ACTU2M - Introduction

Introduction

ACTU2M - Teaching profile

Learning outcomes

Graduates of the master's degree in actuarial sciences will be able to design and implement, using a scientific and multidisciplinary approach, processes for managing the financial impact of risks (Quantitative Risk Management) faced by economic agents.

During his training, the future graduate of the master's degree in actuarial sciences will acquire solid methodological foundations but also know-how thanks to tutorials, practical case studies and an obligatory internship in a company or in a research laboratory.

The future graduate of the master's degree in actuarial sciences will thus acquire the knowledge and skills necessary to become:

- a high-level professional capable of analyzing the financial consequences of risks weighing on an economic agent (Enterprise Risk Management) and providing operational solutions;
- a scientist capable of understanding and modeling complex financial systems and their multiple interactions;
- a specialist combining cutting-edge techniques from actuarial sciences and financial mathematics with various related disciplines, such as law, economics, accounting and taxation in order to analyze quantitative risk management problems in all their dimensions;
- an independent expert, understanding all the ethical, economic and social issues of the problems to be resolved and capable of communicating effectively with the various stakeholders;
- a specialist in data sciences applied to insurance.

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

1. Exploiter de manière intégrée un corpus de savoirs en sciences actuarielles, en data science et en mathématiques financières pour agir avec expertise dans le domaine de la gestion quantitative des risques.

1.1

Maîtriser les développements fondamentaux en mathématiques actuarielles et financières.

1.2

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

Utiliser les outils fondamentaux de calcul et de programmation dans la résolution de problèmes de gestion de l’impact financier des risques.

1.4

Gérer les risques souscrits par les entreprises d’assurance et de réassurance et déterminer le montant des provisions techniques ainsi que la politique de leur placement.

1.5

Tarifer les principaux instruments financiers (actions, obligations, produits dérivés et structurés) et développer des stratégies financières de couverture adaptées à l’appétit pour le risque de l’investisseur.

1.6

Identifier et 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

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

Appliquer les normes et règlementations en vigueur dans la discipline.

2.

Mobiliser des savoirs multiples, dans le domaine des sciences actuarielles et des mathématiques financières ainsi que dans les

Detailed programme by subject

CORE COURSES [64.0]

- Mandatory
- Optional
- Not offered in 2024-2025
- Not offered in 2024-2025 but offered the following year
- Offered in 2024-2025 but not the following year
- Not offered in 2024-2025 or the following year
- Activity with requisites
- Open to incoming exchange students
- Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

				Year 1	Year 2
Mémoire au choix (15 credits)					
LACTU2900	Master thesis : research		FR [q1 or q2] [] [15 Credits]		x
LACTU2910	Master Thesis : Project		FR [q1 or q2] [] [15 Credits]		x
Mathématiques de l'assurance (27 credits)					
LACTU2010	Property and casualty insurance actuarial science	Michel Denuit	FR [q1] [45h] [7 Credits]	x	
LACTU2030	Life insurance actuarial science	Donatien Hainaut	FR [q1] [30h+7.5h] [5 Credits]	x	
LACTU2040	Social security and pension actuarial science	Pierre Devolder	FR [q2] [30h+7.5h] [5 Credits]	x	
LACTU2170	Financial valuation of actuarial liabilities	Donatien Hainaut	FR [q2] [45h+15h] [7 Credits]	x	
LACTU2280	Reinsurance and risk exchanges	Philippe De Longueville	FR [q1] [15h] [3 Credits]	x	x

PROFESSIONAL FOCUS [30.0]

- Mandatory
- Optional
- Not offered in 2024-2025
- Not offered in 2024-2025 but offered the following year
- Offered in 2024-2025 but not the following year
- Not offered in 2024-2025 or the following year
- Activity with requisites
- Open to incoming exchange students
- Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

Year
1 2

Content:

LACTU2210	Quantitative Risk Management	Christian Hafner	EN [q2] [30h] [5 Credits]

				Year 1	2
⊠ LDATS2360	Seminar in data management: basic	Céline Bugli	FR [q1] [15h+10h] [4 Credits]	x	x
⊠ LINFO2275	Data mining & decision making	Marco Saerens	EN [q2] [30h+15h] [5 Credits] *> French-friendly*	x	x

⊠ Mathématiques de la finance

⊠ LMAT2470	Processus stochastiques (statistique)		FR [q2] [30h] [5 Credits] Δ *> English-friendly*	x	x
⊠ LSTAT2170	Times series	Rainer von Sachs	EN [q2] [30h+7.5h] [5 Credits]	x	x

⊠ Finance

⊠ LLSMS2138	Big data in finance	Nathan Lassance	EN [q2] [30h] [5 Credits]	x	x
⊠ LLSMS2226	Credit and interest rate risk	Frédéric Vrins	EN [q2] [30h] [5 Credits]	x	x

⊠ Droit des assurances

⊠ LDROP2021	Insurance Law	Bernard Dubuisson	FR [q2] [30h] [5 Credits]	x	x

OPTIONAL COURSES

- Mandatory
- Optional
- Not offered in 2024-2025
- Not offered in 2024-2025 but offered the following year
- Offered in 2024-2025 but not the following year
- Not offered in 2024-2025 or the following year
- Activity with requisites
- Open to incoming exchange students
- Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

These credits are not counted within the 120 required credits.

