

## Risk Management

Academic Year: ( 2023 / 2024 )

Review date: 26-09-2023

Department assigned to the subject: Business Administration Department

Coordinating teacher: MAYORAL BLAYA, SILVIA

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 2

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Students should have passed Derivatives, Financial Markets and Fixed Income courses.

Professor: Marcos de Castro Riesco - Senior Advisor Freelance.

## OBJECTIVES

This course introduces the different types of risk financial entities face, with a special focus on market risk, and the guidelines that they follow to properly manage them.

Students will learn different hedging techniques and assess the market risk of a portfolio with the traditional measures used in the industry (Value at Risk and Expected Shortfall), understanding their differences and limitations and testing their accuracy through backtesting analysis.

In addition to managing the risk of a portfolio, the course provides an overview of how the structural risk is managed in financial entities

Finally and given the increasingly important role of regulators in the banking industry, the course summarizes the current European regulatory framework.

## DESCRIPTION OF CONTENTS: PROGRAMME

## 1 Quantitative Analysis

Overview of continuous probability Distribution. Uniform, Normal and Log-Normal

Simulation Techniques:

Random Numbers generation

Variable Simulation

Correlated variables simulation

Modeling dependence: correlations and copulas

Overview of Equity and FX option valuation Model: Black Scholes

Term structure models of interest rates: Hull-White Model

## 2-Introduction to Risk Management

Types of Risk

Measurement and management tools

Risk governance and corporate governance

## 3-Hedging Risks

Introduction

Option Greeks and Hedging Strategies

Hedging Strategies with Derivatives

## 4-Market Risk I

Introduction

Measure at Risk

- VaR

- ES

- Coherent risk measure

-Extreme Value Theory (EVT)

## 5- Market Risk II

Methodologies

- Analytical

- Historical Simulation

- Monte Carlo Simulation  
Strengths and Limitations

6- Market Risk III  
Backtesting  
Stress Testing  
Regulatory Framework: FRTB

7- Balance Sheet Management  
Liquidity Risk  
Calculation Methods  
Risk Monitoring and Stress Test

#### LEARNING ACTIVITIES AND METHODOLOGY

Theoretical concepts will be presented using slides that will be available before each lecture. To be consistent with GARP rules for the FRM exams, students must demonstrate their ability to solve problems and exercises by using just a calculator in both the mid-term and the final exam. In addition, students will solve two different assignments in Excel and Matlab in which they will have to calculate some risk metrics of a portfolio of assets (VaR, ES) using real data.

#### ASSESSMENT SYSTEM

The grade will be based on a closed-book final exam (50%) and on coursework (50%). To pass the course, students must hand in the coursework and get a minimum grade of 4 out of 10 in the final exam.

- % end-of-term-examination: 50%
- % continuous assessment (several assignments): 50%

Students that do not meet the minimum passing grade should retake the subject. If the resit is taken, the above grade criteria also apply

<b>% end-of-term-examination:</b>	50
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	50

#### BASIC BIBLIOGRAPHY

- John C. Hull Options, futures, and other derivatives, Prentice Hall , 2012
- Philippe Jorion Financial Risk Manager Handbook, Wiley Finance, 2009

#### ADDITIONAL BIBLIOGRAPHY

- Kevin Dowd Measuring Market Risk., West Sussex, UK: John Wiley & Sons., 2005
- Linda Allen, Jacob Boudoukh and Anthony Saunders Understanding Market, Credit and Operational Risk: The Value at Risk Approach., New York, NY: Wiley-Blackwell, 2004
- Philippe Jorion Value at Risk. The New Benchmark for Managing Financial Risk, McGraw-Hill, 2007