FRM P2 | Syllabus | 2024

Subjects

Reading No.	Subject	Chapters	LOS		Weightage	No. of Questions
			Average	Total		
1	Market Risk	16	6	96	20%	16
2	Credit Risk	23	9	198	20%	16
3	Operational Risk	24	4	99	20%	16
4	Liquidity Risk	19	4	76	15%	12
5	Investment Risk	11	7	79	15%	12
6	Current Issues	10	4	44	10%	8
	TOTAL	**103**	**34**	**592**	**100%**	**80**

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Chapters

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	4	Backtesting VaR	6
	5	VaR Mapping	7
	6	Basel Committee on Banking Supervision	6
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	35	Central Clearing	10
	36	Future Value and Exposure	9
	37	CVA	17
	38	The Evolution of Stress Testing Counterparty Exposures	8
	39	An Introduction to Securitisation	8
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	41	Risk Governance	4
	42	Risk Identification	4
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	44	Risk Mitigation	7
	45	Risk Reporting	4
	46	Integrated Risk Management	4
	47	Cyber-resilience-Range of practices	5
	48	Case Study-Cyberthreats and Information Security Risks	2
	49	Sound Management of Risks related to Money Laundering and Financing of Terrorism	3
	50	Case Study-Financial Crime and Fraud	2
	51	Guidance on Managing Outsourcing Risk	3
	52	Case Study-Third-Party Risk Management	2

Subject	Reading No 2024	Reading Name	No. of LOS
Operational Risk	53	Case Study-Investor Protection and Compliance Risks in Investment Activities	2
	54	Supervisory Guidance on Model Risk Management	4
	55	Case Study-Model Risk and Model Validation	3
	56	Stress Testing Banks	3
	57	Risk Capital Attribution and Risk-Adjusted Performance Measurement	8
	58	Range of practices and issues in economic capital frameworks	4
	59	Capital Planning at Large Bank Holding Companies-Supervisory Expectations and Range of Current Practice	2
	60	Capital Regulation Before the Global Financial Crisis	8
	61	Solvency, Liquidity, and Other Regulation After the Global Financial Crisis	8
	62	High-level summary of Basel III reforms	3
	63	Basel III-Finalising post-crisis reforms	3
Liquidity Risk	64	Liquidity Risk	4
	65	Liquidity and Leverage	7
	66	Early Warning Indicators	3
	67	The Investment Function in Financial-Services Management	3
	68	Liquidity and Reserves Management-Strategies and Policies	5
	69	Intraday Liquidity Risk Management	3
	70	Monitoring Liquidity	5
	71	The Failure Mechanics of Dealer Banks	3
	72	Liquidity Stress Testing	3
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	74	Contingency Funding Planning	3
	75	Managing and Pricing Deposit Services	3
	76	Managing Non-deposit Liabilities	4
	77	Repurchase Agreements and Financing	7
	78	Liquidity Transfer Pricing-A Guide to Better Practice	4
	79	The US Dollar Shortage in Global Banking and the International Policy Response	3
	80	Covered Interest Parity Lost-Understanding the Cross-Currency Basis	3
	81	Risk Management for Changing Interest Rates-Asset-Liability Management and Duration Techniques	4
	82	Illiquid Assets	6
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	86	Portfolio Construction	9
	87	Portfolio Risk-Analytical Methods	5
	88	VaR and Risk Budgeting in Investment Management	8
	89	Risk Monitoring and Performance Measurement	10
	90	Portfolio Performance Evaluation	9
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	92	Performing Due Diligence on Specific Managers and Funds	7
	93	Predicting Fraud by Investment Managers	3
Current Issues	94	Review of the Federal Reserves Supervision and Regulation of Silicon Valley Bank	6
	95	The Credit Suisse CoCo Wipeout-Facts, Misperceptions, and Lessons for Financial Regulation	4
	96	Artificial Intelligence and Bank Supervision	4
	97	Financial Risk Management and Explainable, Trustworthy, Responsible AI	5
	98	Artificial Intelligence Risk Management Framework	5
	99	Climate-related risk drivers and their transmission channels	4
	100	Climate-related financial risks-measurement methodologies	6
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Learning Outcome

Reading No.	Reading Name	LOS	Learning Outcome
			Market Risk
1	Estimating Market Risk Measures: An Introduction and Overview	a	Estimate VaR using a historical simulation approach.
		b	Estimate VaR using a parametric approach for both normal and lognormal return distributions.
		c	Estimate the expected shortfall given profit and loss (P&L) or return data
		d	Estimate risk measures by estimating quantiles.
		e	Evaluate estimators of risk measures by estimating their standard errors.
		f	Interpret quantile-quantile (QQ) plots to identify the characteristics of a distribution.
2	Non-parametric Approaches	a	Apply the bootstrap historical simulation approach to estimate coherent risk measures.
		b	Describe historical simulation using non-parametric density estimation.
		c	Compare and contrast the age-weighted, the volatility-weighted, the correlation-weighted, and the filtered historical simulation approaches
		d	Identify advantages and disadvantages of non-parametric estimation methods.
3	Parametric Approaches (II): Extreme Value	a	Explain the importance and challenges of extreme values in risk management.
		b	Describe extreme value theory (EVT) and its use in risk management.
		c	Describe the peaks-over-threshold (POT) approach
		d	Compare and contrast the generalized extreme value (GEV) and POT approaches to estimating extreme risks
		e	Discuss the application of the generalized Pareto (GP) distribution in the POT approach.
		f	Explain the multivariate EVT for risk management.
4	Backtesting VaR	a	Describe backtesting and exceptions and explain the importance of backtesting VaR models.
		b	Explain the significant difficulties in backtesting a VaR model.
		c	Verify a model based on exceptions or failure rates.
		d	Identify and describe Type I and Type II errors in the context of a backtesting process.
		e	Explain the need to consider conditional coverage in the backtesting framework.
		f	Describe the Basel rules for backtesting.
5	VaR Mapping	a	Explain the principles underlying VaR mapping and describe the mapping process.
		b	Explain and demonstrate how the mapping process captures general and specific risks.
		c	Differentiate among the three methods for mapping portfolios of fixed-income securities
		d	Summarize how to map a fixed-income portfolio into positions of standard instruments
		e	Describe how mapping of risk factors can support stress testing.
		f	Explain how VaR can be computed and used relative to a performance benchmark.
		g	Describe the method of mapping forwards, forward rate agreements, interest rate swaps, and options
6	Basel Committee on Banking Supervision	a	Explain the following lessons on VaR implementation: time horizon over which VaR is estimated, the recognition of time-varying volatility in VaR risk factors, and VaR backtesting
		b	Describe exogenous and endogenous liquidity risk and explain how they might be integrated into VaR models.
		c	Compare VaR, expected shortfall, and other relevant risk measures.
		d	Compare unified and compartmentalized risk measurement.
		e	Compare the results of research on top-down and bottom-up risk aggregation methods.
		f	Describe the relationship between leverage, market value of asset, and VaR within an active balance sheet management framework.
7	Correlation Basics: Definitions, Applications, and Terminology	a	Describe financial correlation risk and the areas in which it appears in finance.
		b	Explain how correlation contributed to the global financial crisis of 2007-2009.
		c	Describe how correlation impacts the price of quanto options as well as other multi-asset exotic options
		d	Describe the structure, uses, and payoffs of a correlation swap.
		e	Estimate the impact of different correlations between assets in the trading book on the VaR capital charge.
		f	Explain the role of correlation risk in market risk and credit risk.
		g	Relate correlation risk to systemic and concentration risk.

