MASTER IN ACTUARIAL AND FINANCIAL SCIENCES

Main Language of Instruction:
French ☑ English ○ Arabic ○

Campus Where The Program Is Offered: CST

OBJECTIVES

Since 2005, the Master in Actuarial and Financial Sciences (SAF) at the USJ Faculty of Science has been recognized as the first of its kind in Lebanon. This innovative approach has established USJ's reputation as a provider of versatile actuarial talents, highly sought after both locally and globally.
At the heart of this program, emphasis is placed on the essential role of actuaries as key players in risk modeling and management. Often referred to as risk engineers, actuaries are experts capable of mastering risks by predicting and anticipating future developments using mathematical models and statistical analyses. Their work facilitates informed decision-making in risk management. Their central role in banking and insurance institutions makes them key experts in managing contemporary financial challenges.
Recognized for its excellence, the SAF Master's program offers students a unique opportunity to acquire in-depth skills in the actuarial field. In partnership with the Institute of Financial Science and Insurance (ISFA) at the Claude Bernard University - Lyon 1 (UCBL), the program delivers a dual degree, combining the academic rigor of USJ with the renowned expertise of ISFA. Beyond the academic aspect, the partnership between USJ and ISFA provides a gateway to the French Institute of Actuaries through the completion of an actuarial dissertation. Graduates of the program also benefit from international recognition by the Society of Actuaries (SOA), further solidifying their status on the global stage.
The global network of partners formed by alumni of the Master's program facilitates access to top-tier professional opportunities, offering students a concrete perspective on the career prospects in this dynamic and constantly evolving field.

PROGRAM LEARNING OUTCOMES (COMPETENCIES)

- Analyze financial and insurance products
- Design pricing and actuarial analysis models
- Manage risks and optimize portfolios
- Pursue a professional career or PhD studiesfood science and contribute to the advancement of the field through new discoveries and innovations.

ADMISSION REQUIREMENTS

The SAF Master's program welcomes candidates who meet one of the following criteria:
- Possess a Bachelor in Mathematics from the USJ Faculty of Science.
- Hold a Bachelor's degree or a transcript from the first year of a Master in Mathematics or a scientific discipline recognized as equivalent by the USJ Equivalence Commission.
- Have an engineering degree recognized as equivalent by the USJ Equivalence Commission.

Admission is based on a review of the candidate's application, followed by an interview with a selection committee.

COURSES/CREDITS GRANTED BY EQUIVALENCE

At the request of the candidate for the SAF Master's program, it is possible to validate academic courses obtained in a study program at a university other than USJ or within an USJ faculty other than the Faculty of Science, by equivalence with the SAF Master's program. This validation is subject to a review of the application and approval by the USJ Equivalence Commission. The number of credits obtained by equivalence cannot exceed 50% of the credits required for the SAF Master's program.

PROGRAM REQUIREMENTS

Required Courses (120 Credits): The SAF Master's program comprises a total of 120 ECTS credits that students must complete to obtain their degree. These credits are distributed across required courses listed in the following study plan.
Those who successfully complete the program will receive a Master in Science, Technology, and Health with a specialization in Actuarial Science from UCBL, as well as a Master in Actuarial and Financial Sciences from USJ. Additionally, candidates have the opportunity to obtain the actuary diploma in France after successfully defending their actuarial dissertation, in accordance with the terms specified in the agreement between USJ and UCBL.

