

Master 2 in Economics

Track Quantitative Finance and Insurance

Magistère option

- Field: Economics
- Duration of studies: 1 year
- Diplomas: Master and Magistère
- Language: English

Aix-Marseille School of Economics
is a department of the Faculty of Economics and Management

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MODELS OF FINANCE - 24H

TEACHER

- Dominique HENRIET - dominique.henriet@centrale-marseille.fr

CONTENT

The aim of this course is to give some general concepts that found the main models of finance. This in order to first better understand the jungle of financial products and second to understand the functioning of markets.

Course outline:

Chapter 1 - Introduction

1. First questions
2. Assets
3. Functioning of trading
4. Two first models: risk neutral valuation

Chapter 2 - Static model: arbitrage free condition

1. No arbitrage condition in a static model
2. Mathematical appendix

Chapter 3 - Dynamics (finite discrete models)

1. The tree of states of nature
2. Stochastic process on a tree
3. No arbitrage condition on a dynamic model
4. Risk neutral probability
5. The Cox Ross Rubinstein model
6. Reformulation: filtration and tree
7. Appendix: the example of a random walk

Chapter 4 - Continuous models

1. The "continuous random walk": Brownian motion
2. Arbitrage free equation
3. The Black and Scholes model
4. Appendix: conditional expectation

Chapter 5 - Microstructure and behaviour models

1. The market efficiency hypothesis
2. The Competitive Rational Expectation Equilibrium
3. Bid ask spread (Glosten and Molgrom)
4. High frequency trading: arm's race
5. The capital asset pricing model

PROFESSIONAL SKILLS

To understand the functioning of financial markets & To know how to model financial asset value

BIBLIOGRAPHY AND TEXTBOOKS

- G. Demange et J.-C. Rochet « Méthodes mathématiques de la finance », Economica
- Divers articles de recherche

ORGANIZATION

This course is given through 24 hours of lecture at Ecole Centrale Marseille. Handouts are provided.

COURSE LANGUAGE

French English

FUNDAMENTAL PREREQUISITES

Knowledge in probability and decision theory.

Updated on April 2021

PORTFOLIO MANAGEMENT - 24H

TEACHER

- WeeFin (professional)

CONTENT

The course objective is to understand the theory and the main optimization techniques used by portfolio managers. The course will review the fundamentals (Markowitz efficient frontier, CAPM) and its application on equity portfolios and fixed income assets. The student will apply the theory on excel examples and then in a group portfolio construction exercise. The course will also cover the main trends (cryptos, passive indexing, ESG) and roles (risk manager, performance analyst, ...) of the asset management industry.

Course outline:

1. Introduction to portfolio management (3h)

We start by explaining how the asset management works and why (clients, goals) and then review the main formulas behind modern theory of portfolio management (Diversification, Markowitz, Sharpe Ratio, Volatility, returns, Efficient Frontier, multi-factor models).

2. Equity Investing and investment process (3h)

The investment process is explained step by step to understand how an asset manager works in practice. The equity market history helps us to understand the construction of the different investment theory: capitalization weighted benchmark and optimized portfolios (min vol, risk parity). And excel example is then used to apply the formulas covered.

3. Fixed Income Investing - basics (3h)

The specificities of the fixed income asset securities risk factors are detailed (time, yield curves, spreads). The risk factors are used to understand what are the main investing strategies (buy & hold, yield bets) for bonds. The pricing and returns formulas are reviewed in an excel example for a fixed bond.

4. Fixed Income Investing - advanced (3h)

More complex strategies and investment products (floaters, bond futures, CDS, IRS, Options) are reviewed. An example of advanced pricing is realized for option-embedded bonds. We also review the main bootstrapping formulas to derive zero-coupon yield curves, mandatory for portfolio manager.

5. Alternative asset classes and Performance Measurement (3h)

The other investment asset classes (Private Equity, Real Estate, Currencies, and Infrastructure) are covered. The basics risks and performance drivers behind the management of each asset class is explained. We also cover what are the main performance measurement ratios and calculations.

6. Asset management trends (3h)

Portfolio managers try to innovate and create new trends to diversify their return sources and information flows. We cover the main ones: NLP, alternative data sets, cryptos, ESG, smart betas. We will as well use a portfolio manager workstation to explain the tools used in practice.

