Master in Actuarial Science

The 2024-2025 programme is subject to change. It is provided for information purposes only.

Programme mnemonic
MA-ACTU
› Focus *Professional* : M-ACTUS

Studies level
Master 120 credits

Learning language
french

Schedule
office hours

Studies category / subcategory
Sciences and technics / Sciences

Campus
Plaine

Programme objectives

Actuaries are experts in risk management, analysing all kinds of risks that affect private individuals and businesses. Based on their analyses, they implement solutions to limit financial liability (insurance packages, social security schemes, etc.).

Mathematics is key to the profession. Actuaries combine scientific rigour in defining and quantifying risks with in-depth knowledge of financial and insurance markets. Strong analytical skills and creativity are also necessary to work in this profession. This actuarial science programme helps students develop all these skills. It requires a solid foundation in mathematics, especially in probability and statistics, as well as good knowledge of economics, law, and management.

Programme's added value

ULB's Master in Actuarial Science is one of only two such programmes in the Wallonia-Brussels Federation.

Graduates are officially entitled to join the Institute of Actuaries in Belgium (IA|BE), which confers international recognition for their qualification.

The Master programme has been designed to create a balance between theoretical knowledge and practical methods used in the field.

For students wishing to complete their training with an internship, the location of the ULB is ideal in Brussels where most financial institutions and insurance companies are located as Brussels hosts most of the financial institutions and insurance companies.

The « Prix P&V » rewards the best master thesis in actuarial sciences.

Teaching methods

Lectures (50%), exercises and seminars (15%), individual and group projects (20%), Master's dissertation (15%).

The programme was designed to strike a balance between theoretical knowledge of finance and insurance (lectures) and the methods used in the field (seminars, individual or group projects).

Succeed in your studies

Choose

The information and guidance counsellors at the InfOR-études [https://www.ulb.be/en/studies-info-desk-1] service will help you choose your studies throughout the year.

Succeed

Take part in preparatory courses [https://www.ulb.be/en/studies-info-desk-1] or get help to succeed [https://www.ulb.be/en/studies-info-desk-1] , before or during your studies.

Get help

Apply for financial aid, look for accommodation or a student job, get support [https://www.ulb.be/fr/aides-services-et-accompagnement/aid-services-and-support-1] for your specific needs.

International/Openness

Collaboration and joint courses with KU Leuven and UC Louvain.

Students can apply to attend some courses from the actuarial programmes of UC Louvain and KU Leuven as elective courses.

The first year of the Master introduces students to general topics in insurance and to the stochastic modelling of risks in insurance and finance. Students may also be required to follow upgrade courses ('cours de mise à niveau'), depending on each student's profile and previous studies or training. These courses will be determined by the president of the jury at the beginning of the academic year. They are intended to complete the student's knowledge of probability theory, statistics, computer science, mathematical optimisation, accounting, law, management, and economics.

During the second year of the Master, students complete their general education and follow specialised courses in life and non-life insurance, ALM for insurance companies, reinsurance, financing methods for pension systems, etc. They also complete a dissertation and may complete a work placement (optional), giving them a first contact with the profession.

Life insurance, non-life insurance, group insurance and pension funds, reinsurance, accounting and fiscality of insurers, risk management in insurance, financial theory, stochastic finance (60%)

Probability, stochastic processes, statistics, econometrics, computer science (25%)

Master thesis (15%)

Job opportunities

Insurance and reinsurance companies, banks and financial institutions, social security and pensions, consulting and supervision.

There are many opportunities on the labour market for actuaries, and demand still outweighs supply by a wide margin.

Insurance companies and reinsurance companies are, of course, the main employers.

But actuaries also work in banking and financial institutions, social security institutions, pension institutions, consulting firms, and supervising organisations. The high level of training provided by this Master programme generally leads, after some years, to decision-making and leading positions.

Contacts

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https://sciences.ulb.be/departement-mathematique

Jury President
Griselda DEELSTRA

Jury Secretary
Jennifer ALONSO GARCIA

Master in Actuarial Science
Focus Professional

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During the second year of the Master, students complete their general education and follow specialised courses in life and non-life insurance, ALM for insurance companies, reinsurance, financing methods for pension systems, etc. They also complete a dissertation and may complete a work placement (optional), giving them a first contact with the profession.

