

## FRM P1 | Summary of Changes | 2024

	No. of Chapters	No. of LOS	% of Total
Same	48	459	95%
New	0	7	1%
Changes	14	17	4%
<b>Total</b>	<b>62</b>	<b>483</b>	<b>100%</b>
Deleted	0	6	1%

New
Changes
Deleted

Reading No.	Reading Name	No. of LOS		
		New	Changes	Deleted
9	Learning from Financial Disasters		3	
18	Linear Regression	1		
25	Machine Learning Methods	1	1	
26	Machine Learning and Prediction	1	1	
38	Options Markets			1
46	Swaps			1
48	Calculating and Applying VaR		2	
49	Measuring and Monitoring Volatility		2	
51	Country Risk-Determinants, Measures, and Implications		1	
54	Stress Testing	1	1	
56	Interest Rates			1
57	Bond Yields and Return Calculations		1	
59	Modeling Non-Parallel Term Structure Shifts and Hedging	2	3	2
62	Option Sensitivity Measures-The Greeks	1	2	1

## Changes in Reading

New  
Change  
Deleted

Subject	Reading No 2024	Reading Name	Details of Changes 2023-24	Reading No 2023
Foundations of Risk Management	1	The Building Blocks of Risk Management		1
	2	How Do Firms Manage Financial Risk?		2
	3	The Governance of Risk Management		3
	4	Credit Risk Transfer Mechanisms		4
	5	Modern Portfolio Theory (MPT) and the Capital Asset Pricing Model (CAPM)		5
	6	The Arbitrage Pricing Theory and Multifactor Models of Risk and Return		6
	7	Principles for Effective Data Aggregation and Risk Reporting		7
	8	Enterprise Risk Management and Future Trends		8
	9	Learning from Financial Disasters	2 LOS Changes	9
	10	Anatomy of the Great Financial Crisis of 2007-2009		10
	11	GARP Code of Conduct		11
Quantitative Analysis	12	Fundamentals of Probability		12
	13	Fundamentals of Probability		13
	14	Common Univariate Random Variables		14
	15	Multivariate Random Variables		15
	16	Sample Moments		16
	17	Hypothesis Testing		17
	18	Linear Regression	1 LOS New	18
	19	Regression with Multiple Explanatory Variables		19
	20	Regression Diagnostics		20
	21	Stationary Time Series		21
	22	Non-Stationary Time Series		22
	23	Measuring Returns, Volatility, and Correlation		23
	24	Simulation and Bootstrapping		24
	25	Machine Learning Methods	1 LOS New	25
	26	Machine Learning and Prediction	1 LOS New 1 LOS Changes	26
Financial Markets and Products	27	Banks		27
	28	Insurance Companies and Pension Plans		28
	29	Fund Management		29
	30	Introduction to Derivatives		30
	31	Exchanges and OTC Markets		31
	32	Central Clearing		32
	33	Futures Markets		33
	34	Using Futures for Hedging		34
	35	Foreign Exchange Markets		35
	36	Pricing Financial Forwards and Futures		36
	37	Commodity Forwards and Futures		37
	38	Options Markets	1 LOS Deleted	38
	39	Properties of Options		39
	40	Trading Strategies		40
	41	Exotic Options		41
	42	Properties of Interest Rates		42
	43	Corporate Bonds		43
	44	Mortgages and Mortgage-Backed Securities		44
	45	Interest Rate Futures		45
46	Swaps	1 LOS Deleted	46	

Subject	Reading No 2024	Reading Name	Details of Changes 2023-24	Reading No 2023
Valuation and Risk Models	47	Measures of Financial Risk		47
	48	Calculating and Applying VaR	1 LOS Changes	48
	49	Measuring and Monitoring Volatility	2 LOS Changes	49
	50	External and Internal Credit Ratings		50
	51	Country Risk: Determinants, Measures, and Implications	1 LOS Changes	51
	52	Measuring Credit Risk		52
	53	Operational Risk		53
	54	Stress Testing	1 LOS New 1 LOS Changes	54
	55	Pricing Conventions, Discounting, and Arbitrage		55
	56	Interest Rates	1 LOS Deleted	56
	57	Bond Yields and Return Calculations	1 LOS Changes	57
	58	Applying Duration, Convexity, and DV01		58
	59	Modeling Non-Parallel Term Structure Shifts and Hedging	2 LOS New 3 LOS Changes 2 LOS Deleted	59
	60	Binomial Trees		60
	61	The Black-Scholes-Merton Model		61
62	Option Sensitivity Measures: The Greeks	1 LOS New 2 LOS Changes 1 LOS Deleted	62	