Reading No.	Reading Name	LOS	Learning Outcome
8	Empirical Properties of Correlation- How Do Correlations Behave in the Real World	a	Describe how equity correlations and correlation volatilities behave throughout various economic states.
		b	Calculate a mean reversion rate using standard regression and calculate the corresponding autocorrelation.
		c	Identify the best-fit distribution for equity, bond, and default correlations.
9	Financial Correlation Modeling- Bottom-Up Approaches	a	Explain the purpose of copula functions and how they are applied in finance.
		b	Describe the Gaussian copula and explain how to use it to derive the joint probability of default of two assets.
		c	Summarize the process of finding the default time of an asset correlated to all other assets in a portfolio using the Gaussian copula.
10	Empirical Approaches to Risk Metrics and Hedging	a	Explain the drawbacks to using a DV01-neutral hedge for a bond position
		b	Describe a regression hedge and explain how it can improve a standard DV01-neutral hedge.
		c	Calculate the regression hedge adjustment factor, beta
		d	Calculate the face value of an offsetting position needed to carry out a regression hedge.
		e	Calculate the face value of multiple offsetting swap positions needed to carry out a two-variable regression hedge.
		f	Compare and contrast level and change regressions.
		g	Describe principal component analysis and explain how it is applied to constructing a hedging portfolio.
11	The Science of Term Structure Models	a	Calculate the expected discounted value of a zero-coupon security using a binomial tree
		b	Construct and apply an arbitrage argument to price a call option on a zero-coupon security using replicating portfolios.
		c	Define risk-neutral pricing and apply it to option pricing.
		d	Distinguish between true and risk-neutral probabilities and apply this difference to interest rate drift
		e	Explain how the principles of arbitrage pricing of derivatives on fixed-income securities can be extended over multiple periods
		f	Define option-adjusted spread (OAS) and apply it to security pricing.
		g	Describe the rationale behind the use of recombining trees in option pricing.
		h	Calculate the value of a constant-maturity Treasury swap, given an interest rate tree and the risk-neutral probabilities
		i	Evaluate the advantages and disadvantages of reducing the size of the time steps on the pricing of derivatives on fixed-income securities.
		j	Evaluate the appropriateness of the Black-Scholes-Merton model when valuing derivatives on fixed-income securities
12	The Evolution of Short Rates and the Shape of the Term Structure	a	Explain the role of interest rate expectations in determining the shape of the term structure
		b	Apply a risk-neutral interest rate tree to assess the effect of volatility on the shape of the term structure.
		c	Estimate the convexity effect using Jensen's inequality.
		d	Evaluate the impact of changes in maturity, yield, and volatility on the convexity of a security
		e	Calculate the price and return of a zero-coupon bond incorporating a risk premium.
13	The Art of Term Structure Models: Drift	a	Construct and describe the effectiveness of a short-term interest rate tree assuming normally distributed rates, both with and without drift.
		b	Calculate the short-term rate change and standard deviation of the rate change using a model with normally distributed rates and no drift.
		c	Describe methods for addressing the possibility of negative short-term rates in term structure models.
		d	Construct a short-term rate tree under the Ho-Lee Model with time-dependent drift.
		e	Describe uses and benefits of the arbitrage-free models and assess the issue of fitting models to market prices.
		f	Describe the process of constructing a simple and recombining tree for a short-term rate under the Vasicek Model with mean reversion.
		g	Calculate the Vasicek Model rate change, standard deviation of the rate change, expected rate in T years, and half-life.
		h	Describe the effectiveness of the Vasicek Model.

Reading No.	Reading Name	LOS	Learning Outcome
14	The Art of Term Structure Models: Volatility and Distribution	a	Describe the short-term rate process under a model with time-dependent volatility
		b	Calculate the short-term rate change and determine the behavior of the standard deviation of the rate change using a model with time-dependent volatility.
		c	Assess the efficacy of time-dependent volatility models.
		d	Describe the short-term rate process under the Cox-Ingersoll-Ross (CIR) and lognormal models.
		e	Calculate the short-term rate change and describe the basis point volatility using the CIR and lognormal models.
		f	Describe lognormal models with deterministic drift and mean reversion.
15	Volatility Smiles	a	Describe a volatility smile and volatility skew.
		b	Explain the implications of put-call parity on the implied volatility of call and put options.
		c	Compare the shape of the volatility smile (or skew) to the shape of the implied distribution of the underlying asset price and to the pricing of options on the underlying asset
		d	Describe characteristics of foreign exchange rate distributions and their implications on option prices and implied volatility
		e	Describe the volatility smile for equity options and foreign currency options and provide possible explanations for its shape
		f	Describe alternative ways of characterizing the volatility smile.
		g	Describe volatility term structures and volatility surfaces and how they may be used to price options.
		h	Explain the impact of the volatility smile on the calculation of an option's Greek letter risk measures.
		i	Explain the impact of a single asset price jump on a volatility smile.
16	Fundamental Review of the Trading Book	a	Describe the changes to the Basel framework for calculating market risk capital under the Fundamental Review of the Trading Book (FRTB) and the motivations for these changes.
		b	Compare the various liquidity horizons proposed by the FRTB for different asset classes and explain how a bank can calculate its expected shortfall using the various horizons.
		c	Explain the FRTB revisions to Basel regulations in the following areas: - Classification of positions in the trading book compared to the banking book - Backtesting, profit and loss attribution, credit risk, and securitizations
Credit Risk			
17	Fundamentals of Credit Risk	a	Define credit risk and explain how it arises using examples
		b	Explain the distinctions between insolvency, default, and bankruptcy
		c	Identify and describe transactions that generate credit risk
		d	Describe the entities that are exposed to credit risk and explain circumstances under which exposure occurs
		e	Discuss the motivations for managing or taking on credit risk
18	Governance	a	Define risk management responsibilities in an organization and explain the three lines of defense framework for effective risk management and control
		b	Explain the processes that lead to risk taking including credit origination, credit risk assessment, and credit approval processes
		c	Discuss the following key principles underlying best practice for the governance system of credit risk: Guidelines, Skills, Limits, and Oversight
		d	Describe the most common parameters of a credit-sensitive transaction
		e	Describe the roles of the credit committee in an organization
19	Credit Risk Management	a	Describe key elements of an effective lending or financing policy
		b	Explain the importance and challenges of setting exposure and concentration limits
		c	Describe the scope and allocation processes of a bank's credit facility and explain bank-specific policies and actions to reduce credit risk
		d	Discuss factors that should be considered during the credit asset classification process
		e	Describe and explain loan loss provisions and loan loss reserves
		f	Identify and explain the components of expected loss and distinguish between expected loss and unexpected loss
		g	Explain the requirements for estimating expected loss under IFRS 9
		h	Describe a workout procedure for loss assets and compare the following two approaches used to manage loss assets: retaining loss assets and writing off loss assets
		i	Explain the components of credit risk analysis
		j	Explain the components of credit risk management capacity, and outline key questions that the board of directors of a bank should ask

