊕ Periodic courses taught during 2013-2014

⊗ Optional

⊖ Periodic courses not taught during 2013-2014

⊞ Two years course

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

De 15 à 25 credits parmi

						Year	
						1	2
⊗ LAUCE2145	<a href="#">Projet d'initiative</a>	<a href="#">Sandra Soares Frazao</a>		3 Credits		x	x
⊗ LAUCE2175	<a href="#">Geomaterials' behaviour</a>	N.	30h+15h	4 Credits	1q △	x	x
⊗ LAUCE2176	<a href="#">Geotechnical risks</a>	<a href="#">Alain Holeyman,</a> <a href="#">Jean-François Vanden Berghe</a>	45h+15h	5 Credits	1q	x	x
⊗ LAUCE2191	<a href="#">Gеоenvironment and Hydrogeology</a>	<a href="#">Pierre-Yves Bolly,</a> <a href="#">Alain Holeyman</a>	45h+15h	5 Credits	2q	x	x
⊗ LBIR1336	<a href="#">Sciences du sol</a>	<a href="#">Pierre Delmelle (coord.),</a> <a href="#">Bruno Delvaux</a>	30h+30h	5 Credits	2q	x	x
⊗ LBIRE2101	<a href="#">Statistical analysis of spatial and temporal data</a>	<a href="#">Patrick Bogaert</a>	22.5h +15h	3 Credits	2q	x	x

**OPTION EN ENVIRONNEMENT**

Cette option a pour objectif de fournir aux étudiants des éléments de géoenvironnement afin de permettre une bonne connaissance des problèmes environnementaux liés aux nuisances acoustiques ou provenant de la pollution des nappes (hydrogéologie) et des sols.

● Mandatory

△ Courses not taught during 2013-2014

⊕ Periodic courses taught during 2013-2014

⊗ Optional

⊖ Periodic courses not taught during 2013-2014

‡ Two years course

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

De 15 à 30 credits parmi

						Year	
						1	2
⊗ LAUCE2145	<a href="#">Projet d'initiative</a>	<a href="#">Sandra Soares Frazao</a>		3 Credits		x	x
⊗ LAUCE2191	<a href="#">Géoenvironnement and Hydrogeology</a>	<a href="#">Pierre-Yves Bolly, Alain Holeyman</a>	45h+15h	5 Credits	2q	x	x
⊗ LAUCE2192	<a href="#">Gestion des choix technologiques</a>	N.	20h	3 Credits	1q △	x	x
⊗ LAUCE2193	<a href="#">Environmental acoustic</a>	<a href="#">Jean-Pierre Coyette</a>	30h+15h	4 Credits	1q ⊕	x	x
⊗ LMAPR2643	<a href="#">Treatment of liquid effluents</a>	<a href="#">Spyridon Agathos, Léon Duvivier</a>	30h+7.5h	4 Credits	1q	x	x
⊗ LMAPR2680	<a href="#">Treatments of gaseous wastes</a>	<a href="#">Jacques Devaux, Olivier Françoisse</a>	30h+7.5h	4 Credits	1q	x	x
⊗ LFSA2245	<a href="#">Environment and Enterprise</a>	<a href="#">Thierry Bréchet</a>	30h	3 Credits	1q	x	x
⊗ LENVI2012	<a href="#">Environment Pollution</a>	<a href="#">Mohamed Ayadim, Bruno Delvaux, Patrick Gerin (coord.), Nathalie Kruyts (compensates Bruno Delvaux)</a>	37.5h +37.5h	6 Credits	2q	x	x
⊗ LBIRE2102	<a href="#">Applied Geomatic</a>	<a href="#">Pierre Defourny</a>	30h +22.5h	4 Credits	1q	x	x

**OPTION EN HYDRAULIQUE**

Cette option a pour objectif de fournir aux étudiants les notions complémentaires de la matière hydraulique. Sont abordés des aspects plus numériques ou en relation avec la maîtrise des rivières et des nappes aquifères (hydrogéologie).

● Mandatory

△ Courses not taught during 2013-2014

⊕ Periodic courses taught during 2013-2014

⊗ Optional

⊖ Periodic courses not taught during 2013-2014

‡ Two years course

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

De 15 à 21 credits parmi

						Year	
						1	2
⊗ LAUCE2145	<a href="#">Projet d'initiative</a>	<a href="#">Sandra Soares Frazao</a>		3 Credits		x	x
⊗ LAUCE2153	<a href="#">Fluvial hydraulics</a>	<a href="#">Sandra Soares Frazao, Benoît Spinewine</a>	30h+30h	5 Credits	2q	x	x
⊗ LAUCE2154	<a href="#">Hydraulique numérique</a>	<a href="#">Benoît Spinewine</a>	20h+15h	3 Credits	1q	x	x
⊗ LAUCE2155	<a href="#">Floods and low-water level</a>	<a href="#">Sandra Soares Frazao, Yves Zech</a>	20h	3 Credits	2q	x	x
⊗ LAUCE2157	<a href="#">Sea Hydrodynamic</a>	N.	30h	3 Credits	1q △ ⊕	x	x
⊗ LAUCE2191	<a href="#">Geoenvironment and Hydrogeology</a>	<a href="#">Pierre-Yves Bolly, Alain Holeyman</a>	45h+15h	5 Credits	2q	x	x

**OPTION EN STRUCTURE**

Cette option a pour objectif de fournir aux étudiants des notions complémentaires à la matière structure notamment en ouvrant au comportement de matériaux structuraux autres que ceux habituellement utilisés. Certains aspects numériques plus approfondis sont aussi traités.

