

ACTU2M

2016 - 2017

Master [120] in Actuarial Science

At Louvain-la-Neuve - 120 credits - 2 years - Day schedule - In frenchDissertation/Graduation Project : **YES** - Internship : **YES**Activities in English: **YES** - Activities in other languages : **NO**Activities on other sites : **YES**Main study domain : **Sciences**Organized by: **Faculté des sciences (SC)**Programme code: **actu2m** - Francophone Certification Framework: 7**Table of contents**

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ACTU2M - Introduction

Introduction

Introduction

Le master offre une formation pointue en sciences actuarielles tout en développant des compétences multidisciplinaires, notamment en calcul des probabilités, statistique, droit, fiscalité, comptabilité, économie et finance.

Les porteurs du master ont accès à l'Institut des Actuaire en Belgique (IABE) et sont autorisés à porter le titre d'actuaire.

Your profile

Vous

- désirez acquérir les techniques de gestion quantitative des risques (Quantitative Risk Management) dans les domaines des assurances, des marchés financiers, des retraites, et des entreprises en général (Enterprise Risk Management) ;
- possédez un sens des affaires, suffisamment de créativité pour trouver des solutions originales, de bonnes techniques de communication ;
- vous destinez à une activité dans le secteur des banques, assurances, fonds de pension, maisons de courtage, firmes d'audit.

Your programme

Le master vous offre

- une formation avancée dans le domaine des sciences actuarielles ainsi que de solides outils méthodologiques dans les disciplines connexes ;
- une formation au travail de terrain, avec de nombreuses occasions de mettre les outils en pratique (travaux personnels, projets d'application, projet intégré en collaboration avec une entreprise) ;
- l'occasion de tester vos compétences sur le terrain lors d'un stage en entreprise ou dans un laboratoire de recherche effectué en Belgique ou à l'étranger ;
- des équipes d'enseignants composées d'académiques et de professionnels de haut niveau.

ACTU2M - Teaching profile

Learning outcomes

This Master programme offers students specialized courses in actuarial science for becoming a qualified actuary, starting a career in the financial sector (banking, insurance, pension funds, brokerage, auditing and so on).

Although actuarial science is now a specific discipline with its own area of knowledge, modern actuarial training needs to develop multidisciplinary skills in probability, statistics, law, accounting, economics and finance. The Master programme reflects this by combining specific actuarial and insurance courses with related disciplines. This multidisciplinary approach, which brings together exact sciences and human sciences, is a key feature of the programme.

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

1. exploiter de manière intégrée un corpus de savoirs en sciences actuarielles et en finance mathématique pour agir avec expertise dans le domaine de la gestion quantitative des risques.

- 1.1 De maîtriser les développements fondamentaux en mathématiques actuarielles et financières.
- 1.2 D'analyser et résoudre des problèmes et des situations pluridisciplinaires concrets et complexes de gestion de l'impact financier des risques selon une approche scientifique en tenant compte de leurs interactions dans une approche dynamique.
- 1.3 D'utiliser les outils fondamentaux de calcul et de programmation dans la résolution de problèmes de gestion de l'impact financier des risques.
- 1.4 De gérer les risques souscrits par les entreprises d'assurance et de réassurance et de déterminer le montant des provisions techniques ainsi que la politique de leur placement.
- 1.5 De tarifier les principaux instruments financiers (actions, obligations, produits dérivés et structurés) et de développer des stratégies financières de couverture adaptées à l'appétit pour le risque de l'investisseur.
- 1.6 D'identifier et de proposer une politique optimale de gestion des risques (quantitative risk management et enterprise risk management) pesant sur un agent économique - individu, collectivité ou entreprise.
- 1.7 De faire preuve d'esprit critique vis-à-vis d'une solution technique en intégrant les enjeux sociaux et la dimension éthique d'un projet.
- 1.8 D'appliquer les normes et réglementations en vigueur dans la discipline.

2. De mobiliser des savoirs multiples, dans le domaine des sciences actuarielles et de la finance mathématique ainsi que dans les disciplines connexes, en vue d'analyser des problèmes complexes de gestion quantitative des risques et d'en concevoir des solutions innovantes dans une démarche scientifique rigoureuse.