7. Portfolio construction (6h)

The students apply the course theory by creating their own investment portfolios. They create an investment target profile and design an innovative investment solution that they pitch with an "investment deck" (backtest, portfolio background, etc...).

PROFESSIONAL SKILLS

- Becoming familiar with the principle concepts of portfolio management.
- Know how to organize an investment process that covers the main asset classes (equities, bonds).
- Understand the main roles and trends in the asset management industry.

BIBLIOGRAPHY AND TEXTBOOKS

John Hull (1995) "Options, futures & other derivatives" - Roland Portait, Patrice Poncet (2014) "Market Finance" - Franck J. Fabozzi (2012) "The Handbook of Fixed Income Securities".

ORGANIZATION

24 hours of lecturers (4 x 6 hours) including practical cases and a group exercise (construction of an investment portfolio).

COURSE LANGUAGE

French English

MANDATORY PREREQUISITES

Basic knowledge of finance theory - Basic maths, in particular matrix calculus - Basic skills in Excel.

KEYWORDS

Equity, Fixed Income - Portfolio optimization - Investment process

Updated on January 2021

This brochure is not legally binding and is provided for information purposes. List of courses may change marginally from one academic year to the next.

CORPORATE FINANCE I - 24H

TEACHER

- Gael LÉBOUF - gael.leboeuf@univ-amu.fr

CONTENT

Understand tools and techniques used in Corporate Finance. (from financial statement analysis and investment decision to financial structure and M&A).

Course outline:

- Chapter 1: The Corporation
- Chapter 2: Introduction to Financial Statements Analysis
- Chapter 3: Financial Decision Making and the Law of One Price
- Chapter 4: The Time Value of Money
- Chapter 5: Investment Decision Rules
- Chapter 6: Fundamentals of Capital Budgeting
- Chapter 7: Capital Markets and The Pricing of Risk
- Chapter 8: Optimal Portfolio Choice and the Capital Asset Pricing Model
- Chapter 9: Estimating the cost of capital
- Chapter 10: Capital Structure in a Perfect Market
- Chapter 11: Mergers and Acquisitions

PROFESSIONAL SKILLS

- Financial statement reading and analysis
- Capital budgeting
- Understanding capital structure

BIBLIOGRAPHY AND TEXTBOOKS

- J. Berk & P. DeMarzo, « Corporate finance », Prentice Hall; 5th edition, 2019
- Useful websites:
 - o Aswath Damodaran at NYU: Course and video materials, formulas, spreadsheets, Estimated risk premium, Cost of capital by sector and more: <http://pages.stern.nyu.edu/~adamodar/>
 - o Annual reports and legal informations on French listed companies: <http://www.amf-france.org/Recherche-avancee?formId=BDIF>
 - o Financial data on listed companies: <https://fr.finance.yahoo.com/>

ORGANIZATION

This course is given through 24 hours of lecture at Ecole Centrale Marseille.

- Group work (50% max. 4 students): Financial analysis and basic DCF valuation of a listed firm.
- Individual work (50%): Final exam.

COURSE LANGUAGE

French English

RECOMMENDED PREREQUISITES

Previous knowledge of accounting, financial analysis and discounting/capitalizing.

KEYWORDS

Corporate finance, capital budgeting, capital structure.

Updated on January 2022

ECONOMICS OF RISK AND INSURANCE - 24H

TEACHER

- Renaud BOURLÈS - renaud.bourles@univ-amu.fr

CONTENT

The aim of this course is - in a first part - to present decision and contract theories in a risky context. In the second part, we apply it to insurance demand and show how individual behaviours aggregate in the insurance market and how prices form.

Course outline:

Chapter 1 - Risk and measures of risk (Dominique Henriët, 9h)

1. Assumptions on risk
2. Risk Analysis
 - 2.1 Cumulative Distribution function
 - 2.2 Stochastic dominance of degree 1
 - 2.3 Quantile Function and Value at Risk
3. Spread Analysis
 - 3.1 Expected Shortfall, Lorenz function
 - 3.2 Mean Preserving Concentration
 - 3.3 Measures based on the quantile function.
 - 3.4 Coherent risk measures
4. Second degree Stochastic dominance
 - 4.1 Mean preserving spread
5. Expected utility hypothesis
6. Dual criterion
7. Ambiguity

Chapter 2 - Insurance economics (Renaud Bourlès, 12h)