Required Courses (120 Credits)
Data Analysis and Clustering (3 Cr.); Basics of Civil Law and Business Law (2 Cr.); Stochastic Calculus (6 Cr.); Labor Law and Social Protection (2 Cr.); Econometrics (3 Cr.); Economics (2 Cr.); English (2 Cr.); Database Software (2 Cr.); Mathematical Optimization (2 Cr.); Inferential Statistics (4 Cr.); Simulation Techniques and Advanced Programming (2 Cr.); Life Insurance: Products, Regulations and Accounting; Group Pension/Employee Benefits (4 Cr.); Accounting, Financial Analysis and Taxation (3 Cr.); Insurance Contract Law (2 Cr.); Economics of Risk and Insurance (3 Cr.); Portfolio Management (2 Cr.); Actuarial Mathematics of Life Insurance (4 Cr.); Generalized Linear Models (3 Cr.); Non-Life Insurance Provisioning Techniques (2 Cr.); Actuarial Internship (3 Cr.); Financial Theory (2 Cr.); Option Pricing Theory (2 Cr.); Data Science/Machine Learning (3 Cr.); Financial Markets (6 Cr.); Asset-Liability Management (3 Cr.); Duration Models (3 Cr.); Modeling Insurance Losses and Ruin Theory (3 Cr.); Advanced Pricing and Provisioning Practices (3 Cr.); Social Protection and Health Insurance (2 Cr.); Retirement and Pension Funds (2 Cr.); Time Series (2 Cr.); Extreme Values and Copula Estimation (3 Cr.); Credibility and Bonus-Malus Systems (2 Cr.); Economic Behavior and Competitive Strategy (3 Cr.); Insurance and Bank Accounting (2 Cr.); Enterprise Risk Management (3 Cr.)Lebanese and Middle Eastern Markets (2 Cr.); Financial Models in Insurance and Generator of Economic Scenarios (3 Cr.); European and International Standards (3 Cr.); Reinsurance, Business Case in Reinsurance, Securitization (3 Cr.); Actuarial Dissertation (9 Cr.).

SUGGESTED STUDY PLAN

Semester 1

Code	Course Name	Credits
048ADDMM1	Data Analysis and Clustering	3
048DCAMM1	Basics of Civil Law and Business Law	2
048CASMM1	Stochastic Calculus	6
048DTPMM1	Labor Law and Social Protection	2
048ECOMM1	Econometrics	3
048EMMMM1	Economics	2
048ENGMM1	English	2
048LBDMM1	Database Software	2
048OPTMM1	Mathematical Optimization	2
048STIMM1	Inferential Statistics	4
048SPAMM1	Simulation Techniques and Advanced Programming	2
	Total	**30**

Semester 2

Code	Course Name	Credits
048ASVMM2	Life Insurance: Products, Regulations and Accounting; Group Pension/Employee Benefits	4
048CAFMM2	Accounting, Financial Analysis and Taxation	3
048DCAMM2	Insurance Contract Law	2
048ERAMM2	Economics of Risk and Insurance	3
048GPAMM2	Portfolio Management	2
048MAAMM2	Actuarial Mathematics of Life Insurance	4
048MLGMM2	Generalized Linear Models	3
048PNVMM2	Non-Life Insurance Provisioning Techniques	2
048SAEMM2	Actuarial Internship	3
048THFMM2	Financial Theory	2
048THOMM2	Option Pricing Theory	2
	Total	**30**

Semester 3

Code	Course Name	Credits
048DASMM3	Data Science/Machine Learning	3
048FIMMM3	Financial Markets	6
048GAPMM3	Asset-Liability Management	3
048MODMM3	Duration Models	3
048CSRMM3	Modelling Insurance Losses and Ruin Theory	3
048PAPMM3	Advanced Pricing and Provisioning Practices	3
048PASMM3	Social Protection and Health Insurance	2
048RFPMM3	Retirement and Pension Funds	2
048SETMM3	Time Series	2
048VECMM3	Extreme Values and Copula Estimation	3
	Total	**30**

Semester 4

Code	Course Name	Credits
048CBMMM4	Credibility and Bonus-Malus Systems	2
048CESMM4	Economic Behavior and Competitive Strategy	3
048CABMM4	Insurance and Bank Accounting	2
048ERMMM4	Enterprise Risk Management	3
048MLRMM4	Lebanese and Middle Eastern Markets	2
048MFGMM4	Financial Models in Insurance and Generator of Economic Scenarios	3
048NEIMM4	European and International Standards	3
048RETMM4	Reinsurance, Business Case in Reinsurance, Securitization	3
048SMAMM4	Actuarial Dissertation	9
	Total	**30**

COURSE DESCRIPTION

048ADDMM1 Data Analysis and Clustering 3 Cr.

This course aims to connect students' statistical knowledge to its practical application on data from businesses, banks, insurance companies, or financial markets during the first year of the master's program. This approach allows students to subsequently acquire interpretation methodologies specific to each field. The software used, such as SPSS and R, is commonly employed by many companies as an initial step in data interpretation before more in-depth analysis by experts. By the end of this course, students will be able to input data into the software, select relevant study samples, apply global descriptive tests and hypothesis tests specific to the questions asked, and master data classification techniques.

