

**MASTERCLASS****Interest Rate Instruments: Risk Measurement and Control****GENERAL PRINCIPLES**

- Programme combining online and in-class training
- Programme in **7 phases**. The first **6 phases** alternate:
  - . **1<sup>st</sup> stage of individual work preceding the seminar** in the form of self-assessment quizzes, online consultations of technical sheets and e-learning modules
  - . **One-day course:** revisions, lectures and case studies
  - . **2<sup>nd</sup> stage of individual work post-seminar:** quizzes, case studies and exercises in EXCEL™ (accessible online after the seminar)
  - . **Phase 7** consists in bestowing a **FIRST FINANCE certificate** to delegates who have successfully completed the programme. Trainees may take the evaluation tests more than once. What is important is that the knowledge be truly acquired.
- This programme is linear. Delegates will have to follow the phases in their sequential order.

**EDUCATIONAL HIGHLIGHTS**

- Anchor knowledge and skills using:
  - . an appropriate rhythm of preparation, training and practice
  - . an alternated use of educational methods: e-learning, small group size, exercises in EXCEL™, case studies, simulations, MCQ
- Gain state-of-the-art practical skills
- Validation via tests and an official FIRST FINANCE certificate

**DURATION**

**60 hours** of training over a **6-month period**

- . Individual work + tests: **18 hours**
- . Seminars: **6 days x 7 hours = 42 hours**

Phases may be removed from the programme if desired.  
Simply ask one of our Training Consultants.

**SYNOPSIS**

TYPE OF TRAINING	TOPICS	DURATION
<b>PHASE 1: Technical fundamentals of sensitivities of non-option interest rate instruments</b>		
Quiz	Self-assessment	20 min
E-learning + quiz	Bond markets	60 min
Pre-reading	Index bonds	20 min
E-learning + Pre-reading	FRAs, short-term futures, IRSs, CIRs and non-option interest rate products	75 min
Seminar	Technical fundamentals and sensitivities of non-option interest rate instruments	1 day
Summary quiz		30 min
Exercise 1	Calculating a bond's price, sensitivity and duration	30 min
Exercise 2	Using sensitivity to analyse swap strategies	30 min
<b>PHASE 2: Risk factors and sensitivities of interest rate options</b>		
Quiz	Self-assessment	15 min
Pre-reading	Exotic interest rate options	40 min
Pre-reading	Quanto swaps, Constant Maturity Swaps (CMS), Libor-in-arrears swaps	30 min
Seminar	Risk factors and sensitivity of interest rate options	1 day
Summary quiz		30 min
Exercises	Analysing risk in function of the Greeks	30 min
<b>PHASE 3: Value-at-Risk (VaR)</b>		
Quiz	Self-assessment	15 min
Pre-reading	Value-at-Risk techniques	45 min
Pre-reading	Riskmetrics cash flow mapping	45 min
Seminar	VALUE at RISK (VaR)	1 day
Summary quiz		30 min
Exercises	VaR calculations on non-option instruments	60 min
<b>PHASE 4: Plain vanilla and exotic option position risks and stress scenarios</b>		
Quiz	Self-assessment	15 min
Pre-reading	VaR delta, gamma and vega	40 min
Seminar	Plain vanilla and exotic option position risks and stress scenarios	1 day
Summary quiz		30 min
Exercise	Calculation and analysis of option VaR and stress scenarios	60 min
<b>PHASE 5: Counterparty risk in market transactions and the Basel II Reform</b>		
Quiz	Self-assessment	15 min
Pre-reading	Counterparty risk in market transactions	40 min
Pre-reading	Basel II Reform and credit risk	45 min
Seminar	Counterparty risk in market transactions and the Basel II Reform	1 day
Summary quiz		30 min
Exercise	Comparison of risk profiles on positions and capital consumption calculations	45 min
<b>PHASE 6: Risk monitoring and control</b>		
Quiz	Self-assessment	15 min
Pre-reading	Internal risk monitoring and control	30 min
Pre-reading	Regulatory and supervisory standards	40 min
Seminar	Risk monitoring and control	1 day
Summary quiz		30 min
Exercise 1	In-depth verification using validation criteria	30 min
Exercise 2	Calibration of risk measurement/monitoring tools	40 min
<b>PHASE 7: Certification by FIRST FINANCE</b>		
Bestowal of FIRST FINANCE certificate to successful delegates		

**TOTAL: 60h00**



## MASTERCLASS OBJECTIVES

- Be able to identify all the risk factors of interest rate products and master key sensitivity parameters
- Master market Value-at-Risk, the various uses of stress scenarios and assess the counterparty risk involved in a market transaction
- Understand capital requirements and the Basel II Reform and grasp the economic potential of optimum internal risk management techniques
- Master cutting edge techniques for risk monitoring, control and driving on interest rate activities