Life insurance, non-life insurance, group insurance and pension funds, reinsurance, accounting and fiscality of insurers, risk management in insurance, financial theory, stochastic finance (55%)

Probability, stochastic processes, statistics, econometrics, computer science (25%)

Master's dissertation (20%)

Life insurance, non-life insurance, group insurance and pension funds, reinsurance, accounting and fiscality of insurers, risk management in insurance, financial theory, stochastic finance (60%)

Probability, stochastic processes, statistics, econometrics, computer science (25%)

Master thesis (15%)

Bloc 1 | M-ACTUS | MA-ACTU

Cours obligatoires

ACTU-F4001 Modèles de régression et Statistical Softwares | Davy PAINDAVEINE (Coordinator) and Toufik ZAHAF
5 credits [lecture: 24h, tutorial classes: 12h] second term

ACTU-F4002 Modèles financiers II | Griselda DEELSTRA (Coordinator)
5 credits [lecture: 36h, tutorial classes: 12h, project: 30h] second term French

ACTU-F401 Modèles financiers I | Griselda DEELSTRA (Coordinator)
5 credits [lecture: 36h, tutorial classes: 12h] first term French

ACTU-F402 Aspects réglementaires du métier de l'actuaire | Ludovic Theate (Coordinator)
5 credits [lecture: 36h] second term French

ACTU-F403 Assurance non vie I | Julien TRUFIN (Coordinator)
5 credits [lecture: 36h, tutorial classes: 12h] first term French

ACTU-F404 Assurance vie I | Julien TRUFIN (Coordinator)
5 credits [lecture: 36h, tutorial classes: 12h] first term French

ACTU-F405 Financement des pensions | Jennifer ALONSO GARCIA (Coordinator)
5 credits [lecture: 36h, tutorial classes: 12h] first term French

ACTU-F502 Assurance vie II | Jennifer ALONSO GARCIA (Coordinator)
5 credits [lecture: 36h, practical work: 12h, project: 100h] second term French

DROI-C690 Droit des assurances et Fiscalité des assurances et des fonds de pension
5 credits [lecture: 36h] first term French

Cours optionnels

Choisir des cours à option pour arriver à un total de 60 ECTS.

Choisir exactement 15 crédits sauf pour les étudiants devant suivre les cours de mise à niveau. N'importe quel autre cours (y compris hors ULB) peut être choisi moyennant l'approbation du jury.

Pour suivre le cours GEST-S572, il faut préalablement avoir suivi le cours GEST-S301

A total of 15 credits chosen from the following

DROI-S3001 (optional)
Droit fiscal | Patrice DELACROIX (Coordinator)
5 credits [lecture: 36h] second term French

GEST-S501 (optional)
Audit | Romuald BILEM (Coordinator)
5 credits [lecture: 24h] second term French

GEST-S503 (optional)
Financial econometrics | Olivier SCAILLET (Coordinator)
5 credits [lecture: 24h, tutorial classes: 12h] second term English

GEST-S572 (optional)
Banking and asset management | Yassine BOUDGHENE STAMBOULI (Coordinator) and Griselda DEELSTRA
5 credits [lecture: 36h] second term English

INFO-F202 (optional)
Langages de programmation 2 | John IACONO (Coordinator)
5 credits [lecture: 24h, practical work: 24h, project: 30h] first term French

INFO-F305 (optional)
Modélisation et simulation | Gianluca BONTEMPI (Coordinator)
5 credits [lecture: 30h, tutorial classes: 24h, project: 6h] first term French

MATH-F309 (optional)
Statistique mathématique II | Thomas VERDEBOUT (Coordinator)
5 credits [lecture: 24h, tutorial classes: 24h] first term French

SOCA-D304 (optional)
Démographie | Jean-Michel DECROLY (Coordinator)
5 credits [lecture: 24h, tutorial classes: 12h] first term French

STAT-F404 (optional)
Graduate statistics | Thomas VERDEBOUT (Coordinator) and Davy PAINDAVEINE
5 credits [lecture: 24h] first term English

STAT-F405 (optional)
Time series analysis | Yves-Caoimhin SWAN (Coordinator)
5 credits [lecture: 24h, tutorial classes: 12h] first term English

STAT-F409 (optional)
Processus stochastiques et applications en assurance
5 credits [lecture: 24h, tutorial classes: 12h] second term French

STAT-F416 (optional)
Analyse des durées de vie | William MALBECQ (Coordinator)
5 credits [lecture: 24h, tutorial classes: 12h] second term French

STAT-S301 (optional)
Introduction to econometrics | Germain VAN BEVER (Coordinator)
5 credits [lecture: 24h, tutorial classes: 24h] first term English

STAT-S401 (optional)
Analyse statistique multivariée | Catherine DEHON (Coordinator)
5 credits [lecture: 24h, tutorial classes: 12h] second term French

STIC-B405 (optional)
Introduction aux bases de données | Frédéric SERVAIS (Coordinator)
5 credits [lecture: 24h, tutorial classes: 24h] second term French

Master in Actuarial Science
Focus Professional

Bloc 2 | M-ACTUS | MA-ACTU

Cours obligatoires

ACTU-F503 Réassurance
5 credits [lecture: 30h, tutorial classes: 12h] second term