048DCAMM1 Basics of Civil Law and Business Law 2 Cr.

This course provides an essential legal foundation for advanced studies. It explores civil law, which governs relationships between individuals, whether physical or moral, and introduces the general principles of law and corporate law. Corporate law examines aspects related to the creation, operation, and liquidation of companies, as well as internal and external relationships. Upon completion of this course, students will be competent in analyzing, interpreting, and resolving every day or professional legal situations involving the concept of corporations.

048CASMM1 Stochastic Calculus 6 Cr.

This course explores stochastic processes, focusing on discrete-time martingales and discrete-state Markov chains, detailing their fundamental properties and key convergence theorems. The second part of the course examines continuous-time martingales, Brownian motion, stochastic integrals, Itô's formulas, and the resolution of stochastic differential equations. By the end of the course, students will be able to explore the valuation of financial options using stochastic techniques.

048DTPMM1 Labor Law and Social Protection 2 Cr.

This course offers a foundational understanding of insurance and labor law, focusing on the legal frameworks that regulate employer-employee relationships. It covers the creation, execution, and termination of employment contracts, union rights, workplace safety, and the protection of vulnerable workers. Additionally, it delves into social protection laws that safeguard individuals against social risks such as illness, disability, and unemployment. By the end of the course, students will be equipped with knowledge of their rights and obligations as employers or employees, as well as the key legal principles governing employment contracts.

048ECOMM1 Econometrics 3 Cr.

This course has both a narrow and broad scope. "Narrow" because it focuses exclusively on single-equation linear models (multiple linear regression); "broad" because its application extends to various fields beyond economics, encompassing all areas where evaluating causal relationships between statistical variables is relevant (marketing, ecology, health, psychology, sociology, etc.). The approach remains consistent in all cases, adopting statistical modeling: defining an application field (studied population, statistical individual), formalizing a causality problem (endogenous, candidate exogenous variables, expected outcomes), using data (sample) to validate or invalidate the formulated hypotheses (significant coefficients, analysis of variance), and interpreting and using the results (sign and value of the coefficients, prediction for a new individual).

048EMMMM Economics 2 Cr.

This course provides students with a comprehensive understanding of Microeconomics and Macroeconomics principles. Through the use of graphical and mathematical analysis, students will explore how changes in supply and demand influence prices within a market economy. The course also delves into the significance of elasticity for firms, as well as the concepts of inflation, unemployment, and fiscal policy. Furthermore, students will examine the interconnectedness between financial markets and the "real" economy, constructing a macroeconomic model that encompasses the Short Run and expands to encompass global interactions.

048ENGMM1 English 2 Cr.

This course is designed to introduce students to the terminology commonly utilized in the banking and insurance sectors. Throughout the course, students will engage in practical exercises encompassing various aspects of finance and insurance, such as dialogue creation, curriculum vitae (CV) writing, report compilation, and textual analysis. The course aims to enhance students' proficiency in the specific language and communication skills essential for effective engagement within the financial and insurance domains.

048LBDMM1 Database Software 2 Cr.

This course consists of two parts: Access and SAS. It aims to enable students to create and manage a complete database including tables, queries, forms, reports, and macros, as well as to develop a structured program using SAS. The main objective of this course is to familiarize students with the fundamental tools of ACCESS and SAS software through concrete examples of real-world applications. By the end of this course, students will be able to import and utilize Access databases in development environments such as Delphi, Visual Basic, WinDev, C++, and SAS.

048OPTMM1 Mathematical Optimization 2 Cr.

This course aims to equip students with the skills necessary to model a real optimization problem into a mathematical problem. It also enables them to analyze the existence and uniqueness of an optimum of a function defined on a normed vector space, as well as to approximate the value of this optimum using classical numerical methods. By the end of the course, students will be able to transfer a concrete problem in the field of optimization into a mathematical framework, evaluate the characteristics of the optimum, and effectively apply numerical methods to estimate its value.

048STIMM1 Inferential Statistics 4 Cr.

Inferential statistics aim to derive the unknown characteristics of a population from a sample taken from that population. This course offers students a comprehensive and in-depth exploration of inferential statistics and how to apply them using the R programming language. It covers estimation techniques, confidence intervals, and hypothesis testing. Students will gain hands-on experience using R to manipulate, visualize and analyze real-world datasets.