1. The single risk model
 - 1.1 Mossin's model
 - 1.2 Wealth effect
 - 1.3 Price effect
2. Product differentiation
 - 2.1 Introducing heterogeneity in Mossin's model
 - 2.2 Measuring the probability of damage: scoring methods
 - 2.3 Estimating scoring models
3. Unobservable criteria
 - 3.1 The adverse selection problem
 - 3.2 Self-selection: the Rothschild-Stiglitz model
 - 3.3 Equilibrium existence
4. Moral hazard
 - 4.1 Self-insurance and its consequences
 - 4.2 Self-protection and moral hazard
 - 4.3 Ex-post moral hazard: the case of insurance fraud
5. Extensions and exercises
 - 5.1 Extensions of Mossin's model
 - 5.2 Insurance demand and exogenous risk
 - 5.3 On the value of genetic information
 - 5.4 Genetic information and self-insurance
 - 5.5 Health risks and bidimensional utility
 - 5.6 Life insurance and savings

Chapter 3 - Market & Counterparty Risk Management

1. Risk Management in Banks
2. Markets Risks
 - 2.1 Sensitivities
 - 2.2 Value at Risk (VaR)
 - 2.3 Limitations of the VaR
 - 2.4 Case Study
3. Counterparty Risks
 - 3.1 Definition and key elements
 - 3.2 Potential Future Expose (PFE) and Expected Positive Exposure (EPE)
 - 3.3 Credit Valuation Adjustment (CVA)

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PROFESSIONAL SKILLS

- Know various measure of risk, their properties, advantages and limitations
- Know how to model behaviour under risk
- Understand how insurance products are priced

BIBLIOGRAPHY AND TEXTBOOKS

- Eeckhoudt L., C. Gollier and H. Schlesinger, 2005, Economic and Financial. Decisions under Risk, Princeton University Press.
- Henriot, D. and Rochet, J.-C., "Microéconomie de l'assurance", Economica, 1990.
- Picard, P., "Economic Analysis of Insurance Fraud", Handbook of Insurance, 2nd edition, G.
- Schlessinger, H., "The Theory of Insurance Demand", Handbook of Insurance, G. Dionne. (ed), Kluwer, 2000.

ORGANIZATION

The course is organized in 24h of lectures at Ecole Centrale Marseille and separated in three part.

The first part on risk and risk measures, from a theoretical point of view. The second, on insurance economics. Finally, the last part on practical risk management in banks. Handouts are provided.

COURSE LANGUAGE

French English

FUNDAMENTAL PREREQUISITES

Knowledge in probability and decision theories.

Updated on April 2021

STOCHASTIC FINANCE - 24H

TEACHER

- Sébastien DARSES - sebastien.darses@univ-amu.fr

CONTENT

The aim of the course is to provide students with mathematical methods that allow valuating financial assets.

Course outline:

1. Gaussian variables and stochastic processes
 - 1.1 Unidimensional Gaussian variable
 - 1.2 Gaussian vectors
 - 1.3 Stochastic processes
2. Brownian motion
 - 2.1 Construction as a Gaussian process
 - 2.2 Expansion, Markov property and martingale
 - 2.3 Invariance property
 - 2.4 Trajectorial property
 - 2.5 Complement on Brownian bridge
3. Stochastic integration and semimartingale
 - 3.1 Integrating with respect to a Brownian motion
 - 3.2 Introduction to the general theory of stochastic integration
 - 3.3 Itô formula and first applications
4. Stochastic differential equation
 - 4.1 Elements of motivation
 - 4.2 Strong solutions
 - 4.3 Some examples
5. Parabolic SDE, brownian diffusion and semigroups
 - 5.1 Brownian motion and linear parabolic SDE
 - 5.2 The general Feynman-Kac formula
 - 5.3 Semigroups
6. Change of measure
 - 6.1 Wiener space
 - 6.2 Change of measure and Girsanov theorem
7. Introduction to financial mathematics
 - 7.1 Black and Scholes model
 - 7.2 Portfolio and option replication

PROFESSIONAL SKILLS

Understand the mathematical framework and assumptions of the classical stochastic finance models.