## Changes in LOS

**New  
Change  
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Reading No.	Reading Name	Learning Outcome	2024 LOS	2023 LOS	Changes
<b>Foundations of Risk Management</b>					
1	The Building Blocks of Risk Management	Explain the concept of risk and compare risk management with risk taking.	1a	1a	
		Evaluate, compare, and apply tools and procedures used to measure and manage risk, including quantitative measures, qualitative risk assessment techniques, and enterprise risk management	1b	1b	
		Distinguish between expected loss and unexpected loss and provide examples of each.	1c	1c	
		Interpret the relationship between risk and reward and explain how conflicts of interest can impact risk management.	1d	1d	
		Describe and differentiate between the key classes of risks, explain how each type of risk can arise, and assess the potential impact of each type of risk on an organization	1e	1e	
		Explain how risk factors can interact with each other and describe challenges in aggregating risk exposures.	1f	1f	
2	How Do Firms Manage Financial Risk?	Compare different strategies that a firm can use to manage its risk exposures and explain situations in which a firm would want to use each strategy	2a	2a	
		Explain the relationship between risk appetite and a firm's risk management decisions.	2b	2b	
		Evaluate some advantages and disadvantages of hedging risk exposures and explain challenges that can arise when implementing a hedging strategy.	2c	2c	
		Apply appropriate methods to hedge operational and financial risks, including pricing, foreign currency, and interest rate risk.	2d	2d	
		Assess the impact of risk management tools and instruments, including risk limits and derivatives.	2e	2e	
3	The Governance of Risk Management	Explain changes in regulations and corporate risk governance that occurred as a result of the 2007-2009 financial crisis.	3a	3a	
		Describe best practices for the governance of a firm's risk management processes.	3b	3b	
		Explain the risk management role and responsibilities of a firm's board of directors.	3c	3c	
		Evaluate the relationship between a firm's risk appetite and its business strategy, including the role of incentives.	3d	3d	
		Illustrate the interdependence of functional units within a firm as it relates to risk management.	3e	3e	
		Assess the role and responsibilities of a firm's audit committee.	3f	3f	
4	Credit Risk Transfer Mechanisms	Compare different types of credit derivatives, explain their applications, and describe their advantages.	4a	4a	
		Explain different traditional approaches or mechanisms that firms can use to help mitigate credit risk.	4b	4b	
		Evaluate the role of credit derivatives in the 2007-2009 financial crisis and explain changes in the credit derivative market that occurred as a result of the crisis.	4c	4c	
		Explain the process of securitization, describe a special purpose vehicle (SPV), and assess the risk of different business models that banks can use for securitized products.	4d	4d	

Reading No.	Reading Name	Learning Outcome	2024 LOS	2023 LOS	Changes
5	Modern Portfolio Theory (MPT) and the Capital Asset Pricing Model (CAPM)	Explain Modern Portfolio Theory and interpret the Markowitz efficient frontier	5a	5a	
		Understand the derivation and components of the CAPM.	5b	5b	
		Describe the assumptions underlying the CAPM.	5c	5c	
		Interpret and compare the capital market line and the security market line.	5d	5d	
		Apply the CAPM in calculating the expected return on an asset.	5e	5e	
		Interpret beta and calculate the beta of a single asset or portfolio.	5f	5f	
		Calculate, compare, and interpret the following performance measures: the Sharpe performance index, the Treynor performance index, the Jensen performance index, the tracking error, information ratio, and Sortino ratio.	5g	5g	
6	The Arbitrage Pricing Theory and Multifactor Models of Risk and Return	Explain the Arbitrage Pricing Theory (APT), describe its assumptions, and compare the APT to the CAPM.	6a	6a	
		Describe the inputs, including factor betas, to a multifactor model and explain the challenges of using multifactor models in hedging	6b	6b	
		Calculate the expected return of an asset using a single-factor and a multifactor model.	6c	6c	
		Explain how to construct a portfolio to hedge exposure to multiple factors.	6d	6d	
		Describe and apply the Fama-French three-factor model in estimating asset returns.	6e	6e	
7	Principles for Effective Data Aggregation and Risk Reporting	Explain the potential benefits of having effective risk data aggregation and reporting.	7a	7a	
		Explain challenges to the implementation of a strong risk data aggregation and reporting process and the potential impacts of using poor-quality data.	7b	7b	
		Describe key governance principles related to risk data aggregation and risk reporting.	7c	7c	
		Describe characteristics of effective data architecture, IT infrastructure, and risk-reporting practices.	7d	7d	
8	Enterprise Risk Management and Future Trends	Describe Enterprise Risk Management (ERM) and compare an ERM program with a traditional silo-based risk management program.	8a	8a	
		Describe the motivations for a firm to adopt an ERM initiative.	8b	8b	
		Explain best practices for the governance and implementation of an ERM program	8c	8c	
		Describe risk culture, explain the characteristics of a strong corporate risk culture, and describe challenges to the establishment of a strong risk culture at a firm.	8d	8d	
		Explain the role of scenario analysis in the implementation of an ERM program and describe its advantages and disadvantages	8e	8e	
		Explain the use of scenario analysis in stress testing programs and capital planning.	8f	8f	
9	Learning from Financial Disasters	Analyze the following factors that contributed to the given case studies of financial disasters and examine the key lessons learned from these case	9a	9a	
		Interest rate risk, including the 1980s savings and loan crisis in the US	9b	9b	
		Funding liquidity risk, including Lehman Brothers, Continental Illinois, and Northern Rock	9c	9c	
		Constructing and implementing a hedging strategy, including the Metallgesellschaft case	9d	9d	
		Model risk, including the Niederhoffer case, Long Term Capital Management, and the London Whale case	9e	9e	
		Rogue trading and misleading reporting, including the Barings case	9f	9f	
		Financial engineering, including Bankers Trust, the Orange County case, and Sachsen Landesbank	9g	9g	
		Reputation risk, including the Volkswagen case	9h	9h	
		Corporate governance, including the Enron case	9i	9i	
		Cyber risk, including the SWIFT case	9j	9j	

