F71QR Quantitative Risk Analysis

**COURSE DETAILS**

**Course Code:** F71QR  
**Full Course Title:** Quantitative Risk Analysis  
**SCQF Level:** 11  
**SCAF Credits:** 15  
**Available as Elective:** No

**DELIVERY LEVEL**

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**COURSE AIMS**

The aims of this course are:
- To provide a thorough grounding in the wide range of risks that a financial institution or other enterprise might be exposed to
- To provide an introduction to the statistical methods underpinning financial risk management
- To teach students the different methods of assessing financial risk
- To equip students with a variety of tools to tackle problems involving financial data

**LEARNING OUTCOMES – SUBJECT MASTERY**

On completion of this course the student should be able to:

- Demonstrate an understanding of the different reasons for measuring financial risk.
- Describe and apply the different measures of financial risk
- Define what is meant by a coherent measure of risk;
- Use appropriate statistical and computational methods to determine the fatness of the tails of returns data
- Describe and apply the main univariate and multivariate distributions to financial data
- Describe and apply the fundamental concepts and theorems in Extreme Value Theory (EVT)
- Describe how analysis of financial data using EVT differs from traditional statistical methods
- Describe and apply the main statistical methods in EVT to financial data
- Demonstrate how multivariate returns can be described using marginal distributions and copulas
- Describe and apply the main copulas
- Explain how the use of different copulas can affect the returns distribution on a portfolio containing two assets
- Demonstrate a good understanding of the different sources of credit risk and credit spreads
- Understand how ratings agencies assess risk
- Explain the risk management control cycle
- Describe the feedback loop in risk management
- Define what is meant by securitization and alternative risk transfer
- Describe different forms of risk transfer and their advantages

- Use appropriate statistical software to analyse problems involving financial risk
- Show an awareness of the different approaches to modelling and managing credit risk
F71QR Quantitative Risk Analysis

- Use an appropriate computer package to analyse financial data and solve complex problems

**LEARNING OUTCOMES – PERSONAL ABILITIES**

- Show an appreciation of the interface between academic theory and industrial practice
- Show an appreciation of the societal role of risk management in protecting the consumer and other stakeholders
- Demonstrate the ability to learn independently and as part of a group
- Manage time, work to deadlines and prioritise workloads
- Use an appropriate computer package to analyse financial data and solve complex problems
- Present results in a way that demonstrates that they have understood the technical and broader issues of financial risk management

**SYLLABUS**

**Introduction**
- The concept of Enterprise Risk Management, the drivers behind it and the resulting value to organisations
- Risk and uncertainty, different definitions
- Direct and indirect stakeholders in an enterprise: Relevance of risk measurement and management to all stakeholders
- Risk taxonomy and overlaps

**Quantitative Analysis of Financial Data**
- Quantifiable and non-quantifiable risks
- Common univariate distributions, model fitting and diagnostic tests
- Extreme value theory
- Common multivariate distributions
- Modelling multivariate risks using copulas
- Different measures of correlation including tail correlation
- Risk measures; coherent risk measures
- Model and parameter risk
- Backtesting

**Contagion and Credit Risk**
- Sources of credit risk; contagion
- Theoretical and commercial approaches to modelling credit risk

**Risk Management**
- Securitisation and alternative risk transfer
- The risk management control cycle
## COURSE RELATIONSHIPS

| N/A |

## LOCATION AND ASSESSMENT METHODS

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