BIBLIOGRAPHY AND TEXTBOOKS

- Lamberton, D. et Lapeyre, B. Introduction au calcul stochastique appliqué à la finance, Paris : Ellipses, 1997.
- El Karoui, N. et Gobet, E. Les Outils Stochastiques des Marchés Financiers : Une Visite Guidée de Einstein à Black-Scholes. Palaiseau : Les Editions de l'Ecole Polytechnique, 2011.
- Pardoux, E. Processus de Markov et Applications : Algorithmes, Réseaux, Génome et Finance. Dunod, 2007.

ORGANIZATION

This course is given through 24 hours of lecture at Ecole Centrale Marseille.

COURSE LANGUAGE

French English

FUNDAMENTAL PREREQUISITES

Knowledge in probability (including conditional expectation).

Updated on April 2021

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ECONOMETRICS OF BANKING AND FINANCE - 24H

TEACHERS

- Deloitte (professional)
- Sullivan HUE (post-doc AMSE)

CONTENT

This course presents the econometric methods used to measure and forecast financial risks. Different models will be studied. These models make it possible to model the dynamics of prices (or returns), ie. the conditional mean, the conditional variance, but also the higher moments (asymmetry, thickness of the distribution tails). Part of this course will also deal with the dependence between the returns of several assets.

Course outline:

- Conditional mean
- Conditional variance
- Estimation
- Specification tests
- Forecast
- Value-at-risk
- Multivariate models

PROFESSIONAL SKILLS

- Understanding time series models specific to financial market data
- Application to real data
- Risk prediction
- Use of specific econometric tools (OxMetrics) and programming (R, matlab, python, ox, etc)

BIBLIOGRAPHY AND TEXTBOOKS

Laurent S. (2018). G@RCH 8, Estimating and Forecasting ARCH Models, London: Timberlake Consultants Press.

ORGANIZATION

Lecture.

COURSE LANGUAGE

French English

FUNDAMENTAL PREREQUISITES

- Advanced statistics
- Introduction to econometrics
- Maximum likelihood
- Econometrics of time series

RECOMMENDED PREREQUISITES

- Programmation (R, matlab, python, ox, etc)

Updated on April 2021

BIG DATA AND FINANCE - 18H

TEACHERS

- Crédit Agricole CACIB (professional)
- WeeFin (professional)

CONTENT

The course presents the last developments around the use of big data technics in finance. The first part offers an overview of the various recent applications to banking and financial regulation. The second concentrates on the use of big data and associated models in market finance.

Course outline:

Part 1: Overview of the applications of Big data in banking (12h, Pierre Bittner & M. Debeux)

1. The interest of big data in finance
 - 1.1 - Reminder on Big data
 - 1.2 - Big data and decision
 - 1.3 - Big data and market supervision
2. Case study in finance
 - 2.1 - Applications to corporate and investment banking
 - 2.2 - Regulatory challenges
3. Cloud and big data architecture
 - 3.1 - The importance of big data architecture
 - 3.2 - Application to sustainable finance

Part 2: Big data and market finance (12h, Yoann Bourgeois)

1. Realized Volatility
 - 1.1 - Continuous time pricing fundamentals
 - 1.1.1 - Brownian motion and random walk
 - 1.1.2 - Stochastic Differential Equation/ Stochastic Integrals
 - 1.1.3 - Quadratic Variation
 - 1.1.4 - Implied volatility in Black Scholes
 - 1.2 - Realized Volatility
 - 1.2.1 - Unbiased estimators
 - 1.2.2 - Confidence intervals
 - 1.2.3 - Application FX market
 - 1.3 - RV and integrated variance
 - 1.3.1 - Seasonality
 - 1.3.2 - The impact of periodic events on the RV
 - 1.3.3 - Application FX market
2. Bonds portfolio automatic engine
 - 2.1 - Definitions (Yields, Bond, Duration, P&L of a bond etc.)
 - 2.2 - Bonds clustering (PCA+KMeans)
 - 2.3 - The reference curve construction
 - 2.3.1 - Regression
 - 2.3.2 - Cubic Splines
 - 2.4 - Z-Score and momentum to sort bonds
 - 2.5 - Reference bonds replication
 - 2.6 - Application France 10Y reference bond
3. Intraday hedging of FX options
 - 3.1 - SABR model
 - 3.2 - Gatheral parametric local volatility model
 - 3.3 - Intraday model calibrations
 - 3.4 - Tichonov Regularization
 - 3.5 - The use of risk neutral distribution quantiles and moments
 - 3.6 - Application FX vanilla options