Reading No.	Reading Name	Learning Outcome	2024 LOS	2023 LOS	Changes
10	Anatomy of the Great Financial Crisis of 2007-2009	Describe the historical background and provide an overview of the 2007-2009 financial crisis.	10a	10a	
		Describe the build-up to the financial crisis and the factors that played an important role.	10b	10b	
		Explain the role of subprime mortgages and collateralized debt obligations (CDOs) in the crisis.	10c	10c	
		Compare the roles of different types of institutions in the financial crisis, including banks, financial intermediaries, mortgage brokers and lenders, and rating agencies.	10d	10d	
		Describe trends in the short-term wholesale funding markets that contributed to the financial crisis, including their impact on systemic risk	10e	10e	
		Describe responses made by central banks in response to the crisis.	10f	10f	
11	GARP Code of Conduct	Describe the responsibility of each GARP Member with respect to professional integrity, ethical conduct, conflicts of interest, confidentiality of information, and adherence to generally accepted practices in risk management.	11a	11a	
		Describe the potential consequences of violating the GARP Code of Conduct.	11b	11b	
<b>Quantitative Analysis</b>					
12	Fundamentals of Probability	Describe an event and an event space	12a	12a	
		Describe independent events and mutually exclusive events.	12b	12b	
		Explain the difference between independent events and conditionally independent events.	12c	12c	
		Calculate the probability of an event for a discrete probability function.	12d	12d	
		Define and calculate a conditional probability.	12e	12e	
		Distinguish between conditional and unconditional probabilities.	12f	12f	
		Explain and apply Bayes' rule.	12g	12g	
13	Random Variables	Describe and distinguish a probability mass function from a cumulative distribution function and explain the relationship between these two	13a	13a	
		Understand and apply the concept of a mathematical expectation of a random variable.	13b	13b	
		Describe the four common population moments.	13c	13c	
		Explain the differences between a probability mass function and a probability density function.	13d	13d	
		Characterize the quantile function and quantile-based estimators	13e	13e	
		Explain the effect of a linear transformation of a random variable on the mean, variance, standard deviation, skewness, kurtosis, median, and interquartile range.	13f	13f	
14	Common Univariate Random Variables	Distinguish the key properties and identify the common occurrences of the following distributions: uniform distribution, Bernoulli distribution, binomial distribution, Poisson distribution, normal distribution, lognormal distribution, Chi-squared distribution, Student's t- and F-distributions.	14a	14a	
		Describe a mixture distribution and explain the creation and characteristics of mixture distributions.	14b	14b	
15	Multivariate Random Variables	Explain how a probability matrix can be used to express a probability mass function.	15a	15a	
		Compute the marginal and conditional distributions of a discrete bivariate random variable.	15b	15b	
		Explain how the expectation of a function is computed for a bivariate discrete random variable.	15c	15c	
		Define covariance and explain what it measures.	15d	15d	
		Explain the relationship between the covariance and correlation of two random variables, and how these are related to the independence of the two variables.	15e	15e	
		Explain the effects of applying linear transformations on the covariance and correlation between two random variables.	15f	15f	