- 2.1 D'apporter un regard critique, constructif et novateur sur les savoirs et pratiques en matière de gestion de l'impact des risques financiers et assurantiels pesant sur les agents économiques - individus, collectivités ou entreprises - en faisant preuve d'indépendance intellectuelle dans le raisonnement.
- 2.2 De conseiller, décider et agir en intégrant des valeurs éthiques et d'intégrité, en prenant en considération les conséquences économiques et sociales de ses conseils, décisions et actes pour les différentes parties prenantes.
- 2.3 De maîtriser un socle de savoirs en sciences actuarielles et en finance mathématique lui permettant d'appréhender et de résoudre les problèmes actuels tout en développant de manière autonome les nouvelles connaissances nécessaires pour rester compétent tout au long de sa vie professionnelle.
- 2.4 D'articuler des savoirs des différentes disciplines connexes (calcul des probabilités, statistique, droit, économie, comptabilité, fiscalité, etc.) afin de concevoir, individuellement et en équipe, des procédés de gestion de l'impact financier des risques, de les réaliser et de les communiquer aux parties prenantes.
- 2.5 De comprendre les enjeux de l'intégration des marchés et de la mondialisation, ainsi que le rôle joué par les experts universitaires dans ce cadre.

3. de contribuer, en équipe, à la réalisation d'un projet en tenant compte des objectifs poursuivis, des ressources allouées et des contraintes qui le caractérisent, et d'en communiquer les résultats de manière claire, précise et rigoureuse.

- 3.1 Fonctionner dans un cadre pluridisciplinaire, collaborant avec des collègues d'autres formations (économistes, juristes, etc.), avec différents points de vue.
- 3.2 Exprimer un message de façon claire et structurée, tant à l'oral qu'à l'écrit, en s'adaptant au public visé et en respectant les standards de communication propres au domaine.
- 3.3 Interagir et dialoguer efficacement avec des interlocuteurs variés, notamment les associations de consommateurs et les pouvoirs publics.

Programme structure

Students must follow a programme of 120 credits comprising compulsory core subjects (75 credits), a specialized focus (30 credits) and elective courses (15 credits). The core subjects (75 credits) includes compulsory subjects (45 credits), additional subjects (10 credits) determined by the Jury according to the degree held by the applicant, a work placement in a company (5 credits) and a master thesis (15 credits). The specialized focus consists in advanced courses of actuarial science and related disciplines.

Thanks to an active collaboration between KULeuven and UCL actuarial master programmes, UCL students attend advanced classes in KULeuven, and vice-versa. The courses shared by the two universities are taught in English, the rest of the UCL programme being taught in French.

A maximum of 50 credits may be accredited to students who already have a second cycle degree or who are working professionally and who have a good foundation and/or professional experience in actuarial science

For a programme-type, and regardless of the focus, options/or elective courses selected, this master will carry a minimum of 120 credits divided over two annual units, corresponding to 60 credits each.

[> Tronc commun](#) [en-prog-2016-actu2m-lactu200t.html]

[> Finalité spécialisée](#) [en-prog-2016-actu2m-lactu200s]

Options courses

[> Cours au choix](#) [en-prog-2016-actu2m-lactu200o.html]

[> Cours facultatif : Ingénieurs Sud](#) [en-prog-2016-actu2m-lsst100o.html]

ACTU2M Detailed programme

Programme by subject

CORE COURSES [75.0]

● Mandatory

△ Courses not taught during 2016-2017

⊕ Periodic courses taught during 2016-2017

⊗ Optional

⊖ Periodic courses not taught during 2016-2017

■ Activity with requisites

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

Year



1 2

o Mémoire et stage (19 credits)

Course ID	Course Name	Activity with requisites	Credits	Year 1	Year 2	Other
LACTU2900	Dissertation	■	15 Credits	1 ou 2q		x
LACTU2950	Internship		4 Credits	1 ou 2q		x

o Cours de base obligatoires (46 credits)