048SPAMM1 Simulation Techniques and Advanced Programming 2 Cr.

This course explores the theory and practice of common random simulation techniques, as well as their implementation using standard computer tools. In the first part, it examines random simulation, Monte Carlo and Quasi-Monte Carlo methods, and variance reduction techniques. The second part focuses on developing dynamic libraries in C++ that can be imported into Excel. These libraries provide Excel users with the ability to externalize scientific calculations in C++, such as Monte Carlo simulations. Consequently, these dynamic libraries significantly reduce computation time by using C++, while benefiting from Excel's user-friendly interface.

048ASVMM2 Life Insurance: Products, Regulations and Accounting; Group Pension/Employee Benefits 4 Cr.

This course aims to familiarize students with life insurance products and group insurance plans. It includes an overview of the insurance market in Lebanon and the Middle East. Students will gain an understanding of the necessary steps for developing an insurance product, highlighting the actuary's role in this process.

048CAFMM2 Accounting, Financial Analysis and Taxation 3 Cr.

This course aims to provide a deep understanding of the fundamental principles of general accounting, enabling students to master the essential concepts and entries of financial accounting for the construction of annual accounts. Students will then be able to understand the taxation applied during an accounting period, covering VAT, the National Social Security Fund, payroll taxes, and income taxes. The second objective is to analyze, assess, and interpret the components of the result of an accounting period, based on the analysis of the accounting and financial impacts of financing operations, a financial analysis of financial statements, and the analysis of the accounting and financial impacts of fiscal operations.

048DCAMM2 Insurance Contract Law 2 Cr.

This course is an essential legal prerequisite for undertaking advanced studies in actuarial science. With the uncertainty of claims, policyholder premiums, and insurer profits, insurance regulation becomes crucial to protect all stakeholders in this sector, including the insured, the insurer, and even third parties (beneficiaries). Insurance law governs the relationships between policyholders and insurers through an in-depth study of an insurance policy. This policy specifies the offered guarantees, respective obligations, and the reasons for these obligations. Beyond analyzing insurance law articles, students taking this course will be able to recognize their rights, duties, and limits as policyholders or insurers.

048ERAMM2 Economics of Risk and Insurance 3 Cr.

This course aims to introduce insurance through the theory of lotteries, exploring preference criteria and utility functions. After a theoretical introduction, the application to insurance focuses on analyzing individual choices among different types of insurance and coverage, whether in a market with symmetric or asymmetric information. The second part of this course concentrates on defining these behaviors using mathematical models, considering one or more risk factors. By the end of this course, students will be able to distinguish various types of insurance contracts, understand the underlying economics of these contracts, and integrate the role of risk (single or multiple) as well as individual specificities in the process of choosing risk or the insurance intended to cover it.

048GPAMM2 Portfolio Management 2 Cr.

The objective of this course is to examine both the theoretical foundations and empirical evidence essential for investment within the framework of portfolio management, with a primary focus on understanding and applying "modern portfolio theory." By the end of the course, students should be able to interpret key return measures, articulate risk aversion and its consequences for portfolio selection, and understand the significance of the minimum-variance and efficient frontiers of risky assets. Furthermore, students will gain proficiency in selecting the optimal portfolio based on an investor's utility and the capital allocation line, thereby acquiring practical skills for effective portfolio management.

048MAAMM2 Actuarial Mathematics of Life Insurance 4 Cr.

This course aims to provide students with the essential actuarial foundations necessary for understanding and technically analyzing life insurance operations. It explores international actuarial notations and delves into pricing methods, estimation of life probabilities, and widely used provisioning techniques in actuarial practice. This course also details premium loading techniques and methods for calculating reserves. Additionally, it covers supplementary topics such as commutations and profitability, thereby enriching the overall understanding of actuarial aspects related to life insurance.

048MLGMM2 Generalized Linear Models 3 Cr.

This course presents the different regression models: simple and multiple linear models, generalized linear models, logistic regression, Poisson model. This course also introduces additional analysis tools for regression models including the analysis of variance. The presentation of the different concepts is done in a context of actuarial applications. At the end of the course, students should be able to establish the differences between all the models, choose the appropriate model according to the situation, and estimate parameters and use them.

048PNVMM2 Non-Life Insurance Provisioning Techniques 2 Cr.

