Financial Markets - 203 - 2ème année de master

Responsable pédagogique : GAELLE **LE FOL** - https://dauphine.psl.eu/recherche/cvtheque/le-fol-gaelle

Crédits ECTS : 60

LES OBJECTIFS DE LA FORMATION

Ce MSc. Financial Markets est un programme international qui forme des spécialistes des marchés financiers exerçant leurs compétences au service des banques et entreprises d'investissement, des sociétés de gestion d'actifs, des cabinets de conseil, des compagnies d'assurance ou des grandes entreprises. La formation offre aux étudiants des connaissances approfondies, à la fois théoriques, quantitatives et opérationnelles, sur tous les produits négociés sur ces marchés.

Les objectifs de la formation :

- Acquérir de bonnes connaissances des marchés financiers, des modèles, des produits et des stratégies quantitatives : le cœur de ce programme international (entièrement en anglais) est axé sur des techniques d'évaluation et de négociation spécifiques, notamment des stratégies d'investissement, de couverture, d'arbitrage et de gestion des risques
- Permettre aux étudiants de développer une base de connaissances large grâce à une large palette de cours d'économie, d'éthique, de finance et de réglementation afin de renforcer et d'étendre leur socle de connaissances
- Préparer les étudiants à travailler de manière indépendante sur des projets et à produire des rapports de qualité professionnelle. La formation offre un bon équilibre entre théorie et pratique, entre compétences académiques et opérationnelles
- Préparer les étudiants à une carrière internationale, la formation offre un programme international pour préparer les étudiants aux entretiens de recrutement en France et à l'étranger. Plusieurs cours y sont consacrés et plusieurs voyages pédagogiques sont organisés chaque année dans ce but
- Acquérir une diversité et savoir travailler en équipe qui se retrouve aussi bien au niveau des intervenants que des étudiants qui ont des parcours variés et viennent d'horizons différents. Les faire travailler tous ensemble pendant deux ans crée un faisceau d'apprentissage indirect important

MODALITÉS D'ENSEIGNEMENT

L'équipe enseignante utilise toutes les méthodes et pratiques d'enseignement : le cours avec travaux dirigés, l'étude de cas, les « teaser » au début des cours, le projet, le projet transversal, le hackathon, le mémoire, la présentation orale, la préparation aux entretiens etc.

Le parcours est principalement un programme en 2 ans (M1 – M2) mais il est également accessible aux étudiants titulaires d'une 1ère année de master en Economie, Finance, Mathématiques ou équivalent. Ces étudiants suivent alors le programme en 1 an et commencent directement au niveau M2. Les étudiants qui ont été recruté en 2ème année de master ces dernières années avaient tous fait un stage en front office.

Le programme en 2 ans est constitué de 3 semestres de cours, de deux stages de 4 à 8 mois ainsi que d'un mémoire de master. Le programme en 1 an prévoit deux semestres de cours ainsi qu'un stage de 4 à 8 mois.

- 1er semestre – septembre à Janvier : Enseignements fondamentaux
- 2nd semestre – janvier à septembre : Stage et mémoire de master
- 3e semestre – septembre à Janvier : Enseignements avancés et enseignements optionnels
- 4e semestre – février à avril : Enseignements avancés et enseignements
- Stage de fin d'étude – mai à novembre

ADMISSIONS

L'accès au Master 2ème année est ouvert aux étudiants ayant validé en première session, le Master Finance 1ère année de Paris-Dauphine sous conditions :

- d'avoir obtenu une note minimale de 08/20 en première session dans chacune des UE de la mention,
- d'avoir choisi les cours suivants : l'UE 104 Marchés de taux d'intérêt, l'UE 106 Investments and Capital Markets (en

anglais), l'UE 112 Derivative Instruments and Markets (en anglais), l'UE 111 Modélisation financière et applications (en anglais), IUE Fondamentaux de l'économétrie et l'UE économétrie de la finance.

Est également ouvert aux étudiants dauphinois, ou non dauphinois, ayant validé une 1ère année de master en économie, gestion et mathématiques en première session.

Les diplomés de Grandes Ecoles de commerce ou d'ingénieur doivent candidater au niveau M1, mais peuvent demander le droit d'accès à la formation de M2 en un an. Cette demande doit être formulée dans la lettre de motivation jointe au dossier de candidature. L'accès au parcours de 2ème année de master est alors accordé par le directeur du Master et le jury de sélection en fonction du profil de l'étudiant.

Enfin, tous les candidats doivent avoir une première expérience professionnelle de 6 mois en marchés financiers ou asset management quantitatif.

POURSUITE D'ÉTUDES
Ce parcours peut être prolongé par une thèse de doctorat, notamment pour les étudiants se destinant à la recherche.

PROGRAMME DE LA FORMATION

- Semester 3
  - Core Advanced (Optional Block)
    - Derivative Pricing and Stochastic calculus II (prerequisite: finance in continuous time)
    - Risk Management
    - Financial Markets & the Economy
    - Financial Econometrics II
    - Applied Time Series
    - Python programming
  - Elective (Optional Block)
    - Regulation and Financial Markets
    - Mergers & Acquisitions
    - Eco & Geo of Energy
    - C++ Programming
    - Volatility Trading Strategies
    - Derivative pricing & Stochastic calculus I
    - Derivative pricing & Stochastic calculus I (Soutien)
    - Financial Derivatives
    - Fixed income I
    - Financial Econometrics I
  - Mandatory Courses
    - Ethics, Prof. Standards & Compliance (Mandatory at M2 level for students following the course in 1 year)
    - Soft Skills
- Semester 4
  - Core Advanced (Optional Block)
    - Credit Risk
    - Fixed Income II
    - Commodities
    - Energy Derivatives
    - Machine Learning in Finance
  - Elective (Optional Block)
    - Behavioral Finance
    - Exotic Options & Structuring
    - Electronic Markets
    - Alternative Finance
    - Advanced Asset Management
    - Numerical Finance

- Sustainable Finance
  - Mandatory Module
    - Internship

DESCRIPTION DE CHAQUE ENSEIGNEMENT

SEMESTER 3

Core Advanced (Optional Block)

Derivative Pricing and Stochastic calculus II (prerequisite: finance in continuous time)

ECTS : 6

Enseignant responsable : JULIEN **CLAISSE** (https://dauphine.psl.eu/recherche/cvtheque/claisse-julien)

Langue du cours : Anglais

Description du contenu de l'enseignement :

The aim of this lecture is to present the theory of derivative asset pricing as well as the main models and techniques used in practice. The lecture starts with discrete time models which can be viewed as a proxy for continuous settings. We then develop on the theory of continuous time models. We start with a general Itô-type framework and then specialize to different situations: Markovian models, constant volatility models, local and stochastic volatility models. For each of them, we discuss their calibration, and the valuation and the hedging of different types of options (plain Vanilla and barrier options, American options, options on realized variance,...).

Course outline:

I. Discrete time modelling
I.1. Financial assets I.2. The absence of arbitrage I.3. Pricing and hedging of European options I.4. Pricing and hedging of American options

II. Continuous time modelling
II.1. Financial assets as Itô processes II.2. The Black-Scholes model II.3. Markovian models in complete markets II.4. Local volatility models II.5. Stochastic volatility models

- General setting
- Tree markets
- Risk-neutral measures
- Fundamental theorem of asset pricing
- The super-hedging problem
- The complete market case : example of the CRR model
- Approximate hedging in incomplete markets
- Examples: binomial and trinomial tree markets
- The Itô process framework
- Discussion of the Absence of arbitrage opportunity
- Complete and incomplete markets
- The general pricing and hedging principle for European and American claims
- Characterization of complete Black Scholes markets
- Explicit formulas : European call option (Black-Scholes formula), barrier option (reflection principle)
- PDE valuation (plain vanilla, barrier, Asian, American options
- Greeks and hedging
- Tracking error and convexity
- Dupire's formula and calibration to the volatility surface
- Super hedging prices
- Completion of the market with options : general principle, Approximate static hedging: example of the variance swap hedging problem
- Specific models : CEV, Heston, SABR,...

Compétences à acquérir :

The lecture starts with discrete time models which can be viewed as a proxy for continuous settings, and for which we present in detail the theory of arbitrage pricing. We then develop on the theory of continuous time models. We start with a general Itô-type framework and then specialize to different situations: Markovian models, local and stochastic volatility

models. For each of them, we discuss the valuation and the hedging of different types of options : plain Vanilla and barrier options, American options, options on realized variance, etc. Finally, we present several specific volatility models (Heston, CEV, SABR,...) and discuss their specificities.

Pré-requis obligatoires

Students must have past Financial Derivatives and Derivative Pricing & Stochastic Calculus 1.

Mode de contrôle des connaissances :

Final exam

Bibliographie, lectures recommandées :

Bouchard B. et Chassagneux J.F., Fundamentals and advanced Techniques in derivatives hedging, Springer, 2016.
Lamberton D. et B. Lapeyre, Introduction au calcul stochastique appliqué à la finance, Ellipses, Paris, 1999.

Risk Management

ECTS : 3

Enseignants : ARNAUD **ANGELO**, LAURENT **DAHAN**
https://dauphine.psl.eu/recherche/cvtheque/angelo-arnaud
https://dauphine.psl.eu/recherche/cvtheque/dahan-laurent-1

Langue du cours : Anglais

Description du contenu de l'enseignement :

Part 1 (L. DAHAN – 18h) : Risk management in practice
The Part 1 objective is to understand the issue of risk management. The principal ways of understanding and learning about risk are considered. Greeks computation is used to explain the daily P/L in a normal trading environment. The VaR is used to take into account market tail events while stress testing highlights performance under extreme market conditions. In a similar measure the course attempts to present the counterparty risk for market operations. This course shows also how all these measures come within the framework of the Basel Accords (3 pillars, regulatory capital requirements...)
Part 2 (X. BOCHER – 12h) : Mathematical framework of market risk measures and its limits
The Part 2 objective is to go deeper into Risk Measures introduced in Part 1, from a mathematical prospective (main measures, properties, limits, implementation). Then the course leads to the identification of main empirical sources of market risks and introduces more sophisticated models that allow to take into consideration those sources of risks. Within this framework, topics will be firstly introduced through empirical observation of data ("Stylized Facts") to lead to modeling answers and their application for risk management purpose.

