

MSc Corporate Finance & Investment Banking

September 2024 – April 2025



CODE: Tbc
Course title: VALUATION TECHNIQUES

Term : FALL

Teaching hours: 24 hours
Number of credits: 3
Teaching language: ☒English ☐French
Course leader:
Speakers: Iordanis Kalaitzoglou

≡ **COURSE DESCRIPTION**

This module aims at addressing the key aspects of business valuation in the current economic climate. The first part focuses on the contexts of evaluation, the main methods and the importance of the evaluation process. An important part is devoted to the cost of capital and the components of various sources of capital. It is then possible to present the main evaluation methods and implement them in practical examples and actual case studies. Some case studies are carried out by professionals. The final session will open the debate through a reflection on the contributions and limitations of the method of real options.

≡ **COURSE OBJECTIVES**

At the end of this module, students should be able to:

- Compute the WACC and its components
- Use different techniques to value a firm
- Understand, search-seek and extract relevant information from various data sources
- Extract Information from the main financial statements
- Update and Adjust current figures
- Estimate Discount Rates
- Estimate Cash Flows
- Estimated Discount Rates
- Decide on what is the most appropriate evaluation for different companies
- Develop a group report

≡ **COMPETENCES VISEES /LEARNING GOALS**

Conduct empirical analysis
Make use of critical analysis/critical thinking skills
Formulate a personal and well-informed opinion
Cooperation with classmates
Work effectively in a team
Contribute to the development of a collective production (group project)

≡ **TACKLED CONCEPTS**

Discount Rates (Cost of Equity, Cost of Debt, WACC); Estimate Cash Flows (Measure and Update Earnings, From Earnings to Cash Flows), Estimate Growth (Stable, 2-stage Growth Models, 3-stage Growth Models, Relative Valuation, Earnings Multiples, Book Value Multiples, Sales Multiples), Real Options (Option to Expand; Option to Abandon; Option to Delay; Equity as an option to liquidate).

≡ **LEARNING METHODS**

The pedagogical approach is centred on inspiring and encouraging students to develop their critical thinking in order to make analytical decisions. Particular focus is devoted to the development of specific skills so that students are able to: i. Collect relevant information ii. Analyse and evaluate of complex setups iii. Make decisions under certain conditions.

The students will need to apply all the knowledge acquired at a collective level. There will be a group project where students will need to respond to a real world scenario. In order to do this effectively they will need to: i. Work effectively in a team ii. Assess, evaluate, communicate and interact with.

≡ **ASSIGNMENTS AND EXPECTED WORK**

The class consists of (Homework/Exercises/readings asked to students to prepare the session or in-class exercises)

Exercises: Every lecture is complemented by in-class exercises. Additional exercises are prepared by students (as homework) and are discussed in the class during the tutorial sessions.

Readings: In addition to the designated book chapters, these include published academic papers and articles from the business and financial press.

Group assignment: This assignment provides an opportunity for students to demonstrate their understanding of the key concepts and material covered in the course, such as the application of finance knowledge, data work, and research skills. Based on the theories taught in the class, the assignment requires the effective cooperation of students for the completion of a collective report.

Final exam: The final exam provides students with the opportunity to demonstrate their understanding of the material covered in the entire unit of study. All topics are potentially examinable in the final exam.

≡ **BIBLIOGRAPHY – COURSE MATERIAL**

Damodaran on Valuation, Willey, 2nd edition.

Investment Valuation, A. Damodaran, Willey, 2nd edition.

Corporate Finance, European edition, HILLIER et al., 2016.

Investments, Bodie et al., 11th edition, 2009.

≡ **EVALUATION METHODS**

Exam: 50%

Continuous assessment: 50%

≡ **SESSIONS**

- **SESSION 1: Introduction**
 - LECTURE: 02h00
 - General information about the class, the format, the evaluation methods (assignment and final exam). Introduction of fundamental financial concepts that are relevant for the subsequent lectures.
- **SESSION 2: Discount rates**
 - LECTURE: 02h00
 - Cost of equity, Cost of debt, weighted average cost of capital (WACC).
- **SESSION 3: Cash flows**
 - LECTURE: 02h00
 - Estimation of cash flows: Measurement and update of earnings, from earnings to cash flows.
- **SESSION 4: Growth**
 - LECTURE: 02h00
 - Growth estimation, stable-growth models, 2-stage growth models, 3-stage growth models.

- **SESSION 5: DCF**
 - LECTURE: 02h00
 - Discounted cash flow (DCF) examples, techniques for DCF calculation types of cash flows.
- **SESSION 6: Relative valuation**
 - LECTURE: 02h00
 - Earnings multiples, book value multiples, sales multiples.
- **SESSION 7: Relative valuation and DCF**
 - LECTURE: 02h00
 - Relative valuation and DCF examples, comparable company analysis, precedent transaction analysis.
- **SESSION 8: Complete case studies**
 - LECTURE: 02h00
 - Complete case studies, full valuations.
- **SESSION 9: Real options**
 - LECTURE: 02h00
 - Option to expand, option to abandon, option to delay.
- **SESSION 10: Additional options**
 - LECTURE: 02h00
 - Equity as an option to liquidate, real option, liquidation preferences.
- **SESSION 11: Group assignment presentation discussion**
 - LECTURE: 02h00
 - Presentation of group assignment by students and analytical discussion of each report by fellow students and the class Instructor.
- **SESSION 12: Review**
 - LECTURE: 02h00
 - Review of main concepts, preparation for the final exam and Q&A session.

CODE: Tbc
Course title: PRIVATE EQUITY

Term: FALL

Teaching hours: 24 hours
Number of credits: 3
Teaching language: ☒English ☐French
Course leader:
Speakers: Michael Reed

≡ **COURSE DESCRIPTION**

Private equity (PE) is crucial in developing new business ventures and promoting innovation. This course investigates how PE firms operate, analysing the key strategic issues they face during the fundraising, investing and exit stages of the PE cycle. Topics covered include: the determinants and types of PE fundraising, the organisational structure of PE firms, the PE firm's investment decision, the PE firm-investee company relationship and the design of exit strategies. The role of PE in the broader economy is also discussed. Finally, we introduce some of the ethical issues PE firms face.

≡ **COURSE OBJECTIVES**

At the completion of this unit, you should be able to:

- demonstrate skills in oral and written communication
- demonstrate skills in problem solving
- demonstrate critical thinking
- understand the different elements of the PE/VC cycle
- understand the nature of the strategic relationship between venture capitalists, entrepreneurs and investors
- identify possible private equity investment opportunities and explain how they may be implemented
- understand the role of government and regulation in the private equity industry
- understand the role of private equity in innovation
- become sufficiently informed to confidently participate in public policy discussions on the impact of the private equity industry.

≡ **COMPETENCES VISEES /LEARNING GOALS**

Conduct empirical analysis
Make use of critical analysis/critical thinking skills
Formulate a personal and well-informed opinion
Cooperation with classmates
Work effectively in a team
Contribute to the development of a collective production (group project)

≡ **TACKLED CONCEPTS**

Private equity structures, private equity compensation, private equity investing, private equity lifecycles and financing, venture capital activities and fundraising, private equity exit, private equity and the role of government.

≡ **LEARNING METHODS**

The pedagogical approach is centred on inspiring and encouraging students to develop their critical thinking in order to make analytical decisions. Particular focus is devoted to the development of specific skills so that students are able to: i. Collect relevant information ii. Analyse and evaluate of complex setups iii. Make decisions under certain conditions.

The students will need to apply all the knowledge acquired at a collective level. There will be a group project where students will need to respond to a real world scenario. In order to do this effectively they will need to: i. Work effectively in a team ii. Assess, evaluate, communicate and interact with.

≡ **ASSIGNMENTS AND EXPECTED WORK**

The class consists of (Homework/Exercises/readings asked to students to prepare the session or in-class exercises)

Exercises: Every lecture is complemented by in-class exercises. Additional exercises are prepared by students (as homework) and are discussed in the class during the tutorial sessions.

Readings: In addition to the designated book chapters, these include published academic papers and articles from the business and financial press.

Group assignment: This assignment provides an opportunity for students to demonstrate their understanding of the key concepts and material covered in the course, such as the application of finance knowledge, data work, and research skills. Based on the theories taught in the class, the assignment requires the effective cooperation of students for the completion of a collective report.

Final exam: The final exam provides students with the opportunity to demonstrate their understanding of the material covered in the entire unit of study. All topics are potentially examinable in the final exam.

≡ **BIBLIOGRAPHY – COURSE MATERIAL**

Private Equity Second Edition: History, Governance, and Operations. Cendrowski, Harry, Martin, James P., Petro.

≡ **EVALUATION METHODS**

Exam: 50%

Continuous assessment: 50%

≡ **SESSIONS**

- **SESSION 1: Introduction**
 - LECTURE: 02h00
 - General information about the class, the format, the evaluation methods (assignment and final exam). Introduction of fundamental financial concepts that are relevant for the subsequent lectures.
- **SESSION 2: PE structures and compensation**
 - LECTURE: 02h00
 - Private equity (PE) structures and compensation, salary, bonus, management fees.
- **SESSION 3: PE investing**
 - LECTURE: 02h00
 - Private equity investing, buy-to-sell orientation.
- **SESSION 4: PE exit**
 - LECTURE: 02h00
 - Private equity exit and other issues, value realisation, proceeds to investors, track record relevant for raising successor funds.
- **SESSION 5: PE lifecycles**
 - LECTURE: 02h00
 - Private equity lifecycles and financing, phases in the lifecycle, private equity fund timeline.