Reading No.	Reading Name	Learning Outcome	2024 LOS	2023 LOS	Changes
15	Multivariate Random Variables	Compute the variance of a weighted sum of two random variables.	15g	15g	
		Compute the conditional expectation of a component of a bivariate random variable.	15h	15h	
		Describe the features of an independent and identically distributed (iid) sequence of random variables.	15i	15i	
		Explain how the iid property is helpful in computing the mean and variance of a sum of iid random variables.	15j	15j	
16	Sample Moments	Estimate the mean, variance, and standard deviation using sample data.	16a	16a	
		Explain the difference between a population moment and a sample moment.	16b	16b	
		Distinguish between an estimator and an estimate.	16c	16c	
		Describe the bias of an estimator and explain what the bias measures.	16d	16d	
		Explain what is meant by the statement that the mean estimator is BLUE.	16e	16e	
		Describe the consistency of an estimator and explain the usefulness of this concept.	16f	16f	
		Explain how the Law of Large Numbers (LLN) and Central Limit Theorem (CLT) apply to the sample mean.	16g	16g	
		Estimate and interpret the skewness and kurtosis of a random variable.	16h	16h	
		Use sample data to estimate quantiles, including the median.	16i	16i	
		Estimate the mean of two variables and apply the CLT.	16j	16j	
17	Hypothesis Testing	Estimate the covariance and correlation between two random variables.	16k	16k	
		Explain how coskewness and cokurtosis are related to skewness and kurtosis.	16l	16l	
		Construct an appropriate null hypothesis and alternative hypothesis and distinguish between the two.	17a	17a	
		Differentiate between a one-sided and a two-sided test and identify when to use each test.	17b	17b	
		Explain the difference between Type I and Type II errors and how these relate to the size and power of a test.	17c	17c	
		Understand how a hypothesis test and a confidence interval are related.	17d	17d	
		Explain what the p-value of a hypothesis test measures.	17e	17e	
		Construct and apply confidence intervals for one-sided and two-sided hypothesis tests and interpret the results of hypothesis tests with a specific confidence level	17f	17f	
18	Linear Regression	Identify the steps to test a hypothesis about the difference between two population means.	17g	17g	
		Explain the problem of multiple testing and how it can lead to biased results.	17h	17h	
		Describe the models which can be estimated using linear regression and differentiate them from those which cannot.	18a	18a	
		Interpret the results of an ordinary least squares (OLS) regression with a single explanatory variable.	18b	18b	
		Describe the key assumptions of OLS parameter estimation.	18c	18c	
		Characterize the properties of OLS estimators and their sampling distributions.	18d	18d	
		Construct, apply, and interpret hypothesis tests and confidence intervals for a single regression coefficient in a regression.	18e	18e	
		Explain the steps needed to perform a hypothesis test in a linear regression.	18f	18f	
19	Regression with Multiple Explanatory Variables	Describe the relationship among a t-statistic, its p-value, and a confidence interval.	18g	18g	
		Estimate the correlation coefficient from the R <sup>2</sup> measure obtained in linear regressions with a single explanatory variable	18h		
		Distinguish between the relative assumptions of single and multiple regression.	19a	19a	
		Interpret regression coefficients in a multiple regression.	19b	19b	
19	Regression with Multiple Explanatory Variables	Interpret goodness-of-fit measures for single and multiple regressions, including R <sup>2</sup> and adjusted-R <sup>2</sup> .	19c	19c	
		Construct, apply, and interpret joint hypothesis tests and confidence intervals for multiple coefficients in a regression.	19d	19d	

Reading No.	Reading Name	Learning Outcome	2024 LOS	2023 LOS	Changes
19	Regression with Multiple Explanatory Variables	Calculate the regression R2 using the three components of the decomposed variation of the dependent variable data: the explained sum of squares, the total sum of squares, and the residual sum of squares.	19e	19e	
20	Regression Diagnostics	Explain how to test whether a regression is affected by heteroskedasticity	20a	20a	
		Describe approaches to using heteroskedastic data.	20b	20b	
		Characterize multicollinearity and its consequences, as well as distinguish between multicollinearity and perfect collinearity	20c	20c	
		Describe the consequences of excluding a relevant explanatory variable from a model and contrast those with the consequences of including an irrelevant regressor.	20d	20d	
		Explain two model selection procedures and how these relate to the bias-variance trade-off	20e	20e	
		Describe the various methods of visualizing residuals and their relative strengths.	20f	20f	
		Describe methods for identifying outliers and their impact.	20g	20g	
		Determine the conditions under which OLS is the best linear unbiased estimator.	20h	20h	
21	Stationary Time Series	Describe the requirements for a series to be covariance stationary.	21a	21a	
		Define the autocovariance function and the autocorrelation function.	21b	21b	
		Define white noise and describe independent white noise and normal (Gaussian) white noise	21c	21c	
		Define and describe the properties of autoregressive (AR) processes.	21d	21d	
		Define and describe the properties of moving average (MA) processes.	21e	21e	
		Explain how a lag operator works.	21f	21f	
		Explain mean reversion and calculate a mean-reverting level.	21g	21g	
		Define and describe the properties of autoregressive moving average (ARMA) processes.	21h	21h	
		Describe the application of AR, MA, and ARMA processes.	21i	21i	
		Describe sample autocorrelation and partial autocorrelation.	21j	21j	
		Describe the Box-Pierce Q statistic and the Ljung-Box Q statistic.	21k	21k	
		Explain how forecasts are generated from ARMA models.	21l	21l	
		Describe the role of mean reversion in long-horizon forecasts.	21m	21m	
		Explain how seasonality is modeled in a covariance-stationary ARMA.	21n	21n	
22	Non-Stationary Time Series	Describe linear and nonlinear time trends.	22a	22a	
		Explain how to use regression analysis to model seasonality.	22b	22b	
		Describe a random walk and a unit root.	22c	22c	
		Explain the challenges of modeling time series containing unit roots	22d	22d	
		Describe how to test if a time series contains a unit root.	22e	22e	
		Explain how to construct an h-step-ahead point forecast for a time series with seasonality	22f	22f	
		Calculate the estimated trend value and form an interval forecast for a time series.	22g	22g	
23	Measuring Returns, Volatility, and Correlation	Calculate, distinguish, and convert between simple and continuously compounded returns.	23a	23a	
		Define and distinguish between volatility, variance rate, and implied volatility.	23b	23b	
		Describe how the first two moments may be insufficient to describe non-normal distributions.	23c	23c	
		Explain how the Jarque-Bera test is used to determine whether returns are normally distributed.	23d	23d	
		Describe the power law and its use for non-normal distributions.	23e	23e	
		Define correlation and covariance and differentiate between correlation and dependence.	23f	23f	
		Describe properties of correlations between normally distributed variables when using a one-factor model.	23g	23g	
		Compare and contrast the different measures of correlation used to assess dependence.	23h	23h	