PROFESSIONAL SKILLS

- Understand how Big data methods are used in finance to value data
- Understand the issue it creates for market regulation
- Understand how Big data methods can be used for hedging purpose in market finance

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BIBLIOGRAPHY AND TEXTBOOKS

- Brigo, D. and Mercurio, F., 'Interest Rate Models - Theory and Practice', 1998, 981p, Springer.
- Cont, R., 'Frontiers in Quantitative Finance', 2008, 295p, Wiley.
- Wang, T.H. and Gatheral, J., 'Implied Volatility from Local Volatility: A Path Integral Approach' in Large Deviations and Asymptotic Methods in Finance', Peter K. Friz and alii, 2015, Wiley.

ORGANIZATION

Twenty-four hours of lecturers including practical training in class.

COURSE LANGUAGE

French English

MANDATORY PREREQUISITES

Basic knowledge in financial econometrics.

RECOMMENDED PREREQUISITES

Basic knowledge in quantitative finance and financial market.

KEYWORDS

Valuing data, Data lake, Realized volatility, clustering, Market supervision, insurtech.

Updated on October 2020

ACTUARIAL SCIENCE I - 24H

TEACHERS

- Renaud BOURLÈS - renaud.bourles@univ-amu.fr
- AXA (professional)

CONTENT

The aim of the course is to present the main issues related to the pricing of insurance products as well as the fundamental differences between life and non-life insurance.

Course outline:

Chapter 1 - Introduction to actuarial science (R. Bourlès, 6h)

1. Life insurance model
 - 1.1 Mortality risk and pricing errors
 - 1.2 Main insurance products: fair premiums and prudent pricing
 - 1.3 Actuarial Present Value and Notations
 - 1.4 Exercises
2. Non-life specificities
 - 2.1 Provisioning
 - 2.2 The variability of non-life risks
 - 2.3 The role of financial markets

Chapter 2 - Life Insurance, saving products, and accounting (X. Guerrault, 9h)

1. Introduction on Mathematical Reserves
2. Saving contracts and performance distribution mechanisms
3. Performance indicators for an insurance company

Chapter 3 - Non-Life Insurance (F. Derbez and R. Mouyrin, 9h)

1. Introduction (definition and example of claims)
2. Mechanisms of Non-Life Insurance
 - 2.1. Generalities
 - 2.2 Technical indicators
3. Pricing (modeling and examples)
4. Loss experience and reserving
 - 4.1 Definitions
 - 4.2 Deterministic methods

PROFESSIONAL SKILLS

- How to price simple life insurance products
- Understand the accounting specificities of insurance companies
- Know the current issues and the current regulations of the insurance market.

BIBLIOGRAPHY AND TEXTBOOKS

- Tosetti A., Weiss F. et Poncelin T., Les outils de l'actuariat vie, Economica
- Charpentier A. et Dutang C., L'Actuariat avec R

ORGANIZATION

This course is given through 24 hours of lecture at Ecole Centrale Marseille. The first six hours are taught by Renaud Bourlès, the remaining being instructed by practitioners from AXA.

COURSE LANGUAGE

- French English

FUNDAMENTAL PREREQUISITES

Knowledge in probability (in particular conditional expectation).

Updated on April 2021

ECONOMICS, FINANCE AND CRISES - 24H

TEACHER

- Céline POILLY - celine.poilly@univ-amu.fr

CONTENT

Using both empirical evidences and theoretical concepts, this course aims at explaining how economic and financial issues are closely related, and how shocks and crises can propagate. It also explains the interactions between financial markets and economic cycles (in light of the recent crises).

Course outline:

- Empirical Evidence on Financial Crises
- Financial frictions
- The financial crisis of 2006-2009
- Unconventional monetary policy
- European Sovereign Debt Crisis Discussion

PROFESSIONAL SKILLS

Good knowledge of the effects of financial frictions on the economy.

BIBLIOGRAPHY AND TEXTBOOKS

- Bernanke, B. S., Gertler, M., and Gilchrist, S. (1999). The financial accelerator in a quantitative business cycle framework. In Taylor, J. B. and Woodford, M., editors, Handbook of Macroeconomics, volume 1, chapter 21, pages 134-1393.
- Bernanke B. (2013). The Federal Reserve and the Financial Crisis. Princeton University Press.