- **SESSION 6: VC activities and fundraising**
 - LECTURE: 02h00
 - Venture capital (VC) activities and fundraising, capital raising process, fundraising activity, interest rates and fundraising.
- **SESSION 7: PE deals**
 - LECTURE: 02h00
 - The process of valuation, techniques of valuation, cash as a source of value, debt as a source of value, capital structure, leveraged buyouts.
- **SESSION 8: Portfolio companies**
 - LECTURE: 02h00
 - Portfolio companies, control and ownership, recapitalizations, ownership transition, corporate valuation, due diligence.
- **SESSION 9: Institutional issues**
 - LECTURE: 02h00
 - Institutional issues, institutional investors, endowments, foundations, pension funds, insurance firms, mutual funds.
- **SESSION 10: PE and the role of government**
 - LECTURE: 02h00
 - Private equity and the role of government, government regulation, government-owned companies, government-owned venture capital.
- **SESSION 11: Group assignment presentation discussion**
 - LECTURE: 02h00
 - Presentation of group assignment by students and analytical discussion of each report by fellow students and the class Instructor.
- **SESSION 12: Review**
 - LECTURE: 02h00
 - Review of main concepts, preparation for the final exam and Q&A session.

CODE: Tbc
Course title: MERGERS AND ACQUISITIONS

Term: FALL

Teaching hours: 24 hours
Number of credits: 3
Teaching language: ☒English ☐French
Course leader:
Speakers: Etienne Redor

≡ **COURSE DESCRIPTION**

This course covers the broad field of mergers, acquisitions, and divestitures. The primary objective of the course is for each student to gain a well-rounded understanding of the major strategic, economic, financial, and governance issues of mergers and acquisitions.

≡ **COURSE OBJECTIVES**

At the completion of this course, students should be able to:

- Examine the role that M&A plays in the contemporary corporate world, and its use as a strategic tool to provide growth, enhance competitive position, transform a company or industry, and create shareholder value
- Analyse transactions including understanding strategic rationale, valuation methodologies, deal structures, bidding strategies, and the need for a value proposition
- Understand how M&A can be used successfully as well as its pitfalls, dangers and risks

≡ **COMPETENCES VISEES /LEARNING GOALS**

Conduct empirical analysis
Make use of critical analysis/critical thinking skills
Formulate a personal and well-informed opinion
Cooperation with classmates
Work effectively in a team
Contribute to the development of a collective production (group project)

≡ **TACKLED CONCEPTS**

M&As, drivers of mergers, merger proxy statement, ethics in M&As, cross-border M&As, strategy, acquisition search, due diligence, valuation approaches, deal structuring, post-merger issues, governance in M&As, hostile takeovers, takeover defences.

≡ **LEARNING METHODS**

The pedagogical approach is centred on inspiring and encouraging students to develop their critical thinking in order to make analytical decisions. Particular focus is devoted to the development of specific skills so that students are able to: i. Collect relevant information ii. Analyse and evaluate of complex setups iii. Make decisions under certain conditions.

The students will need to apply all the knowledge acquired at a collective level. There will be a group project where students will need to respond to a real world scenario. In order to do this effectively they will need to: i. Work effectively in a team ii. Assess, evaluate, communicate and interact with.

≡ **ASSIGNMENTS AND EXPECTED WORK**

The class consists of (Homework/Exercises/readings asked to students to prepare the session or in-class exercises)

Exercises: Every lecture is complemented by in-class exercises. Additional exercises are prepared by students (as homework) and are discussed in the class during the tutorial sessions.

Readings: In addition to the designated book chapters, these include published academic papers and articles from the business and financial press.

Group assignment: This assignment provides an opportunity for students to demonstrate their understanding of the key concepts and material covered in the course, such as the application of finance knowledge, data work, and research skills. Based on the theories taught in the class, the assignment requires the effective cooperation of students for the completion of a collective report.

Final exam: The final exam provides students with the opportunity to demonstrate their understanding of the material covered in the entire unit of study. All topics are potentially examinable in the final exam.

≡ **BIBLIOGRAPHY – COURSE MATERIAL**

Applied Mergers and Acquisitions, by Robert F. Bruner, University Edition (Wiley, 2004).

≡ **EVALUATION METHODS**

Exam: 50%

Continuous assessment: 50%

≡ **SESSIONS**

- **SESSION 1: Introduction**
 - LECTURE: 02h00
 - General information about the class, the format, the evaluation methods (assignment and final exam). Introduction of fundamental financial concepts that are relevant for the subsequent lectures.
- **SESSION 2: Overview of M&As**
 - LECTURE: 02h00
 - Review of mergers and acquisitions (M&As), drivers of mergers, merger proxy statement.
- **SESSION 3: Ethics**
 - LECTURE: 02h00
 - Ethics in M&As, do M&As pay?; cross-border M&As.
- **SESSION 4: Acquisitions**
 - LECTURE: 02h00
 - Strategy, acquisition search, due diligence.
- **SESSION 5: Valuation I**
 - LECTURE: 02h00
 - Valuation approaches; valuing synergies.
- **SESSION 6: Valuation II**
 - LECTURE: 02h00
 - Valuing high levered deals; valuing liquidity and control.
- **SESSION 7: Deal structuring**
 - LECTURE: 02h00
 - Acquisition through equity, cash acquisition, acquisition through debt, stock swap transaction, leveraged buyout (LBO).

- **SESSION 8: Post-merger**
 - LECTURE: 02h00
 - Post-merger management issues, post-merger integration, post-merger performance.
- **SESSION 9: Corporate governance**
 - LECTURE: 02h00
 - Governance in M&As, board of directors, due diligence, the intersection of due diligence and governance.
- **SESSION 10: Legal aspect**
 - LECTURE: 02h00
 - Legal framework, legal language, negotiation issues, negotiation tactics.
- **SESSION 11: Takeovers**
 - LECTURE: 02h00
 - Hostile takeovers, competitive bidding, takeover defences, defensive tactics.
- **SESSION 12: Review**
 - LECTURE: 02h00
 - Review of main concepts, preparation for the final exam and Q&A session.

CODE: Tbc
Course title: CORPORATE FINANCE

Term: FALL

Teaching hours: 24 hours

Number of credits: 3

Teaching language: ☒English ☐French

Course leader:

Speakers: Panagiotis N. Politsidis

≡ **COURSE DESCRIPTION**

This course introduces foundational concepts in capital markets and corporate finance, equipping students for further studies in the discipline. The firm and the role of financial institutions are explored before developing important skills in financial mathematics. The course then moves to the valuation of tradable securities and their pricing in the capital markets. The decisions firms make around capital structure and payout policy are studied. The course concludes with an exploration of information and market efficiency. The tools of finance allow decision makers to navigate risk and uncertainty.

≡ **COURSE OBJECTIVES**

At the completion of this unit, you should be able to:

- Compute the risk-adjusted present value and future value of single cash flow streams, mixed cash flow streams, annuities and perpetuities
- Understand the contemporary institutional environment of financial markets and key participants.
- Discuss and explain the relationship between various measures of risk and return and apply the Capital Asset Pricing Model (CAPM).
- Discuss and explain the concept of market efficiency and the role of information in financial markets.
- Value bonds and stocks through the principles of valuation.
- Solve capital budgeting problems and describe and integrate them into practical considerations.
- Explain the impact of investment, financing and dividend decisions on firm value.
- Apply and integrate key financial concepts to real-world problems.
- Operate and contribute in a team-based structure.

≡ **COMPETENCES VISEES /LEARNING GOALS**

Compute the present value and future value of single cash flow streams, mixed cash flow streams, annuities and perpetuities

Calculate the value of a bond and an ordinary share and explain the basic concepts underpinning the valuation of securities

Solve capital budgeting problems, taking into account many practical aspects and issues associated with corporate capital budgeting

Discuss and explain the relationship between various measures of risk and return and apply the Capital Asset Pricing Model (CAPM) and the Security Market Line (SML)

Discuss and explain the concept of market efficiency

Explain the impact of the investment, financing and dividend decision on firm value.

≡ **TACKLED CONCEPTS**

Financial mathematics, assessment of risk and return, financial decision making, valuation and pricing of instruments, information and market efficiency.

≡ **LEARNING METHODS**

The pedagogical approach is centred on inspiring and encouraging students to develop their critical

Audencia Business School – MSc Corporate Finance & Investment Banking – September 2024 / April

thinking in order to make analytical decisions. Particular focus is devoted to the development of specific skills so that students are able to: i. Collect relevant information ii. Analyse and evaluate of complex setups iii. Make decisions under certain conditions. The students will need to apply all the knowledge acquired at a collective level. There will be a group project where students will need to respond to a real world scenario. In order to do this effectively they will need to: i. Work effectively in a team ii. Assess, evaluate, communicate and interact with.

≡ **ASSIGNMENTS AND EXPECTED WORK**

The class consists of (Homework/Exercises/readings asked to students to prepare the session or in-class exercises)

Exercises: Every lecture is complemented by in-class exercises. Additional exercises are prepared by students (as homework) and are discussed in the class during the tutorial sessions.

Readings: In addition to the designated book chapters, these include published academic papers and articles from the business and financial press.

Group assignment: This assignment provides an opportunity for students to demonstrate their understanding of the key concepts and material covered in the course, such as the application of finance knowledge, data work, and research skills. Based on the theories taught in the class, the assignment requires the effective cooperation of students for the completion of a collective report.

Final exam: The final exam provides students with the opportunity to demonstrate their understanding of the material covered in the entire unit of study. All topics are potentially examinable in the final exam.

≡ **BIBLIOGRAPHY – COURSE MATERIAL**

Titman, S., T. Martin, A Keown and J. Martin (2018). Financial Management: Principles and Applications. Pearson.

≡ **EVALUATION METHODS**

Exam: 50%

Continuous assessment: 50%

≡ **SESSIONS**

- **SESSION 1: Introduction**
 - LECTURE: 02h00
 - General information about the class, the format, the evaluation methods (assignment and final exam). Introduction of fundamental financial concepts that are relevant for the subsequent lectures.
- **SESSION 2: Financial mathematics I**
 - LECTURE: 02h00
 - Interest rates, discounted cash flows, time value of money, different types of compounding, covariance, correlation, OLS regression
- **SESSION 3: Financial mathematics II**
 - LECTURE: 02h00
 - Weighted average cost of capital (WACC), expected values, ordinary annuity, annuity due, deferred annuity, perpetuity.
- **SESSION 4: Valuation of stocks and bonds**
 - LECTURE: 02h00
 - Bond pricing and yields, firm valuation, valuation of debt and equity securities, share valuation models.