Course outline:
Part 1 : Risk management in practice

- Introduction to Risk-Management
- Value-at-Risk
- Stress test
- Counterparty risk on derivatives

Part 2 : Mathematical framework of market risk measures
- Introduction
- Mathematical definition and properties of a Coherent Risk Measure
- Stylized facts on market risk and models to take them into consideration

Compétences à acquérir :

Master the issues and tools in risk management

Mode de contrôle des connaissances :

Final Exam

Coefficient : 1.5

Bibliographie, lectures recommandées :

Cherubini U., E. Luciano and W. Vecchiato, 2004, Copula Methods in Finance, Wiley, 310 pages.
Roncalli T., 2009, La Gestion des Risques Financiers, Economica (2ème édition), Collection Gestion, 455 pages.

Financial Markets & the Economy

ECTS : 3

Enseignants : CONSTANCE **BOUBLIL GROH**, JACOPO **D ANDRIA**
https://dauphine.psl.eu/recherche/cvtheque/boublil-groh-constance

Langue du cours : Anglais

Description du contenu de l'enseignement :

The objective of this course is to describe the strong interactions between financial markets and the economy:

- from the economy towards markets, by reviewing how economic newsflow affects the fundamental valuation of different assets classes,
- from markets towards the economy, by presenting the predominant role played by financial markets and financial institutions in the economy (crises, raw materials price movements,.)

The course will be organized around different themes prevalent in the current financial and economic environment considered as helpful to illustrate fundamental financial and economic principles. Particular attention will be drawn on the links between finance and economic policies, as fiscal policy, monetary policy and finance regulation.

The course will go through the following themes:
. Session I - Reminder of key macroeconomic analysis tools (1.5h – Alain)
· Session II - Global imbalances and financial implications (including portfolio allocation) (1.5h – Alain)
· Session III - Interaction between finance, fiscal and monetary policies with a specific focus on the US (2h – Alain)
· Session IV- Interaction between finance, fiscal and monetary policies with a specific focus on the Eurozone (2h – Alain)
· Session IV- Between Theory and Evidence: Case studies illustrating the application of tools in previous sessions (2h - Alain)
· Session V – Economic developments in emerging markets (3h – Constance)
· Session VI – Implications of key financial crises in emerging markets and application through case studies (3h – Constance)
· Session VII – Evolution of the financial regulation through crises (3h – Simon)
· Session VIII – Implication for the banking sector and case studies (3h – Simon)

Compétences à acquérir :

Master financial en economics environement as well as the interactions between financial markets and the economy

Mode de contrôle des connaissances :

Final Exam

Coefficient : 1.5

Bibliographie, lectures recommandées :

Frederic S. Mishkin « Economics of Money, Banking, and Financial Markets »
Carmen M. Reinhart & Kenneth S. Rogoff « This Time Is Different: Eight Centuries of Financial Folly »

Financial Econometrics II

ECTS : 3

Enseignant responsable : GUILLAUME **MONARCHA** (https://dauphine.psl.eu/recherche/cvtheque/monarcha-guillaume)

Langue du cours : Anglais

Description du contenu de l'enseignement :

The last ten years have seen an extraordinary growth in the use of quantitative methods in financial markets. Professionals now use sophisticated statistical techniques in portfolio management, proprietary trading, derivative pricing, risk management and securities regulation. This course has two main objectives. The first one is to offer an overview of mostly used econometrics tools, and some of their developements in the machine learning area: moment estimation, linear factor models, dynamic linear models, latent factor models, numerical simulations, model selection, clustering. The second one is to highlight the strong link between academic research and their practical implementation in various fields – portfolio construction, asset pricing, fund analysis, performance evaluation, quantitative investment strategies, factor investing, backtesting – through the analysis of research papers and applications into Python.

Course outline:

Lecture 1 - An Overview of Financial Data

- The statistical properties of financial asset's return
- Portfolio returns and aggregatio
- Distribution estimation
- Robust estimator
- Distributional test
- Time dependency

Python applications: distributional tests, modified-/conditional-/theoretical value-at-risk estimations.

Lecture 2 - Econometrics of the Efficient Frontier, part 1

- Theoretical Background of the efficient frontier and Sharpe ratio estimation
- The impact of estimation errors on efficient portfolios, and more generaly on portfolio optimizations

Python applications: simulation of estimation errors ; illustration of the impact of estimation errors on optimal porfolio weights.

Lecture 3 - Econometrics of the Efficient Frontier, part 2

- Portfolio optimization in practice
- Dealing with the presence of estimation errors in the estimation of the efficient frontier
- Bootstrap estimation of the efficient frontier
- Testing the efficiency of the efficient frontier and efficient portfolios

Python applications: Replication of the main results of 3 research papers (cf. references): simulation of statistically equivalent optimal portfolios, estimation of the resampled efficient frontier, bootstrap estimation of the efficient frontier.

Lecture 4 - Factor Pricing Models

- From the CAPM to multifactor model
- The main types of factor models
- Latent factor models
- Financial applications and paper study (cf. references)

Python applications: Identification of the cross-sectional return drivers of global macro hedge funds.

Lecture 5 - Dynamic factor Models

- Conditional factor models
- Dynamic factor models
- Dynamic latent factor models

Python applications: estimation of fund dynamic exposures, implementation of trend following strategies.

Lecture 6 - Model selection

- Stepwise selection methods
- Ridge and LASSO regressions
- Statistical inference and cross validation

Python application: Identification of the global macro factors driving equity returns.

Lecture 7 – Backtest validation

- Backtesting biases
- Assessing the impact of backtesting bias on return distributions
- Estimating backtest parameters
- Validating backtested strategies

Python applications: backtesting the momentum alternative risk premia strategy.

Compétences à acquérir :

Master econometrics (static) tools in empirical finance: factor models, risk premia, etc.

Mode de contrôle des connaissances :

Final Exam

Coefficient : 1.5

Bibliographie, lectures recommandées :

- Greene W. H., 2017, "Econometric Analysis", 8th edition, Pearson, 1176 pages.
- Hastie T., Tibshirani R., and J. Friedman, 2016, "The Elements of Statistical Learning", Springer Series in Statistics, 2nd edition, 745 pages.
- Meucci A., 2009, "Risk and Asset Allocation", Springer Finance, 3rd Edition, 532 pages.

- Tsay R., 2010, "Analysis of Financial Time Series", Wiley-Blackwell, 3rd edition, 712 pages.

Applied Time Series

ECTS : 3

Enseignant responsable : Sylvain **BENOIT** (https://sites.google.com/site/sylvainbenoit87/)

Langue du cours : Anglais

Description du contenu de l'enseignement :

The objective of the course is to study the theory, modeling, programming, and interpretation of the major time series models. Some applications to finance will be undertaken using Python. At the end of this class, students should be able to :

- Develop knowledge of basic univariate time series models appropriate for economic and financial data.
- Learn how to specify and estimate a time series model on these data (SARIMA models).
- Be able to use such models for forecasting and to evaluate their performance.
- Familiarize with common volatility modelling approaches (GARCH models).

 Course outline:

1/ Time series building blocks

- Stationarity
- Autocorrelation and white noise
- Testing autocorrelation
- Non-stationarity
- Python exercices

2/ ARMA Framework

- Moving average process
- Auto regressive process
- ARMA models and the Box-Jenkins method
- Maximum-Likelihood estimation
- Simulation and model selection with Python

3/ Specific topics and applications

- Unit-roots
- Trends
- Seasonnality
- Python application to the Earnings-Per-Share

4/ Volatility models

- GARCH
- Value-at-Risk
- Expected Shortfall
- Yahoo-Finance API and ARCH/GARCH modelisation with Python

5/ Principal Component Analysis

- Normed vs. Non-normed PCA
- Contribution and quality of representation of observations and variables on principal components
- Computation of the Absorption Ratio with Python

Compétences à acquérir :

Master the econometrics (dynamic) tools used in empirical finance.

Pré-requis obligatoires

Students must be enrolled in course Python Programming and must have past Introduction to Financial Econometrics.

Mode de contrôle des connaissances :

Assignment (30%) + Final Exam (70%)

Coefficient : 1.5

Bibliographie, lectures recommandées :

Brooks C (2008), Introductory econometrics for Finance, Cambridge Univ Pr.
Brockwell, P.J. and Davis, R.A. (2002), Introduction to time series and forecasting, Springer Verlag.
Campbell J., Lo A., McKinley, A. (1997), The Econometrics of Financial Markets. NJ: Princeton University Press.
Francq C, Zakoïan J.M. (2010), Garch models: Structure, statistical inference and financial applications, Wiley.
Hamilton J. D. (1994), Time Series Analysis, Princeton University Press.

Python programming

ECTS : 3

Enseignant responsable : JUAN FELIPE **IMBET JIMENEZ** (https://amandri.github.io/)

Langue du cours : Anglais

Description du contenu de l'enseignement :

This is an intermediate course on Python programming. It is designed for students with some prior programming experience. During the course the students and the instructor will develop jointly a python library, covering the steps, methodologies, and standards to produce high quality open-source code. At the end of the course, the students are expected to develop an independent new feature compatible with the project.

Session 1 Introduction, Methodology, and Tools.