This course aims to equip students with the essential knowledge required for carrying out claims reserving activities within a non-life insurance or reinsurance company. It is structured into three distinct phases. The first phase outlines the general context of the non-life reserving process, providing an understanding of the principles, stakeholders, and key steps governing this practice. The second phase highlights the deterministic and stochastic methods currently used by market players. Finally, the third phase involves the development of a reserving tool in Excel, utilizing both deterministic and stochastic methods.

048SAEMM2 Actuarial Internship 3 Cr.

This one-month internship is offered to first-year students in the Master in Actuarial and Financial Sciences. Its primary objective is to provide students with an initial immersion in the banking and insurance sectors, allowing them to gain practical experience and a first contact with the professional environment.

048THFMM2 Financial Theory 2 Cr.

This course covers the fundamental principles of financial theory in perfect markets, highlighting the Modigliani-Miller model and aspects related to corporate financing. The course also addresses the initial interest rate models and the methods for constructing the yield curve. Concrete examples are used to illustrate the practical application of the discussed theories.

048THOMM2 Option Pricing Theory 2 Cr.

The objective of this course is to equip students with the necessary tools to evaluate derivative products such as options in financial markets. The course focuses on the study of options markets, as well as the evaluation and hedging of derivative products in general, emphasizing their use in financial markets. The concepts of arbitrage, market completeness, and various valuation models (such as the binomial model, the multi-period tree, and the Black-Scholes model) are covered. Concrete examples are used to illustrate the practical application of the discussed theories.

048DASMM3 Data Science/Machine Learning 3 Cr.

Statistical learning plays a central role in current risk forecasting. This course aims to explore the fundamental theoretical concepts of renowned algorithms used in this field, with a particular emphasis on tree-based techniques. We will apply several algorithms and their extensions in the context of insurance pricing or reserving. This course contributes to the development of the following skills: exploration of various data sets, modeling, and projection to test and train our models on different data sets.

048FIMMM3 Financial Markets 6 Cr.

The objective of this course is to understand the functioning of common financial instruments and their applications, define the concept of arbitrage, discuss the principles of derivative instrument pricing and hedging of financial instruments. This course covers the following four parts: mathematical finance, numerical techniques in finance, structured products, and credit risk.

048GAPMM3 Asset-Liability Management 3 Cr.

Asset-liability management integrates the knowledge acquired from accounting principles, the necessity of evaluating assets and liabilities based on potentially diverse standards, and the analysis of the interplay between the two.

The asset-liability management course serves as an introductory exploration of bank asset-liability management, focusing on liquidity risk and interest rate risk. Students who enroll in this course will learn the methodology for calculating internal transfer rates and managing a network based on these rates. They will gain an understanding of ALM risk indicators and the impact on net interest margin. The course also covers the topic of risk and return on capital.

Furthermore, this course introduces fundamental concepts of corporate finance, including an understanding of different types of capital and debt from the perspective of both issuers and investors. Students will learn how to calculate the weighted average cost of capital, construct basic financial statements, and interpret financial ratios. The integration of asset-liability management and corporate finance is essential for comprehending the connections between financial structure, cost of capital, and risk. This integrated perspective enables the development of effective strategies for risk management and financial performance.

This course contributes to the development of the following competencies:

- Acquire fundamental techniques for managing the assets and liabilities of a bank.
- Examine the risks associated with liquidity and interest rates.
- Develop a comprehension of the core principles of corporate finance and acquire the skills to analyze the financial well-being of a company.

048MODMM3 Duration Models 3 Cr.

The construction of experience tables for biometric risks is a crucial aspect of the pricing and evaluation process in personal insurance commitments. This course presents the techniques used in an actuarial context by covering parametric, semi-parametric, and non-parametric models in the presence of right-censored and left-truncated data. The construction of mortality tables (generational models, alternative models, regulatory aspects) is specifically described.

048CSRMM3 Modeling Insurance Losses and Ruin Theory 3 Cr.

This course encompasses two major aspects: claim load modeling and ruin theory. The first part delves into individual and collective models, initially introduced in the first year of the Master's program, with a particular focus on common approximations of generating functions, including the use of Panjer's algorithm. The second part explores classical results of ruin theory, including closed-form and asymptotic formulas, ruin in continuous time – whether inventory, economic, or regulatory – as well as the concepts of the time and severity of ruin. The course also addresses advanced aspects such as reinsurance problems and optimal investment strategies, thus providing a comprehensive overview of these two fields.