- **SESSION 5: Capital budgeting I**
 - LECTURE: 02h00
 - Examine the nature of capital budgeting, review of the project evaluation techniques, provide a justification of net present value (NPV) technique.
- **SESSION 6: Capital budgeting II**
 - LECTURE: 02h00
 - Apply NPV technique, which cashflows to discount, the impact of taxation, the impact of inflation, risk analysis and project evaluation.
- **SESSION 7: Risk and return. Market efficiency**
 - LECTURE: 02h00
 - Calculate realised and expected rates of return and risk, describe the historical pattern of financial market returns, compute geometric (or compound) and arithmetic average rates of return, explain the efficient markets hypothesis and why it is important to share prices.
- **SESSION 8: CAPM**
 - LECTURE: 02h00
 - Examine the risk of portfolios, examine the components of total risk, discuss a number of concepts related to selecting portfolios and fundamental to understanding the capital asset pricing model (CAPM), including: possible portfolio risk/return outcomes and optimum portfolio selection, derive the CAPM equation, examine two major CAPM issues: estimation of the parameters of the CAPM and evaluation of the CAPM.
- **SESSION 9: Company cost of capital**
 - LECTURE: 02h00
 - Calculation of the company cost of capital, estimation of the cost of debt capital, estimation of the cost of equity capital, impact of corporate tax on the company cost of capital, calculation and forecasting of free cash flows, cash flow reporting in financial statements, preparation of free cash flow forecasts.
- **SESSION 10: Capital structure policy**
 - LECTURE: 02h00
 - Description of firm's capital structure, explanation of why firms have different capital structures and how capital structure influences a firm's WACC, fundamental differences in industries that drive differences in the way they finance their investments, basic tools of financial analysis to analyse a firm's financing decisions.
- **SESSION 11: Dividend policy**
 - LECTURE: 02h00
 - Dividend policy, how corporations pay dividends, alternatives to cash dividends, how companies decide on the amount of dividends paid, impact of dividend policy on shareholder wealth.
- **SESSION 12: Review**
 - LECTURE: 02h00
 - Review of main concepts, preparation for the final exam and Q&A session.

CODE: Tbc
Course title: PORTFOLIO MANAGEMENT

Term: FALL

Teaching hours: 24 hours
Number of credits: 3
Teaching language: ☒English ☐French
Course leader:
Speakers: Giacomo Nocera

≡ **COURSE DESCRIPTION**

The course deals with the theory and the application of portfolio management techniques.

The aim is to survey the major theories, tools and results in portfolio management.

As the course emphasizes not only the theory, but also its practical application, by the end of this course, students are expected to have a good understanding of the asset management market, the financial instruments, and the market practitioners' terminology.

In addition, they should be able to develop a fair knowledge and understanding of key issues in asset allocation and portfolio composition and management and to implement adequate portfolio management strategies.

The course is designed to cover most of the "Portfolio Management and Wealth Planning" topic area and many concepts of some of the other topic areas of the CFA Candidate Body of Knowledge.

≡ **COURSE OBJECTIVES**

The main objective of this course is to learn the key theory with practical applications relevant to portfolio management.

After completing this course students will be able to:

- measure and manage portfolio risk and return;
- select and monitor an investment and build a portfolio;
- practically understand and apply asset pricing basic scenarios

≡ **COMPETENCES VISEES /LEARNING GOALS**

Analyse complex situations

Formulate hypotheses to understand a complex situation, in a structured way, by mobilizing disciplinary frameworks if necessary

Evaluate, prevent and manage short, medium and long-term risks

Determine the potential risks plus the degree of probability and time frame, work out various risk Scenarios

≡ **TACKLED CONCEPTS**

Portfolio mathematics; portfolio return; portfolio risk; expected utility; risk aversion; efficient portfolios; asset pricing models; index models; portfolio performance evaluation; passive and active portfolio management.

≡ **LEARNING METHODS**

The pedagogical approach is centred on inspiring and encouraging students to develop their critical thinking in order to make analytical decisions. Particular focus is devoted to the development of specific skills so that students are able to: i. Collect relevant information ii. Analyse and evaluate of complex setups iii. Make decisions under certain conditions.

The students will need to apply all the knowledge acquired at a collective level. There will be a group project where students will need to respond to a real world scenario. In order to do this effectively they will need to: i. Work effectively in a team ii. Assess, evaluate, communicate and interact with.

≡ **ASSIGNMENTS AND EXPECTED WORK**

The class consists of (Homework/Exercises/readings asked to students to prepare the session or in-class exercises)

Exercises: Every lecture is complemented by in-class exercises. Additional exercises are prepared by students (as homework) and are discussed in the class during the tutorial sessions.

Readings: In addition to the designated book chapters, these include published academic papers and articles from the business and financial press.

Group assignment: This assignment provides an opportunity for students to demonstrate their understanding of the key concepts and material covered in the course, such as the application of finance knowledge, data work, and research skills. Based on the theories taught in the class, the assignment requires the effective cooperation of students for the completion of a collective report.

Final exam: The final exam provides students with the opportunity to demonstrate their understanding of the material covered in the entire unit of study. All topics are potentially examinable in the final exam.

≡ **BIBLIOGRAPHY – COURSE MATERIAL**

Z. Bodie; A. Kane; A.J. Marcus, *Investments*. McGraw-Hill International (from 6th to 11th edition). Additional required materials, including articles, handouts, slides, Excel files, etc., will be provided before or during the classes through the Blackboard page of the course.

Students are also encouraged to undertake their own search for additional relevant literature and follow up relevant references contained in the literature identified.

≡ **EVALUATION METHODS**

Exam: 50%

Continuous assessment: 50%

≡ **SESSIONS**

- **SESSION 1: Introduction**
 - LECTURE: 02h00
 - General information about the class, the format, the evaluation methods (assignment and final exam). Introduction of fundamental financial concepts that are relevant for the subsequent lectures.
- **SESSION 2: The asset management industry**
 - LECTURE: 02h00
 - Quantitative tools for portfolio management: the basics of return calculation, a review of basic statistics, regression analysis, and matrix algebra
- **SESSION 3: Mean-variance framework**
 - LECTURE: 02h00
 - The mean-variance framework: concepts of return and risk as the main inputs of any asset allocation strategy, advantages and disadvantages of using expected returns and variance of returns as the only indicators of return and risk, representation of individuals' preferences in a mean-variance framework.
- **SESSION 4: Portfolio selection: theory**
 - LECTURE: 02h00
 - Markowitz's model, construction of optimal portfolios by using (i) 2 risky assets, (ii) a risky asset and a riskless one, (iii) n risky assets, (iv) n risky assets and a riskless one, Investor's preferences and portfolio selection.

- **SESSION 5: Portfolio selection: MS application**
 - LECTURE: 02h00
 - Generation of efficient frontier of financial portfolios using real data on Excel. Discussion of quadratic optimization approach (through Excel solver).
- **SESSION 6: EMH**
 - LECTURE: 02h00
 - The efficient markets hypothesis (EMH), different forms of EMH; applications for the stock market, real examples/case studies, the efficient frontier.
- **SESSION 7: CAMP and index models**
 - LECTURE: 02h00
 - Capital Asset Pricing Model (CAMP), index models (single-index and multi-index models), practical examples of index model applications, link between the market model and the CAPM.
- **SESSION 8: APT**
 - LECTURE: 02h00
 - Arbitrage Pricing Theory (APT), Fama-French multifactor model of risk and return, APT and multifactor models of risk and return.
- **SESSION 9: The frontiers of portfolio diversification**
 - LECTURE: 02h00
 - Benefits of a portfolio diversification across different markets, sectors and different asset classes, main alternative asset classes.
- **SESSION 10: Practical issues in portfolio management I**
 - LECTURE: 02h00
 - Rationale of the existence of different mutual funds, the need for benchmarks, the costs and benefits of two alternative investment approaches (active vs passive portfolio management), the performance evaluation measures (risk-adjusted measures such as the Sharpe ratio, the Treynor ratio, the Jensen's alpha, the appraisal or information ratio).
- **SESSION 11: Practical issues in portfolio management II**
 - LECTURE: 02h00
 - Performance analysis of mutual funds, standard approaches to decompose performances and identify investment styles, modern portfolio management process, different stages of the portfolio process, Remuneration of the asset management activity.
- **SESSION 12: Review**
 - LECTURE: 02h00
 - Review of main concepts, preparation for the final exam and Q&A session.

CODE: Tbc
Course title: ADVANCED FINANCIAL ANALYSIS

Term: FALL

Teaching hours: 24 hours
Number of credits: 3
Teaching language: ☒English ☐French
Course leader:
Speakers: Alexis Guyot

≡ **COURSE DESCRIPTION**

The aim of this course is to give knowledge to students about default risk and skills to assess it. Students will apply credit scoring techniques used in the banking industry as well as within companies to assess borrowers' risk of default.

Prerequisites for this course:

- Financial analysis course (basic level)
- Basic math, probability theory & statistics

A brief reminder of these topics will take place within the course.

≡ **COURSE OBJECTIVES**

Upon completion of the module, you should have:

- advanced knowledge and critical understanding in rating, scoring and default prediction techniques applied in the banking & corporate industry
- demonstrated ability to exercise critical judgment on complex situations
- the ability to assess a company's financial position and risk of bankruptcy through a solid and detailed analysis of its financial statements, business environment, strategy and financing decisions
- the understanding of the impact of ESG dimensions on credit rating

≡ **COMPETENCES VISEES /LEARNING GOALS**

Analyse complex situations

Make use of critical analysis/critical thinking skills

Formulate a personal and well-informed opinion

Students are expected to develop their critical thinking in order to make a decision under uncertainty.

Skills that need to be developed include: i. Collection of relevant information ii. Analysis and evaluation of complex setups iii. Make decisions under uncertainty

Work effectively in a team

Contribute to the development of a collective production

The students will need to apply all the knowledge acquired at a collective level. There will be a group project where students will need to respond to a real world scenario. In order to do this effectively they will need to: i. Work effectively in a team ii. Assess, evaluate, communicate and interact with peers under an uncertain scenario iii. Identify and evaluate collectively all the risks, opportunities and challenges involved in the specific context.