Session 2 PyBacktestChain: A Backtesting framework for investment strategies that uses Blockchain technology to avoid overfitting.

Session 3 Data Module: Numpy, Pandas, and Object Oriented Programming.

Session 4 Strategy Module: Portfolio Optimization with SciPy

Session 5 Simulation and Risk Management

Session 6 Blockchain Module: Foundations, create a blockchain from scratch

Session 7 Blockchain Module: Storing backtests in the blockchain.

Session 8 User Interface and final project presentation

Compétences à acquérir :

Knowledge in Python programming for career in quantitative finance

Mode de contrôle des connaissances :

Project 90% - Participation 10%

Recommended prior knowledge
Basic concepts of programming, statistics, linear algebra and convex optimization.

Coefficient : 1.5

Bibliographie, lectures recommandées :

Mandatory literature: Mandatory installation:
Python 3.9 and other pydata libraries from Anaconda: https://www.anaconda.com/distribution/

An IDE like VSCode to run python code https://code.visualstudio.com/

Pre-requisite:
Recommended material if the student has no experience coding: 1 hour Python beginner tutorial - See the vide

- Hilpisch, Yves, Python for Finance: Analyze Big Financial Data, 2015, O'Reilly Publishing
- Lecture Notes and Github code of the class

Elective (Optional Block)

Regulation and Financial Markets

ECTS : 3

Enseignant responsable : THIBAULT **GODBILLON** (httpauphine.psl.eu/recherche/cvtheque/godbillon-thibault)

Langue du cours : Anglais

Description du contenu de l'enseignement :

Banks, and the financial sector more broadly, operate in a highly regulated environment. Financial regulations have evolved over time, in response to key events, such as the 2008 Global Financial Crisis, emerging risks (e.g., data, cyber security, FinTech, etc) and more recently the COVID19 pandemic, or the failure of SVB and Credit Suisse. Regulations have broadened to encompass all parts of the financial system: banks and non-banks—insurers, market infrastructures, credit rating agencies, hedge funds, etc. Global policymakers (including BCBS, FSB, IOSCO) have developed international standards to support the G20 mandate—ensuring the stability and resiliency of the global financial system. At the local and regional level (in the EU for instance), prudential and market regulators are tasked with transposing these global standards in their own framework, which may cause some variations in the way regulations are implemented across jurisdictions.

This lecture aims to provide students with an understanding of the global regulatory architecture, ensure they understand where regulations come from, and how to stay up-to-date with a complex and constantly evolving topic. The course will also provide students with an overview of the current rules and regulations applying to banks and financial market operators in general. Via the drafting of a two-page note on a specific topic from the course, students will practice their written English communication and capacity to summarise complex matters. Finally, via the participation of experts from various background, the course will provide students with an insight into working for global organisations.

Course outline:

1) An introduction to financial regulations
2) Prudential regulations (Basel standards, CRD/CRR, DFA)
3) Crisis management (FSB standards, BRRD/CMDI, DFA)
4) Overview of Market regulations (International standards, MIFID/EMIR)
5) Sustainable Finance (Key risks, FSB/BCBS standards, EU taxonomy/GBS/ SFDR)
6) Digital Finance (Key risks, FSB/BCBS standards, DORA/MiCAR)
7) Outro (Wrap-up, critical considerations on financial regulations)

Compétences à acquérir :

Master the regulatory prudential and market reforms, at the global level and across regions

Mode de contrôle des connaissances :

Each students will be asked to prepare a two page note aimed at summarising a key issue of the programme.

Mergers & Acquisitions

ECTS : 3

Langue du cours : Anglais

Description du contenu de l'enseignement :

- Introduction to Mergers & Acquisitions' issues and practice,
- Introduction to valuation methods and M&A process,
- Presentation of usual transaction structures with a special focus on tender offers, takeover bids, structured finance, and LBO transactions.

Course outline:

Class #1: Introduction to M&A

- The ecosystem of M&A *(landscape of parties involved)*: types of transactions, framework of an M&A process, types of investors,
- For M&A, 1+1 = 3: value creation,
- Course based on Group Flo transaction: €300 million, 155 restaurants,
- How to conduct a transaction from the beginning to a final tender offer.

Class #2: Basic valuation and structure

- What's the difference between Price and *(intrinsic)* Value,
- The language used in finance is accounting: = basic accounting, how to read financial statements,
- Standalone financial statements vs. Consolidated accounts,
- "Qui-est ce ?" Can you identify the activity of a company using its P&L & B/S?
  (Exercise used at H.E.C.),
- France Pare Brise: financial statements of a company in a distressed situation. Are you capable of identifying the

decisions that need to be made to save the company?

- Valuation methods *(transaction multiples, trading multiples, DCF, DDM, LBO models, NAV),*
- The course is Case study based.

Class #3: Buy-side versus sell-side M&A

- Description: who do what?
- Review of an HSBC pitch book prepared for Buffalo Grill,
- Overview of the timetable,
- Differences in modelling,
- How to purchase a company? How to structure the acquisition,
- Most common calculations *(premium, FDSO, transaction values, transaction multiples …)*
- Example of Provimi, a company worth €1,4 billion: review of the business plan used in the transaction *(which dates back 2008)*, and the fairness opinion *(invoiced for €200.000 for 33 pages report).*

Class #4: Excel Models, business planning, auditing of a spreadsheet

- Key principles,
- Why do bankers create Business plans, and how?
- How to enlighten the key considerations on a model,
- Are assumptions realistic? Why?
- What kind of stress, and which "haircut" will the banker use to test the resistance of financial forecasts,
- Course based on very many different excel spreadsheets used in real transactions.

Class #5: Takeover Bids and LBO transactions

- Key principles
- Friendly vs. hostile bids,
- Case study: the acquisition of Gilette by Procter&Gamble,
- Rationale of "leverage", and the relationship between leverage, risk and I.R.R.
- Case study: the I.P.O. of Mr. Bricolage,
- The recent considerations on Structured finance & Leveraged Buy outs: Debt Push Down *(How to relocate debt at the level of the assets rather than at the level of the holding company)*

Class #6: Negotiations

- Key principles,
- Structuring and modeling a transaction. But negotiating is key,
- What are the main issues at stake,
- How to bridge a valuation gap *(earn-outs, price adjustments)*,
- Case study based on legal documentation for a transaction,
- Possible case study from Harvard Business School: "Café Kenya".

Compétences à acquérir :

 Master usual transaction structures with a special focus on takeover bids and LBO transactions.

Mode de contrôle des connaissances :

- 45min multiple-choice questionnaire
- No documents allowed
- 1 case study

Coefficient : 1.5

Bibliographie, lectures recommandées :

- Vernimmen P., P. Quiry et Y. Le Fur, 2016, Finance d'entreprise, 14th Edition, Dalloz, 1124 pages.
- Filippelli M. A., Mergers and Acquisitions Playbook: Lessons from the Middle-Market Trenches, 2010, 1st Edition, ? Wiley, 338 pages.
- Higgins R., ISE Analysis for Financial Management, 2022, 13th Edition, McGraw-Hill Education, 464 pages.
- Reed S. F., A. Lajoux, and H. P. Nesvold, The Art of M&A: A Merger Acquisition Buyout Guide, 2019, 5th Edition, McGraw-Hill Education, 1264 pages.
- Rosenbaum J. and J. Pearl, Investment Banking: Valuation, LBOs, M&A, and IPOs, 2020, 3rd Edition, Wiley, 512 pages.

Eco & Geo of Energy

ECTS : 3

Enseignant responsable : GUILLAUME **LEENHARDT** (https://dauphine.psl.eu/recherche/cvtheque/leenhardt-guillaume)

Langue du cours : Anglais

Description du contenu de l'enseignement :

To share with students the combined, yet distinct, importance of economics and geopolitics in the shaping of the global energy map, and how these can in turn trigger long term effects globally on both society and economy as a whole.
The course will also elaborate on the recent "financiarisation" of the energy sector and its related impact.

Course outline:
The course starts with a review of the key historical periods of the energy industry and the progressive shaping of today's energy sector, especially for the period starting from the decolonisation to today's resource nationalism period.
It will focus on the evolution of the global supply/demand equation, its specificities for the major energy resources as well as its relative impact (together with that of economic theory) on resource valuation.
It will then elaborate on the major changes in the recent shaping of the energy industry, with the emergence of new Major energy firms, the quest for ever more difficult production areas and technologies and the role of pioneer oil companies.
Throughout the course, the ever-growing involvement of the financial industry in the energy sector will be highlighted.
The course will then invite energy sector specialists to share with students their experience and views on some of the key aspects and issues:

- the investment and financing decision in the upstream oil sector
- the emergence of gas and LNG and its ever changing global dynamics
- will shale oil and gas reshape the global energy map?
- the emergence and role of international energy traders and banks in the supply chain
- resource Narionalism in today's complex geopolitical environment
- the growing and essential role of regulation throughout the energy sector
- renewable energies

Compétences à acquérir :

Knowledge of the history and evolution of the energy sector and its main drivers.

Coefficient : 1.5

C++ Programming

ECTS : 3

Enseignant responsable : ALI **ARBOUN** (https://dauphine.psl.eu/recherche/cvtheque/arboun-ali)

Langue du cours : Anglais

Description du contenu de l'enseignement :

This practical oriented course focuses on learning C++ language as a practical tool. It aims to be both an introduction to C/C++ and a basic course for whoever want to get an expertise in programming. A special care to practice is taken through solving simple issues C++ as a tool ; no special programming background is expected. The 2 last courses are dedicated to advanced topics, not mandatory to learn the language, but important for people with programming background especially C programmers. A good grasp of the previous lessons will be required.