ORGANIZATION

This course covers several topics, each topic being used as a support to introduce key theoretical concepts.

COURSE LANGUAGE

French English

FUNDAMENTAL PREREQUISITES

Good knowledge in macroeconomics and econometrics.

Updated on April 2021

INNOVATION AND FINANCE - 24H

TEACHERS

- LICA-Europe (professional)
- WeeFin (professional)

CONTENT

This course presents recent financial innovations and their impact on financial markets.

Course outline:

Chapter 1 - Blockchain and applications (Jérôme Gonzalez, 12h)

1. Introduction (history, properties and use case)
2. Applications in finance and insurance
3. Focus on ICOs
4. Perspectives

Chapter 2 - Green finance and sustainable finance (Grégoire Hug, 6h)

1. Sustainable Finance
 - 1.1. Socially Responsible Investment (SRI) history
 - 1.2. ESG (Environmental Social & Governance) data
 - 1.3. Investment strategies
 - 1.4. Financial innovation
2. Green finance
 - 2.1 COP21 implications on Finance
 - 2.2 Carbon Footprint measurement applied to finance: Principle & bias
 - 2.3 Case study

Chapter 3 - Crowdfinance and its impact on banking (François Fromaget, 6h)

1. Introduction: crowdlending and crowdfunding
2. How to measure and present default risk?
3. Fintech and crowdfinance

PROFESSIONAL SKILLS

Know recent innovations in finance and their impact for business.

ORGANIZATION

This course is given through 24 hours of lecture at Ecole Centrale Marseille and is entirely taught by practitioners.

COURSE LANGUAGE

- French English

FUNDAMENTAL PREREQUISITES

Knowledge in portfolio management and corporate finance.

Updated on April 2021

END-OF-STUDY PROJECT

TEACHER

- Karine GENTE - karine.gente@univ-amu.fr

CONTENT

PROFESSIONAL SKILL(S)

BIBLIOGRAPHY AND TEXTBOOKS

ORGANIZATION

COURSE LANGUAGE

French English

RECOMMENDED/FUNDAMENTAL PREREQUISITES

Update in progress

IT TOOLS FOR BIG DATA, A DEEPER VIEW - 24H

TEACHER

- EQUANCY (professional)

CONTENT

Course outline:

- Hadoop. HDFS. MapReduce. Stockage et calculs distribués. Déploiement d'un cluster.
- Préparation, stockage et traitement des big data : Pandas, Hive and Pig
- Data visualisation avec matplotlib & seaborn
- Alternatives : solutions propriétaires, bases NoSQL, ElasticSearch

PROFESSIONAL SKILL(S)

BIBLIOGRAPHY AND TEXTBOOKS

ORGANIZATION

COURSE LANGUAGE

French English

RECOMMENDED/FUNDAMENTAL PREREQUISITES

Update in progress

ADVANCED MACHINE LEARNING - 24H

TEACHER

- Badih GHATTAS - badih.ghattas@univ-amu.fr

CONTENT

Course outline:

- Advanced feature extraction (TF_IDF, Word2Vec, etc.)
- Deep learning (TensorFlow, Theano)
- Text Mining

PROFESSIONAL SKILL(S)

BIBLIOGRAPHY AND TEXTBOOKS

ORGANIZATION

COURSE LANGUAGE

French English

RECOMMENDED/FUNDAMENTAL PREREQUISITES

Update in progress

NUMERICAL METHODS FOR FINANCE - 15H

TEACHER

- Costin PROTOPOPESCU - costin.protopopescu@univ-amu.fr

CONTENT

PROFESSIONAL SKILL(S)

BIBLIOGRAPHY AND TEXTBOOKS

ORGANIZATION

COURSE LANGUAGE

French English

RECOMMENDED/FUNDAMENTAL PREREQUISITES

Update in progress

ACTUARIAL SCIENCE II - 24H

TEACHER

- AXA (professional)

CONTENT

The aim of this course is to present the recent developments in actuarial sciences, notably those related to prudential regulation.

Course outline:

1. Valuing an insurance portfolio
2. Introduction to reinsurance
3. Asset-liability management in insurance
4. Accounting and financial communication of insurance companies
5. The current regulation: Solvency 2
6. Long term care

PROFESSIONAL SKILLS

- Know the current issues and the current regulation of the insurance market.
- Know how to value an insurance company and understand the impact of this valuation on decisions.