## RECOMMENDED FOR:

- Middle office staff
- Internal control/audit
- Financial department staff

## COURSE OUTLINES

### Day 1

#### TECHNICAL FUNDAMENTALS AND SENSITIVITIES OF NON-OPTION INTEREST RATE INSTRUMENTS

- Introduction to risk typology
- Common techniques for assessing market risk
- Risk factors and sensitivity
- Risk indicators and potential loss
- Linear and non-linear positions
- Revision of Mark-to-Market valuation
- Discount coefficients and the zero-coupon curve
- Bond valuation and sensitivity
  - **Practical Workshop**
    - Price bonds and calculate sensitivities by maturity in EXCEL™
- FRAs and futures: valuation and sensitivity
  - **Exercises in EXCEL™**
    - Construct a forward rate curve
    - Calculate the sensitivity of a forward rate transaction
- IRS pricing and sensitivity
  - **Practical Workshop**
    - Elaborate a simplified swaps pricer in EXCEL™
    - Determine global sensitivities and sensitivities by maturity

### Day 2

#### RISK FACTORS AND SENSITIVITIES OF INTEREST RATE OPTIONS

- Option premium components
  - Graphical illustration of earnings at maturity of a call or put
  - Graphical illustration of an option premium
- Risk factors and sensitivity parameters (Greeks)
- Analysis of sensitivities in relation to underlyings, volatility, maturity and risk-free interest rates
  - **Practical Workshop**
    - Simulate expected results given by delta, gamma, vega and rho
- The Greeks: interdependencies
- Applications for futures options, caps, floors and swaptions
  - **Exercises in EXCEL™**
    - Construct a simplified options pricer and calculate profits and losses on positions and standard interest rate option portfolios
- CMS: pricing fundamentals and convexity

### Day 3

#### VALUE AT RISK (VaR)

- Risk measurement
- Revision of statistics (variance/covariance, standard deviation, correlation and matrices)
  - **Practical Workshop**
    - Statistical calculations in EXCEL™ and use of matrix results
- Estimating expected loss
- Advanced Value-at-Risk (VaR) techniques
  - VaR calculation methods
    - **Practical Workshop**
      - Perform simple VaR calculations based on real historical market prices
  - Advantages and disadvantages of historical VaR
  - Parametric VaR
    - Revision of statistical laws
      - **Practical Workshop**
        - Calculate a complete parametric VaR in EXCEL™
    - Advantages and disadvantages of parametric VaR
    - Monte Carlo VaR
      - **Practical Workshop**
        - Analyse an EXCEL™ spreadsheet on Monte Carlo VaR
  - Summary of position risk: RISKMETRICS™ example
  - Regulatory VaR
  - Using VaR for internal risk driving

### Day 4

#### PLAIN VANILLA AND EXOTIC OPTION POSITION RISKS AND STRESS SCENARIOS

- Risk monitoring for a plain vanilla options portfolio
- Choosing risk indicators
- Setting limits: achieving a coherent system of limits
- Analysis using sensitivities

### COURSE OUTLINES (cont.)

- Risk factors unaccounted for in the VaR (smile, etc.)
- Integrating an option's parameters into a VaR calculation

#### Practical Workshop

- . Using delta, gamma and vega VaRs

- Determining, calculating and analysing stress scenarios: which risk factors should be examined?
- Risk monitoring for an exotic options portfolio
- Exotic options (barriers, multiple underlyings, etc.)

#### Practical Workshop

- . Evaluate and analyse an exotic option book's risk

- Choosing risk indicators: are the indicators adaptable to these products or do the products have to be coherent with the other product lines?
- Specific issues: discontinuity risks, correlation risks, etc.
- An indication: favouring stress scenarios

#### Practical Workshop

- . Simulate stress scenarios, calculations and analysis

### Day 5

#### COUNTERPARTY RISK ON MARKET TRANSACTIONS AND THE BASEL II REFORM

- Counterparty risks on market transactions and credit risk
- Base techniques and operational aspects
- Typology of counterparty risks (credit risk, variation risk, settlement-delivery risk, issuer risk, etc.)

- . Measure counterparty risks: percentile exposure and average exposure

#### Practical Workshop

- . Calculate the risk profiles of an IRS using the Monte Carlo method

- Overview of objectives: framework of a customer's positions, determining a credit spread, calculating yield and economic capital, country risk
- Introduction to credit VaR (internal portfolio models) and capital requirements
- Introduction to the Basel II Reform

- Analysis of the solvency ratio and the Basel parameters for credit risk
  - . McDonough ratio calculations (Basel II capital requirements)
- Relation to credit VaR
- Generalisation to all contexts

### Day 6

#### RISK MONITORING AND CONTROL

- Risk drivers: operational process
- Analysing risk monitoring methods
- Revision of calibration procedures and monitoring for limits and stop losses (demand, instruction, extension, revision...)
- Behaviour after exceeding operational limits
- Determining the granularity of risk monitoring and degrees of consolidation
- Continuous integration of new instruments within a secured context
- Conditions necessary to monitor and control risks
  - . Commonly related fields and validation of cash flows
  - . Verification procedures and data coherency
- VaR production and control, add-ons and stress scenarios
  - . Standard VaR production reports: examples
- Regulatory requirements for validation criteria and internal models
  - . Analysis of standard auditing reports on Banking Commission requirement observance
- Back-testing and reporting procedures