Reading No.	Reading Name	LOS	Learning Outcome
20	Capital Structure in Banks	a	Evaluate a bank's economic capital relative to its level of credit risk.
		b	Identify and describe important factors used to calculate economic capital for credit risk: probability of default, exposure, and loss rate
		c	Define and calculate expected loss (EL).
		d	Define and calculate unexpected loss (UL).
		e	Estimate the variance of default probability assuming a binomial distribution
		f	Calculate UL for a credit asset portfolio and the UL contribution of each asset under various scenarios of portfolio composition, asset characteristics and size
		g	Describe how economic capital is derived.
		h	Explain how the credit loss distribution is modeled.
		i	Describe challenges to quantifying credit risk.
21	Introduction to Credit Risk Modeling and Assessment	a	Explain the capital adequacy, asset quality, management, earnings, and liquidity (CAMEL) system used for evaluating the financial condition of a bank.
		b	Describe quantitative measurements and factors of credit risk, including probability of default, loss given default, exposure at default, expected loss, and time horizon.
		c	Estimate capital adequacy ratio of a financial institution
		d	Describe the judgmental approaches, empirical models, and financial models to predict default
		e	Apply the Merton model to calculate default probability and the distance to default and describe the limitations of using the Merton model.
		f	Compare and contrast different approaches to credit risk modeling, such as those related to the Merton model, Credit Risk Plus (CreditRisk+), CreditMetrics, and the Moody's-KMV model
		g	Apply risk-adjusted return on capital (RAROC) to measure the performance of a loan
22	Credit Scoring and Rating	a	Compare the credit scoring system to the credit rating system in assessing credit quality and describe the different types of each system
		b	Distinguish between through-the-cycle and point-in-time credit rating systems
		c	Describe the process for developing credit risk scoring and rating models
		d	Describe rating agencies' assignment methodologies for issue and issuer ratings, and identify the main criticisms of the credit rating agencies' ratings
23	Credit Scoring and Retail Credit Risk Management	a	Analyze the credit risks and other risks generated by retail banking
		b	Explain the differences between retail credit risk and corporate credit risk.
		c	Discuss the "dark side" of retail credit risk and the measures that attempt to address the problem.
		d	Define and describe credit risk scoring model types, key variables, and applications.
		e	Discuss the key variables in a mortgage credit assessment and describe the use of cutoff scores, default rates, and loss rates in a credit scoring model.
		f	Discuss the measurement and monitoring of a scorecard performance including the use of cumulative accuracy profile (CAP) and the accuracy ratio (AR) techniques.
		g	Describe the customer relationship cycle and discuss the trade-off between creditworthiness and profitability
		h	Discuss the benefits of risk-based pricing of financial services.
24	Country Risk: Determinants, Measures, and Implications	a	Identify and explain the different sources of country risk
		b	Evaluate the methods for measuring country risk and discuss the limitations of using those methods
		c	Compare and contrast foreign currency defaults and local currency defaults
		d	Explain the consequences of a country's default
		e	Discuss measures of sovereign default risk and describe components of a sovereign rating
		f	Describe the shortcomings of the sovereign rating systems of rating agencies
		g	Compare the use of credit ratings, market-based credit default spreads, and CDS spreads in predicting default
25	Estimating Default Probabilities	a	Compare agencies' ratings to internal credit rating systems
		b	Describe linear discriminant analysis (LDA), define the Altman's Z-score and its usage, and apply LDA to classify a sample of firms by credit quality
		c	Describe the relationship between borrower rating and probability of default.
		d	Describe a rating migration matrix and calculate the probability of default, cumulative probability of default, and marginal probability of default

Reading No.	Reading Name	LOS	Learning Outcome
25	Estimating Default Probabilities	e	Define the hazard rate and use it to define probability functions for default time as well as to calculate conditional and unconditional default probabilities
		f	Describe recovery rates and their dependencies on default rates
		g	Define a credit default swap (CDS) and explain its mechanics including the obligations of both the default protection buyer and the default protection seller
		h	Describe CDS spreads and explain how CDS spreads can be used to estimate hazard rates
		i	Define and explain CDS-bond basis
		j	Compare default probabilities calculated from historical data with those calculated from credit yield spreads
		k	Describe the difference between real-world and risk-neutral default probabilities and determine which one to use in the analysis of credit risk
		l	Using the Merton model, calculate the value of a firm's debt and equity, the volatility of firm value, and the volatility of firm equity
		m	Using the Merton model, calculate distance to default and default probability
		n	Assess the quality of the default probabilities produced by the Merton model, the Moody's KMV model, and the Kamakura model
26	Credit Value at Risk	a	Compare market risk value at risk (VaR) with credit VaR in terms of definition, time horizon, and tools for measuring them
		b	Define and calculate credit VaR.
		c	Describe the use of rating transition matrices for calculating credit VaR
		d	Describe the application of the Vasicek model to estimate capital requirements under the Basel II internal-ratings-based (IRB) approach
		e	Interpret the Vasicek's model, Credit Risk Plus (CreditRisk+) model, and the CreditMetrics ways of estimating the probability distribution of losses arising from defaults as well as modeling the default correlation
		f	Define credit spread risk and assess its impact on calculating credit VaR
27	Portfolio Credit Risk	a	Define and calculate default correlation for credit portfolios.
		b	Identify drawbacks in using the correlation-based credit portfolio framework.
		c	Assess the impact of correlation on a credit portfolio and its Credit VaR.
		d	Describe the use of a single factor model to measure portfolio credit risk, including the impact of correlation
		e	Define beta and calculate the asset return correlation of any pair of firms using the single factor
		f	Using the single factor model, estimate the probability of a joint default of any pair of credits and the default correlation between any pair of credits
		g	Describe how Credit VaR can be calculated using a simulation of joint defaults.
		h	Assess the effect of granularity on Credit VaR
28	Structured Credit Risk	a	Describe common types of structured products.
		b	Describe tranching and the distribution of credit losses in a securitization.
		c	Describe a waterfall structure in a securitization.
		d	Identify the key participants in the securitization process and describe conflicts of interest that can arise in the process
		e	Compute and evaluate one or two iterations of interim cashflows in a three-tiered securitization structure.
		f	Describe the treatment of excess spread in a securitization structure and estimate the value of the overcollateralization account at the end of each year.
		g	Explain the tests on the excess spread that a custodian must go through at the end of each year to determine the cash flow to the overcollateralization account and to the equity noteholders
		h	Describe a simulation approach to calculating credit losses for different tranches in a securitization.
		i	Explain how the default probabilities and default correlations affect the credit risk in a securitization.
		j	Explain how default sensitivities for tranches are measured.
		k	Describe risk factors that impact structured products.
		l	Define implied correlation and describe how it can be measured.
		m	Identify the motivations for using structured credit products.
29	Credit Risk	a	Assess the credit risks of derivatives.
		b	Define credit valuation adjustment (CVA) and debt valuation adjustment (DVA)
		c	Calculate the probability of default using credit spreads

Reading No.	Reading Name	LOS	Learning Outcome
29	Credit Risk	d	Describe, compare, and contrast various credit risk mitigants and their role in credit analysis.
		e	Describe the significance of estimating default correlation for credit portfolios and distinguish between reduced form and structural default correlation models
		f	Describe the Gaussian copula model for time to default and calculate the probability of default using the one-factor Gaussian copula model
		g	Describe how to estimate credit VaR using the Gaussian copula and the CreditMetrics approach
30	Credit Derivatives	a	Describe a credit derivative, credit default swap (CDS), total return swap, and collateralized debt obligation (CDO)
		b	Explain how to account for credit risk exposure in valuing a CDS
		c	Identify the default probabilities used to value a CDS
		d	Evaluate the use of credit indices and fixed coupons in pricing CDS transactions
		e	Define CDS forwards and CDS options
		f	Describe the process of valuing a synthetic CDO using the spread payments approach and the Gaussian copula model of time to default approach
		g	Define the two measures of implied correlation: compound (tranche) correlation and base correlation
		h	Discuss alternative approaches used to estimate default correlation
31	Derivatives	a	Define derivatives and explain how derivative transactions create counterparty credit risk
		b	Compare and contrast exchange-traded derivatives and over-the-counter (OTC) derivatives, and discuss the features of their markets
		c	Describe the process of clearing a derivative transaction
		d	Identify the participants and describe the use of collateralization in the derivatives market
		e	Define the International Swaps and Derivatives Association (ISDA) Master Agreement, the risk-mitigating features it provides, and the default events it covers
		f	Describe the features and use of credit derivatives and discuss potential risks they may create
		g	Describe central clearing of OTC derivatives and discuss the roles, mandate, advantages, and disadvantages of the central counterparty (CCP)
		h	Explain the margin requirements for both centrally-cleared and non-centrally-cleared derivatives
		i	Define special purpose vehicles (SPVs), derivatives product companies (DPCs), monolines, and credit derivatives product companies (CDPCs) and describe the limitations of using them as risk mitigating methods
		j	Describe the approaches used and the challenges faced in modeling derivatives risk
32	Counterparty Risk and Beyond	a	Describe counterparty risk and differentiate it from lending risk.
		b	Describe transactions that carry counterparty risk and explain how counterparty risk can arise in each transaction.
		c	Identify and describe institutions that take on significant counterparty risk.
		d	Describe credit exposure, credit migration, recovery, mark-to-market, replacement cost, default probability, loss given default, and the recovery rate.
		e	Describe credit value adjustment (CVA) and compare the use of CVA and credit limits in evaluating and mitigating counterparty risk.
		f	Identify and describe the different ways institutions can quantify, manage, and mitigate counterparty risk.
		g	Identify and explain the costs of an OTC derivative
		h	Explain the components of the X-Value Adjustment (xVA) term.
33	Netting, Close-out and Related Aspects	a	Explain the purpose of an International Swaps and Derivatives Association (ISDA) master agreement.
		b	Summarize netting and close-out procedures (including multilateral netting), explain their advantages and disadvantages, and describe how they fit into the framework of the ISDA master agreement.
		c	Describe the effectiveness of netting in reducing credit exposure under various scenarios.
		d	Describe the mechanics of termination provisions and trade compressions and explain their advantages and disadvantages.
		e	Provide examples of trade compression of derivative positions, calculate net notional exposure amount, and identify the party holding the net contract position in a trade compression.
		f	Identify and describe termination events and discuss their potential effects on parties to a transaction.