≡ **TACKLED CONCEPTS**

Credit ratings, S&P rating methodology, recovery rating, credit risk assessment, ESG ratings, hybrid securities, covenant package, covenant breach, default prediction models, naive Bayesian classifiers, fitting a bayesian model, linear discriminant analysis, Altman's Z-score.

≡ **LEARNING METHODS**

The pedagogical approach is centred on inspiring and encouraging students to develop their critical thinking in order to make analytical decisions. Particular focus is devoted to the development of specific skills so that students are able to: i. Collect relevant information ii. Analyse and evaluate of complex setups iii. Make decisions under certain conditions.

The students will need to apply all the knowledge acquired at a collective level. There will be a group project where students will need to respond to a real world scenario. In order to do this effectively they will need to: i. Work effectively in a team ii. Assess, evaluate, communicate and interact with.

≡ **ASSIGNMENTS AND EXPECTED WORK**

The class consists of (Homework/Exercises/readings asked to students to prepare the session or in-class exercises)

Exercises: Every lecture is complemented by in-class exercises. Additional exercises are prepared by students (as homework) and are discussed in the class during the tutorial sessions.

Readings: In addition to the designated book chapters, these include published academic papers and articles from the business and financial press.

Group assignment: This assignment provides an opportunity for students to demonstrate their understanding of the key concepts and material covered in the course, such as the application of finance knowledge, data work, and research skills. Based on the theories taught in the class, the assignment requires the effective cooperation of students for the completion of a collective report.

Final exam: The final exam provides students with the opportunity to demonstrate their understanding of the material covered in the entire unit of study. All topics are potentially examinable in the final exam.

≡ **BIBLIOGRAPHY – COURSE MATERIAL**

Z Damadoran, A. Corporate Finance: Theory and Practice. John Wiley & sons.

Tan, P. N., Steinbach M., Kumar V. Introduction to data mining. Pearson.

≡ **EVALUATION METHODS**

Exam: 50%

Continuous assessment: 50%

≡ **SESSIONS**

- **SESSION 1: Introduction**
 - LECTURE: 02h00
 - General information about the class, the format, the evaluation methods (assignment and final exam). Introduction of fundamental financial concepts that are relevant for the subsequent lectures.
- **SESSION 2: Rating and scoring**
 - LECTURE: 02h00
 - S&P Rating methodology, assessing a business profile, assessing a financial profile, determining an anchor rating, modifiers, recovery rating, scoring methodology, Bank of France score, scoring grid in use within the banking industry.
- **SESSION 3: Moody's credit risk assessment I**
 - LECTURE: 02h00
 - Moody's rating methodology, using industry specific mapping grids, Moody's standard adjustments, unfunded defined benefit pension plans.

- **SESSION 4: Moody's credit risk assessment II**
 - LECTURE: 02h00
 - Moody's standard adjustments, operating leases, capitalized interest.
- **SESSION 5: Moody's credit risk assessment III**
 - LECTURE: 02h00
 - Moody's standard adjustments, capitalized development costs, interest expense on discounted long-term non-debt liabilities, hybrid securities.
- **SESSION 6: Moody's credit risk assessment IV**
 - LECTURE: 02h00
 - Moody's standard adjustments, factoring arrangements, consistent measure of FFO, non-recurring and exceptional items, Total SA case study.
- **SESSION 7: ESG and credit rating**
 - LECTURE: 02h00
 - Integration of ESG factors into credit risk assessment, S&P approach, Moody's approach, Fitch approach.
- **SESSION 8: Covenant package**
 - LECTURE: 02h00
 - Covenant types, covenant breach, technical default, duties of the management, legal consequences, Findus case study.
- **SESSION 9: Default prediction models I**
 - LECTURE: 02h00
 - Naive Bayesian classifiers, fitting a bayesian model, computer lab session.
- **SESSION 10: Default prediction models II**
 - LECTURE: 02h00
 - Linear Discriminant Analysis (LDA), Altman's z-score, fitting a LDA model, computer lab session, evaluation measures (risk-adjusted measures such as the Sharpe ratio, the Treynor ratio, the Jensen's alpha, the appraisal or information ratio).
- **SESSION 11: Default prediction models III**
 - LECTURE: 02h00
 - Logit models, fitting a Logit model, computer lab session.
- **SESSION 12: Review**
 - LECTURE: 02h00
 - Review of main concepts, preparation for the final exam and Q&A session.

CODE: Tbc
Course title: MONEY AND BANKING

Term: FALL

Teaching hours: 24 hours
Number of credits: 3
Teaching language: ☒English ☐French
Course leader:
Speakers: Manthos D. Delis

≡ **COURSE DESCRIPTION**

This course explores a wide range of topics involving money, financial institutions and financial markets, and the links between the financial sector and the central bank. It also examines the importance of banks and other financial institutions in the economy, and how information asymmetries and regulation have shaped their evolution. Throughout the course, issues How are interest rates determined, and how does the central bank conduct monetary policy? What economic factors drive the yield curves in different bond markets? We will pay particular attention to the banking system, with an eye toward understanding the function and importance of banks. Topics will include the role of the central bank as a lender of last resort during the recent, and prior, financial crises, unconventional monetary policy tools such as quantitative easing and forward guidance.

≡ **COURSE OBJECTIVES**

This module aims to equip students with the tools to:

- Demonstrate knowledge and understanding of the nature and role of money and the interest rates
- Analyse the role of banks in the economy, evaluate their performance and justify their regulation
- Understand the role of banks and financial institutions in maintaining sustainability in the banking system
- Gain a better understanding of the banking sector, financial markets and their interaction with the broader economy
- Demonstrate knowledge and understanding of central banking and evaluate the conduct of monetary policy
- Advance your understanding of the role of the central bank and how monetary policy can influence growth and fluctuations in the economy
- Retrieve, analyse and interpret the economic and finance literature and provide policy recommendations

≡ **COMPETENCES VISEES /LEARNING GOALS**

Conduct empirical analysis
Make use of critical analysis/critical thinking skills
Formulate a personal and well-informed opinion
Cooperation with classmates
Work effectively in a team
Contribute to the development of a collective production (group project)

≡ **TACKLED CONCEPTS**

Financial system, interest rates, interest rate risk, term structure of interest rates, stock market, theory of rational expectations, efficient markets hypothesis, management of financial institutions, money supply, monetary policy.

≡ **LEARNING METHODS**

The pedagogical approach is centred on inspiring and encouraging students to develop their critical thinking in order to make analytical decisions. Particular focus is devoted to the development of specific skills so that students are able to: i. Collect relevant information ii. Analyse and evaluate of complex setups iii. Make decisions under certain conditions.

The students will need to apply all the knowledge acquired at a collective level. There will be a group project where students will need to respond to a real world scenario. In order to do this effectively they will need to: i. Work effectively in a team ii. Assess, evaluate, communicate and interact with.

≡ **ASSIGNMENTS AND EXPECTED WORK**

The class consists of (Homework/Exercises/readings asked to students to prepare the session or in-class exercises)

Exercises: Every lecture is complemented by in-class exercises. Additional exercises are prepared by students (as homework) and are discussed in the class during the tutorial sessions.

Readings: In addition to the designated book chapters, these include published academic papers and articles from the business and financial press.

Group assignment: This assignment provides an opportunity for students to demonstrate their understanding of the key concepts and material covered in the course, such as the application of finance knowledge, data work, and research skills. Based on the theories taught in the class, the assignment requires the effective cooperation of students for the completion of a collective report.

Final exam: The final exam provides students with the opportunity to demonstrate their understanding of the material covered in the entire unit of study. All topics are potentially examinable in the final exam.

≡ **BIBLIOGRAPHY – COURSE MATERIAL**

The Economics of Money, Banking and Financial. Markets 11th ed. Frederic S. Mishkin.

≡ **EVALUATION METHODS**

Exam: 50%

Continuous assessment: 50%

≡ **SESSIONS**

○ **SESSION 1: Introduction**

- LECTURE: 02h00
- General information about the class, the format, the evaluation methods (assignment and final exam). Introduction of fundamental financial concepts that are relevant for the subsequent lectures. Why study money, banking and financial markets.

○ **SESSION 2: The financial system**

- LECTURE: 02h00
- An overview of the financial system, sustainability of the financial system.

○ **SESSION 3: Money**

- LECTURE: 02h00
- Functions of money, why and how money promotes economic efficiency, tracing how its forms have evolved over time, how money is currently measured.

○ **SESSION 4: Interest rates I**

- LECTURE: 02h00
- Present value of future cash flows and the yield to maturity, current yield, rate of return, and rate of capital gain, distinction between real and nominal interest rates.

- **SESSION 5: Interest rates II**
 - LECTURE: 02h00
 - Factors that affect the demand for assets, demand and supply curves for the bond market, equilibrium interest rate, factors that affect the equilibrium interest rate in the bond market.
- **SESSION 6: The risk and term structure of interest rates**
 - LECTURE: 02h00
 - Sources of fluctuations of interest rates, factors explaining the risk structure of interest rates, theories of why interest rates vary across maturities.
- **SESSION 7: Stock market**
 - LECTURE: 02h00
 - The stock market, the theory of rational expectations, and the Efficient Market Hypothesis (EMH).
- **SESSION 8: Financial structure**
 - LECTURE: 02h00
 - An economic analysis of financial structure, banking and the management of financial institutions.
- **SESSION 9: Central banks**
 - LECTURE: 02h00
 - Central banks' actions about interest rates and the money supply, central banks and inflation, development of the central banking system, the key features and functions of a central bank, discussion of the European Central Bank (ECB) and the Federal Reserve System, discussion of the structure and degree of independence of the Bank of Canada, the Bank of Japan, and the People's Bank of China.
- **SESSION 10: The money supply process**
 - LECTURE: 02h00
 - How commercial banks create deposits, basic principles of the money supply creation process, factors affecting the Federal Reserve's assets and liabilities, factors that affect the monetary base, deposit creation process using T- accounts.
- **SESSION 11: Tools of monetary policy**
 - LECTURE: 02h00
 - Tools used by the Federal Reserve System to control the money supply and interest rates, how changes in monetary policy can affect the federal funds rate, how conventional monetary policy tools are implemented and the advantages and limitations of each tool, key monetary policy tools that are used when conventional policy is no longer effective, distinctions and similarities between the monetary policy tools of the Federal Reserve and those of the European Central Bank.
- **SESSION 12: Review**
 - LECTURE: 02h00
 - Review of main concepts, preparation for the final exam and Q&A session.