Course outline:
1. The basics

- Working with git
- C++ first program, compilation chaintools, input and output
- Variables and types, scopes, operators
- Working with numbers: maths VS computers
- Control structures

2. Express your algorithms using C++
- Functions (declaration, arguments, overloading)
- lvalue and rvalue references
- Namespace
- Precompiler and macros
- Program structure and build process

- Application: closed-formulae for pricing

3. Programming with the STL
- Sequential containers
- Associative containers
- Algorithms, iterators, functors
- Lambdas
- Streams

4. Defining your own types
- Structures and classes
- Value semantic
- Conversions
- Operator overloading
- Application: data models in pricing libraries

5. Managing memory and low-level data structures
- Pointers and arrays
- Pointer to method and functions
- Three kinds of memory
- Exceptions

6. Making your types abstract
- Inheritance and polymorphism
- Entity semantic and Liskov Substitution Principle
- Runtime Type Information
- Multiple inheritance
- Inheritance of implementation
- Application: reusable numerical tools

7. Generic programming: write less, do more
- Template classes and specializations
- Template functions, specialization vs overloading
- Type deduction and auto
- Universal references and perfect forwarding
- Curiously Recurring Template Pattern
- Traits
- Managing the overload resolution set
- Variadic templates and advanced metaprogramming

Compétences à acquérir :

Knowledge in C++ programming for finance

Coefficient : 1.5

Bibliographie, lectures recommandées :

Beginners:
Stanley B.Lippman, Josee Lajoie, Barbara Moo, "C++ Primer ", Fifth Edition, 2012.
Koenig A. & B. E. Moo, "Accelerated C++", Addison-Wesley, 2000
Reference guides:
Bjarne Stroustrup, "The C++ Programming Language", Fourth Edition, 2013.
Nicolai M. Josuttis N. M., "The C++ standard library" 2nd edition, Addison-Wesley, 2012
Scott Meyers, "Effective STL", Addison-Wesley, 2001

Online Gurus:
http://www.drdobbs.com/

Volatility Trading Strategies

ECTS : 3

Enseignants : SCHLOMY **BOTBOL**, BRICE **PERIN**
https://dauphine.psl.eu/recherche/cvtheque/botbol-schlomy-1

Langue du cours : Anglais

Description du contenu de l'enseignement :

The objective of the course is to give in-depth knowledge about Volatility Trading Strategies.
The goal is to provide participants with the various uses of volatility, its dynamics, the instruments to trade it, the risks embedded in and how to avoid classic pitfalls about volatility.

We will cover main instruments to trade Volatility (from vanilla options to more complex products as Conditional Variance swaps or Vix Options) and how to manage them in the various volatility strategies (Vega/Gamma Trades, Relative Value Trading, Risk Overlay, Cross-Asset volatility arbitrage strategies, Convertible Bonds Arbitrage, Variance Trades, Dispersion…).

Course outline:

The course (4 Courses Sessions and 3 Lab Sessions) will go through the following themes:
- Vanilla Options Trading Strategies and associated risk/returns
- Multi-Leg Option Strategies
- Volatility Investment Solutions
- Dynamic Hedging of associated Risks
- Risk Overlay for Long Equity portfolios
- Cross Asset Volatility Arbitrage Strategies
- Convertible Bonds Arbitrage
- Volatility Swaps and Variance Swaps Dynamics
- Variance Swaps Replication
- Correlation and Dispersion Trading
- Vix : Dynamics and related products

Compétences à acquérir :

Practical knowledge to design quantitative investment strategies.

Coefficient : 1.5

Bibliographie, lectures recommandées :

Bennett C. (2012), Volatility Trading, Santander Research Notes
Cochrane, J.H.(2005), Asset Pricing, Revised Edition, Princeton University Press.
Demeterfi, Derman, Kamal & Zou, (1999), More Than You Ever Wanted to Know About Volatility Swaps, GS Research Notes
Hull, J. (2006), Options, futures and other derivatives, 6th ed., Pearson Prentice Hall
Ilmanen, A. (2011), Expected returns, Wiley Finance.
MacDonald R. L. (2006) Derivatives Markets, 2nd ed., Addison Wesley
Riva, F. (2008) Applications financières sous Excel en Visual Basic, 3ème éd., Economica.
Taleb, N. (1997) Dynamic Hedging: Managing Vanilla and Exotic Options, Wiley

Derivative pricing & Stochastic calculus I

ECTS : 3

Enseignant responsable : VINCENT **TENA** (https://dauphine.psl.eu/recherche/cvtheque/tena-vincent)

Langue du cours : Anglais

Description du contenu de l'enseignement :

Course Objectives:

The primary aim of this course is to provide students with a comprehensive understanding of dynamic stock models and derivative securities. We will delve into essential mathematical concepts, illuminating the fundamental techniques for pricing and hedging in both discrete and continuous time. These concepts are pivotal for prospective professionals in numerous finance sectors.

Course Breakdown:

1. Probability Theory Refresher
2. Arbitrage
3. Binomial Pricing Model

4. Dynamic Strategies in Multiple Periods
5. Continuous-Time Models and Stochastic Calculus 6. Portfolio Dynamics & Stochastic Integration

7. Black & Scholes Model

Support Class for M1-level Students:

Complementing the main course, this support class seeks to solidify the understanding and application of concepts explored in 'Derivatives Pricing and Stochastic Calculus 1'. Beginning with a concise recap of salient class content, the support course then emphasizes the real- world financial application of these principles. The structure of the main course is mirrored in this supplementary class to optimize the integration and mutual reinforcement of the two courses.

Compétences à acquérir :

The "Derivative Pricing & Stochastic Calculus 1" course aims to equip students with a comprehensive understanding of dynamic stock models and derivative securities, emphasizing mathematical concepts for pricing and hedging in both discrete and continuous time.

Pré-requis recommandés

Prerequisites:

While the course is designed to be self-contained, with the initial chapter laying out the pertinent concepts of probability theory, an introduction in probability theory will greatly benefit the students and is not covered in this course. For further reading, chapters *All the Math you need* and *Elementary Stochastic Calculus* in "Paul Wilmott Introduces quantitative Finance", Willmott P, 2nd Edition, Wiley. 2007.

Mode de contrôle des connaissances :

Assessment

1 mid-term exam (30%), 1 final exam (70%)

Bibliographie, lectures recommandées :

References

Shreve, S. (2005). Stochastic calculus for finance I: the binomial asset pricing model. Springer Science & Business Media.

Shreve, S. E. (2004). Stochastic calculus for finance II: Continuous-time models (Vol. 11). New York: springer.

Back, K. (2005). A course in derivative securities: Introduction to theory and computation. Berlin: Springer.

Derivative pricing & Stochastic calculus I (Soutien)

Langue du cours : Français

Financial Derivatives

ECTS : 3

Enseignant responsable : AYMERIC **KALIFE** (https://dauphine.psl.eu/recherche/cvtheque/kalife-aymeric-1)

Langue du cours : Anglais

Description du contenu de l'enseignement :

The objective of this course is to give an all round comprehensive knowledge and understanding of the theory and the day-to-day use of derivatives contracts.
This course aims at "demystifying" key derivatives products, widely used to hedge existing market risks, to speculate on the future movements of market variables or more generally to taylor the return distribution of a portfolio. Participants will learn how banks and corporate treasuries use Financial Options alike in the management of risks, for trading, hedging and arbitrage and their role in the day-to-day running of the finances of businesses.
Starting from some basic knowledge of cash equity and equity derivatives market, and based on real option trade ideas capitalizing on a "nuanced" market view, it equips the audience with the skills to price and risk manage the most common and complex options, by explaining and dissecting the risks associated with trading a derivative from a risk/return/cost perspective by means of real life examples. For each option, from vanilla to exotics and structured products, this course makes clear why there is an investor demand, explains where the risks lie and how this affects the actual pricing, shows

how best to hedge them.
The class uses MS Excel Spreadsheet applications and Visual Basic extensively, involving the use of market data and Equity Market Research publications.

Course outline
I Derivatives products features overview II Capitalizing on a "nuanced" view using derivatives III Arbitraging using derivatives IV Hedging using derivatives

- Derivatives Markets Overview
- Options Pricing framework
- Specific market situations where derivatives go beyond cash
- Tailoring a derivatives strategy to a specific market situation and fundamentals
- Capitalizing on a risk/return/cost profile using derivatives: from protection to yield enhancement derivatives strategies
- Asymmetry between market rise and fall: "the skew"
- Short-term crash fears: jumps and "fat tails"
- Long-term uncertainty: volatility term structure trades
- Dynamic hedging: "Delta hedging" using Futures (discrete hedging & transaction costs, Delta Greek features -vs. stock level, time, "shadow delta")
- Static hedging: trading "Gamma and Vega hedging" using options (Gamma & Vega Greeks features, illustrations of Gamma-Vega hedging)
- P&L and hedging issues (Gamma-Theta P&L computation & pattern, impact of option maturity and Time decay, P&L and Options portfolio rebalancing frequency)
- Stylized facts of volatility empirics

Compétences à acquérir :

Binomial Tree, basic stochastic calculs

Mode de contrôle des connaissances :

Grading: Homeworks (trade idea on corporates,
VBA project on options portfolio) + Final Exam

Coefficient : 1.5

Bibliographie, lectures recommandées :

John C. Hull: Options, Futures, & Other Derivatives, Prentice Hall
Paul Wilmott: Derivatives: The Theory and Practice of Financial Engineering
Sheldon Natenberg: Option Volatility and Pricing: Advanced Trading Strategies and Techniques
Nassim Nicolas Taleb: Dynamic Hedging: Managing Vanilla and Exotic Options

Fixed income I

ECTS : 3

Enseignant responsable : ARNAUD **LEVY RUEFF**

Langue du cours : Anglais

Description du contenu de l'enseignement :

The course aims to offer students a broad understanding of the fixed income products, both qualitatively and quantitatively. Relative prices of assets will be studied in the context of arbitrage relationship. The course will also present the market organization as well as its culture, and main characters.
The design and implementation of 'dealing room alike' spreadsheets will illustrate the theories and models outlined.
Particular emphasis will be given to pragmatic thinking in order for students to focus, in context, on the relevant details.