Reading No.	Reading Name	LOS	Learning Outcome
34	Margin (Collateral) and Settlement	a	Describe the rationale for collateral management.
		b	Describe the terms of a collateral agreement and features of a credit support annex (CSA) within the ISDA Master Agreement including threshold, initial margin, minimum transfer amount and rounding, haircuts, credit quality, and credit support amount.
		c	Calculate the credit support amount (margin) under various scenarios.
		d	Describe the role of a valuation agent.
		e	Describe the mechanics of collateral and the types of collateral that are typically used.
		f	Explain the process for the reconciliation of collateral disputes.
		g	Explain the features of a collateralization agreement.
		h	Differentiate between a two-way and one-way CSA agreement and describe how collateral parameters can be linked to credit quality.
		i	Explain aspects of collateral including funding, rehypothecation, and segregation.
		j	Explain how market risk, operational risk, and liquidity risk (including funding liquidity risk) can arise through collateralization.
		k	Describe the various regulatory capital requirements.
35	Central Clearing	a	Define a central counterparty (CCP) and describe the mechanics of central clearing
		b	Explain the concept of novation under central clearing
		c	Define netting, multilateral offset, and compression and provide examples of each
		d	Describe the application and estimation of margin and default funds under central clearing
		e	Discuss the risks faced by a CCP and the ways it manages its exposures
		f	Provide examples of a loss waterfall
		g	Explain the different methods of managing the default of one or more members of a CCP
		h	Compare bilateral and central clearing
		i	Compare initial margin and default fund requirements for clearing members in relation to loss coverage, cost of clearing, and moral hazard
		j	Describe the advantages and disadvantages of central clearing
36	Future Value and Exposure	a	Describe and calculate the following metrics for credit exposure: expected mark-to-market, expected exposure, potential future exposure, expected positive exposure and negative exposure, effective expected positive exposure, and maximum exposure
		b	Compare the characterization of credit exposure to VaR methods and describe additional considerations used in the determination of credit exposure
		c	Identify factors that affect the calculation of the credit exposure profile and summarize the impact of collateral on exposure.
		d	Identify typical credit exposure profiles for various derivative contracts and combination profiles.
		e	Explain how payment frequencies and exercise dates affect the exposure profile of various securities.
		f	Explain the general impact of aggregation on exposure, and the impact of aggregation on exposure when there is correlation between transaction values.
		g	Describe the differences between funding exposure and credit exposure.
		h	Explain the impact of collateralization on exposure and assess the risk associated with the remargining period, threshold, and minimum transfer amount.
		i	Assess the impact of collateral on counterparty risk and funding, with and without segregation or rehypothecation.
37	CVA	a	Explain the motivation for and the challenges of pricing counterparty risk.
		b	Describe credit value adjustment (CVA).
		c	Calculate CVA and CVA as a spread with no wrong-way risk, netting, or collateralization.
		d	Evaluate the impact of changes in the credit spread and recovery rate assumptions on CVA
		e	Describe debt value adjustment (DVA) and bilateral CVA (BCVA).
		f	Explain the distinctions between unilateral CVA (UCVA) and BCVA, and between unilateral DVA (UDVA) and BCVA.
		g	Calculate DVA, BCVA, and BCVA as a spread.
		h	Explain how netting can be incorporated into the CVA calculation.
		i	Define and calculate incremental CVA and marginal CVA and explain how to convert CVA into a running spread
		j	Explain the impact of incorporating collateralization into the CVA calculation, including the impact of margin period of risk, thresholds, and initial margins.
		k	Describe wrong-way risk and contrast it with right-way risk.

Reading No.	Reading Name	LOS	Learning Outcome
37	CVA	l	Identify examples of wrong-way risk and examples of right-way risk.
		m	Discuss the impact of collateral on wrong-way risk.
		n	Identify examples of wrong-way collateral.
		o	Discuss the impact of wrong-way risk on central counterparties (CCPs).
		p	Describe the various wrong-way modeling methods including hazard rate approaches, structural approaches, parametric approaches, and jump approaches.
		q	Explain the implications of central clearing on wrong-way risk.
38	The Evolution of Stress Testing Counterparty Exposures	a	Differentiate among current exposure, peak exposure, expected exposure, and expected positive exposure.
		b	Explain the treatment of counterparty credit risk (CCR) both as a credit risk and as a market risk and describe its implications for trading activities and risk management for a financial institution.
		c	Describe a stress test that can be performed on a loan portfolio and on a derivative portfolio
		d	Differentiate between stressed expected loss and stress loss of a credit portfolio, and calculate the stress loss on a loan portfolio and the stress loss on a derivative portfolio
		e	Describe a stress test that can be performed on CVA.
		f	Calculate the stressed CVA and the stress loss on CVA
		g	Calculate the DVA and explain how stressing DVA enters into aggregating stress tests of CCR.
		h	Describe the common pitfalls in stress testing CCR.
39	An Introduction to Securitisation	a	Define securitization, describe the securitization process, and explain the roles of participants in the process
		b	Explain the terms over-collateralization, first-loss piece, equity piece, and cash waterfall within the securitization process
		c	Analyze the differences in the mechanics of issuing securitized products using a trust versus a special purpose vehicle (SPV) and distinguish between the three main SPV structures: amortizing, revolving, and master trust.
		d	Explain the reasons for and the benefits of undertaking securitization.
		e	Describe and assess the various types of credit enhancements.
		f	Explain the various performance analysis tools for securitized structures and identify the asset classes they are most applicable to.
		g	Define and calculate the delinquency ratio, default ratio, monthly payment rate (MPR), debt service coverage ratio (DSCR), the weighted average coupon (WAC), the weighted average maturity (WAM), and the weighted average life (WAL) for relevant securitized structures.
		h	Explain the prepayment forecasting methodologies and calculate the constant prepayment rate (CPR) and the Public Securities Association (PSA) rate.
Operational Risk			
40	Introduction to Operational Risk and Resilience	a	Describe an operational risk management framework and assess the types of risks that can fall within the scope of such a framework.
		b	Describe the seven Basel II event risk categories and identify examples of operational risk events in each category.
		c	Explain characteristics of operational risk exposures and operational loss events, and challenges that can arise in managing operational risk due to these characteristics.
		d	Describe operational resilience, identify the elements of an operational resilience framework, and summarize regulatory expectations for operational resilience
41	Risk Governance	a	Explain the Basel regulatory expectations for the governance of an operational risk management framework.
		b	Describe and compare the roles of different committees and the board of directors in operational risk governance
		c	Describe the "three lines of defense" model for operational risk governance and compare roles and responsibilities for each line of defense.
		d	Explain best practices and regulatory expectations for the development of a risk appetite for operational risk and for a strong risk culture.
42	Risk Identification	a	Compare different top-down and bottom-up approaches and tools for identifying operational risks.
		b	Describe best practices in the process of scenario analysis for operational risk
		c	Describe and apply an operational risk taxonomy and give examples of different taxonomies of operational risks.
		d	Describe and apply the Level 1, 2, and 3 categories in the Basel operational risk taxonomy.