● Mandatory

△ Courses not taught during 2013-2014

⊕ Periodic courses taught during 2013-2014

⊗ Optional

⊙ Periodic courses not taught during 2013-2014

‡ Two years course

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

*De 15 à 29 credits parmi*

						Year	
						1	2
⊗ LAUCE2145	<a href="#">Projet d'initiative</a>	<a href="#">Sandra Soares Frazao</a>		3 Credits		x	x
⊗ LAUCE2183	<a href="#">Design of wood structures</a>	<a href="#">Catherine Doneux</a>	20h	2 Credits	2q	x	x
⊗ LAUCE2185	<a href="#">Dynamic of structures</a>	<a href="#">Jean-Pierre Coyette</a>	30h+30h	5 Credits	1q	x	x
⊗ LMECA2131	<a href="#">Introduction to nonlinear solid mechanics.</a>	<a href="#">Issam Doghri</a>	30h+30h	5 Credits	2q	x	x
⊗ LMECA2520	<a href="#">Calcul de structures planes</a>	<a href="#">Issam Doghri</a>	30h+30h	5 Credits	1q	x	x
⊗ LMECA2640	<a href="#">Mechanics of composite materials.</a>	<a href="#">Issam Doghri, Frédéric Lani</a>	30h+30h	5 Credits	2q	x	x
⊗ LMAPR2482	<a href="#">Plasticity and metal forming</a>	<a href="#">Laurent Delannay, Thomas Pardoen (coord.)</a>	30h +22.5h	5 Credits	2q	x	x



**OPTION EN CONSTRUCTION ET ARCHITECTURE**

Cette option a pour objectif de fournir aux étudiants une ouverture plus architecturale de la matière construction - bâtiments. L'accent est mis sur des aspects de durabilité, de conception architecturale et de droit du bâti.

● Mandatory

△ Courses not taught during 2013-2014

⊕ Periodic courses taught during 2013-2014

⊗ Optional

⊙ Periodic courses not taught during 2013-2014

‡ Two years course

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

De 15 à 21 credits parmi

						Year	
						1	2
⊗ LAUCE2145	<a href="#">Projet d'initiative</a>	<a href="#">Sandra Soares Frazao</a>		3 Credits		x	x
⊗ LAUCE2344	<a href="#">Programming for large-scale projects</a>	N.	40h	4 Credits	1q ⊙	x	x
⊗ LAUCE2364	<a href="#">Physique appliquée au bâtiment, compléments</a>	<a href="#">André De Herde</a> (coord.)	22.5h	2 Credits	2q ⊙	x	x
⊗ LAUCE2370	<a href="#">Analyse et composition urbaine</a>	<a href="#">Christian Gilot</a>	30h	3 Credits	1q	x	x
⊗ LAUCE2371	<a href="#">Analyse et composition des édifices</a>	<a href="#">Olivier Masson</a> (compensates Jean Stillemans), <a href="#">Olivier Masson</a> , <a href="#">Jean Stillemans</a> (coord.)	30h	3 Credits	2q	x	x
⊗ LAUCE2380	<a href="#">Economie et politique de l'édification</a>	<a href="#">Olivier Masson</a> , <a href="#">David Vanderburgh</a> , <a href="#">Denis Zastavni</a>	22.5h	2 Credits	2q	x	x
⊗ LAUCE2386	<a href="#">Conception de l'architecture avec le bois</a>	<a href="#">Frank Norrenberg</a>	22.5h	2 Credits	1q ⊕	x	x
⊗ LAUCE2387	<a href="#">Civil architecture additional subjects (renovation, restoration)</a>	<a href="#">Cécile Mairy</a>	22.5h	2 Credits	2q ⊕	x	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 2013-2014

⊕ Periodic courses taught during 2013-2014

⊗ Optional

⊖ Periodic courses not taught during 2013-2014

‡ Two years course

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

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	Gerrit Sarens	30h+15h	4 Credits	2q	x	x
⊗ LFSA2202	Ethics and ICT	Axel Gosseries, Olivier Pereira	30h	3 Credits	2q	x	x
⊗ LFSA2245	Environment and Enterprise	Thierry Bréchet	30h	3 Credits	1q	x	x
⊗ LFSA2210	Organisation and human resources	John Cultiaux	30h	3 Credits	1+2q	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>