Content:

				Year 1	Year 2
LSST1001	IngénieuxSud	Stéphanie Merle Jean-Pierre Raskin	FR [q1+q2] [15h+45h] [5 Credits]	x	x
LSST1002M	Information and critical thinking - MOOC	Anne Bauwens (compensates Jean-François Rees) Myriam De Kesel	FR [q2] [30h+15h] [3 Credits]	x	x

Supplementary classes

To access this Master, students must have a good command of certain subjects. If this is not the case, in the first annual block of their Masters programme, students must take supplementary classes chosen by the faculty to satisfy course prerequisites.

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- Activity with requisites
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- Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

Course prerequisites

The **table** below lists the activities (course units, or CUs) for which there are one or more prerequisites within the programme, i.e. the programme CU for which the learning outcomes must be certified and the corresponding credits awarded by the jury before registering for that CU.

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

Prerequisites and student's annual programme

As the prerequisite is for CU registration puposes only, there are no prerequisites within a programme year. Prerequisites are defined between CUs of different years and therefore influence the order in which the student will be able to register for the programme's CUs.

In addition, when the jury validates a student's individual programme at the beginning of the year, it ensures its coherence, meaning that it may:

- require the student to combine registration in two separate CUs which it considers necessary from a pedagogical point of view.
- transform a prerequisite into a corequisite if the student is in the final year of a degree course.

For more information, please consult the Academic Regulations and Procedures.

 # Prerequisities list

LACTU2900 "Mémoire recherche" has prerequisite(s) LACTU2010 ET LACTU2030 ET LACTU2230 ET LACTU2170

- LACTU2010 - Property and casualty insurance actuarial science
- LACTU2030 - Life insurance actuarial science
- LACTU2230 - Health insurance actuarial science
- LACTU2170 - Financial valuation of actuarial liabilities

LACTU2910 "Mémoire projet" has prerequisite(s) LACTU2010 ET LACTU2030 ET LACTU2230 ET LACTU2170

- LACTU2010 - Property and casualty insurance actuarial science
- LACTU2030 - Life insurance actuarial science
- LACTU2230 - Health insurance actuarial science
- LACTU2170 - Financial valuation of actuarial liabilities

The programme's courses and learning outcomes

For each UCLouvain training programme, a reference framework of learning outcomes specifies the the skills expected of every graduate on completion of the programme. Course unit descriptions specify targeted learning outcomes, as well as the unit's contribution to reference framework of learning outcomes.

ACTU2M - Information

Access Requirements

Master course admission requirements are defined by the French Community of Belgium Decree of 7 November 2013 defining the higher education landscape and the academic organisation of courses.

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

Unless explicitly mentioned, the bachelor's, master's and licentiate degrees listed in this table or on this page are to be understood as those issued by an institution of the French, Flemish or German-speaking Community, or by the Royal Military Academy.

In the event of the divergence between the different linguistic versions of the present conditions, the French version shall prevail.

SUMMARY

Others Bachelors of the French speaking Community of Belgium

Access based on application : access may be granted either directly or on the condition of completing additional courses of a maximum of 60 ECTS credits, or refused.

Foreign students who have completed a university education (minimum 3 years) with strong quantitative connotation and who have obtained at least 70% (or 14/20) of average for all successful university years in their home university, without the slightest failure in mathematics courses, calculation of probabilities and statistics, have the possibility to apply for admission to the program of the Master in Actuarial Science (120 ECTS).

Moreover students who wish to be admitted on the basis of a dossier are invited to consult the criteria for the evaluation of application.

Admission and Enrolment Procedures for general registration

Students must draw up their individual programmes and submits it to the Jury who is responsible for accrediting prior learning and experience.

Specific professional rules

Graduates of UCLouvain's ACTU2M program have direct access to the Belgian professional association (Institut des Actuaires en Belgique - IABE, www.iabe.be) and are authorized to use the title of actuary.

Entity

Structure entity	SST/SC/LSBA
Denomination	(LSBA)
Faculty	Faculty of Science (SC)
Sector	Sciences and Technology (SST)
Acronym	LSBA
Postal address	Voie du Roman Pays 20 - bte L1.04.01 1348 Louvain-la-Neuve Tel: +32 (0) 10 47 43 14 - Fax: +32 (0) 10 47 30 32
Website	https://uclouvain.be/fr/facultes/sc/lsba

Academic supervisor: Michel Denuit

Jury

- President: Donatien Hainaut
- Secretary ot the jury: karim.barigou@uclouvain.be
- Study advisor: Michel Denuit

Useful Contact(s)

- Secretary of The Louvain School of Statistics, Biostatistics and Actuarial Sciences: Sophie Malali