Reading No.	Reading Name	LOS	Learning Outcome
43	Risk Measurement and Assessment	a	Explain best practices for the collection of operational loss data and reporting of operational loss incidents, including regulatory expectations.
		b	Explain operational risk-assessment processes and tools, including risk control self-assessments (RCSAs), likelihood assessment scales, and heatmaps.
		c	Describe the differences among key risk indicators (KRIs), key performance indicators (KPIs), and key control indicators (KCIs).
		d	Describe the use of factor-based models that quantitatively assess operational risk, and explain the application of the Swiss cheese model and the bowtie tool
		e	Estimate operational risk exposures based on the fault tree model given probability assumptions.
		f	Describe approaches used to determine the level of operational risk capital for economic capital purposes, including their application and limitations.
		g	Describe and explain the steps to ensure a strong level of operational resilience, and to test the operational resilience of important business services
44	Risk Mitigation	a	Explain and compare different ways firms address their operational risk exposures
		b	Compare different types of internal controls and provide examples of each type of internal control
		c	Describe control automation, internal control design, and control testing, including risks and challenges that arise in these processes and ways to make them more effective
		d	Describe methods to improve the quality of an operational process and reduce the potential for human error
		e	Explain how operational risk can arise with new products, new business initiatives, or mergers and acquisitions, and describe ways to mitigate these risks
		f	Identify and describe approaches firms should use to mitigate the impact of operational risk events
		g	Describe methods for the transfer of operational risks and the management of reputational risk, and assess their effectiveness in different situations.
45	Risk Reporting	a	Identify roles and responsibilities of different organizational committees, and explain how risk reports should be developed for each committee or business function.
		b	Describe components of operational risk reports and explain best practices in operational risk reporting
		c	Describe challenges to reporting operational risks, including characteristics of operational loss data, and explain ways to overcome these challenges.
		d	Explain best practices for reporting risk exposures to regulators and external stakeholders.
46	Integrated Risk Management	a	Describe the role of risk governance, risk appetite, and risk culture in the context of an enterprise risk management (ERM) framework.
		b	Summarize the role of Basel regulatory capital and the process of determining internal economic capital.
		c	Describe elements of a stress-testing framework for financial institutions and explain best practices for stress testing
		d	Explain challenges and considerations when developing and implementing models used in stress testing operational risk.
47	Cyber-resilience: Range of practices	a	Define cyber-resilience and compare recent regulatory initiatives in the area of cyber-resilience
		b	Describe current practices by banks and supervisors in the governance of a cyber-risk management framework, including roles and responsibilities.
		c	Explain methods for supervising cyber-resilience, testing and incident response approaches, and cybersecurity and resilience metrics
		d	Explain and assess current practices for the sharing of cybersecurity information between different types of institutions.
		e	Describe practices for the governance of risks of interconnected third-party service providers
48	Case Study: Cyberthreats and Information Security Risks	a	Provide examples of cyber threats and information security risks, and describe frameworks and best practices for managing cyber risks.
		b	Describe lessons learned from the Equifax case study.

Reading No.	Reading Name	LOS	Learning Outcome
49	Sound Management of Risks related to Money Laundering and Financing of Terrorism	a	Explain best practices recommended by the Basel committee for the assessment, management, mitigation, and monitoring of money laundering and financing of terrorism (ML/FT) risks.
		b	Describe recommended practices for the acceptance, verification, and identification of customers at a bank.
		c	Explain practices for managing ML/FT risks in a group-wide and cross-border context
50	Case Study: Financial Crime and Fraud	a	Describe elements of a control framework to manage financial fraud risk and money laundering risk
		b	Summarize the regulatory findings and describe the lessons learned from the USAA case study.
51	Guidance on Managing Outsourcing Risk	a	Explain how risks can arise through outsourcing activities to third-party service providers and describe elements of an effective program to manage outsourcing risk.
		b	Explain how financial institutions should perform due diligence on third-party service providers.
		c	Describe topics and provisions that should be addressed in a contract with a third-party service provider.
52	Case Study: Third-Party Risk Management	a	Explain how risks related to the use of third parties can arise and describe characteristics of an effective third-party risk management framework.
		b	Describe the lessons learned from the presented case studies
53	Case Study: Investor Protection and Compliance Risks in Investment	a	Summarize important regulations designed to protect investors in financial instruments, including MiFiD, MiFiD II, and Dodd-Frank.
		b	Describe and provide lessons learned from the case studies involving violations of investor protection or compliance regulations.
54	Supervisory Guidance on Model Risk Management	a	Describe model risk and explain how it can arise in the implementation of a model.
		b	Describe elements of an effective model risk management process.
		c	Explain best practices for the development and implementation of models.
		d	Describe elements of a strong model validation process and challenges to an effective validation process.
55	Case Study: Model Risk and Model Validation	a	Define a model and describe different ways that financial institutions can become exposed to model risk
		b	Describe the role of the model risk management function and explain best practices in the model risk management and validation processes
		c	Describe lessons learned from the three case studies involving model risk.
56	Stress Testing Banks	a	Describe the evolution of the stress testing process and compare the methodologies of historical European Banking Association (EBA), Comprehensive Capital Analysis and Review (CCAR), and Supervisory Capital Assessment Program (SCAP) stress tests.
		b	Explain challenges in designing stress test scenarios, including the problem of coherence in modeling risk factors.
		c	Explain challenges in modeling a bank's revenues, losses, and its balance sheet over a stress test horizon period.
57	Risk Capital Attribution and Risk-Adjusted Performance Measurement	a	Define, compare, and contrast risk capital, economic capital, and regulatory capital and explain methods and motivations for using economic capital approaches to allocate risk capital
		b	Describe the RAROC (risk-adjusted return on capital) methodology and its use in capital budgeting
		c	Compute and interpret the RAROC for a project, loan, or loan portfolio and use RAROC to compare business unit performance.
		d	Explain challenges that arise when using RAROC for performance measurement, including choosing a time horizon, measuring default probability, and choosing a confidence level.
		e	Calculate the hurdle rate and apply this rate in making business decisions using RAROC.
		f	Compute the adjusted RAROC for a project to determine its viability.
		g	Explain challenges in modeling diversification benefits, including aggregating a firm's risk capital and allocating economic capital to different business lines.
		h	Explain best practices in implementing an approach that uses RAROC to allocate economic capital.

Reading No.	Reading Name	LOS	Learning Outcome
58	Range of practices and issues in economic capital frameworks	a	Within the economic capital implementation framework, describe the challenges that appear in: - Defining and calculating risk measures - Risk aggregation - Validation of models - Dependency modeling in credit risk - Evaluating counterparty credit risk - Assessing interest rate risk in the banking book
		b	Describe the recommendations by the Bank for International Settlements (BIS) that supervisors should consider to make effective use of internal risk measures, such as economic capital, that are not designed for regulatory purposes.
		c	Explain benefits and impacts of using an economic capital framework within the following areas: - Credit portfolio management - Risk-based pricing - Customer profitability analysis - Management incentives
		d	Describe best practices and assess key concerns for the governance of an economic capital framework.
59	Capital Planning at Large Bank Holding Companies: Supervisory Expectations and Range of Current Practice	a	Describe the Federal Reserve's Capital Plan Rule and explain the seven principles of an effective capital adequacy process for bank holding companies (BHCs) subject to the Capital Plan Rule.
		b	Describe practices that can result in a strong and effective capital adequacy process for a BHC in the following areas: - Risk identification - Internal controls, including model review and validation - Corporate governance - Capital policy, including setting of goals and targets and contingency planning - Stress testing and stress scenario design - Estimating losses, revenues, and expenses, including quantitative and qualitative methodologies - Assessing the impact of capital adequacy, including risk-weighted asset (RWA) and balance sheet projections
60	Capital Regulation Before the Global Financial Crisis	a	Explain the motivations for introducing the Basel regulations, including key risk exposures addressed, and explain the reasons for revisions to Basel regulations over time.
		b	Explain the calculation of risk-weighted assets and the capital requirement per the original Basel I guidelines
		c	Describe measures introduced in the 1995 and 1996 amendments, including guidelines for netting of credit exposures and methods for calculating market risk capital for assets in the trading book.
		d	Describe changes to the Basel regulations made as part of Basel II, including the three pillars.
		e	Compare the standardized internal ratings-based (IRB) approach, the foundation IRB approach, and the advanced IRB approach for the calculation of credit risk capital under Basel II.
		f	Calculate credit risk capital under Basel II utilizing the IRB approach.
		g	Compare the basic indicator approach, the standardized approach, and the advanced measurement approach for the calculation of operational risk capital under Basel II.
		h	Summarize elements of the Solvency II capital framework for insurance companies.
61	Solvency, Liquidity, and Other Regulation After the Global Financial Crisis	a	Describe and calculate the stressed VaR introduced in Basel 2.5 and calculate the market risk capital charge.
		b	Explain the process of calculating the incremental risk capital charge for positions held in a bank's trading book.
		c	Describe the comprehensive risk (CR) capital charge for portfolios of positions that are sensitive to correlations between default risks
		d	Define in the context of Basel III and calculate where appropriate: - Tier 1 capital and its components - Tier 2 capital and its components - Required Tier 1 equity capital, total Tier 1 capital, and total capital
		e	Describe the motivations for and calculate the capital conservation buffer and the countercyclical buffer, including special rules for globally systemically important banks (G-SIBs).