CODE: Tbc
Course title: BANK FINANCIAL MANAGEMENT

Term: FALL

Teaching hours: 24 hours
Number of credits: 3
Teaching language: ☒English ☐French
Course leader:
Speakers: Giacomo Nocera; Panagiotis N. Politsidis

≡ **COURSE DESCRIPTION**

The unifying theme in this course is the application of modern finance theory to financial decision making in the management of banks and non-bank financial institutions. The subject of bank and financial institution decision-making is approached from a risk perspective. The course objectives are: (i) To provide students with an understanding of the modern model of financial institutions and the economic functions that they perform; (ii) Identify the main types of risk confronted by financial institutions; (iii) Apply relevant techniques to measure and manage those risks; (iv) To provide students with the ability to critically assess the effectiveness of the techniques used by banks to manage their risks; (v) To provide students with an understanding of international bank management and financial services.

≡ **COURSE OBJECTIVES**

At the completion of this course, you should be able to:

- identify and measure the key inherent risks faced by banks
- develop and apply strategies using tools and techniques to effectively manage these risks
- identify the strengths and weaknesses that exist in the approaches currently available to measure the financial risks faced by financial institutions
- understand the mechanics behind the responsible management of financial institutions
- assess the appropriateness of the various approaches in formulating risk management strategies
- present findings in the form of a report, including recommendations for action which are supported by quantitative and qualitative analysis
- participate as a member of a team to undertake analysis of a business situation and to present the team's findings and recommendations
- describe the failings of financial institutions during the 2008 GFC and the identify the extent to which these failings can be traced back to poor ethical and governance frameworks
- analyse everyday financial/banking news and reflect on the new developments in the banking industry

≡ **COMPETENCES VISEES /LEARNING GOALS**

Identify and measure the key inherent risks faced by banks

Develop and apply strategies using tools and techniques to effectively manage these risks

Identify the strengths and weaknesses that exist in the approaches currently available to measure the financial risks faced by financial institutions

Assess the appropriateness of the various approaches in formulating risk management strategies

Present findings in the form of a report, including recommendations for action which are supported by quantitative and qualitative analysis

Participate as a member of a team to undertake analysis of a business situation and to present the team's findings and recommendations

Describe the failings of financial institutions during the 2008 GFC and the identify the extent to which these failings can be traced back to poor ethical and governance frameworks

Analyse everyday financial/banking news and reflect on the new developments in the banking industry

industry.

≡ **TACKLED CONCEPTS**

Modern finance theory, financial decision making, management of financial institutions, bank portfolio risk, bank risk management, sustainability in banking, bank regulation.

≡ **LEARNING METHODS**

The pedagogical approach is centred on inspiring and encouraging students to develop their critical thinking in order to make analytical decisions. Particular focus is devoted to the development of specific skills so that students are able to: i. Collect relevant information ii. Analyse and evaluate of complex setups iii. Make decisions under certain conditions.

The students will need to apply all the knowledge acquired at a collective level. There will be a group project where students will need to respond to a real world scenario. In order to do this effectively they will need to: i. Work effectively in a team ii. Assess, evaluate, communicate and interact with.

≡ **ASSIGNMENTS AND EXPECTED WORK**

The class consists of (Homework/Exercises/readings asked to students to prepare the session or in-class exercises)

Exercises: Every lecture is complemented by in-class exercises. Additional exercises are prepared by students (as homework) and are discussed in the class during the tutorial sessions.

Readings: In addition to the designated book chapters, these include published academic papers and articles from the business and financial press.

Group assignment: This assignment provides an opportunity for students to demonstrate their understanding of the key concepts and material covered in the course, such as the application of finance knowledge, data work, and research skills. Based on the theories taught in the class, the assignment requires the effective cooperation of students for the completion of a collective report.

Final exam: The final exam provides students with the opportunity to demonstrate their understanding of the material covered in the entire unit of study. All topics are potentially examinable in the final exam.

≡ **BIBLIOGRAPHY – COURSE MATERIAL**

Saunders, A. Cornett, M., and Erhemjamts, O., 2020. Financial institutions management: a risk management approach, 10th ed, McGrawHill.

≡ **EVALUATION METHODS**

Exam: 50%

Continuous assessment: 50%

≡ **SESSIONS**

○ **SESSION 1: Introduction**

- LECTURE: 02h00
- General information about the class, the format, the evaluation methods (assignment and final exam). Introduction of fundamental financial concepts that are relevant for the subsequent lectures. Types of risk and objectives of bank financial management.

○ **SESSION 2: Bank financial statements and banking risks**

- LECTURE: 02h00
- Presentation of bank financial statements, steps for preparation of bank

financial statements, overview of main banking risks, relation between bank financial statements and banking risks.

- **SESSION 3: Interest rate risk**
 - LECTURE: 02h00
 - Types of interest rates, calculation of interest rates, determinants of interest rates, yield curve, interest rate risk, overview of approaches to interest rate risk management.
- **SESSION 4: Credit risk I**
 - LECTURE: 02h00
 - Individual loan risk measurement, loan assessment, different loan types, loan risk-weights.
- **SESSION 5: Credit risk II**
 - LECTURE: 02h00
 - Loan portfolios and concentration risk measurement, construction of loan portfolios, default risk, risk and exposure, diversification.
- **SESSION 6: Liquidity risk**
 - LECTURE: 02h00
 - Overview of liquidity risk, sources of liquidity risk, measurement and management of liquidity risk, bank liquidity risk and bank runs.
- **SESSION 7: Market risk**
 - LECTURE: 02h00
 - Market risk measurement and management, market prices, on and off-balance sheet positions, application of Value at Risk (VaR), stress testing.
- **SESSION 8: The future of banking**
 - LECTURE: 02h00
 - Responsible banking, green banking, integration of ESG in bank lending and bank practices, societal impact of bank lending.
- **SESSION 9: Bank regulation I**
 - LECTURE: 02h00
 - Micro-prudential regulation, micro-prudential instruments, risk-based capital adequacy requirements, Pillar 1 and Pillar 2, capital conservation buffer.
- **SESSION 10: Bank regulation II**
 - LECTURE: 02h00
 - Macro-prudential regulation, macro-prudential instruments, counter-cyclical capital buffers, loan-to-value (LTV) ratios, loan-to-income (LTI) ratios, Global Systemically Important Banks (G-SIBs).
- **SESSION 11: Loan sales and securitisation**
 - LECTURE: 02h00
 - Secondary loan market, participants in secondary loan market, institutional investors, loan securitisation, asset-backed securities (ABS), collateralized debt obligation (CDO), loan mortgages.
- **SESSION 12: Review**
 - LECTURE: 02h00
 - Review of main concepts, preparation for the final exam and Q&A session

CODE: Tbc
Course title: INTERNATIONAL BANKING MANAGEMENT
Term: FALL

Teaching hours: 24 hours
Number of credits: 3
Teaching language: ☒ English ☐ French
Course leader:
Speakers: Giacomo Nocera; Panagiotis N. Politsidis

≡ **COURSE DESCRIPTION**

This course covers various theoretical and applied issues for the international financial markets in which international banks operate in. Topics covered include theories of international banking; internationalization of banking - US, Japan and Chinese experience; competitiveness strategies; international banking and debt crises; Euro currency markets; financial secrecy and money laundering; and the role of foreign banks in emerging markets.

≡ **COURSE OBJECTIVES**

At the completion of this course, students should be able to:

- explain the trends of and factors behind the current and past international financial market developments relevant for international commercial and investment banks
- identify and explain the (policy) implications of current financial market developments in relation to international banks' strategic positioning
- understand the mechanics behind the responsible management of financial institutions
- apply the experience of an independent research performed as a requirement of a group project to conduct further research to answer research question posed in a topic related to international banking industry

≡ **COMPETENCES VISEES /LEARNING GOALS**

Explain the trends of and factors behind the current and past international financial market developments relevant for international commercial and investment banks
Identify and explain the (policy) implications of current financial market developments in relation to international banks' strategic positioning
Apply the experience of an independent research performed as a requirement of a group project to conduct further research to answer research question posed in a topic related to international banking.

≡ **TACKLED CONCEPTS**

International banking, determinants and speculation during crises, responsible banking, financial secrecy and money laundering, sovereign risk, competitive strategies, loan syndication.

≡ **LEARNING METHODS**

The pedagogical approach is centred on inspiring and encouraging students to develop their critical thinking in order to make analytical decisions. Particular focus is devoted to the development of specific skills so that students are able to: i. Collect relevant information ii. Analyse and evaluate of complex setups iii. Make decisions under certain conditions.

The students will need to apply all the knowledge acquired at a collective level. There will be a group project where students will need to respond to a real world scenario. In order to do this effectively they will need to: i. Work effectively in a team ii. Assess, evaluate, communicate and interact with.

≡ **ASSIGNMENTS AND EXPECTED WORK**

The class consists of (Homework/Exercises/readings asked to students to prepare the session or in-class exercises)

Exercises: Every lecture is complemented by in-class exercises. Additional exercises are prepared by students (as homework) and are discussed in the class during the tutorial sessions.

Readings: In addition to the designated book chapters, these include published academic papers and articles from the business and financial press.

Group assignment: This assignment provides an opportunity for students to demonstrate their understanding of the key concepts and material covered in the course, such as the application of finance knowledge, data work, and research skills. Based on the theories taught in the class, the assignment requires the effective cooperation of students for the completion of a collective report.

Final exam: The final exam provides students with the opportunity to demonstrate their understanding of the material covered in the entire unit of study. All topics are potentially examinable in the final exam.

≡ **BIBLIOGRAPHY – COURSE MATERIAL**

International Bank Management. Dileep Mehta, Hung-Gay Fung. Wiley.