Course ID	Course Name	Instructor	Hours	Credits	Year 1	Year 2	Other
LINMA2725	Financial mathematics	Pierre.Devolder	30h +22.5h	5 Credits	1q		x
LACTU2010	NON LIFE INSURANCE 1	Michel.Denuit	30h+15h	5 Credits	1q		x
LACTU2020	Fixed income mathematics	Pierre.Devolder	30h+15h	5 Credits	1q		x
LACTU2030	LIFE INSURANCE 1	Francoise.Gilles	30h+15h	5 Credits	1q		x
LACTU2040	PENSION FUNDING	Pierre.Devolder	30h+15h	5 Credits	2q		x
LACTU2050	ACCOUNTING OF INSURANCE COMPANIES	Cindy.Courtois	30h	5 Credits	1q		x
LACTU2060	LIFE INSURANCE 2	Michel.Denuit Donatien.Hainaut	30h	5 Credits	2q		x
LACTU2070	STOCHASTIC FINANCE 1	Donatien.Hainaut	30h	5 Credits	2q		x

							Year	
							1	2
○ LACTU2210	Quantitative Risk Management 	Christian.Hafner	15h	3 Credits	2q		x	
○ LACTU2260	Enterprise Risk Management 	Philippe.Delongueville	15h	3 Credits	2q		x	

○ Cours complémentaires obligatoires

Les cours complémentaires sont fixés par le Jury en fonction du diplôme donnant accès au Master.

⊗ Cours complémentaires obligatoires (10 credits)

Pour les étudiants possédant un diplôme de 1er ou de 2ème cycle en sciences mathématiques ou physiques, un master en statistique ou un diplôme de 1er ou de 2ème cycle en sciences de l'ingénieur.

○ LECGE1212	Macroeconomics	Fabio.Mariani	45h+15h	5 Credits	1q	x	
○ LESPO1122	Foundations of Law	Diane.Bernard Nicolas.Bonbled Maxime.Lambrecht Thibaut.Slingeneyer	40h	5 Credits	1 ou 2q	x	

⊗ Cours complémentaires obligatoires (10 credits)

Pour les étudiants possédant un diplôme de 1er ou de 2ème cycle en économie ou ingénieur de gestion.

○ LFSAB1105	Probability and statistics	Anouar.Elghouch Rainer.Vonsachs	30h+30h	4 Credits	1q	x	
○ LSTAT2020	Statistical computing	Celine.Bugli (compensates Bernadette Govaerts) Bernadette.Govaerts	20h+20h	6 Credits	1q	x	

FINALITÉ SPÉCIALISÉE [30.0]


○ Mandatory

△ Courses not taught during 2016-2017


⊕ Periodic courses taught during 2016-2017

⊗ Optional

⊖ Periodic courses not taught during 2016-2017

 Activity with requisites

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

							Year	
							1	2
○ LDROP2021	Insurance Law	Bernard.Dubuisson	30h	5 Credits	2q	x		
○ LACTU2080	REINSURANCE	Jean-Francois.Walhin	30h	5 Credits	2q	x		
○ LACTU2200	NON LIFE INSURANCE 2 	Michel.Denuit	30h	5 Credits	2q		x	
○ LACTU2220	ALM OF INSURANCE COMPANIES 	Jerome.Barbarin	30h	5 Credits	2q		x	
○ LACTU2230	Health Insurance 	Michel.Denuit	30h	5 Credits	1q		x	
○ LACTU2240	STOCHASTIC FINANCE 2 	Pierre.Ars Pierre.Devolder	30h	5 Credits	2q		x	

OPTIONS

- > Cours au choix [en-prog-2016-actu2m-lactu200o]
- > Cours facultatif : Ingénieurs Sud [en-prog-2016-actu2m-lsst100o]

COURS AU CHOIX [15.0]

Students choose 15 credits of courses of which 12 credits KUL courses.

- Mandatory
- △ Courses not taught during 2016-2017
- ⊕ Periodic courses taught during 2016-2017
- ⊗ Optional
- ⊙ Periodic courses not taught during 2016-2017
- Activity with requisites