Reading No.	Reading Name	LOS	Learning Outcome
61	Solvency, Liquidity, and Other Regulation After the Global Financial Crisis	f	Describe and calculate ratios intended to improve the management of liquidity risk, including the required leverage ratio, the liquidity coverage ratio, and the net stable funding ratio.
		g	Describe the mechanics of contingent convertible bonds (CoCos) and explain the motivations for banks to issue them.
		h	Provide examples of legislative and regulatory reforms that were introduced after the 2007-2009 financial crisis
62	High-level summary of Basel III reforms	a	Explain the motivations for revising the Basel III framework and the goals and impacts of the December 2017 reforms to the Basel III framework
		b	Summarize the December 2017 revisions to the Basel III framework in the following areas: - The standardized approach to credit risk - The internal ratings-based (IRB) approaches for credit risk - The CVA risk framework - The operational risk framework - The leverage ratio framework
		c	Describe the revised output floor introduced as part of the Basel III reforms and approaches to be used when calculating the output floor.
63	Basel III: Finalising post-crisis reforms	a	Explain the elements of the new standardized approach to measure operational risk capital, including the business indicator, internal loss multiplier, and loss component, and calculate the operational risk capital requirement for a bank using this approach.
		b	Compare the Standardized Measurement Approach (SMA) to earlier methods of calculating operational risk capital, including the Advanced Measurement Approaches (AMA).
		c	Describe general and specific criteria recommended by the Basel Committee for the identification, collection, and treatment of operational loss data.
Liquidity Risk			
64	Liquidity Risk	a	Explain and calculate liquidity trading risk via cost of liquidation and liquidity-adjusted VaR (LVaR).
		b	Identify liquidity funding risk, funding sources, and lessons learned from real cases: Northern Rock, Ashanti Goldfields, and Metallgesellschaft.
		c	Evaluate Basel III liquidity risk ratios and BIS principles for sound liquidity risk management
		d	Explain liquidity black holes and identify the causes of positive feedback trading.
65	Liquidity and Leverage	a	Differentiate between sources of liquidity risk and describe specific challenges faced by different types of financial institutions in managing liquidity risk.
		b	Summarize the asset-liability management process at a fractional reserve bank, including the process of liquidity transformation.
		c	Compare transactions used in the collateral market and explain risks that can arise through collateral market transactions
		d	Describe the relationship between leverage and a firm's return profile (including the leverage effect) and distinguish the impact of different types of transactions on a firm's leverage and balance sheet.
		e	Distinguish methods to measure and manage funding liquidity risk and transactions liquidity risk.
		f	Calculate the expected transactions cost and the spread risk factor for a transaction and calculate the liquidity adjustment to VaR for a position to be liquidated over a number of trading days.
		g	Discuss interactions between different types of liquidity risk and explain how liquidity risk events can increase systemic risk.
66	Early Warning Indicators	a	Evaluate the characteristics of sound Early Warning Indicators (EWI) measures.
		b	Identify EWI guidelines from banking regulators and supervisors (OCC, BCBS, Federal Reserve).
		c	Discuss the applications of EWIs in the context of the liquidity risk management process.
67	The Investment Function in Financial-Services Management	a	Compare various money market and capital market instruments and discuss their advantages and disadvantages
		b	Identify and discuss various factors that affect the choice of investment securities by a bank.
		c	Apply investment maturity strategies and maturity management tools based on the yield curve and duration

Reading No.	Reading Name	LOS	Learning Outcome
68	Liquidity and Reserves Management: Strategies and Policies	a	Calculate a bank's net liquidity position and explain factors that affect the supply and demand of liquidity at a bank.
		b	Compare strategies that a bank can use to meet demands for additional liquidity.
		c	Estimate a bank's liquidity needs through three methods (sources and uses of funds, structure of funds, and liquidity indicators).
		d	Summarize the process taken by a US bank to calculate its legal reserves
		e	Differentiate between factors that affect the choice among alternate sources of reserves
69	Intraday Liquidity Risk Management	a	Identify and explain the uses and sources of intraday liquidity
		b	Discuss the governance structure of intraday liquidity risk management
		c	Differentiate between methods for tracking intraday flows and monitoring risk levels.
70	Monitoring Liquidity	a	Distinguish between deterministic and stochastic cash flows and provide examples of each.
		b	Describe and provide examples of liquidity options and explain the impact of liquidity options on a bank's liquidity position and its liquidity management process.
		c	Describe and apply the concepts of liquidity risk, funding cost risk, liquidity generation capacity, expected liquidity, and cash flow at risk.
		d	Interpret the term structure of expected cash flows and cumulative cash flows.
		e	Discuss the impact of available asset transactions on cash flows and liquidity generation capacity.
71	The Failure Mechanics of Dealer Banks	a	Compare and contrast the major lines of business in which dealer banks operate and the risk factors they face in each line of business.
		b	Identify situations that can cause a liquidity crisis at a dealer bank and explain responses that can mitigate these risks.
		c	Assess policy measures that can alleviate firm-specific and systemic risks related to large dealer banks.
72	Liquidity Stress Testing	a	Differentiate between various types of liquidity, including funding, operational, strategic, contingent, and restricted liquidity.
		b	Estimate contingent liquidity via the liquid asset buffer
		c	Discuss liquidity stress test design issues such as scope, scenario development, assumptions, outputs, governance, and integration with other risk models.
73	Liquidity Risk Reporting and Stress Testing	a	Identify best practices for the reporting of a bank's liquidity position.
		b	Compare and interpret different types of liquidity risk reports.
		c	Explain the process of reporting a liquidity stress test and interpret a liquidity stress test report.
74	Contingency Funding Planning	a	Discuss the relationship between contingency funding planning and liquidity stress testing.
		b	Evaluate the key design considerations of a sound contingency funding plan.
		c	Assess the key components of a contingency funding plan (governance and oversight, scenarios and liquidity gap analysis, contingent actions, monitoring and escalation, and data and reporting).
75	Managing and Pricing Deposit Services	a	Differentiate between the various transaction and non-transaction deposit types.
		b	Compare the different methods used to determine the pricing of deposits and calculate the price of a deposit account using cost-plus, marginal cost, and conditional pricing formulas.
		c	Explain challenges faced by banks that offer deposit accounts, including deposit insurance, disclosures, overdraft protection, and basic (lifeline) banking.
76	Managing Non-deposit Liabilities	a	Distinguish between the various sources of non-deposit liabilities at a bank.
		b	Describe and calculate the available funds gap.
		c	Discuss factors affecting the choice of non-deposit funding sources.
		d	Calculate overall cost of funds using both the historical average cost approach and the pooled-funds approach.
77	Repurchase Agreements and Financing	a	Describe the mechanics of repurchase agreements (repos) and calculate the settlement for a repo transaction.
		b	Discuss common motivations for entering into repos, including their use in cash management and liquidity management
		c	Discuss how counterparty risk and liquidity risk can arise through the use of repo transactions.
		d	Assess the role of repo transactions in the collapses of Lehman Brothers and Bear Stearns during the 2007-2009 financial crisis.
		e	Compare the use of general and special collateral in repo transactions.