≡ **EVALUATION METHODS**

Exam: 50%

Continuous assessment: 50%

≡ **SESSIONS**

- **SESSION 1: Introduction**
 - LECTURE: 02h00
 - General information about the class, the format, the evaluation methods (assignment and final exam). Introduction of fundamental financial concepts that are relevant for the subsequent lectures. Types of risk and objectives of risk management.
- **SESSION 2: International banking 1**
 - LECTURE: 02h00
 - Types of risk and objectives of international banking management.
- **SESSION 3: International banking 2**
 - LECTURE: 02h00
 - Overview and analysis of different approaches to international banking management.
- **SESSION 4: Competitive strategies in international banking 1**
 - LECTURE: 02h00
 - Analysis of competitive strategies in international banking: foreign vs domestic banks, foreign vs local operations, synergies and diversification.
- **SESSION 5: Competitive strategies in international banking 2**
 - LECTURE: 02h00
 - Analysis of competitive strategies in international banking: subsidiaries, market concentration, competition, regulatory developments.
- **SESSION 6: International banking crises**
 - LECTURE: 02h00
 - International banking crises, bank lending during crises, flight to safety and

flight to quality, lending contraction and real effects.

- **SESSION 7: Euro currency markets**
 - LECTURE: 02h00
 - Euro currency markets and importance for bank financing, interbank market, interbank market conditions during crises.
- **SESSION 8: International loan syndication**
 - LECTURE: 02h00
 - Overview of global syndicated loan market, determinants of global syndicated lending, analysis of lenders and borrowers engaging in syndicated lending.
- **SESSION 9: Sovereign lending and country risk**
 - LECTURE: 02h00
 - Lending to governments, sovereign credit ratings, sovereign ceiling rule, sovereign downgrades, government-bank connections.
- **SESSION 10: Foreign banks and emerging markets**
 - LECTURE: 02h00
 - Role of foreign banks in emerging markets, characteristics of foreign banks, analysis of emerging market economies.
- **SESSION 11: Responsible banking**
 - LECTURE: 02h00
 - Responsible banking, secret money and international banks, laws and regulations on green banking.
- **SESSION 12: Review**
 - LECTURE: 02h00
 - Review of main concepts, preparation for the final exam and Q&A session.

CODE: Tbc
Course title: FINANCIAL MATHEMATICS

Term: SPRING

Teaching hours: 24 hours
Number of credits: 3
Teaching language: ☒English ☐French
Course leader:
Speakers: Elias Demetriades

≡ **COURSE DESCRIPTION**

The purpose of this course is to expose undergraduate and graduate students to the mathematical concepts and techniques used in the financial industry. The course will consist of a set of mathematics lectures on topics in Linear Algebra, Probability, Statistics, Stochastic Processes and Numerical Methods. Mathematics lectures will be mixed with lectures illustrating the corresponding application in the financial industry.

≡ **COURSE OBJECTIVES**

After the end of this course, students should be able to:

- Derive price-yield relationship and understand convexity
- Bootstrap a yield curve
- Compute standard Value at Risk and understand assumptions behind it
- Estimate volatility of an option
- Derive Black-Scholes equations using risk-neutral arguments
- Understand decomposition of matrices in statistics (and probability) point of view, e.g., principle component analysis
- Use statistical techniques and methods in data analysis; understand the advantages and limitations of different methods
- Understand basic limiting theorems and assumptions behind them
- Understand Ito's lemma and its applications in financial mathematics
- Understand Girsanov's theorem and change of measure.

≡ **COMPETENCES VISEES /LEARNING GOALS**

Conduct empirical analysis
Make use of critical analysis/critical thinking skills
Formulate a personal and well-informed opinion
Cooperation with classmates
Work effectively in a team
Contribute to the development of a collective production (group project)

≡ **TACKLED CONCEPTS**

Price-yield relationship, convexity, bootstrap, yield curve, Value at Risk, volatility, regression analysis, portfolio theory, Black-Scholes model, matrix algebra, probability theory, limiting theorem, Ito's lemma, Girsanov's theorem.

≡ **LEARNING METHODS**

The pedagogical approach is centred on inspiring and encouraging students to develop their critical thinking in order to make analytical decisions. Particular focus is devoted to the development of specific skills so that students are able to: i. Collect relevant information ii. Analyse and evaluate of complex setups iii. Make decisions under certain conditions.

The students will need to apply all the knowledge acquired at a collective level. There will be a group project where students will need to respond to a real world scenario. In order to do this effectively they will need to: i. Work effectively in a team ii. Assess, evaluate, communicate and interact with.

≡ **ASSIGNMENTS AND EXPECTED WORK**

The class consists of (Homework/Exercises/readings asked to students to prepare the session or in-class exercises)

Exercises: Every lecture is complemented by in-class exercises. Additional exercises are prepared by students (as homework) and are discussed in the class during the tutorial sessions.

Readings: In addition to the designated book chapters, these include published academic papers and articles from the business and financial press.

Group assignment: This assignment provides an opportunity for students to demonstrate their understanding of the key concepts and material covered in the course, such as the application of finance knowledge, data work, and research skills. Based on the theories taught in the class, the assignment requires the effective cooperation of students for the completion of a collective report.

Final exam: The final exam provides students with the opportunity to demonstrate their understanding of the material covered in the entire unit of study. All topics are potentially examinable in the final exam.

≡ **BIBLIOGRAPHY – COURSE MATERIAL**

Finite Difference Methods for Financial Engineering. Daniel Duffy. Wiley Finance.

≡ **EVALUATION METHODS**

Exam: 50%

Continuous assessment: 50%

≡ **SESSIONS**

- **SESSION 1: Introduction**
 - LECTURE: 02h00
 - General information about the class, the format, the evaluation methods (assignment and final exam). Introduction of fundamental financial concepts that are relevant for the subsequent lectures.
- **SESSION 2: Linear algebra**
 - LECTURE: 02h00
 - Vectors, linear combinations, matrix transformations, functions and linear transformations, alternate coordinate systems.
- **SESSION 3: Probability theory**
 - LECTURE: 02h00
 - Random experiment, sample space, event, random variable, conditional probability, expectation, variance, probability density function.
- **SESSION 4: Stochastic processes**
 - LECTURE: 02h00
 - Stochastic calculus, stochastic processes, filtration, filtering theory, Markov processes, Brownian motion.
- **SESSION 5: Regression analysis**
 - LECTURE: 02h00

- Linear regression, ordinary least squares (OLS), Gauss-Markov theorem, generalised least squares (GLS), distribution theory, maximum likelihood estimation (MLE).
- **SESSION 6: VaR**
 - LECTURE: 02h00
 - Value at Risk (VaR), expected shortfall (CVaR), portfolio VaR, VaR backtesting, stress testing, historical simulation, Monte Carlo simulation.
- **SESSION 7: Time series analysis**
 - LECTURE: 02h00
 - Stationary and non-stationary variables, autoregressive distributed lag models and forecasting, additive model for a time series, linear filtering for time series, autocovariances and autocorrelations, moving averages and autoregressive processes.
- **SESSION 8: Portfolio theory**
 - LECTURE: 02h00
 - Portfolio theory, arbitrage, risk measures, utility functions, efficient frontier, Markowitz portfolio theory, capital market pricing model (CAPM).
- **SESSION 9: Black-Scholes**
 - LECTURE: 02h00
 - Black-Scholes model; risk-neutral valuation, Ito's lemma, Black-Scholes model in practice, limitations of Black-Scholes model.
- **SESSION 10: Option Price and Probability Duality**
 - LECTURE: 02h00
 - Duality principle, hedging duality, pricing of American and European options under duality approach, semimartingale setting, dynamic vs static trading.
- **SESSION 11: Stochastic differential equations**
 - LECTURE: 02h00
 - Stochastic differential equations (SDEs), relationship between probability theory with ordinary and partial differential equations, option pricing and investment optimisation, basics of Malliavin's stochastic calculus of variations, relationship between stochastic analysis and partial differential equations.
- **SESSION 12: Review**
 - LECTURE: 02h00
 - Review of main concepts, preparation for the final exam and Q&A session.

CODE: Tbc
Course title: RISK MANAGEMENT

Term: SPRING

Teaching hours: 24 hours
Number of credits: 3
Teaching language: ☒English ☐French
Course leader:
Speakers: Giacomo Nocera; Panagiotis N. Politsidis

≡ **COURSE DESCRIPTION**

Risk is an integral part of financial decisions. Following the rapid evolution of the discipline of financial risk management, analysts must be prepared to assess the level of risk in the marketplace. This course explores the basic concepts of modelling, measuring and managing financial risks within the regulatory framework. Topics covered include market risk (value-at-risk and expected loss), credit risk (single name, portfolio, ratings and market based models, credit derivatives), liquidity risk and operational risk. To overcome the rather quantitative nature of the topics, the course relies heavily on practical based lab exercises with emphasis on simulations, real life examples and case studies.

≡ **COURSE OBJECTIVES**

At the completion of this course, students should be able to:

- identify and explain the characteristics of market, credit, operational, legal, regulatory and reputation risk
- identify key financial risks in corporations
- construct and evaluate risk management models
- apply hedging techniques in managing market risk

≡ **COMPETENCES VISEES /LEARNING GOALS**

Conduct empirical analysis
Make use of critical analysis/critical thinking skills
Formulate a personal and well-informed opinion
Cooperation with classmates
Work effectively in a team
Contribute to the development of a collective production (group project)

≡ **TACKLED CONCEPTS**

Value at Risk (VaR), expected shortfall (CVaR), portfolio VaR, VaR backtesting, stress testing, historical simulation, Monte Carlo simulation, credit ratings, default probabilities, credit default swaps (CDS), credit VaR, collateralised debt obligations (CDOs)

≡ **LEARNING METHODS**

The pedagogical approach is centred on inspiring and encouraging students to develop their critical thinking in order to make analytical decisions. Particular focus is devoted to the development of specific skills so that students are able to: i. Collect relevant information ii. Analyse and evaluate of complex setups iii. Make decisions under certain conditions.