Fixed income 101: starting up with the concept of actualization

Understand actualization curves and learn how to select the most appropriate one upon specific contexts.

Fixed income at a glance: needs for financing, basic products and market organization
What you should know about issuers, investors, intermediaries and their respective interactions

Bonds and loans: the center of the fixed income galaxy

Price and compute risks for the main styles of debt instruments using actualization and credit curves

Hedging the risks with swaps and more: how to select and price interest rate and credit derivatives
Anticipate risks thanks to interest rate models. Use and price derivatives for hedging or speculation.

Building and analyzing fixed income portfolios: a quantitative approach
Compare actuarial and statistical approaches for ex ante and ex post fixed income portfolio analysis

Setting up fixed income arbitrage strategies: from the mindset to the know-how.
Understand the taxonomy of arbitrage strategies and get ready for practical implementation

Nonlinear fixed income products: volatility and correlation products
Learn about the main fixed income nonlinear products and their pricing basics

Compétences à acquérir :

Fixed Income basics and more advanced knowledge

Mode de contrôle des connaissances :

80% Final written exam 20% involvement in class and workshops/homework

Coefficient : 1.5

Bibliographie, lectures recommandées :

Technical
Fabozzi, F. J., The handbook of Fixed Income Securities, McGraw-Hill Education, 8th edition, 2012, 1840p.
Hull, J. C., Fundamentals of futures and Options Markets, Pearson, 9th edition, 2016.
Inspirational
Thorp, E. O., A man for all markets, 2017, Random House, 416p.
Zuckermann, G., The Greatest Trade Ever, 2009, Crown Business, 306p.
Lowenstein, R., When Genius failed, 2001, Random House, 291p.
Taleb, N., The Black swan: The Impact of the Highly Improbable, 2007, Random House, 436p.

Financial Econometrics I

ECTS : 3

Enseignant responsable : GAELLE **LE FOL** (https://dauphine.psl.eu/recherche/cvtheque/le-fol-gaelle)

Langue du cours : Anglais

Description du contenu de l'enseignement :

This course is an introduction and/or refresher course in Econometrics that focuses on techniques for estimating regression models, on problems commonly encountered in estimating such models, and on interpreting the estimates. The goal is to provide participants with the basic skills and knowledge necessary to undertake empirical research and to prepare them to the advanced course in Econometrics of Financial Markets. If Gretl will be the econometric software used in the course, it is possible to use R.
Course outline

- How to build an econometric model and how to use it?
- The (simple and multiple) linear regression model
- Inference, hypothesis testing and prediction
- Specification and diagnostic testing (autocorrelation, heteroskedasticity, stochastic regressors and endogeneity, mutlicolinearity, normality, model specification)
- Selection criteria
- Alternative to OLS (2SLS, ML, GLS, Quantile regression)

Compétences à acquérir :

Theoretical and practical knowledge of linear regression models estimation technics. Being able to set up an econometric analysis.

Pré-requis obligatoires

Mathematics and Statistics (bachelor level)

Pré-requis recommandés

First course in programming

Bibliographie, lectures recommandées :

- Adkins L. C., Using gretl for Principles of Econometrics, Version 1.041, August 2018, Free copy;
- Brooks C., Introductory Econometrics for Finance, Second Edition, Cambridge University Press, 2014 ;
- Gelman A., J. Hill and A. Vehtari, 2021, Regression and Other Stories, 1st Edition, Cambridge University Press, 2021;
- Gujarati D., Basic Econometrics, McGraw Hill Higher Education; 5th Revised edition edition, 2009 ;
- Hill C., W. Griffiths and G. Lim, Principles of Econometrics, Wiley, 5th Edition, 2018 ;

Mandatory Courses

Ethics, Prof. Standards & Compliance (Mandatory at M2 level for students following the course in 1 year)

ECTS : 3

Langue du cours : Anglais

Description du contenu de l'enseignement :

Course objectives
Conducting business in the financial sector means conducting business with highest standards of ethics and in accordance with the laws and regulations of the countries where the business is done.
The course's objectives are
· to understand the importance of ethics and professional standards when conducting business in the financial sector;
· to get a basic knowledge of the regulation and laws;
· to understand the main compliance concepts applied in Corporate & Investment Banks

Part 1. Ethical and Professional Standards
This part offers a pragmatic approach of ethics in finance, pointing out some of the recent issues that emerged since the financial crisis.
The course takes as a starting point some of the recent codes of conduct issued by the finance industry as well as CFA Institute® Code of Ethics and Standards of Professional Conduct; it then turns to concrete issues such as rate-rigging, toxic assets or liabilities, product structuring, investor protection, as well as some of the recent regulation. Topics are covered through presentations in class, student presentations, exercises and case studies. Student presentations are delivered individually, in class, under a pre-set format, and are part of the participation grade. As a prerequisite, students must be familiar with CFA Institute® Code of Ethics and have prepared an example of a standard violation and corrective action for the first class.

Part 2. Global Compliance
Main objectives are giving students a global overview on the main Compliance concepts applied in a Corporate & Investment Bank and emphasizing the latest trends in regulatory environment. Theoretical courses and practical examples will be exposed to students on the main Compliance and Financial Security themes met in a Corporate & Investment Bank.
· Compliance: privileged information, information barriers, conflicts of interests, market abuse and insider trading, suitability, reputation risk, etc...
· Financial Security: KYC, KYB, and implementation of the European 3rd Directive ; embargos, countries on watch lists, combating money laundering, fraud prevention.

Course outline
Introduction Course: Regulation today - for a better understanding of Ethics and Compliance (3h)
· Evolution of regulation and where we are now
· Linkage between the directives
· Comparison EU/rest of the world
Part 1. Ethical and Professional Standards
Session 1-Course Introduction: (1h)
Why do ethics matter? How to prepare a presentation, a case study, an exercise?
Exercise on Standard violations: (Using CFA Institute® Code of Ethics and Standards of Professional Conduct) Debrief on the example prepared by each student for and before Class 1.
Session 2- What do Codes of ethics and Codes of conducts tell us? (2h)
Compare 2 different codes: what is the focus? How well do they protect clients? other stakeholders? Identify what codes

teach us about business ethics, operational risks, reputation risk.

Session 3- FX rate-rigging & other benchmarks (2h)

The FX rate-rigging scandal – FX markets Codes of conduct. Importance of trust in benchmarks.

Session 4- Libor rate-rigging & other benchmarks (2h)

The Libor manipulation scandal–Libor administration before/after the scandal.

Regulation on benchmarks and indice

Compétences à acquérir :

Demonstrate ethical awareness when conducting business in the financial sector, as well as the ability to understand the main compliance concepts applied in Corporate & Investment Banks.

Mode de contrôle des connaissances :

Participation and Final exam

Coefficient : 1.5

Bibliographie, lectures recommandées :

Lewis M. , The Big Short, 2011. Flash Boys, 2014
O' Malley C. : The story of the Eurobond Markets (ch. 10-11), 2015
CFA Institute® Code of Ethics and Standards of Professional Conduct
CFA Institute® Standards of Practice Handbook, 2014 edition

Soft Skills

ECTS : 3

Enseignants : NATHALIE **COHEN**, KAREN **HERRGOTT NICOLAON**

Langue du cours : Anglais

Description du contenu de l'enseignement :

Course objectives
"85% of our success accounts from soft skills and emotional intelligence, yet we only pay attention to them 10% of the time."
The result of this study conducted by Stanford university, amongst many others, highlights the importance of increasing our focus on soft skills on the road to professional and personal success.
Whether for the purpose of a successful first round HR interview, the fluidity of colleague and client relationships at a first entry job, or the integrity with which one treats themselves and other people - the soft skill module offers you a space of contemplation on emotional intelligence and interpersonal relationships, and its importance in your long term career.
This module is not a practical preparation for interviews, but rather a space of reflection on how to know yourself and accept yourself in your strengths and areas of development, so that you may apprehend your interview rounds, your career path, as well as your personal life with integrity, strength and authenticity.
"Your level of success will seldom exceed your level of personal development, because success is something you tract by the person you become" - Jim Rohn

Course outline
Part I –Interactive workshops on Authentic Leadership, 1 session of 3h and 6 sessions of 1h30 each.
·   Emotional intelligence: Group interactive work on emotion & awareness, stress & confidence, emotional intelligence, inter&intra-personal relationships, challenges & opportunites at work
·   Clarity = Power: Who am I ?, Identifying your Talents and Resources
·   Emotions Management: Brain plasticity, Face your fears
·   Communication: Projection and Intuition, Story Telling
·   Authentic Leadership & Critical Thinking: Ability to Learn & Transmit, Decision-Making Power
·   Team Work: Flexibility and Collective Intelligence, Win-Win Negotiation
·   Mindfulness & Positive Attitude: Active Listening, Personal and collective growth

Part II - Discovery and practice of the process of NonViolent Communication according to Marshall Rosenberg over 6 sessions of 1h30 each.
·   Listening to yourself
- Observe one's thoughts & judgements and translate them into needs.
- Distinguishing facts/obs. from our interpretations/ judgments
·   Listening to each other

- Offering non-directive listening, with empathic reflection in Feeling & Need
- Accepting a difficult message: against oneself, against the other, with oneself, with the other
·   Dialogue practice
      - Alternating self-expression and listening to others
      - Elaborate a solution that considers the needs of each person

Mode de contrôle des connaissances :

No Exam

Bibliographie, lectures recommandées :

- Hsieh T., 2010, Delivering Happiness: A Path to Profits, Passion and Purpose, Grand Central Publishing, 255 pages.
- LaLoux F. and E. Lappert, 2016, Reinventing Organizations: Reinventing Organizations: An Illustrated Invitation to Join the Conversation on Next-Stage Organizations, Nelson Parker Ed., 172 pages.
- Rosenberg M. and D. Chopra, 2015, NonViolent Communication: a Language of Life, Puddle Dancer Press Ed., 264 pages.
- Sinek S., 2011, Start with why, Portfolio Ed, 256 pages.
- Tan C.-M., 2014, Search inside yourself, HarperOne Ed., 288 pages.