048PAPMM3 Advanced Pricing and Provisioning Practices 3 Cr.

The objective of this course is to explore the specifics of insurance pricing, with a focus on accounting for specific risk factors and handling risk exposure. Two modeling approaches are examined: parametric and non-parametric techniques. Additionally, given the constant evolution of reserving practices, the course focuses on stochastic techniques, integrating the consideration of insurance-specific data, such as the treatment of reinsurance programs and extreme data. Particular attention is given to line-by-line reserving.

048PASMM3 Social Protection and Health Insurance 2 Cr.

This course aims to develop an understanding of the social protection system and health insurance. Social protection encompasses all collective welfare mechanisms that enable individuals to cope with the financial consequences of "social risks." These social risks can compromise the economic security of individuals or their families, leading to a decrease in their resources or an increase in their expenses, such as old age, illness, disability, unemployment, maternity, family responsibilities, etc. Health insurance, on the other hand, is responsible for providing insurance coverage for risks related to illness, work accidents, disability, maternity, and death.

048RFPMM3 Retirement and Pension Funds 2 Cr.

This course addresses the description and operation of mandatory pay-as-you-go pension schemes, with a particular focus on the in-depth study of private sector employee schemes. It also examines supplementary corporate pension schemes based on capitalization, exploring the functioning of the main types of schemes. Furthermore, the objective of this course is to study and apply the evaluations of social commitments according to IAS 19 standards. It offers an overview of the regulatory environment, highlighting the social and fiscal aspects, as well as the insurance mechanisms associated with corporate pension schemes based on capitalization.

048SETMM3 Time Series 2 Cr.

This course aims to present tools and concepts for studying dynamic phenomena, which evolve over time, from a statistical perspective, with the goal of modeling, estimating, and predicting. The program begins by examining the notions of stationarity and stochastic dependence, introducing tools such as spectral density, autocorrelation, and partial autocorrelation. Next, various estimation and prediction algorithms will be studied. Finally, the course concludes with a review of classical time series models, including moving averages, autoregressive processes, ARMA, (S)ARIMA models, as well as conditionally heteroscedastic models such as (G)ARCH.

048VECMM3 Extreme Values and Copula Estimation 3 Cr.

This course is divided into two parts: "Extreme Values" and "Copula Estimation." The first part explores how to evaluate a "Value-at-Risk" associated with an extreme probability and how to estimate the individual net premium for an excess-of-loss reinsurance contract. The goal is to present probabilistic and statistical tools to address such

questions, with a focus on the numerical implementation of the proposed methods. Topics covered include an introduction to extreme value theory, threshold exceedance modeling, and the evaluation of small probabilities and extreme quantiles. The second part focuses on copula estimation techniques, offering a statistical perspective complementary to the ERM course section dedicated to stochastic dependence.

048CBMMM4 Credibility and Bonus-Malus Systems 2 Cr.

This course, offered in the fourth semester of the SAF master's program, provides an introduction to the Credibility Theory while exploring various topics related to actuarial science. It defines and examines the essential tools of this discipline, combining analytical and synthetic thinking to solve practical problems and develop the necessary actuarial knowledge. The term "credibility" was historically introduced to measure the reliability of relevant experiences for pricing. This course explores the multiple applications of credibility, from property insurance to life insurance, highlighting the theoretical foundations of each tool. The chapters conclude with exercises that evaluate the handling of tools and encourage critical interpretation by students. By the end of the course, students will master Bayesian credibility, Bühlmann credibility, and Bühlmann-Straub credibility, as well as differentiate and discuss each model and be able to choose the appropriate tools for pricing or estimation according to credibility theory.

048CESMM4 Economic Behavior and Competitive Strategy 3 Cr.

This course explores the standard model of the insurance market, relating insurance companies competing on prices and product characteristics with clients, whether individuals or businesses, expressing specific preferences and facing financial constraints. The simplified model assumes a total absence of information asymmetry and no behavioral biases among market agents. This course introduces the Prospect Theory of Daniel Kahneman and Amos Tversky and examines the implications of behavioral biases on the competitive strategy of insurance companies.

048CABMM4 Insurance and Bank Accounting 2 Cr.