ACTU-F504 ALM en assurance | Céline AZIZIEH (Coordinator)
5 credits [lecture: 30h, tutorial classes: 12h] second term

ACTU-F505 Modèles financiers en assurances | Pierre DEVOLDER (Coordinator)
5 credits [lecture: 30h, tutorial classes: 12h] first term

ACTU-F506 Assurance non vie II | Julien TRUFIN (Coordinator)
5 credits [lecture: 36h, tutorial classes: 12h] first term French

GEST-S408 Advanced Finance | Hugues PIROTTE (Coordinator)
5 credits [lecture: 36h, tutorial classes: 24h] first term English

MEMO-F520 Mémoire | Julien TRUFIN (Coordinator)
15 credits [mfe/tfe: 180h] first and second terms

Cours optionnels

Choisir des cours à option pour arriver à un total de 60 ECTS.
En outre, tout cours au programme de l'ULB, de l'UCLouvain ou de la KULeuven peut être proposé par l'étudiant au jury.

Choisir des cours à option pour arriver à un total de 60 crédits.
En outre, tout cours au programme de l'ULB, de l'UCL ou de la KULeuven peut être proposé par l'étudiant au jury.

Up to 20 credits chosen from the following

Cours KULeuven ou UCLouvain

Up to ten credits chosen from the following

ACTU-Y101 (optional) Foundations of Quantitative Risk Measurement
6 credits [lecture: 39h] first term English

ACTU-Y102 (optional) Statistical tools for quantitative risk management
6 credits [lecture: 39h] first term English

ACTU-Y105 (optional) Actuariat des assurances de personnes
7 credits [lecture: 45h] second term French

ACTU-Y108 (optional) Actuarial and Financial Valuation Principles
6 credits [lecture: 39h] first term English

ACTU-Y109 (optional) Financial Engineering
6 credits [lecture: 39h] second term English

ACTU-Y111 (optional) Actuarial Enterprise Risk Management
3 credits [lecture: 15h] second term French

ACTU-Y112 (optional) — Data science for insurance and finance
3 credits [lecture: 15h] first term English

Cours ULB

Pour suivre le cours GEST-S572, il faut préalablement avoir suivi le cours GEST-S301.

DROI-S3001 (optional) — Droit fiscal | Patrice DELACROIX (Coordinator)
5 credits [lecture: 36h] second term French

GEST-S501 (optional) — Audit | Romuald BILEM (Coordinator)
5 credits [lecture: 24h] second term French

GEST-S503 (optional) — Financial econometrics | Olivier SCAILLET (Coordinator)
5 credits [lecture: 24h, tutorial classes: 12h] second term English

GEST-S572 (optional) — Banking and asset management | Yassine BOUDGHENE STAMBOULI (Coordinator) and Griselda DEELSTRA
5 credits [lecture: 36h] second term English

MATH-F309 (optional) — Statistique mathématique II | Thomas VERDEBOUT (Coordinator)
5 credits [lecture: 24h, tutorial classes: 24h] first term French

SOCA-D304 (optional) — Démographie | Jean-Michel DECROLY (Coordinator)
5 credits [lecture: 24h, tutorial classes: 12h] first term French

STAT-F404 (optional) — Graduate statistics | Thomas VERDEBOUT (Coordinator) and Davy PAINDAVEINE
5 credits [lecture: 24h] first term English

STAT-F405 (optional) — Time series analysis | Yves-Caoimhin SWAN (Coordinator)
5 credits [lecture: 24h, tutorial classes: 12h] first term English

STAT-F409 (optional) — Processus stochastiques et applications en assurance
5 credits [lecture: 24h, tutorial classes: 12h] second term French

STAT-F416 (optional) — Analyse des durées de vie | William MALBECQ (Coordinator)
5 credits [lecture: 24h, tutorial classes: 12h] second term French

STAT-S301 (optional) — Introduction to econometrics | Germain VAN BEVER (Coordinator)
5 credits [lecture: 24h, tutorial classes: 24h] first term English

STAT-S401 (optional) — Analyse statistique multivariée | Catherine DEHON (Coordinator)
5 credits [lecture: 24h, tutorial classes: 12h] second term French

STAT-S502 (optional) — Data management and analytics | Pierre DEVILLE (Coordinator)
5 credits [lecture: 36h, tutorial classes: 24h] second term English

STIC-B405 (optional) — Introduction aux bases de données | Frédéric SERVAIS (Coordinator)
5 credits [lecture: 24h, tutorial classes: 24h] second term French

STIC-B505 (optional) — Conception et gestion de banques de données | Frédéric SERVAIS (Coordinator)
5 credits [lecture: 24h, tutorial classes: 24h] first term French