Reading No.	Reading Name	LOS	Learning Outcome
77	Repurchase Agreements and Financing	f	Identify the characteristics of special spreads and explain the typical behavior of US Treasury special spreads over an auction cycle
		g	Calculate the financing advantage of a bond trading special when used in a repo transaction.
78	Liquidity Transfer Pricing: A Guide to Better Practice	a	Discuss the process of liquidity transfer pricing (LTP) and identify best practices for the governance and implementation of an LTP process.
		b	Discuss challenges that may arise for banks during the implementation of LTP.
		c	Compare the various approaches to liquidity transfer pricing (zero cost, average cost, and matched-maturity marginal cost)
		d	Describe the contingent liquidity risk pricing process and calculate the cost of contingent liquidity risk.
79	The US Dollar Shortage in Global Banking and the International Policy Response	a	Identify the causes of the US dollar shortage during the Great Financial Crisis
		b	Evaluate the importance of assessing maturity/currency mismatch across the balance sheets of consolidated entities
		c	Discuss how central bank swap agreements overcame challenges commonly associated with international lenders of last resort.
80	Covered Interest Parity Lost: Understanding the Cross-	a	Differentiate between the mechanics of foreign exchange (FX) swaps and cross-currency swaps.
		b	Identify key factors that affect the cross-currency swap basis.
		c	Assess the causes of covered interest rate parity violations after the financial crisis of 2008.
81	Risk Management for Changing Interest Rates: Asset-Liability Management	b	Describe interest-sensitive gap management and apply this strategy to maximize a bank's net interest margin
		c	Describe duration gap management and apply this strategy to protect a bank's net worth.
		d	Discuss the limitations of interest-sensitive gap management and duration gap management
		a	Discuss how asset-liability management strategies can help a bank hedge against interest rate risk.
82	Illiquid Assets	a	Evaluate the characteristics of illiquid markets.
		b	Examine the relationship between market imperfections and illiquidity.
		c	Assess the impact of biases on reported returns for illiquid assets.
		d	Explain the unsmoothing of returns and its properties.
		e	Compare illiquidity risk premiums across and within asset categories.
		f	Evaluate portfolio choice decisions on the inclusion of illiquid assets.
Investment Risk			
83	Factor Theory	a	Provide examples of factors that impact asset prices and explain the theory of factor risk premiums
		b	Discuss the capital asset pricing model (CAPM) including its assumptions and explain how factor risk is addressed in the CAPM.
		c	Explain the implications of using the CAPM to value assets, including equilibrium and optimal holdings, exposure to factor risk, its treatment of diversification benefits, and shortcomings of the CAPM.
		d	Describe multifactor models and compare and contrast multifactor models to the CAPM.
		e	Explain how stochastic discount factors are created and apply them in the valuation of assets.
		f	Describe efficient market theory and explain how markets can be inefficient.
84	Factors	a	Describe the process of value investing and explain why a value premium may exist.
		b	Explain how different macroeconomic risk factors, including economic growth, inflation, and volatility, affect asset returns and risk premiums
		c	Assess methods of mitigating volatility risk in a portfolio and describe challenges that arise when managing volatility risk
		d	Explain how dynamic risk factors can be used in a multifactor model of asset returns, using the Fama-French model as an example
		e	Compare value and momentum investment strategies, including their return and risk profiles
85	Alpha (and the Low-Risk Anomaly)	a	Describe and evaluate the low-risk anomaly of asset returns
		b	Define and calculate alpha, tracking error, the information ratio, and the Sharpe ratio
		c	Explain the impact of benchmark choice on alpha and describe characteristics of an effective benchmark to measure alpha
		d	Describe Grinold's fundamental law of active management, including its assumptions and limitations, and calculate the information ratio using this law.

Reading No.	Reading Name	LOS	Learning Outcome
85	Alpha (and the Low-Risk Anomaly)	e	Apply a factor regression to construct a benchmark with multiple factors, measure a portfolio's sensitivity to those factors, and measure alpha against that benchmark
		f	Explain how to use style analysis to handle time-varying factor exposures
		g	Describe issues that arise when measuring alphas for nonlinear strategies.
		h	Compare the volatility anomaly and the beta anomaly and analyze evidence of each anomaly.
		i	Describe potential explanations for the risk anomaly.
86	Portfolio Construction	a	Distinguish among the inputs to the portfolio construction process
		b	Evaluate the motivation for and the methods used for refining alphas in the implementation process.
		c	Describe neutralization and the different approaches used for refining alphas to be neutral
		d	Describe the implications of transaction costs on portfolio construction.
		e	Describe practical issues in portfolio construction, including the determination of an appropriate risk aversion, aversions to specific risks, and proper alpha coverage
		f	Describe portfolio revisions and rebalancing, and analyze the tradeoffs between alpha, risk, transaction costs, and time horizon.
		g	Determine the optimal no-trade region for rebalancing with transaction costs.
		h	Evaluate the strengths and weaknesses of the following portfolio construction techniques: screens, stratification, linear programming, and quadratic programming.
		i	Describe dispersion, explain its causes, and describe methods for controlling forms of dispersion.
87	Portfolio Risk: Analytical Methods	a	Define, calculate, and distinguish between the following portfolio VaR measures: diversified and undiversified portfolio VaR, individual VaR, incremental VaR, marginal VaR, and component VaR.
		b	Explain the impact of correlation on portfolio risk.
		c	Apply the concept of marginal VaR in making portfolio management decisions.
		d	Explain the risk-minimizing position and the risk and return-optimizing position of a portfolio.
		e	Explain the difference between risk management and portfolio management and describe how to use marginal VaR in portfolio management.
88	VaR and Risk Budgeting in Investment Management	a	Define risk budgeting.
		b	Describe the impact of horizon, turnover, and leverage on the risk management process in the investment management industry.
		c	Describe the investment process of large investors such as pension funds.
		d	Describe the risk management challenges associated with investments in hedge funds
		e	Distinguish among the following types of risk: absolute risk, relative risk, policy-mix risk, active management risk, funding risk, and sponsor risk.
		f	Explain the use of VaR to check manager compliance and monitor risk.
		g	Explain how VaR can be used in the development of investment guidelines and for improving the investment process.
		h	Describe the risk budgeting process and calculate risk budgets across asset classes and active managers
89	Risk Monitoring and Performance Measurement	a	Describe the three fundamental dimensions behind risk management, and their relation to VaR and tracking error.
		b	Describe risk planning, including its objectives, effects, and the participants in its development
		c	Describe risk budgeting and the role of quantitative methods in risk budgeting
		d	Describe risk monitoring and its role in an internal control environment.
		e	Identify sources of risk consciousness within an organization
		f	Describe the objectives and actions of a risk management unit in an investment management firm.
		g	Describe how risk monitoring can confirm that investment activities are consistent with expectations
		h	Describe the Liquidity Duration Statistic and how it can be used to measure liquidity.
		i	Describe the objectives of performance measurement tools.
		j	Describe the use of alpha, benchmarks, and peer groups as inputs in performance measurement tools.