Reading No.	Reading Name	Learning Outcome	2024 LOS	2023 LOS	Changes
24	Simulation and Bootstrapping	Describe the basic steps to conduct a Monte Carlo simulation.	24a	24a	
		Describe ways to reduce Monte Carlo sampling error.	24b	24b	
		Explain the use of antithetic and control variates in reducing Monte Carlo sampling error.	24c	24c	
		Describe the bootstrapping method and its advantage over Monte Carlo simulation.	24d	24d	
		Describe pseudo-random number generation.	24e	24e	
		Describe situations where the bootstrapping method is ineffective.	24f	24f	
		Describe the disadvantages of the simulation approach to financial problem solving	24g	24g	
25	Machine Learning Methods	Discuss the philosophical and practical differences between machine learning techniques and classical econometrics	25a	25a	
		Compare and apply the two methods utilized for rescaling variables in data preparation	25b		
		Explain the differences among the training, validation, and test data sub-samples, and how each is used.	25c	25b	
		Understand the differences between and consequences of underfitting and overfitting, and propose potential remedies for each	25d	25c	
		Use principal components analysis to reduce the dimensionality of a set of features.	25e	25d	
		Describe how the K-means algorithm separates a sample into clusters.	25f	25e	
		Describe natural language processing and how it is used	25g	25f	
		Differentiate among unsupervised, supervised, and reinforcement learning models.	25h	25g	
Explain how reinforcement learning operates and how it is used in decision-making.	25i	25h			
26	Machine Learning and Prediction	Explain the role of linear regression and logistic regression in prediction.	26a	26a	
		Evaluate the predictive performance of logistic regression models	26b	26h	
		Understand how to encode categorical variables.	26c	26b	
		Discuss why regularization is useful, and distinguish between the ridge regression and LASSO approaches.	26d	26c	
		Show how a decision tree is constructed and interpreted.	26e	26d	
		Describe how ensembles of learners are built.	26f	26e	
		Explain the intuition and processes behind the K nearest neighbors and support vector machine methods for classification	26g	26f	
		Understand how neural networks are constructed and how their weights are determined.	26h	26g	
Compare the logistic regression and neural network classification approaches using a confusion matrix	26i				
<b>Financial Markets and Products</b>					
27	Banks	Identify the major risks faced by banks and explain how these risks can arise	27a	27a	
		Distinguish between economic capital and regulatory capital.	27b	27b	
		Summarize the Basel committee regulations for regulatory capital and their motivations.	27c	27c	
		Explain how deposit insurance gives rise to a moral hazard problem.	27d	27d	
		Describe investment banking financing arrangements, including private placement, public offering, best efforts, firm commitment, and Dutch auction approaches	27e	27e	
		Describe the potential conflicts of interest among commercial banking, securities services, and investment banking divisions of a bank, and recommend solutions to these conflict of interest problems.	27f	27f	
		Describe the distinctions between the banking book and the trading book of a bank.	27g	27g	
		Explain the originate-to-distribute banking model and discuss its benefits and drawbacks.	27h	27h	