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

						Year	
						1	2
⊗ LACTU2250	Risk management in energy markets	Christian.Hafner	15h	3 Credits	2q		x
⊗ LACTU2410	Solvency of financial institutions (KUL-DOR58B)		39h	6 Credits	1q		x
⊗ LACTU2420	Foundations of Risk Measurement (KUL-DOR57B)		39h	6 Credits	1q		x
⊗ LACTU2440	Actuarial and Financial Models (KUL-DON57A)		39h+0h	6 Credits	1q		x
⊗ LACTU2450	Financial Engineering (KUL-GOQ22A)		26h+13h	6 Credits	2q		x
⊗ LACTU2470	Statistics for finance and insurance (KUL-GOQ24A)		39h	6 Credits	1q		x
⊗ LLSMS2013	Empirical Corporate Finance (in English)	Sophie.Bereau Yue.Zhang (compensates Sophie Béreau)	30h	5 Credits	2q		x
⊗ LLSMS2017	International financial reporting standards	Bruno.Colmant	30h	5 Credits	1q		x
⊗ LLSMS2100	Advanced finance (in English)	Sophie.Bereau Leonardo.lania Leonardo.lania (compensates Sophie Béreau)	30h	5 Credits	1q		x
⊗ LSTAT2170	Times series	Rainer.Vonsachs	22.5h +7.5h	5 Credits	2q		x

COURS FACULTATIF : INGÉNIEUX SUD

● Mandatory

△ Courses not taught during 2016-2017

⊕ Periodic courses taught during 2016-2017

⊗ Optional

⊖ Periodic courses not taught during 2016-2017

■ Activity with requisites

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

						Year	
						1	2
⊗ LSST1001	IngénieuxSud	Jean-Pierre.Raskin	15h+45h	5 Credits	2q	x	x

Course prerequisites

A document entitled [en-prerequis-2016-actu2m.pdf](#) specifies the activities (course units - CU) with one or more pre-requisite(s) within the study programme, that is the CU whose learning outcomes must have been certified and for which the credits must have been granted by the jury before the student is authorised to sign up for that activity.

These activities are identified in the study programme: their title is followed by a yellow square.

As the prerequisites are a requirement of enrolment, there are none within a year of a course.

The prerequisites are defined for the CUs for different years and therefore influence the order in which the student can enrol in the programme's CUs.

In addition, when the panel validates a student's individual programme at the beginning of the year, it ensures the consistency of the individual programme:

- It can change a prerequisite into a corequisite within a single year (to allow studies to be continued with an adequate annual load);
- It can require the student to combine enrolment in two separate CUs it considers necessary for educational purposes.

For more information, please consult [regulation of studies and exams](#).

The programme's courses and learning outcomes

For each UCL training programme, a [reference framework of learning outcomes](#) specifies the competences expected of every graduate on completion of the programme. You can see the contribution of each teaching unit to the programme's reference framework of learning outcomes in the document "In which teaching units are the competences and learning outcomes in the programme's reference framework developed and mastered by the student?"

The document is available by clicking [this link](#) after being authenticated with UCL account.

ACTU2M - 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 Business Engineering		Direct access	
Bachelor in Engineering		Direct access	
Bachelor in Mathematics		Direct access	
Bachelor in Physics		Direct access	
Bachelor in Economics and Management		On the file: direct access or access with additional training	
Others Bachelors of the French speaking Community of Belgium			
Bachelor in Business Engineering Bachelor in Engineering Bachelor in Mathematics Bachelor in Physics		Direct access	
Bachelor in Economics and Management		On the file: direct access or access with additional training	
Bachelors of the Dutch speaking Community of Belgium			
Bachelor in Business Engineering Bachelor in Engineering Bachelor in Mathematics Bachelor in Physics Bachelor in Economics and Management		On the file: direct access or access with additional training	
Foreign Bachelors			
Bachelor in Business Engineering Bachelor in Engineering Bachelor in Mathematics Bachelor in Physics Bachelor in Economics and Management		On the file: direct access or access with additional training	

Non university Bachelors

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

Holders of a 2nd cycle University degree

Diploma	Special Requirements	Access	Remarks
"Licenciés"			
		Direct access	
Masters			
Master in Business engineering Master in Biomedical Engineering Master in Chemical and Materials Engineering Master in Civil Engineering Master in Computer Science and Engineering Master in Electrical Engineering Master in Electro-mechanical Engineering Master in Mathematical Engineering Master in Mechanical Engineering Master in Physical Engineering Master in Mathematics Master in Physics Master in Statistics		Direct access	
Master in Management Master in Economics Master in Computer Science		On the file: direct access or access with additional training	

Holders of a non-University 2nd cycle degree

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

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.

Entry to all Masters (with the exception of Advanced Masters) can be gained through the special procedure for accrediting prior learning and experience known as VAE (validation des acquis de l'expérience).