Reading No.	Reading Name	LOS	Learning Outcome
90	Portfolio Performance Evaluation	a	Differentiate between the time-weighted and dollar-weighted returns of a portfolio and describe their appropriate uses
		b	Describe risk-adjusted performance measures, such as Sharpe's measure, Treynor's measure, Jensen's measure (Jensen's alpha), and the information ratio and identify the circumstances under which the use of each measure is most relevant
		c	Describe the uses for the Modigliani-squared and Treynor's measure in comparing two portfolios and the graphical representation of these measures.
		d	Determine the statistical significance of a performance measure using standard error and the t-statistic.
		e	Describe style analysis.
		f	Explain the difficulties in measuring the performance of actively managed portfolios
		g	Describe performance manipulation and the problems associated with using conventional performance measures.
		h	Describe techniques to measure the market timing ability of fund managers with a regression and with a call option model and compute return due to market timing.
		i	Describe and apply performance attribution procedures, including the asset allocation decision, sector and security selection decision, and the aggregate contribution.
91	Hedge Funds	a	Explain biases that are commonly found in databases of hedge funds
		b	Explain the evolution of the hedge fund industry and describe landmark events that precipitated major changes in the development of the industry
		c	Explain the impact of institutional investors on the hedge fund industry and assess reasons for the growing concentration of assets under management (AUM) in the industry.
		d	Explain the relationship between risk and alpha in hedge funds.
		e	Compare and contrast the different hedge fund strategies, describe their return characteristics, and describe the inherent risks of each strategy
		f	Describe the historical portfolio construction and performance trends of hedge funds compared to those of equity indices.
		g	Describe market events that resulted in a convergence of risk factors for different hedge fund strategies and explain the impact of such convergences on portfolio diversification strategies.
		h	Describe the problem of risk sharing asymmetry between principals and agents in the hedge fund industry.
92	Performing Due Diligence on Specific Managers and Funds	a	Identify reasons for the failures of hedge funds in the past.
		b	Explain elements of the due diligence process used to assess investment managers.
		c	Identify themes and questions investors can consider when evaluating a hedge fund manager.
		d	Describe criteria that can be evaluated in assessing a hedge fund's risk management process.
		e	Explain how due diligence can be performed on a hedge fund's operational environment.
		f	Explain how a hedge fund's business model risk and its fraud risk can be assessed.
		g	Describe elements that can be included as part of a due diligence questionnaire
93	Predicting Fraud by Investment Managers	a	Explain the use and efficacy of information disclosures made by investment advisors in predicting fraud.
		b	Describe the barriers and the costs incurred in implementing fraud prediction methods
		c	Discuss ways to improve investors' ability to use disclosed data to predict fraud.
Current Issues			
94	Review of the Federal Reserve's Supervision and Regulation of Silicon Valley Bank	a	Describe the events leading up to the failure of Silicon Valley Bank
		b	Describe shortfalls and deficiencies in the Federal Reserve's supervisory oversight of Silicon Valley Bank during the period that the bank transitioned from the Fed's Regional Banking Organization (RBO) portfolio to its Large and Foreign Banking Organization (LFBO) portfolio.
		c	Identify Silicon Valley Bank's specific risk issues which led to and accelerated its failure including deposit concentration, type of deposits, held-to-maturity securities, available-for-sale securities, the bank's contingent funding plan and capacity, and its capital raising efforts.
		d	Identify and describe the failures and shortfalls of Silicon Valley Bank in the areas of governance and risk management including those related to the CRO position and the bank's internal audit function
		e	Identify the scope of Silicon Valley Bank's liquidity risk management deficiencies and shortfalls, including its modeling and stress testing of its 30-day liquidity buffer, as well as the actions that management and regulators considered to address these specific liquidity issues.

Reading No.	Reading Name	LOS	Learning Outcome
94	Review of the Federal Reserve's Supervision and Regulation of Silicon Valley Bank	f	Describe the deficiencies in Silicon Valley Bank's interest rate risk management process, including its modelling process, and explain how proper use of metrics such as net interest income (NII) at risk and economic value of equity (EVE) could have improved its management of interest rate risk.
95	The Credit Suisse CoCo Wipeout: Facts, Misperceptions, and Lessons for Financial Regulation	a	Describe the features and mechanics of contingent convertible bonds (CoCos) and explain the rationale for banks to issue them
		b	Explain the rescue of Credit Suisse by Swiss regulators in 2023 and compare it to the rescue of Bear Stearns by US regulators during the financial crisis in 2008
		c	Explain the rationale for the write-down of Credit Suisse CoCos that was engineered by regulators during the rescue of Credit Suisse and its takeover by UBS
		d	Describe the reactions by market participants to the write-down of the CoCos, and explain and evaluate different arguments and lessons learned related to the decision to write down the CoCos
96	Artificial Intelligence and Bank Supervision	a	Describe historical evolution and common types of AI-based applications used in the financial sector
		b	Explain the advantages of implementing AI-based applications to the banking services companies and their customers
		c	Discuss the disadvantages and difficulties for financial companies using AI
		d	Clarify the specific issues faced by banks and regulators arising from utilizing AI in modeling and valuation
97	Financial Risk Management and Explainable, Trustworthy, Responsible AI	a	Describe the challenge posed by potential model bias and the ethical and responsible considerations surrounding the implementation of AI-driven solutions in financial risk management
		b	Analyze the potential benefits and challenges of utilizing AI while maintaining fairness and preventing biases in risk assessment and decision-making
		c	Explain the proposed considerations for the technical validation of decision-making algorithms to check for potential unfairness
		d	Describe the approaches and technologies that should be considered in the implementation and assessment of Trustworthy AI
		e	Examine the application of Explainable AI (XAI) in the field of credit risk management as presented in the use case of a European insurance group
98	Artificial Intelligence Risk Management Framework	a	Describe how organizations can frame the risks related to AI and explain the challenges that should be considered in AI risk management
		b	Identify AI actors across the AI lifecycle dimensions and describe how these actors work together to manage risks and achieve the goals of trustworthy and responsible AI
		c	Describe the characteristics of trustworthy AI and analyze the proposed guidance to address them
		d	Explain the potential benefits of periodically evaluating AI risk management effectiveness
		e	Describe specific functions applied to help organizations address the risks of AI systems in practice
99	Climate-related risk drivers and their transmission channels	a	Describe climate-related risk drivers and explain how those drivers give rise to different types of risks for banks.
		b	Compare physical and transition risk drivers related to climate change
		c	Assess the potential impact of different microeconomic and macroeconomic drivers of climate risk.
		d	Describe and assess factors that can amplify the impact of climate-related risks on banks as well as potential mitigants for these risks.
100	Climate-related financial risks – measurement methodologies	a	Describe main issues in identifying and measuring climate-related financial risks.
		b	Identify unique data needs inherent in the climate-related risks and describe candidate methodologies that could be used to analyze these types of data.
		c	Describe current and developing methodologies for measuring climate-related financial risks employed by banks and supervisors
		e	Identify strengths and weaknesses of the main types of measurement approaches.
		f	Assess gaps and challenges in designing a modeling framework to capture climate-related financial risk
		d	Compare and contrast climate-measuring methodologies utilized by banks, regulators, and third-party providers.

Reading No.	Reading Name	LOS	Learning Outcome
101	Principles for the effective management and supervision of climate-related financial risks	a	Describe the principles for managing climate-related financial risks related to corporate governance and internal control framework
		b	Describe the principles for managing climate-related financial risks related to capital and liquidity adequacy and the risk management process
		c	Describe the principles for the management of climate-related financial risks related to management, monitoring, and reporting, comprehensive management of credit risk and other risks, and scenario analysis
		d	Describe the principles for the supervision of climate-related financial risks related to prudential regulatory and supervisory requirements for banks and responsibilities, powers, and functions of supervisors.
102	The Crypto Ecosystem: Key Elements and Risks	a	Describe the key elements of the crypto ecosystem, including unbacked crypto, stablecoins, smart contracts, and DeFi services
		b	Describe the structural flaws inherent in various elements of the crypto ecosystem
		c	Describe the risks crypto poses to parties including crypto investors, governments, regulators, and traditional financial institutions; and identify potential policy actions that can be taken to mitigate these risks
103	Digital Resilience and Financial Stability	a	Describe characteristics of cyber risks and information/communication technology (ICT) risks faced by financial institutions
		b	Assess the interactions between cyber and ICT risks and financial risks and explain how cyber and ICT risk events at financial institutions can lead to systemic financial risk
		c	Describe potential macroprudential tools and policy measures that can be used to address cyber risks and ICT risks and explain challenges to the adoption of each one