This course provides a comprehensive overview of the accounting aspect in relation to financial information, with a specific focus on insurance companies. Students will have the opportunity to examine accounting positions within insurance companies, explore international accounting standards (IFRS), and gain insights into the intricacies of consolidated accounts.
By the end of this course, students will develop the ability to understand and analyze the balance sheets of insurance companies and banks. They will be proficient in interpreting financial results, constructing internal accounting structures, and detecting any potential fraud or errors that may arise.

048ERMMM4 Enterprise Risk Management 3 Cr.

This course provides students with a comprehensive understanding of Enterprise Risk Management (ERM) fundamentals, risk measurement tools, risk transfer strategies, and the importance of stochastic dependence analysis. It equips participants with the necessary knowledge to determine economic capital needs and effectively allocate capital to mitigate risks in financial and insurance sectors. The course covers the following topics:

- ERM Framework and Process: Understanding the ERM structure and methodology, including its role in aligning risk management with organizational objectives.
- Risk Mapping: Techniques for identifying and categorizing risks to assess their potential impact on strategic goals.
- Measurement Tools: Exploring essential measurement tools in ERM, such as Value at Risk (VaR), TailVaR, and Wang-Transform, along with an examination of their properties and coherence.
- Risk Transfer Strategies: Investigating risk transfer mechanisms like reinsurance, securitization, and hedging, and their significance in managing and mitigating risks.
- Stochastic Dependence: In-depth analysis of the interrelationships and stochastic dependencies between risks, and their implications for risk aggregation in insurance and finance.
- Economic Capital Determination: Examining the foundational principles for determining the economic capital requirements of financial and insurance companies.
- Allocation of Economic Capital: Exploring different methods and properties involved in the allocation of economic capital within organizations.

048MLRMM4 Lebanese and Middle Eastern Markets 2 Cr.

The objective of this course is to familiarize students with the insurance, reinsurance, and banking markets in Lebanon and the Middle East. The course primarily aims to provide an overall view of the situation of financial institutions, insurance companies, reinsurance, and banks in the Middle East region. The ultimate goal is to introduce students to the specific dynamics of this sector within their regional environment.

048MFGMM4 Financial Models in Insurance and Generator of Economic Scenarios 3 Cr.

This course aims to demonstrate the implications of the "economic valuation" frameworks shared by prudential (Solvency II), accounting (IFRS), and financial (MCEV) standards on insurance valuation models. The transition from "marked to market" to "marked to model" logic results in specific valuation model characteristics, particularly the calculations of best estimates, which are examined in detail. The course also focuses on economic scenario generators (ESG), introducing the ESG concept and detailing the implementation process of an ESG, including projection, modeling, calibration, simulation, and result analysis. Practical cases are addressed, implementing an ESG in a simple context and its use in calculating the SCR Solo.

048NEIMM4 European and International Standards 3 Cr.

This course covers two major areas. The first part focuses on prudential banking regulation, presenting the new rules such as Basel II, Basel III, and Basel IV, with an analysis of the quantitative aspects, their impacts, and their management. The second part, complementary to the "Insurance Accounting" course, explores IFRS standards and Solvency II. This section highlights the new European solvency regime and the main international financial reporting standards used by insurance groups. The course emphasizes major developments compared to the previous framework, the principles underlying evaluations, and analyzes the impact of these standards on the management and organization of insurers.

048RETMM4 Reinsurance, Business Case in Reinsurance, Securitization 3 Cr.

This course explores in detail both proportional and non-proportional reinsurance techniques in a non-life context. A practical application complements the theoretical aspects of reinsurance through a Business Case titled "Optimization in Reinsurance," which takes into account the Solvency II regulatory environment. This Business Case provides students with the opportunity to apply their theoretical knowledge in the field of reinsurance and adapt it to contemporary regulatory requirements.

048SMAMM4 Actuarial Dissertation 9 Cr.

This internship, lasting three to four months, is offered to students in the second year of the Master in Actuarial and Financial Sciences. Each intern is supervised by a mentor, an executive from the company where the internship takes place. The internship topic must have a distinctly professional nature in the field of actuarial and financial sciences. At the same time, the topic must include sufficiently innovative aspects to provide the intern with interesting opportunities for academic development. At the end of the internship, students write a final dissertation and present their results before a jury.