



2020 FRM EXAM TRAINING SYLLABUS

PART I

Introduction to Financial Mathematics

1. Introduction to Financial Calculus
 - a. Variables – Discrete and Continuous
 - b. Univariate and Multivariate Functions – Dependent variable and Independent variable
 - c. Physical representation of a function
 - d. Linear and Non-Linear functions
 - e. Limits of a function
 - f. The number e and Natural Logarithm
 - g. Differential Calculus – Differentiation, Interpretation - Slope of a tangent, using derivatives to calculate function values and deltas. Linear functions - 1st order derivative. Non-linear functions – 1st and higher order derivatives, interpretations and usage. Rules of derivatives.
 - h. Functions – Differentiation and Taylor Series Expansion
 - i. Introduction to Partial Derivatives
 - j. Introduction to Integral Calculus
2. Introduction to Bond Mathematics
 - a. Finance and the Time Value of Money
 - b. Concept of Zero Coupon (Discount) Bonds and Coupon Bonds.
 - c. Bond Characteristics
 - d. Bond Types – Fixed Rate, Floating Rate, Inverse Floater Rate, etc.
 - e. Interest Rates – Discrete and Continuous Compounding
 - f. Bond Pricing – using ZCYC or YTM with discrete compounding or continuous compounding
 - g. Difference between bond coupon rate and bond yield
 - h. Calculating Bond Yield (YTM, CY, MMY, ZCY/Spot, Par Yield, etc.)
 - i. Price Yield Relationship

Introduction to Financial Statistics

1. Introduction to Financial Statistics
 - a. Frequency distributions
 - b. Measures of Central Tendency/Location (Mean/Mode/Median)
 - c. Dispersion, Measures of Dispersion (Variance/SD/Quartiles/Percentiles/Ranges) and its relevance to Risk Management
 - d. Correlations
 2. Introduction to Probability Theory
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- a. Random variables
- b. Probability and its uses
- c. Probability Rules
- d. Conditional Probabilities
- e. Probability Distributions (Single Variable)
 - i. Continuous Time/Discrete Time; Continuous Value/ Discrete Value
 - ii. Probability Mass Function
 - iii. Probability Density Function
 - iv. Cumulative Distribution Function
 - v. Applications and relevance in Risk Management
- f. Mathematical Expectation
- g. Moments of Distribution (Mean, Variance, Skewness, Kurtosis), Central Moments, Standardized Moments

Quantitative Analysis

1. Discrete and continuous probability distributions
2. Estimating the parameters of distributions
3. Population and sample statistics
4. Bayesian analysis
5. Statistical inference and hypothesis testing
6. Estimating correlation and volatility using EWMA and GARCH models
7. Volatility term structures
8. Correlations and copulas
9. Linear regression with single and multiple regressors
10. Time series analysis and forecasting
11. Simulation methods

Foundations of Risk Management

1. Basic risk types, measurement and management tools
 2. Creating value with risk management
 3. Risk governance and corporate governance
 4. Credit risk transfer mechanisms
 5. The Capital Asset Pricing Model (CAPM)
 6. Risk-adjusted performance measurement
 7. Multifactor models
 8. Data aggregation and risk reporting
 9. Financial disasters and risk management failures
 10. Ethics and the GARP Code of Conduct
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Financial Markets and Products

1. Structures and functions of financial institutions
2. Structure and mechanics of OTC and exchange markets
3. Structure, mechanics, and valuation of forwards, futures, swaps, and options
4. Hedging with derivatives
5. Interest rates and measures of interest rate sensitivity
6. Foreign exchange risk
7. Corporate bonds
8. Mortgage-backed securities

Valuation and Risk Modeling

1. Value-at-Risk (VaR)
 2. Expected shortfall (ES)
 3. Measuring volatility
 4. Economic and regulatory capital
 5. Stress testing and scenario analysis
 6. Option valuation
 7. Fixed income valuation
 8. Hedging
 9. Country and sovereign risk models and management
 10. External and internal credit ratings
 11. Expected and unexpected losses
 12. Operational risk
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PART II

Market Risk Measurement and Management

1. VaR and other risk measures
 - a. Parametric and non-parametric methods of estimation
 - b. VaR mapping
 - c. Backtesting VaR
 - d. Expected shortfall (ES) and other coherent risk measures
 - e. Extreme Value Theory (EVT)
2. Modeling dependence: Correlations and copulas
3. Term structure models of interest rates
4. Volatility: Smiles and term structures
5. Fundamental Review of the Trading Book

Credit Risk Measurement and Management

1. Credit analysis
2. Default risk: Quantitative methodologies
3. Expected and unexpected loss
4. Credit VaR
5. Counterparty risk
6. Credit derivatives
7. Structured finance and securitization

Operational Risk and Resiliency

1. Principles for sound operational risk management
 2. Risk appetite frameworks and enterprise risk management (ERM)
 3. Risk culture and conduct
 4. Analyzing and reporting operational loss data
 5. Model risk and model validation
 6. Risk-adjusted return on capital (RAROC)
 7. Economic capital frameworks and capital planning
 8. Stress testing banks
 9. Third-party outsourcing risk
 10. Risks related to money laundering and financing of terrorism
 11. Regulation and the Basel Accords
 12. Cyber risk and cyber-resilience
 13. Operational resilience
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Liquidity and Treasury Risk Measurement and Management

1. Liquidity risk principles and metrics
2. Liquidity portfolio management
3. Cash-flow modeling, liquidity stress testing, and reporting
4. Contingency funding plan
5. Funding models
6. Funds transfer pricing
7. Cross-currency funding
8. Balance sheet management
9. Asset liquidity

Risk Management and Investment Management

1. Factor theory
2. Portfolio construction
3. Portfolio risk measures
4. Risk budgeting
5. Risk monitoring and performance measurement
6. Portfolio-based performance analysis
7. Hedge funds

Current Issues In Financial Markets

1. Blockchain
 2. Fintech revolution
 3. Artificial intelligence (AI), machine learning and “big data”
 4. Climate change and financial risk
 5. Reference rates
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