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28	Insurance Companies and Pension Plans	Describe the key features of the various categories of insurance companies and identify the risks facing insurance companies.	28a	28a	
		Describe the use of mortality tables and calculate the premium payments for a policy holder	28b	28b	
		Distinguish between mortality risk and longevity risk and describe how to hedge these risks.	28c	28c	
		Describe defined benefit plans and defined contribution plans and explain the differences between them.	28d	28d	
		Compare the various types of life insurance policies.	28e	28e	
		Calculate and interpret loss ratio, expense ratio, combined ratio, and operating ratio for a property-casualty insurance company.	28f	28f	
		Describe moral hazard and adverse selection risks facing insurance companies, provide examples of each, and describe how to overcome these risks	28g	28g	
		Evaluate the capital requirements for life insurance and property-casualty insurance companies.	28h	28h	
		Compare the guaranty system and the regulatory requirements for insurance companies with those for banks.	28i	28i	
29	Fund Management	Differentiate among open-end mutual funds, closed-end mutual funds, and exchange-traded funds (ETFs).	29a	29a	
		Identify and describe potential undesirable trading behaviors at mutual funds.	29b	29b	
		Explain the concept of net asset value (NAV) of an open-end mutual fund and how it relates to share price.	29c	29c	
		Explain the key differences between hedge funds and mutual funds.	29d	29d	
		Calculate the return on a hedge fund investment and explain the incentive fee structure of a hedge fund including the terms hurdle rate, high-water mark, and clawback	29e	29e	
		Describe various hedge fund strategies including long-short equity, dedicated short, distressed securities, merger arbitrage, convertible arbitrage, fixed income arbitrage, emerging markets, global macro, and managed futures, and identify the risks faced by hedge funds.	29f	29f	
		Describe characteristics of mutual fund and hedge fund performance and explain the effect of measurement biases on performance measurement.	29g	29g	
30	Introduction to Derivatives	Define derivatives, describe the features and uses of derivatives, and compare linear and non-linear derivatives	30a	30a	
		Describe the specifics of exchange-traded and over-the-counter markets, and evaluate the advantages and disadvantages of each.	30b	30b	
		Differentiate between options, forwards, and futures contracts.	30c	30c	
		Identify and calculate option and forward contract payoffs.	30d	30d	
		Differentiate among the broad categories of traders: hedgers, speculators, and arbitrageurs.	30e	30e	
		Calculate and compare the payoffs from hedging strategies involving forward contracts and options.	30f	30f	
		Calculate and compare the payoffs from speculative strategies involving futures and options.	30g	30g	
		Describe arbitrageurs' strategy and calculate an arbitrage payoff.	30h	30h	
		Describe some of the risks that can arise from the use of derivatives.	30i	30i	
31	Exchanges and OTC Markets	Describe how exchanges can be used to alleviate counterparty risk.	31a	31a	
		Explain the developments in clearing that reduce risk.	31b	31b	
		Define netting and describe a netting process.	31c	31c	
		Describe the implementation of a margining process, explain the determinants of and calculate initial and variation margin requirements	31d	31d	
		Describe the process of buying stock on margin without using CCP and calculate margin requirements.	31e	31e	
		Compare exchange-traded and OTC markets and describe their uses.	31f	31f	

Reading No.	Reading Name	Learning Outcome	2024 LOS	2023 LOS	Changes
31	Exchanges and OTC Markets	Identify risks associated with OTC markets and explain how these risks can be mitigated.	31g	31g	
		Describe the role of collateralization in the OTC market and compare it to the margining system.	31h	31h	
		Explain the use of special purpose vehicles (SPVs) in the OTC derivatives market.	31i	31i	
32	Central Clearing	Provide examples of the mechanics of a central counterparty (CCP).	32a	32a	
		Describe the role of CCPs and distinguish between bilateral and centralized clearing.	32b	32b	
		Describe advantages and disadvantages of central clearing of OTC	32c	32c	
		Explain regulatory initiatives for the OTC derivatives market and their impact on central clearing.	32d	32d	
		Compare margin requirements in centrally cleared and bilateral markets and explain how margin can mitigate risk	32e	32e	
		Compare netting in bilateral markets vs centrally cleared markets.	32f	32f	
		Assess the impact of central clearing on the broader financial markets.	32g	32g	
		Identify and explain the types of risks faced by CCPs.	32h	32h	
		Identify and distinguish between the risks to clearing members and to non-members.	32i	32i	
33	Futures Markets	Define and describe the key features and specifications of a futures contract, including the underlying asset, the contract price and size, trading volume, open interest, delivery, and limits.	33a	33a	
		Explain the convergence of futures and spot prices.	33b	33b	
		Describe the role of an exchange in futures transactions.	33c	33c	
		Explain the differences between a normal and an inverted futures market	33d	33d	
		Describe the mechanics of the delivery process and contrast it with cash settlement.	33e	33e	
		Describe and compare different trading order types.	33f	33f	
		Describe the application of marking to market and hedge accounting for futures.	33g	33g	
		Compare and contrast forward and futures contracts.	33h	33h	
34	Using Futures for Hedging	Define and differentiate between short and long hedges and identify their appropriate uses.	34a	34a	
		Describe the arguments for and against hedging and the potential impact of hedging on firm profitability.	34b	34b	
		Define and calculate the basis, discuss various sources of basis risk, and explain how basis risks arise when hedging with futures.	34c	34c	
		Define cross hedging and compute and interpret the hedge ratio and hedge effectiveness.	34d	34d	
		Calculate the profit and loss on a short or a long hedge	34e	34e	
		Compute the optimal number of futures contracts needed to hedge an exposure and explain and calculate the "tailing the hedge" adjustment	34f	34f	
		Explain how to use stock index futures contracts to change a stock portfolio's beta.	34g	34g	
		Explain how to create a long-term hedge using a stack-and-roll strategy and describe some of the risks that arise from this strategy	34h	34h	
35	Foreign Exchange Markets	Explain and describe the mechanics of spot quotes, forward quotes, and futures quotes in the foreign exchange markets distinguish between bid and ask exchange rates.	35a	35a	
		Calculate a bid-ask spread and explain why the bid-ask spread for spot quotes may be different from the bid-ask spread for forward quotes.	35b	35b	
		Compare outright (forward) and swap transactions.	35c	35c	
		Define, compare, and contrast transaction risk, translation risk, and economic risk.	35d	35d	
		Describe examples of transaction, translation, and economic risks and explain how to hedge these risks.	35e	35e	