SEMESTER 4

Core Advanced (Optional Block)

Credit Risk

ECTS : 3

Enseignant responsable : OLIVIER **TOUTAIN** (https://dauphine.psl.eu/recherche/cvtheque/toutain-olivier)

Langue du cours : Anglais

Description du contenu de l'enseignement :

Part 1 : O. Toutain (18h)
The objectives of this cours is the following:

- Understanding credit risk
- Mastering the financial mechanisms of CDS and other credit derivatives
- Mastering pricing

Part 2 : F. Astic (12h)
This course provides a theoretical and practical analysis of the asset-backed security market.
Topics include: Duration And Convexity of Bond Yields, Price Dynamics of Mortgages and Cash Flows, Default Risk, Interest Rate Volatility, Financial Risk Management of Bond Portfolios, Securitization, Corporate Debt And The Securitization Markets, Asset-Backed Commercial Paper, Collateralized Loan Obligations, Structuring Synthetic Collateralized Loan Obligations, Securitization of Revolving Credit, Financial Derivatives And Their Use As Hedging Tools. The course is in the computer lab, where theoretical models are illustrated and solved using Excel. Students will have computer application of topics covered in class using Excel. Students will be assigned a field project, instead of a final exam, that involves financial decision making and real data analysis.

Course outline:

Part 1
1 Credit Risk
- Default risk
- Downgrade risk
- Issuer risk
- Counterparty risk
- Sources of risk
- Characterizing credit risk

2 Measuring Credit Risk
- Ratings: advantages and disadvantages
- Market measures: bond spreads, asset swap spread, CDS spreads

3 Credit Derivatives Markets

- Main products : CDS, Total Return Swaps, Credit Linked Notes, Spread options
- Market size
- Market organization
- Market participants

4 CDS on one entity
- CDS mechanism
- Cash flow diagram
- Buying or selling a protection
- Credit events
- Settlement risks
- Cash settlement / Physical settlement
- Conditions of exercise
- ISDA contract

5 Basket CDS
- Principles : premium of a basket CDS, default correlations, example
- ITraxx : indices, contracts on the iTraxx index
- Les CDOs : generic structure of a CDO, tranching, correlations, Cash CDO and synthetic CDO

6 Pricing of CDS
- Simplified approach for a zero-coupon bond
- Principles of structural models
- products based on a structural model: KMV and CreditGrades
- Principle of intensity models (reduced form models) : extracting default probabilities from CDS spreads

Part 2
Key Structures and Cash Flow Dynamics
I. Price Dynamics of Mortgages and Cash Flows
- Bond and Mortgage Basics
- Bond Valuation
- Price/Yield Relationship
- Fixed-Rate Mortgages
- Prepayment Option
- Macauley and Modified Duration
- Convexity
- Risk Exposures

II. Sub-Prime Mortgages, Securitization, The Liquidity problems of August 2007
III. Mortgage-Backed Securities: Origins of the Market
- From the Primary to the Secondary Mortgage Market (The Agency Market,The Private-Label Market)
- Agency and Nonagency Market Segments Compared (Credit Risk Considerations, Mortgage and Funds Flow in the Secondary Market, Industry Illustration)
- Pricing of Newly Originated Mortgages (Freddie Mac Sample Purchase Pricing, Mortgage Pricing from the Bank's Perspective)
- Valuation of Mortgage- and Asset-Backed Securities
- Modeling Cash Flows of Pass-Through, PO, and IO Securities (Information Set, Model, Cash Flow over Time)
- Effective Duration
- Effective Convexity
- Case Study: A Pass-Through Security Issued by FNMA (Prepayment Standard, Assumption Levels, S-Curve Prepayment Function, Weighted Average Life and Different Spreads Measurements, Spread I, Static Sprea

Compétences à acquérir :

Master the mecanisms behind the credit risk products and their pricing models

Mode de contrôle des connaissances :

100% Final exam

Coefficient : 1.5

Bibliographie, lectures recommandées :

Textbooks
Options, Futures and Other Derivatives (6th Edition), Prentice Hall, 2005

By John C. Hull

Credit Risk : Modeling, Valuation and Hedging, Springer Finance, 2002

By Tomasz R. Bielecki, Marek Rutkowski

Articles

Altman, Edward, Andrea Resti, and Andrea Sironi, "Default Recovery Rates in Credit Risk Modeling: A Review of the Literature and Empirical Evidence", Economic Notes, Vol. 33, No. 2, (July 2004), pp. 183-208.

Jarrow, Robert A. and Stuart M. Turnbull. "Pricing Derivatives on Financial Securities Subject to Credit Risk", Journal of Finance, Vol. L, No. 1, Cornell University, and Queen's University (Canada) (Mar-1995), pp. 53-85.

Hull, John and Alan White, "The Impact of Default Risk on the Prices of Options and Other Derivative Securities", Journal of Banking & Finance, Vol. 19, No. 2, (May 1995), pp. 299-322.

Duffie, Darrel, Lasse Hefe Pedersen and Kenneth J. Singleton, "Modeling Sovereign Yield Spreads: A Case Study of Russian Debt", Journal of Finance, (February 2003), Vol. LVIII, No. 1, pp. 119-159.

Elliott, Robert J., Monique Jeanblanc, and Marc Yor, "On Models of Default Risk", Mathematical Finance, Vol. 10, No. 2, (April 2000), pp. 179-196.

Schönbucher, Philipp J., "Term Structure Modelling of Defaultable Bonds", The Review of Derivatives Research, Vol. 2, No. 2/3 (Fall-1998), pp. 161-192.

Heath, David, Robert Jarrow, "Bond pricing and the Term Structure of Interest Rates: A Discrete Time Approximation", Journal of Financial and Quantitative Analysis, Vol. 25, No. 4, Cornell University, University of Illinois at Chicago, (December-1990), pp 419-440.

Jarrow, Robert A., and Stuart M. Turnbull. "Pricing Derivatives on Financial Securities Subject to Credit Risk", Journal of Finance, Vol. L, No. 1, Cornell University, and Queen's University (Canada) (Mar-1995), pp. 53-85.

Fixed Income II

ECTS : 3

Enseignant responsable : HAFID **AGOUZOUL** (https://dauphine.psl.eu/recherche/cvtheque/agouzoul-hafid)

Langue du cours : Anglais

Description du contenu de l'enseignement :

The course is intended to be both theoretical and practical; its purpose is to introduce issues and problems that arise regarding pricing and hedging of exotic rate products. Specific examples of pricing and hedging will be dealt with. Concepts of DELTA and GAMMA/VEGA HEDGING will also be studied during the course. Recent advances in interest rate modelling will be introduced.

Course outline :

- Introduction of interest rate markets
- Delta Hedging products (Interest rate futures and bonds, Interest rate swaps, Zero coupon rate construction)
- GAMMA/VEGA Hedging products (Caps -Floors, Swaptions, Volatility Surface/Cube)
- Black and Scholes model -Numeraire Change- (Caps/floors, and swaptions pricing and cases Studies)
- SABR Model (Caps-Floor, and Swaption Smile, CMS pricing and convexity adjustment case study)
- Introduction to exotic interest rate derivatives (Bermudan swaptions, Callable bond and swap, Callable reverse floater, Callable snowball and Ratchet, Target Redemption Notes -TARNs, Range Accruals)
- HJM framework -HW 1 and 2 Factors (Cap- Floor and swaption pricing in the Hull White model -Hedge Basket, Calibration concepts)
- Introduction to multifactor models (Libor Market Model)
- Cheyette Model (Stochastic volatility)
- Case studies (Forward start options, Snowballs/Ratchets)
- VaR methodology in interest rates

Compétences à acquérir :

Master the theory and practice of Fi Income products pricing and hedging.

Mode de contrôle des connaissances :

Final exam

Coefficient : 1.5

Bibliographie, lectures recommandées :

Brigo D. and F. Mercurio, Interest Rate Models-Theory and Practice With Smile, Inflation and Credit, Springer-Verlag Berlin and Heidelberg GmbH & Co. K; Édition : 2nd Revised edition 2005, 1037 pages.

Commodities

ECTS : 3

Enseignant responsable : BENOIT **GUILLEMINOT**

Langue du cours : Anglais

Description du contenu de l'enseignement :

Commodity markets have experienced exceptional turmoil over the last 20 years. The arrival of new players in futures markets has drastically changed the behavior of commodities prices, connecting them to equity and currency markets. The objective of this course is to provide an economic understanding of the latest developments in commodity markets, grasp the financial, social and regulatory challenges behind commodity investing as well as the necessary concepts and tools to i) evaluate and hedge business exposure to commodities price fluctuations, ii) construct physical or paper trading strategies on commodities markets, iii) price and hedge complex commodity derivatives (on paper contracts or spot price) iv) present risk measurement and stress testing principles for commodity portfolios.