The students will need to apply all the knowledge acquired at a collective level. There will be a group project where students will need to respond to a real world scenario. In order to do this effectively they will need to: i. Work effectively in a team ii. Assess, evaluate, communicate and interact with.

≡ **ASSIGNMENTS AND EXPECTED WORK**

The class consists of (Homework/Exercises/readings asked to students to prepare the session or in-class exercises)

Exercises: Every lecture is complemented by in-class exercises. Additional exercises are prepared by students (as homework) and are discussed in the class during the tutorial sessions.

Readings: In addition to the designated book chapters, these include published academic papers and articles from the business and financial press.

Group assignment: This assignment provides an opportunity for students to demonstrate their understanding of the key concepts and material covered in the course, such as the application of finance knowledge, data work, and research skills. Based on the theories taught in the class, the assignment requires the effective cooperation of students for the completion of a collective report.

Final exam: The final exam provides students with the opportunity to demonstrate their understanding of the material covered in the entire unit of study. All topics are potentially examinable in the final exam.

≡ **BIBLIOGRAPHY – COURSE MATERIAL**

Value at Risk (3rd Edition) by Philippe Jorion.

Risk Management and Financial Institution (Fifth Edition) by John C. Hull. Wiley.

≡ **EVALUATION METHODS**

Exam: 50%

Continuous assessment: 50%

≡ **SESSIONS**

- **SESSION 1: Introduction**
 - LECTURE: 02h00
 - General information about the class, the format, the evaluation methods (assignment and final exam). Introduction of fundamental financial concepts that are relevant for the subsequent lectures. Types of risk and objectives of risk management.
- **SESSION 2: Risk management**
 - LECTURE: 02h00
 - Types of risk and objectives of risk management, future trends in risk management.
- **SESSION 3: VaR and CvaR**
 - LECTURE: 02h00
 - Value at risk (VaR) and Expected shortfall (CVaR), strengths and limitations of VaR and CVaR.
- **SESSION 4: VaR precision and backtesting**
 - LECTURE: 02h00
 - VaR precision and time aggregation, backtesting of VaR and Liquidity (unwinding positions).
- **SESSION 5: Portfolio VaR**
 - LECTURE: 02h00
 - Portfolio VaR, analytical approach to VaR, multivariate models, mapping, correlations and copulas.

- **SESSION 6: Forecasting**
 - LECTURE: 02h00
 - Forecasting, volatility and correlations, forecasting techniques, forecasting horizons.
- **SESSION 7: VaR methods**
 - LECTURE: 02h00
 - VaR methods: delta normal, historical simulation and Monte Carlo simulation.
- **SESSION 8: Stress testing**
 - LECTURE: 02h00
 - Stress testing, scenarios and integrated risk management, evolution of stress testing, stress testing in practice.
- **SESSION 9: Credit risk I**
 - LECTURE: 02h00
 - Credit ratings, default probabilities and credit default swap (CDS), speculative nature of CDS, regulation of CDS market, CDS-bond basis.
- **SESSION 10: Credit risk II**
 - LECTURE: 02h00
 - Credit risk modelling, credit VaR, different approaches to credit risk modelling, alternative credit risk measures.
- **SESSION 11: Securitization**
 - LECTURE: 02h00
 - Private financial crisis, structured products and securitization, collateralised debt obligations (CDOs)
- **SESSION 12: Review**
 - LECTURE: 02h00
 - Review of main concepts, preparation for the final exam and Q&A session.

CODE: Tbc
Course title: CASH MANAGEMENT AND DERIVATIVES

Term: SPRING

Teaching hours: 24 hours
Number of credits: 3
Teaching language: ☒English ☐French
Course leader:
Speakers: Joëlle Miffre

≡ **COURSE DESCRIPTION**

This module aims to provide students with the necessary training to develop an advanced understanding of money markets, foreign exchange, derivatives and commodities.

Part 1. Is dedicated to give students a strong knowledge and understanding of the money markets.

Part 2. Provides students with specialist knowledge of international trade and currency markets.

Part 3. Gives the students an in depth knowledge of derivatives, in particular futures, swaps and options, so that they will be able to calculate the price of such instruments from first principles.

Cross-over program with the following modules:

- Portfolio management

≡ **COURSE OBJECTIVES**

Upon completion of the module, you should have:

- specialist knowledge of the different types of cash instruments in the money markets
- advanced knowledge and critical understanding in currency exchange rates with an appreciation of international trade and capital flows
- describe the investment and risk characteristics of derivatives
- an in depth knowledge of the uses and functionality of basic derivative products, and be able to calculate the underlying value of such products

≡ **COMPETENCES VISEES /LEARNING GOALS**

Analyse complex situations

Make use of critical analysis/critical thinking skills

Formulate a personal and well-informed opinion

Support one's conclusions and issue well-reasoned recommendations

Evaluate, prevent and manage short, medium and long-term risks

Locate and state overall risks characterizing a situation

≡ **TACKLED CONCEPTS**

Treasury bills, commercial paper, bankers acceptance, certificate of deposit, repurchase agreements, floating rate notes, nominal and real exchange rates, direct and indirect forex quotations, currency cross rates, forwards, exchange rate regimes, international capital flows, traditional options, traded options, hedge ratio, call/put parity, binomial model, future margin, interest rate swaps, currency swaps, swaptions.

≡ **LEARNING METHODS**

The pedagogical approach is centred on inspiring and encouraging students to develop their critical thinking in order to make analytical decisions. Particular focus is devoted to the development of specific skills so that students are able to: i. Collect relevant information ii. Analyse and evaluate of complex setups iii. Make decisions under certain conditions.

The students will need to apply all the knowledge acquired at a collective level. There will be a group

project where students will need to respond to a real world scenario. In order to do this effectively they will need to: i. Work effectively in a team ii. Assess, evaluate, communicate and interact with.

≡ **ASSIGNMENTS AND EXPECTED WORK**

The class consists of (Homework/Exercises/readings asked to students to prepare the session or in-class exercises)

Exercises: Every lecture is complemented by in-class exercises. Additional exercises are prepared by students (as homework) and are discussed in the class during the tutorial sessions.

Readings: In addition to the designated book chapters, these include published academic papers and articles from the business and financial press.

Group assignment: This assignment provides an opportunity for students to demonstrate their understanding of the key concepts and material covered in the course, such as the application of finance knowledge, data work, and research skills. Based on the theories taught in the class, the assignment requires the effective cooperation of students for the completion of a collective report.

Final exam: The final exam provides students with the opportunity to demonstrate their understanding of the material covered in the entire unit of study. All topics are potentially examinable in the final exam.

≡ **BIBLIOGRAPHY – COURSE MATERIAL**

Options, Futures, and Other Derivatives. John Hull. Wiley.

≡ **EVALUATION METHODS**

Exam: 50%

Continuous assessment: 50%

≡ **SESSIONS**

- **SESSION 1: Introduction**
 - LECTURE: 02h00
 - General information about the class, the format, the evaluation methods (assignment and final exam). Introduction of fundamental financial concepts that are relevant for the subsequent lectures.
- **SESSION 2: Management of Cash Models**
 - LECTURE: 02h00
 - Cash Instruments - treasury bills, commercial paper, bankers acceptance, certificates of deposit, repo agreements and FRN
- **SESSION 3: Currency and Exchange Rates**
 - LECTURE: 02h00
 - The economics of international trade, capital flows, benefits of trading, blocs and unions
- **SESSION 4: Currency markets**
 - LECTURE: 02h00
 - Trade organisations, currency regimes, foreign exchange market, exchange rate calculations.
- **SESSION 5: Derivatives futures**
 - LECTURE: 02h00
 - Forwards, characteristics of different futures, price calculation, derivative futures, strategies with futures, commodities.

- **SESSION 6: Derivative Option I**
 - LECTURE: 02h00
 - Traded options, basic price calculation of puts and calls.
- **SESSION 7: Derivative Option II**
 - LECTURE: 02h00
 - Investment risk and characteristics of options, investment strategies, binomial model of pricing, Greeks.
- **SESSION 8: Option strategies**
 - LECTURE: 02h00
 - Covered call, married put, bull call spread, bear put spread, protective collar, long straddle, long strangle, long call butterfly.
- **SESSION 9: Black-Scholes**
 - LECTURE: 02h00
 - Black-Scholes model of option valuation.
- **SESSION 10: Derivative swaps**
 - LECTURE: 02h00
 - Basic concepts of swaps, valuation, swaptions.
- **SESSION 11: CDS**
 - LECTURE: 02h00
 - Credit default swaps (CDS), CDS pricing, CDS liquidity, sovereign CDS contracts, speculation in CDS markets.
- **SESSION 12: Review**
 - LECTURE: 02h00
 - Review of main concepts, preparation for the final exam and Q&A session.

CODE: Tbc
Course title: BLOCKCHAIN AND CRYPTOFINANCE
Term: SPRING

Teaching hours: 24 hours
Number of credits: 3
Teaching language: ☒English ☐French
Course leader:
Speakers: Aristogenis Lazos

≡ **COURSE DESCRIPTION**

This course is for students wishing to explore blockchain technology's potential use – by entrepreneurs and incumbents – to change the world of money and finance. The course begins with a review of Bitcoin and an understanding of the commercial, technical, and public policy fundamentals of blockchain technology, distributed ledgers, and smart contracts. The class then continues on to current and potential blockchain applications in the financial sector.

≡ **COURSE OBJECTIVES**

This module aims to equip students with the tools to:

- Explore blockchain technology's potential use to change the world of money and finance
- Gain knowledge of the technology's initial application, the cryptocurrency Bitcoin
- Gain an understanding of the commercial, technical and public policy fundamentals of blockchain technology, distributed ledgers and smart contracts in both open sourced and private applications
- Gain a comprehensive understanding of potential use cases for payment systems, central banking, venture capital, secondary market trading, trade finance, commercial banking, post trade possessing and digital ID
- Learn current and potential blockchain applications in the financial sector
- Explore the markets and regulatory landscape for cryptocurrencies, initial coin offerings, other tokens and crypto derivatives

≡ **COMPETENCES VISEES /LEARNING GOALS**

Conduct empirical analysis
Make use of critical analysis/critical thinking skills
Formulate a personal and well-informed opinion
Cooperation with classmates
Work effectively in a team
Contribute to the development of a collective production (group project)

≡ **TACKLED CONCEPTS**

Blockchain, cryptography, money fundamentals, cryptocurrencies, crypto-exchanges, crypto-exchanges and payments, primary markets, ICOs, venture capital, trade finance and supply chain, central banks and commercial banking.