Reading No.	Reading Name	Learning Outcome	2024 LOS	2023 LOS	Changes
35	Foreign Exchange Markets	Describe the rationale for multi-currency hedging using options.	35f	35f	
		Identify and explain the factors that determine exchange rates.	35g	35g	
		Calculate and explain the effect of an appreciation/depreciation of one currency relative to another.	35h	35h	
		Explain the purchasing power parity theorem and use this theorem to calculate the appreciation or depreciation of a foreign currency.	35i	35i	
		Describe the relationship between nominal and real interest rates.	35j	35j	
		Describe how a non-arbitrage assumption in the foreign exchange markets leads to the interest rate parity theorem and use this theorem to calculate forward foreign exchange rates.	35k	35k	
		Distinguish between covered and uncovered interest rate parity conditions.	35l	35l	
36	Pricing Financial Forwards and Futures	Define and describe financial assets.	36a	36a	
		Define short-selling and calculate the net profit of a short sale of a dividend-paying stock.	36b	36b	
		Describe the differences between forward and futures contracts and explain the relationship between forward and spot prices.	36c	36c	
		Calculate the forward price given the underlying asset's spot price and describe an arbitrage argument between spot and forward prices.	36d	36d	
		Distinguish between the forward price and the value of a forward contract.	36e	36e	
		Calculate the value of a forward contract on a financial asset that does or does not provide income or yield.	36f	36f	
		Explain the relationship between forward and futures prices.	36g	36g	
		Calculate the value of a stock index futures contract and explain the concept of index arbitrage.	36h	36h	
37	Commodity Forwards and Futures	Explain the key differences between commodities and financial assets.	37a	37a	
		Define and apply commodity concepts such as storage costs, carry markets, lease rate, and convenience yield.	37b	37b	
		Identify factors that impact prices on agricultural commodities, metals, energy, and weather derivatives.	37c	37c	
		Explain the formula for pricing commodity forwards.	37d	37d	
		Describe an arbitrage transaction in commodity forwards and compute the potential arbitrage profit.	37e	37e	
		Define the lease rate and explain how it determines the no-arbitrage values for commodity forwards and futures.	37f	37f	
		Describe the cost of carry model and determine the impact of storage costs and convenience yields on commodity forward prices and no-arbitrage bounds.	37g	37g	
		Compute the forward price of a commodity with storage costs.	37h	37h	
		Explain how to create a synthetic commodity position and use it to explain the relationship between the forward price and the expected future spot price.	37i	37i	
		Explain the impact of systematic and nonsystematic risk on current futures prices and expected future spot prices.	37j	37j	
Define and interpret normal backwardation and contango.	37k	37k			
38	Options Markets	Describe the various types and uses of options, define moneyness	38a	38a	
		Explain the payoff function and calculate the profit and loss from an options position.	38b	38b	
		Explain how dividends and stock splits can impact the terms of a stock option.	38c	38d	
		Describe the application of commissions, margin requirements, and exercise procedures to exchange-traded options, and explain the trading characteristics of these options.	38d	38e	
		Define and describe warrants, convertible bonds, and employee stock options.	38e	38f	
		Explain the specification of exchange-traded stock option contracts, including that of nonstandard products		38c	

Reading No.	Reading Name	Learning Outcome	2024 LOS	2023 LOS	Changes
39	Properties of Options	Identify the six factors that affect an option's price.	39a	39a	
		Identify and compute upper and lower bounds for option prices on non-dividend and dividend paying stocks.	39b	39b	
		Explain put-call parity and apply it to the valuation of European and American stock options, with dividends and without dividends, and express it in terms of forward prices.	39c	39c	
		Explain and assess potential rationales for using the early exercise features of American call and put options.	39d	39d	
40	Trading Strategies	Explain the motivation to initiate a covered call or a protective put strategy.	40a	40a	
		Describe principal protected notes (PPNs) and explain necessary conditions to create them.	40b	40b	
		Describe the use and calculate the payoffs of various spread strategies.	40c	40c	
		Describe the use and explain the payoff functions of combination strategies.	40d	40d	
41	Exotic Options	Define and contrast exotic derivatives and plain vanilla derivatives.	41a	41a	
		Describe some of the reasons that drive the development of exotic derivative products.	41b	41b	
		Explain how any derivative can be converted into a zero-cost product.	41c	41c	
		Describe how standard American options can be transformed into nonstandard American options.	41d	41d	
		Identify and describe the characteristics and payoff structures of the following exotic options: gap, forward start, compound, chooser, barrier, binary, lookback, Asian, exchange, and basket options.	41e	41e	
		Describe and contrast volatility swaps and variance swaps	41f	41f	
		Explain the basic premise of static option replication and how it can be applied to hedging exotic options.	41g	41g	
42	Properties of Interest Rates	Describe Treasury rates, LIBOR, Secured Overnight Financing Rate (SOFR), and repo rates, and explain what is meant by the "risk-free" rate.	42a	42a	
		Calculate the value of an investment using different compounding frequencies.	42b	42b	
		Convert interest rates based on different compounding frequencies.	42c	42c	
		Calculate the theoretical price of a bond using spot rates.	42d	42d	
		Calculate the Macaulay duration, modified duration, and dollar duration of a bond.	42e	42e	
		Evaluate the limitations of duration and explain how convexity addresses some of them.	42f	42f	
		Calculate the change in a bond's price given its duration, its convexity, and a change in interest rates.	42g	42g	
		Derive forward interest rates from a set of spot rates.	42h	42h	
		Derive the value of the cash flows from a forward rate agreement (FRA).	42i	42i	
		Calculate zero-coupon rates using the bootstrap method.	42j	42j	
		Compare and contrast the major theories of the term structure of interest rates.	42k	42k	
		43	Corporate Bonds	Describe features of bond trading and explain the behavior of bond yields	43a
Describe a bond indenture and explain the role of the corporate trustee in a bond indenture.	43b			43b	
Define high-yield bonds and describe types of high-yield bond issuers and some of the payment features unique to high-yield bonds.	43c			43c	
Differentiate between credit default risk and credit spread risk.	43d			43d	
Describe event risk and explain what may cause it to manifest in corporate bonds.	43e			43e	
Describe different characteristics of bonds such as issuer, maturity, interest rate, and collateral.	43f			43f	
Describe the mechanisms by which corporate bonds can be retired before maturity	43g			43g	
Define recovery rate and default rate, and differentiate between an issue default rate and a dollar default rate.	43h			43h	