Personalized access

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

Entry to all Masters (with the exception of Advanced Masters) can also be gained on submission of a special personal file.

Admission and Enrolment Procedures for general registration

Specific procedures :

Students must draw up their individual programmes with the academic coordinator who is responsible for accrediting prior learning and experience.

Supplementary classes

To enrol for this Masters, the student must have a good command of certain subjects. If this is not the case, they must add preparatory modules to their Master's programme.

○ Mandatory

△ Courses not taught during 2016-2017

⊕ Periodic courses taught during 2016-2017

⊗ Optional

⊖ Periodic courses not taught during 2016-2017

■ Activity with requisites

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

⊗ Cours de mathématiques de base

⊗ LINGE1114	Mathematics I: analysis	Kouider.Ben-Naoum Vincent.Wertz	30h+30h	5 Credits	1q
⊗ LINGE1121	Mathematics II: algebra and matrix calculus	Tom.Claeys	30h+30h	5 Credits	2q

⊗ Cours de calcul des probabilités et de statistique

⊗ LINGE1113	Probability	Johan.Segers	30h+15h	4 Credits	2q
⊗ LINGE1214	Further Statistics	Christian.Hafner	30h+15h	4 Credits	1q
⊗ LINGE1221	Econometrics	Sebastien.Vanbellegem	30h+15h	5 Credits	2q
⊗ LINGE1222	Multivariate Statistical Analysis	Johan.Segers	30h+15h	4 Credits	2q

⊗ Cours de finance

⊗ LFSA1290	Introduction to financial and accounting management	Andre.Nsabimana (compensates Gerrit.Sarens) Gerrit.Sarens	30h+15h	5 Credits	2q
⊗ LLSMG2001	Finance	Giorgio.Tesolin	30h+10h	5 Credits	1q

⊗ Cours d'informatique

⊗ LINGE1225	Algorithms and Programming in Economics and Management	Marco.Saerens	22.5h+22.5h	4 Credits	1q
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⊗ Cours de langue

⊗ LANGL1330	English intermediate level - 1st part	Estelle.Dagneaux Aurelie.Deneumoustier Fanny.Desterbecq Marie.Duelz Michaël.Grare Marielle.Henriet Carlo.Lefevre Sandrine.Meirlaen Sandrine.Mulkers (coord.) Marc.Piwnik (coord.) Nevin.Serbest Colleen.Starrs	30h	3 Credits	1 ou 2q
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Teaching method

In addition to strong methodological contents, the cursus includes case studies, personal projects and an internship in an insurance or reinsurance company, consulting firm, pension fund.

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".

Depending on the course, the exam may be oral or written and may include a personal project. The master thesis and the internship are defended publicly.

Mobility and/or Internationalisation outlook

Besides the active collaboration with the KULeuven master in actuarial studies, the internship may take place abroad (Paris, London or Luxembourg, for instance).

Possible trainings at the end of the programme

Advanced Masters

The Master in Actuarial Science is not a requirement for any particular Advanced Masters.

Doctoral programme

Holders of a Master in Actuarial Science may enrol for the doctoral programme in Actuarial Science, subject to some conditions (e.g. higher level pass).

Certificates

In addition to the master in actuarial science, CPD activities are organized as University certificates, under the auspices of the University Institute for Continuing Education (Institut universitaire de formation continue - IUFC).

Contacts

Attention, you are currently reading a page of an old programme study. To get up to date contact information, please got to the [current program study](#) site.

Curriculum Management

Entite de la structure LSBA

Acronyme	LSBA
Dénomination	Louvain School of Statistics, Biostatistics and Actuarial Sciences
Adresse	Voie du Roman Pays, 20 bte L1.04.01 1348 Louvain-la-Neuve Tél 010/474314 - Fax 010/473032
Site web	http://www.uclouvain.be/lsba
Secteur	Secteur des sciences et technologies (SST)
Faculté	Faculté des sciences (SC)
Commission de programme	Louvain School of Statistics, Biostatistics and Actuarial Sciences (LSBA)

Academic Supervisor : Michel Denuit

Jury

Président : Pierre Devolder
Secrétaire : Donatien Hainaut

Usefull Contacts

Secrétariat des étudiants : Sophie Malali

Attention, you are currently reading a page of an old programme study. To get up to date contact information, please got to the [current program study](#) site.