≡ **LEARNING METHODS**

The pedagogical approach is centred on inspiring and encouraging students to develop their critical thinking in order to make analytical decisions. Particular focus is devoted to the development of specific skills so that students are able to: i. Collect relevant information ii. Analyse and evaluate of complex setups iii. Make decisions under certain conditions.

The students will need to apply all the knowledge acquired at a collective level. There will be a group project where students will need to respond to a real world scenario. In order to do this effectively they will need to: i. Work effectively in a team ii. Assess, evaluate, communicate and interact with.

≡ **ASSIGNMENTS AND EXPECTED WORK**

The class consists of (Homework/Exercises/readings asked to students to prepare the session or in-class exercises)

Exercises: Every lecture is complemented by in-class exercises. Additional exercises are prepared by students (as homework) and are discussed in the class during the tutorial sessions.

Readings: In addition to the designated book chapters, these include published academic papers and articles from the business and financial press.

Group assignment: This assignment provides an opportunity for students to demonstrate their understanding of the key concepts and material covered in the course, such as the application of finance knowledge, data work, and research skills. Based on the theories taught in the class, the assignment requires the effective cooperation of students for the completion of a collective report.

Final exam: The final exam provides students with the opportunity to demonstrate their understanding of the material covered in the entire unit of study. All topics are potentially examinable in the final exam.

≡ **BIBLIOGRAPHY – COURSE MATERIAL**

Bitcoin, Blockchain, and Cryptoassets. A Comprehensive Introduction. Fabian Schär and Aleksander Berentsen.

Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, Steven Goldfeder. 1st edition, Princeton University Press.

≡ **EVALUATION METHODS**

Exam: 50%

Continuous assessment: 50%

≡ **SESSIONS**

- **SESSION 1: Introduction**
 - LECTURE: 02h00
 - General information about the class, the format, the evaluation methods (assignment and final exam). Introduction of fundamental concepts that are relevant for the subsequent lectures.
- **SESSION 2: Blockchain and money fundamentals I**
 - LECTURE: 02h00
 - Money, ledgers, bitcoin.
- **SESSION 3: Blockchain and money fundamentals II**
 - LECTURE: 02h00
 - Blockchain basics and cryptography.
- **SESSION 4: Blockchain and money fundamentals III**
 - LECTURE: 02h00
 - Blockchain basics and consensus, blockchain basics and transactions.
- **SESSION 5: Blockchain and money fundamentals IV**
 - LECTURE: 02h00

- Blockchain smart contracts and DApps, technical challenges.
- **SESSION 6: Blockchain and money fundamentals V**
 - LECTURE: 02h00
 - Public policy, Financial system challenges and opportunities.
- **SESSION 7: Blockchain economics**
 - LECTURE: 02h00
 - Assessing use cases.
- **SESSION 8: Payments**
 - LECTURE: 02h00
 - Payments, central banks, commercial banking.
- **SESSION 9: Financial sector use cases I**
 - LECTURE: 02h00
 - Secondary markets and crypto-exchanges, crypto-exchanges and payments.
- **SESSION 10: Financial sector use cases II**
 - LECTURE: 02h00
 - Primary Markets, ICOs, venture capital.
- **SESSION 11: Financial sector use cases III**
 - LECTURE: 02h00
 - Trade finance and supply chain, digital ID.
- **SESSION 12: Review**
 - LECTURE: 02h00
 - Review of main concepts, preparation for the final exam and Q&A session.

CODE: Tbc
Course title: FINANCIAL ENGINEERING
Term: SPRING

Teaching hours: 24 hours
Number of credits: 3
Teaching language: ☒English ☐French
Course leader:
Speakers: Elias Demetriades

≡ **COURSE DESCRIPTION**

This course studies the fundamentals of innovations financial engineering. This course is consisting of three basic interlocking conceptual "rings": valuation theory, numerical methods, and statistical/econometric methods. This course will examine each in detail. The course explores the major valuation techniques—PDE techniques and martingale methods in a variety of different contexts including equity option, currency option, fixed income derivative, exotic derivative, and stochastic volatility models. This analysis will be built on an extended introduction to basic stochastic calculus.

≡ **COURSE OBJECTIVES**

After the end of this course, students should be able to:

- Understand the main tools of financial engineering
- Implement PDE and martingale models using numerical methods—PDE solvers and Monte Carlo techniques
- Utilize basic statistical and econometric techniques to evaluate and validate models

≡ **COMPETENCES VISEES /LEARNING GOALS**

Conduct empirical analysis
Make use of critical analysis/critical thinking skills
Formulate a personal and well-informed opinion
Cooperation with classmates
Work effectively in a team
Contribute to the development of a collective production (group project)

≡ **TACKLED CONCEPTS**

Derivatives, PDE methods, Black-Scholes model, Ito's Lemma, finite difference solutions, martingale methods, Girsanov theorem, numeraires, Kolmogorov theorem, Feynman Kac theorem, numerical implementation using explicit integration, numerical integration Monte Carlo, stochastic volatility and jumps, diffusion models.

≡ **LEARNING METHODS**

The pedagogical approach is centred on inspiring and encouraging students to develop their critical thinking in order to make analytical decisions. Particular focus is devoted to the development of specific skills so that students are able to: i. Collect relevant information ii. Analyse and evaluate of complex setups iii. Make decisions under certain conditions.

The students will need to apply all the knowledge acquired at a collective level. There will be a group project where students will need to respond to a real world scenario. In order to do this effectively they will need to: i. Work effectively in a team ii. Assess, evaluate, communicate and interact with.

≡ **ASSIGNMENTS AND EXPECTED WORK**

The class consists of (Homework/Exercises/readings asked to students to prepare the session or in-class exercises)

Exercises: Every lecture is complemented by in-class exercises. Additional exercises are prepared by students (as homework) and are discussed in the class during the tutorial sessions.

Readings: In addition to the designated book chapters, these include published academic papers and articles from the business and financial press.

Group assignment: This assignment provides an opportunity for students to demonstrate their understanding of the key concepts and material covered in the course, such as the application of finance knowledge, data work, and research skills. Based on the theories taught in the class, the assignment requires the effective cooperation of students for the completion of a collective report.

Final exam: The final exam provides students with the opportunity to demonstrate their understanding of the material covered in the entire unit of study. All topics are potentially examinable in the final exam.

≡ **BIBLIOGRAPHY – COURSE MATERIAL**

Finite Difference Methods for Financial Engineering. Daniel Duffy. Wiley Finance.

≡ **EVALUATION METHODS**

Exam: 50%

Continuous assessment: 50%

≡ **SESSIONS**

- **SESSION 1: Introduction**
 - LECTURE: 02h00
 - General information about the class, the format, the evaluation methods (assignment and final exam). Introduction of fundamental financial concepts that are relevant for the subsequent lectures.
- **SESSION 2: Overview of derivatives**
 - LECTURE: 02h00
 - Basic review of derivatives, derivative rules, differentiation, limits, asymptotes, velocity and other rates of change.
- **SESSION 3: Stochastic calculus**
 - LECTURE: 02h00
 - Review of mathematics, introduction to stochastic calculus, stochastic processes, Brownian motion, filtration.
- **SESSION 4: PDEs I**
 - LECTURE: 02h00
 - Basic partial differential equation (PDE) methods, derivative valuation in the Style of Black-Scholes-Merton, Ito's Lemma.
- **SESSION 5: PDEs II**
 - LECTURE: 02h00
 - PDE Methods when the underlying asset is not traded.
- **SESSION 6: PDEs III**
 - LECTURE: 02h00
 - Implementing PDE models, pricing models, dynamic models.
- **SESSION 7: Finite difference methods**

- LECTURE: 02h00
- Finite difference solutions to models with more than one state variable.

- **SESSION 8: Martingales I**
 - LECTURE: 02h00
 - Martingale methods: The Girsanov theorem, numeraires.

- **SESSION 9: Martingales II**
 - LECTURE: 02h00
 - Martingale methods: The Kolmogorov and Feynman-Kac theorems.

- **SESSION 10: Martingales III**
 - LECTURE: 02h00
 - Martingale methods: Numerical implementation using explicit integration, numerical integration Monte Carlo.

- **SESSION 11: Stochastic volatility**
 - LECTURE: 02h00
 - Stochastic volatility and jumps, diffusion models.

- **SESSION 12: Review**
 - LECTURE: 02h00
 - Review of main concepts, preparation for the final exam and Q&A session

Course title: GREEN ENERGY FINANCE

Teaching hours: 24 hours

Number of credits: 3

Teaching language: ☒English

COURSE DESCRIPTION

The Paris Agreement aims at “making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development” (Article 2 c of the Paris Agreement). This ambition requires a significant increase in funding – with new instruments and approaches required to mobilize a broad range of investors and to achieve scalability in financing climate action.

Through this course, students will explore the fundamentals of renewable energy (RE) and energy efficiency (EE) financing dimensions.

Course title: Collaborate and manage across cultures

Teaching hours: 24 hours

Number of credits: 3

Teaching language: ☒English

COURSE DESCRIPTION

Cultures surround and permeate organizations of all types and forms. International managers therefore need to navigate across national, organizational, industrial, and occupational cultures and create efficient work environment with satisfied multicultural teams.

This advanced course helps students learn how to collaborate in multicultural environment, how to build efficient and satisfied multicultural teams, how to communicate in multicultural settings and how to manage across cultures. We study the cultural dimensions as learned stereotypes and collective values, emic and etic approach, high and low context and other differences in communication across cultures, perception and taking decisions across cultures, steps of building multicultural teams, leadership postures across the cultures, etc. Going beyond gaining knowledge, thanks to coaching techniques, students are invited to reflect on their own views and experience and to get trained on the above subjects.