Course outline:

- Introduction
- Spot prices models
- Forward curves
- Options pricing models (Futures options, real and commodity-specific options)
- Commodities investing (properties, indices, relations to other asset classes and hedge funds strategies)
- Commodities dependencies modelling
- Commodities hedging business case: airlines jet fuel supply strategies

Compétences à acquérir :

Deep understanding of the latest developments in commodity markets, grasp the financial, social and regulatory challenges behind commodity investing as well as the necessary concepts and tools

Mode de contrôle des connaissances :

Final exam

Coefficient : 1.5

Bibliographie, lectures recommandées :

Eydeland A., Wolyniec K., Energy and Power Risk Management : New Developments in Modeling, Pricing, and Hedging, WileyEurope (2003).
Geman H., Commodities and Commodity Derivatives : Modelling and Pricing for Agriculturals, Metals and Energy, Wiley Finance (2005).
Intelligent Commodity Investing, edited by H.Till and J. Eagleeye, Riskbooks (2007).
Risk Management in Commodity Markets, edited by H.Geman, Wiley ed (2008).

Energy Derivatives

ECTS : 3

Enseignants : CLEMENCE **ALASSEUR**, MARC **RINGEISEN**
https://dauphine.psl.eu/recherche/cvtheque/ringeisen-marc

Langue du cours : Français

Description du contenu de l'enseignement :

The purpose of this course is to provide students with an overview of both the technical aspects of energy markets (generation, demand, constraints, market organization) as well as the most commonly used price models for pricing energy derivatives.
Attention is given to specific energy derivatives (Swing options and powerplants) and computational methods needed are detailed.

Course outline:

- Introduction to energy markets : electricity and gas market designs

- Price modeling : Spot and Forward models for electricity and gas prices
- Vanilla energy derivatives
- Structured derivatives and physical assets
- Advanced computational methods for stochastic control in energy markets

Compétences à acquérir :

Good technical knowledge of pricing models and computational methods for energy derivatives products

Pré-requis obligatoires

Students must be enrolled in courses Economics and Geopolitics of Energy, Derivatives Pricing & Stochastic Calculus 2, and have past Financial Derivatives, and Derivative Pricing & Stochastic Calculus 1

Mode de contrôle des connaissances :

Final exam

Coefficient : 1.5

Bibliographie, lectures recommandées :

Clewlow L. & Strickland S., Energy Derivatives: Pricing & Risk Management, Lacima Group Pub., 2000.
Eydeland A. & Woliniec K, Energy and Power Risk Management: New Developments in Modelling, Pricing and Hedging, Wiley, 2007.
Géman H., Commodities and commodity derivatives: modelling and pricing for agriculturals, metals and energy, Wiley, 2005.

Machine Learning in Finance

ECTS : 3

Enseignant responsable : THIBAUD **VIENNE** (https://dauphine.psl.eu/recherche/cvtheque/vienne-thibaud)

Langue du cours : Anglais

Description du contenu de l'enseignement :

The objective of the course is to provide students with an introduction to supervised machine learning and its applications to finance.
At the end of the course, students will be able to implement a whole machine learning pipeline in Python. From key features (data cleaning, cross-validation..) to machine learning models implementation (linear regression, tree-based techniques, neural networks...).
Live-coding and practicing also are main features of the course.
Students will be asked for multiple hours labs and a machine learning competition evaluation.

Course outline:
Session 1: Machine learning in finance.
Session 2: Linear and Logistic regressions.
Session 3 : Machine learning in practice.
Labclass 1: Financial news impact on Dow Jones index.
Session 4: Tree-based methods.
Session 5: Feedforward neural networks.
Labclass 2: Machine learning competition.

Compétences à acquérir :

Be able to implement a whole machine learning pipeline in Python. From key features (data cleaning, cross-validation..) to machine learning models implementation (linear regression, tree-based techniques, neural networks...).

Pré-requis obligatoires

Students must be enrolled in courses Python Programming and Applied Times series.

Mode de contrôle des connaissances :

Machine learning competition (50%), final evaluation (50%).

Coefficient : 1.5

Bibliographie, lectures recommandées :

Trevor Hastie, Robert Tibshirani, Jérôme Friedman (2009), The elements of statistical learning, (Springer).
Tuffery S. (2011), Data mining and statistics for decision making, (Wiley).
Hinton Geoffrey (2014), Neural networks for machine learning, Toronto University.
Ng Andrew (2014), Machine Learning, Stanford University.

Elective (Optional Block)

Behavioral Finance

ECTS : 3

Enseignant responsable : ALBERTO **MANCONI** (https://dauphine.psl.eu/recherche/cvtheque/manconi-alberto)

Langue du cours : Anglais

Description du contenu de l'enseignement :

Introduce students to this relatively new sub-discipline of finance which incorporates insights from cognitive and social psychology into finance. In the past 20 years behavioral finance has emerged as an important stream of thinking in finance. Relaxing the traditional assumptions of finance models has proved a fruitful way of understanding financial decision-making.

Course outline:
The course will go through:

- The cognitive biases evidenced by cognitive psychologists;
- Financial anomalies and their interpretations through a behavioral finance lens;
- The implications of behavioral finance for investors and corporate financial policy.

Compétences à acquérir :

Relaxing the traditional assumptions of finance models has proved a fruit ful way of understanding financial decision-making and anomalies found in empirical tests.

Mode de contrôle des connaissances :

Students will present a state-of-the art research paper among a selection of papers chosen by the instructors.

Bibliographie, lectures recommandées :

Daniel Kahneman, Paul Slovic, and Amos Tversky (eds.), Judgment under uncertainty: Heuristics and biases, Cambridge: Cambridge University Press, 1982.
Richard Thaler, ed., Advances in behavioral finance, New York: Russell Sage Foundation, 1993.
Richard Thaler, ed., Advances in behavioral finance, Volume II, New York: Russell Sage Foundation, 2005.
Shleifer, Inefficient markets : an introduction to behavioral finance, Oxford, Oxford University Press 2000.

Exotic Options & Structuring

ECTS : 3

Enseignant responsable : REDOUANE **ZAD** (https://dauphine.psl.eu/recherche/cvtheque/zad-redouane)

Langue du cours : Anglais

Description du contenu de l'enseignement :

Structured Products offer tailor made investment solutions which can combine equities, currencies, commodities, credit or interest rates to meet specific investor's needs in term of expected returns, frequency of cash flows and investment horizons and respect constraints such as risk level and specific legal and fiscal aspects.
The most known Structured Products (Linked Notes) are based on exotic optional component to achieve their investment objectives.
The last financial crisis leads to important changes in rules and regulations with regard to investor protection (MiFID II). A first effect was the simplification of Structured Products destined to retail market. Today Sophisticated products concern only the most discerning customers (institutional and client of private banks)
The course will recall some key elements in fixed income and derivatives to concentrate first on exotic payoffs and then structured products. We will have a review of products from each main asset class. We will learn how to build them, how to hedge them, how to manage the life cycle and how to insure liquidity and create a secondary market. At the end of the course we will look to regulatory aspects, the cost of capital and liquidity and distribution rules.

The course includes the uses of online pricer and simulations.

Course outline:

- Quick review of basics: Asset Class, derivatives, Greeks
- Exotic Options: Dispersion, Barrier, Digitals, Lookback, Autocallable
- Structured Products: introduction to the market, strategies, Linked Notes
- Structured Products Life cycle process: creation, pricing, secondary market
- Regulatory aspects: distribution rules, capital cost, liquidity
- How to improve valuation of derivatives using machine learning methods and their capacity to extract features and detect patterns from a large data set

Compétences à acquérir :

Knowledge in structured products: how to build them (funded, or unfunded), how to hedge them and how to manage the life cycle.

Mode de contrôle des connaissances :

Final Exam

Coefficient : 1.5

Bibliographie, lectures recommandées :

- Blümke, A., How to Invest in Structured Products: A Guide for Investors and Asset Manager, Wiley, 1st Edition, 392 pages, 2009.
- Bouzoubaa, M. and A. Osseiran, Exotic Options and Hybrids: A Guide to Structuring, Pricing and Trading, Wiley, 393 pages, 2016.
- Hull, John C., Options, Futures & other Derivatives, International Edition, 10th Edition, 2018.

Electronic Markets

ECTS : 3

Enseignants : ARTHUR **BAGOURD**, GAELLE **LE FOL**, JIANG **PU**
https://dauphine.psl.eu/recherche/cvtheque/bagourd-arthur
https://dauphine.psl.eu/recherche/cvtheque/le-fol-gaelle
https://dauphine.psl.eu/recherche/cvtheque/pu-jiang

Langue du cours : Anglais

Description du contenu de l'enseignement :

This course is a presentation of financial markets, trading mechanisms and their evolution dedicated to advancing the understanding and practice of electronic markets. A particular attention will be dedicated to optimal trading and execution technics but also on the use of algo trading startegies by market participants (who do what).

Compétences à acquérir :

This course is a presentation of financial markets, trading mechanisms and their evolution dedicated to advancing the understanding and practice of electronic markets. A particular attention will be dedicated to optimal trading and execution technics but also on the use of algo trading startegies by market participants (who do what).

Pré-requis recommandés

 Derivative Pricing and Stochastic Calculus 2, Computational Finance, Advanced time series, Machine learning,

Coefficient : 1.5

Bibliographie, lectures recommandées :

- Bacidore, J. R., 2020, Algorithmic Trading Method: A practitioner's guide, TBG Press New York, 229 pages.
- Chan E., Algorithmic Trading- Winning Strategies and Their Rationale, Wiley, 2013, 207 pages.
- Guéant O., 2016, The Financial Mathematics of Market Liquidity: From Optimal Execution to Market Making, Chapman and Hall, 302 pages.
- Kissell, R., 2020 Algorithmic Trading Method: Applications Using Advanced Statistics, Optimization, and Machine Learning Techniques, Academic Press Inc, 2nd Edition, 612 pages.
- Lehalle C. A. and S. Laruelle, 2018, Market Microstructure in Pratice, World Scientific, 2nd Edition, 339 pages.
- Johnson B, 2010, Algorithmic Trading & DMA, Myeloma Press, 574 pages.