## OPTION FACULTAIRE EN CRÉATION DE PETITES ET MOYENNES ENTREPRISES

● Mandatory

△ Courses not taught during 2013-2014

⊕ Periodic courses taught during 2013-2014

⊗ Optional

⊙ Periodic courses not taught during 2013-2014

‡ Two years course

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

De 20 à 25 credits parmi

Year

1 2

### ○ Compulsory courses

○ LCPME2001	<a href="#">Entrepreneurship Theory (in French)</a>	<a href="#">Frank Janssen</a>	30h+20h	5 Credits	1q	x	
○ LCPME2003	<a href="#">Business plan of the creation of a company (in French)</a>	<a href="#">Frank Janssen</a>	30h+15h	5 Credits	2q		x
○ LCPME2002	<a href="#">Managerial, legal and economic aspects of the creation of a company (in French)</a>	<a href="#">Régis Coeurderoy,</a> <a href="#">Yves De Cordt</a>	30h+15h	5 Credits	1q	x	x
○ LCPME2004	<a href="#">Advanced seminar on Entrepreneurship (in French)</a>	<a href="#">Frank Janssen</a>	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	<a href="#">Venture creation financement and management I</a>	<a href="#">Régis Coeurderoy,</a> <a href="#">Olivier Giacomini</a> (compensates Régis Coeurderoy), <a href="#">Paul Vanzeveren</a>	30h+15h	5 Credits	1+2q	x	
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## COURS AU CHOIX DU MASTER INGÉNIEUR CIVIL DES CONSTRUCTIONS

L'étudiant choisit librement des cours endéans les modalités détaillées ci-dessous de manière à totaliser, quelles que soient la finalité ou les options choisies, un minimum de 120 crédits répartis sur deux années d'études correspondant à 60 crédits chacune.

Les étudiants n'ayant pas suivi les cours suivants au cours de leur bachelier en Sciences de l'ingénieur sont encouragés à les considérer pour leur choix : FSAB1103, MECA2120 et FSAB1106.

● Mandatory

△ Courses not taught during 2013-2014

⊕ Periodic courses taught during 2013-2014

⊗ Optional

⊙ Periodic courses not taught during 2013-2014

‡ Two years course

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

Year

1 2

⊗ LAUCE2801	<a href="#">Génie civil : routes (cours ECAM)</a>	N.	30h	3 Credits	2q	x	x
⊗ LAUCE2802	<a href="#">Ponts (cours ECAM)</a>	<a href="#">Sandra Soares Frazao</a>	30h	3 Credits	2q	x	x
⊗ LFSA2351A	<a href="#">Group dynamics</a>	<a href="#">Piotr Sobieski</a>	15h+30h	3 Credits	1q	x	x
⊗ LFSA2351B	<a href="#">Group dynamics</a>	<a href="#">Piotr Sobieski</a>	15h+30h	3 Credits	2q	x	x

### ⊗ Advanced courses

Students should note that any course appearing in the options of their Master -s, but not selected as such, remains a possible elective.  
Students should note that any course appearing in the options of their Master -s, but not selected as such, remains a possible elective.

### ⊗ Short term exchanges

Students may include in their curriculum any BEST or ATHENS courses subject to approval by the Program committee. These courses are worth 2 credits  
Students may include in their curriculum any BEST or ATHENS subject to approval by the Diploma committee. These courses are worth 2 credits

### ⌘ 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	Laurent Francis, Ernest Matagne	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	30h +22.5h	5 Credits	2q	x	x
⌘ LMAPR2680	Treatments of gaseous wastes	Jacques Devaux, Olivier Françoisse	30h+7.5h	4 Credits	1q	x	x
⌘ LPHY2150	Physique et dynamique de l'atmosphère et de l'océan I	Michel Crucifix, Thierry Fichetef	45h+9h	6 Credits	1q	x	x
⌘ LPHY2153	Introduction à la physique du système climatique et à sa modélisation	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	Seminar of professional integration: Dutch - intermediate level	Isabelle Demeulenaere (coord.), Mariken Smit	30h	3 Credits		x	x
⌘ LNEER2600	Seminar of professional integration: Dutch - upper-intermediate level	Isabelle Demeulenaere	30h	3 Credits		x	x
⌘ LALLE2500	German - Seminar of professional integration, intermediate level	Caroline Klein, Ann Rinder (coord.)	30h	3 Credits	1+2q	x	x
⌘ LALLE2501	German - Seminar of professional integration, intermediate level	Caroline Klein, Ann Rinder (coord.)	30h	5 Credits	1+2q	x	x
⌘ LESPA2600	Séminaire d'insertion professionnelle - espagnol	Isabel Baeza Varela, Carmen Vallejo Villamor (compensates Isabel Baeza Varela)	30h	3 Credits	1q	x	x
⌘ LESPA2601	Spanish - Seminar of professional integration	Paula Lorente Fernandez (coord.)	30h	5 Credits	1q	x	x