ORGANIZATION

This course is given through 24 hours of lecture at Ecole Centrale Marseille and is entirely taught by practitioners from AXA.

COURSE LANGUAGE

French English

FUNDAMENTAL PREREQUISITES

Knowledge in probability (in particular conditional expectation). Basic knowledge in actuarial science and corporate accounting.

Updated on April 2021

CORPORATE FINANCE II - 24H

TEACHERS

- Caisse d'Épargne CEPAC (professional)
- Crédit Agricole (professional)

CONTENT

The aim is to present the main tools of structured finance, for both project and corporate financing.

Course outline:

Chapter 1 - Corporate financing (Johannes Lock, 6h)

1. Leasing
2. LBO

Chapter 2 - Introduction to project financing (Medhi El Alaoui, 6h)

Chapter 3 - Financing of sustainable energy infrastructures (Philippe Genre et Amaury Schoenauer, 12h)

PROFESSIONAL SKILLS

Know the main tools of structuring that allow complex financings.

ORGANIZATION

This course is given through 24 hours of lecture at Ecole Centrale Marseille and is entirely taught by practitioners.

COURSE LANGUAGE

French English

FUNDAMENTAL PREREQUISITES

Knowledge in corporate finance.

Updated on April 2021

CREDIT RISK - 24H

TEACHER

- Quant Digital AM (professional)

CONTENT

To explain the evolution of banking regulation on credit risk since the financial crisis (Basel II, Basel III & future regulations)
To understand the notion of credit risk (theoretical models, measurement, pricing, management, etc...)

Course outline:

1. Introduction: bonds and OTC transactions
2. Modelling defaults: structural models and ratings
3. Structured financing: plain-vanilla, asset financing, securitization etc.
4. Banking regulation on credit risk

PROFESSIONAL SKILLS

- A panorama on banking regulation
- An understanding of most basic financial instruments (loans, securitization, bonds etc.)

BIBLIOGRAPHY AND TEXTBOOKS

- GOURIEROUX C. et TIOMO, A. (2007) : Risque de crédit : une approche avancée, Economica.
- MERTON R. (1998), Continuous time finance, Blackwell Publishers.
- BRUYERE R., CONT R., FERY L., JAECK C. and SPITZ T. (2005): Credit derivatives, Wiley.
- RONCALLI T. (2016): Risk Management & Financial Regulation (<http://thierry-roncalli.com>).
- Xavier Freixas and Jean-Charles Rochet, Microeconomics of Banking, MIT Press, 2008.
- International Convergence of Capital Measurement and Capital Standards (Basel Committee).
- Arrêté du 20 février 2007 relatif aux exigences de fonds propres applicables aux établissements de crédit et aux entreprises d'investissement.
- DIRECTIVE 2006/48/CE DU PARLEMENT EUROPÉEN ET DU CONSEIL du 14 juin 2006 concernant l'accès à l'activité des établissements de crédit et son exercice (refonte).
- www.defaultrisk.com : permet l'accès à un grand nombre d'articles consacrés aux dérivés de crédit.

ORGANIZATION

This course is given through 24 hours of lecture at Ecole Centrale Marseille.

COURSE LANGUAGE

French English

FUNDAMENTAL PREREQUISITES

Knowledge in corporate accounting and financial modelling.

Updated on April 2021

MANAGING BIG DATA WITH SAS - 24H

TEACHER

- AVISIA (professional)

CONTENT

Course outline:

- SAS and Big Data, an introduction
- The SAS procedures for Big Data (1/2)
- The SAS procedures for Big Data (2/2)

PROFESSIONAL SKILL(S)

BIBLIOGRAPHY AND TEXTBOOKS

ORGANIZATION

COURSE LANGUAGE

French English

RECOMMENDED/FUNDAMENTAL PREREQUISITES

Update in progress

HANDS-ON PROJECT - 24H

TEACHER

- EQUANCY (professional)

CONTENT

PROFESSIONAL SKILL(S)

BIBLIOGRAPHY AND TEXTBOOKS

ORGANIZATION

COURSE LANGUAGE

French English

RECOMMENDED/FUNDAMENTAL PREREQUISITES

Update in progress

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