Alternative Finance

ECTS : 3

Enseignants : FABIAN **ASTIC**, MARIUS **FRUNZA**
https://dauphine.psl.eu/recherche/cvtheque/astic-fabian

Langue du cours : Anglais

Description du contenu de l'enseignement :

The aim of this course is to propose an out-of the box perspective upon the financial markets and to explore the financial universe beyond the traditional investments like equity, bonds, currency… . We will focus the course on the products and technics used at the fringe of finance including crowfunding, peer-2-peer finance, shadow banking, Bitcoin, social and environmental impact products….

Throughout this course students will learn about alternative investment supports and alternative financing solutions. The objectives of this lecture are:

- To understand the mechanism of alternative risks: global warming, catastrophic events including on the economy, …
- To explore new area including Environmental, Social, and Governance (ESG) Investment, cryptocurrency etc..
- To get familiar with modelling methods specific to alternative finance.

Course outline:

1. Alternative finance 101
Two faces of the same coin: as investors or as issuers.
2. Modelling methods for alternative finance
- Introduction to the non-Gaussian universe
- Real Option Theory
- Extreme value theory

3. Crypto-currencies: an alternative financial universe
4. Environmental, Social, and Governance (ESG) Investment
5. Crypto-currency : an alternative financial universe.
6. Alternative capital markets and Fintechs: Focus on Crowdfunding and P2P finance
7. Alternative Risk Transfer
- Climate risks
- Insurance and re-insurance. Focus on CAT Bonds

8. Fintech workshop (industry view)

Compétences à acquérir :

Knowledge on the modelling methods specific to alternative finance.

Pré-requis obligatoires

Students must be enrolled in courses Applied Time series and must have past Introduction to Financial Econometrics, Financial Derivatives.

Mode de contrôle des connaissances :

Project

Coefficient : 1.5

Bibliographie, lectures recommandées :

- Alexandridis, A. K. and A. D. Zapranis, 2013: Weather Derivatives, Springer, 300 pages.
- Barrieu P., and L. Albertini, 2009: The Handbook of Insurance-Linked Securities, Wiley, 398 pages.
- Frunza, M., 2010: Carbon allowances: A new financial asset, Editions universitaires europeennes, 164 pages.
- Guthrie G., Real Options in Theory and Practice, 2009, OUP, 432 pages.

Advanced Asset Management

ECTS : 3

Enseignants : THIERRY **KUAGBENU**, GUILLAUME **MONARCHA**, MATHIEU **VAISSIE**

https://dauphine.psl.eu/recherche/cvtheque/kuagbenu-thierry
https://dauphine.psl.eu/recherche/cvtheque/monarcha-guillaume

Langue du cours : Anglais

Description du contenu de l'enseignement :

We propose a deep dive into the factor investing universe, from its academic foundations to practical implementation. This course will consider two complementary perspectives, focusing on both:

- the structuring side of smart beta, factor-based, and alternative risk premia strategies, through the presentation of their implementation process, from stock selection to portfolio construction and strategy management
- a buy-side perspective, from performance attribution and strategy selection, to the management of multi-factor / multi-asset diversified portfolios.

The course is organized around four parts. First, we will introduce the academic foundations of factor investing, and present the typology of the current investment universe (smart beta, factor investing and alternative risk premia). The second part is dedicated to the presentation of long-only equity-based investment strategies (both smart beta and factor-based), and to the introduction of multi-factor investing. In the third one, we will review the alternative risk premia (ARP) universe across the various asset classes (equities, commodities, interest rates, FX), and we will address the issue of the management of ARP allocations. In the fourth part, we will consider the role of factor-based investment strategies (smart beta, factor investing and ARPs) within a diversified, multi-asset solution context.

Course outline:

Introduction (Guillaume Monarcha, 3h)

Part 1 (Thierry Béchu, 7h30)
- 1.1. Beta
- 1.2. Smart beta strategies
- 1.3. Factor investing
- 1.4. Multi-factor investing

Part 2 (Guillaume Monarcha, 9h)
- 2.1. Alternative risk premia
- 2.2. The management of ARP allocations

Part 3: Multi-asset solutions (Thierry Kuagbenu, 4h30)
- 3.1. Introduction
- 3.2. Theory
- 3.3. Practical applications

Compétences à acquérir :

Master the technics, tools and strategies for alpha extraction

Pré-requis obligatoires

Be familiar with basic quantitative tools (statistics, estimation of linear models, constrained linear optimization), and portfolio theory.

Mode de contrôle des connaissances :

Exam and group project
Group project: will consist in the construction and backtesting of systematic investment strategies, risk premia allocations, replication and application of research papers...

Coefficient : 1.5

Numerical Finance

ECTS : 3

Enseignant responsable : TETE KAIZA **AMOUH** (https://dauphine.psl.eu/recherche/cvtheque/amouh-kaiza-1)

Langue du cours : Anglais

Description du contenu de l'enseignement :

The course bears on the modeling and numerical analysis of financial derivatives. The objectives are:

- Understanding the financial meaning of the related mathematics: model parameters, implied volatility, Greeks.
- Learning how to derive a pricing equation based on the probabilistic formulation of a model, possibly with stochastic volatility and/or jumps,
- Learning how to implement a theta-scheme of finite differences or a tree pricing method,
- Learning simulation Monte Carlo pricing and Greeking methods: basic principles and variance reduction techniques, first in a set-up of random variables or vectors, then in a dynamic set-up of stochastic processes.

Course outline:
1) Motivating examples: Black-Scholes and Dupire model, Realized volatility vs Implied volatility vs Local volatility,
2) Derivation of the Pricing Equations in various models,
3) Deterministic Pricing Schemes: Finite Differences methods and Tree Methods
4) Simulation Pricing Schemes: simulation of random variables and stochastic processes, Pseudo Monte Carlo versus Quasi Monte Carlo, variance reduction techniques

Compétences à acquérir :

Master the modelling and numerical analysis of financial derivatives

Pré-requis obligatoires

Students must be enrolled in courses Derivative Pricing and Stochastic Calculus 2 and C++ Programming and must have past Financial Derivatives and Derivative Pricing and Stochastic Calculus 1

Mode de contrôle des connaissances :

Project (in teams of two to three students)

Coefficient : 1.5

Bibliographie, lectures recommandées :

Crépey S., Computational Finance Lecture Notes, 2009 edition, 188 pages, available on http://www.maths.univ-evry.fr/crepey
Lamberton D. and Lapeyre P., Introduction to Stochastic Calculus Applied to Finance. Chapman & Hall, 2nd revised edition, 2007.
Shreve S., Stochastic Calculus for Finance II, Springer Finance, 2008.
Hull J., Options, Futures, and Other Derivative Securities, Prentice-Hall, 7th edition, 2009.

Sustainable Finance

ECTS : 3

Enseignants : KENZA **AKALLAL**, ASHWIN **JOSHI**, AYMERIC **KALIFE**, OLIVIER **TOUTAIN**
https://dauphine.psl.eu/recherche/cvtheque/akallal-kenza-1
https://dauphine.psl.eu/recherche/cvtheque/joshi-ashwin
https://dauphine.psl.eu/recherche/cvtheque/kalife-aymeric-1
https://dauphine.psl.eu/recherche/cvtheque/toutain-olivier

Langue du cours : Anglais

Description du contenu de l'enseignement :

The past years have seen a marked shift in society's attitudes toward sustainability. This shift is spurring political pressure, a regulatory push and technological advancements to create the foundations of a more sustainable world, leading to a change in investor behaviour and setting in motion a major yet gradual capital reallocation. Society's long transition toward the practice of sustainable investing is likely to drive market adjustments for years and even decades.
In this course, we have a curated a series which will enable you to learn the basics and get started in the sustainable investing landscape, while providing you an opportunity to discover insights, data and tools across asset classes that are evolving the markets.

Course outline:
Part 1: What is Sustainable Investing and why does it matter? --- 3h
1.1. Big picture - why sustainable development matters?
1.2. Evolving regulatory landscape
1.3. Recent market trends and strategy

1.4. Measuring sustainability

1.5. Limitations and challenge

Part 2: Sustainability's challenge to corporates --- 3h

2.1. Externalities

2.2. Governance and behaviour

2.3. Strategy and intangibles - changing business models

2.4. Integrated reporting - metrics and data

Part 3: Approaches of data analysis --- 6h

3.1. ESG metrics methodology

3.2. Data availability, data quality and usage

3.3. Identification of material information

3.4. New tools and technology

Part 4: Financing Sustainability --- 6h

4.1. Investing for long-term value creation

4.2. Equity - Engagement and Stewardship, ESG integration in valuation

4.3. Bonds - investing without voting power

4.4. Alternatives - approach to sustainable investing in real assets

4.5. Banking - new forms of lending

4.6. Insurance - managing long-term risk

4.7. Market view - risk/return assessment

Part 5: How to get there? --- 3h

5.1. Current state of the market and financial institutions commitments

5.2. Next steps

5.3. Conclusion

Compétences à acquérir :

In this course, we have a curated a series which will enable you to learn the basics and get started in the sustainable investing landscape, while providing you an opportunity to discover insights, data and tools across asset classes that are evolving the markets.

Pré-requis obligatoires

A first course in Asset management

Coefficient : 1.5

Bibliographie, lectures recommandées :

Schoenmaker D. and W. Schramade, Principles of Sustainable Finance, Oxford University Press, 432 pages, 2018.

Mandatory Module

Internship

ECTS : 6

Langue du cours : Anglais

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