Reading No.	Reading Name	Learning Outcome	2024 LOS	2023 LOS	Changes
43	Corporate Bonds	Evaluate the expected return from a bond investment and identify the components of the bond's expected return.	43i	43i	
44	Mortgages and Mortgage-Backed Securities	Describe the various types of residential mortgage products.	44a	44a	
		Calculate a fixed-rate mortgage payment and its principal and interest components.	44b	44b	
		Summarize the securitization process of mortgage-backed securities (MBS), particularly the formation of mortgage pools, including specific pools and to-be-announced (TBAs)	44c	44c	
		Calculate the weighted average coupon, weighted average maturity, single monthly mortality rate (SMM), and conditional prepayment rate (CPR) for a mortgage pool.	44d	44d	
		Describe the process of trading pass-through agency MBS.	44e	44e	
		Explain the mechanics of different types of agency MBS products, including collateralized mortgage obligations (CMOs), interest-only securities (IOs), and principal-only securities (POs).	44f	44f	
		Describe a dollar roll transaction and how to value a dollar roll.	44g	44g	
		Describe the mortgage prepayment option and factors that affect it; explain prepayment modeling and its four components: refinancing, turnover, defaults, and curtailments.	44h	44h	
		Describe the steps in valuing an MBS using Monte Carlo simulation.	44i	44i	
		Define Option-Adjusted Spread (OAS) and explain its uses and challenges	44j	44j	
45	Interest Rate Futures	Identify the most commonly used day count conventions, describe the markets that each one is typically used in, and apply each to an interest calculation.	45a	45a	
		Calculate the conversion of a discount rate to a price for a US Treasury bill	45b	45b	
		Differentiate between the clean and dirty price for a US Treasury bond; calculate the accrued interest and dirty price on a US Treasury bond	45c	45c	
		Explain and calculate a US Treasury bond futures contract conversion factor	45d	45d	
		Calculate the cost of delivering a bond into a Treasury bond futures contract.	45e	45e	
		Describe the impact of the level and shape of the yield curve on the cheapest-to-deliver Treasury bond decision.	45f	45f	
		Calculate the theoretical futures price for a Treasury bond futures contract.	45g	45g	
		Calculate the final contract price on a Eurodollar futures contract and compare Eurodollar futures to FRAs.	45h	45h	
		Describe and compute the Eurodollar futures contract convexity adjustment.	45i	45i	
		Calculate the duration-based hedge ratio and create a duration-based hedging strategy using interest rate futures.	45j	45j	
Explain the limitations of using a duration-based hedging strategy.	45k	45k			
46	Swaps	Explain the mechanics of a plain vanilla interest rate swap and compute its cash flows.	46a	46a	
		Explain how a plain vanilla interest rate swap can be used to transform an asset or a liability and calculate the resulting cash flows.	46b	46b	
		Explain the role of financial intermediaries in the swaps market.	46c	46c	
		Describe the role of the confirmation in a swap transaction.	46d	46d	
		Describe the comparative advantage argument for the existence of interest rate swaps and evaluate some of the criticisms of this argument.	46e	46e	
		Explain how the discount rates in a plain vanilla interest rate swap are computed.	46f	46f	
		Calculate the value of a plain vanilla interest rate swap based on two simultaneous bond positions.	46g	46g	
		Calculate the value of a plain vanilla interest rate swap from a sequence of FRAs.	46h	46h	
		Explain how a currency swap can be used to transform an asset or liability and calculate the resulting cash flows	46i	46j	

Reading No.	Reading Name	Learning Outcome	2024 LOS	2023 LOS	Changes
46	Swaps	Calculate the value of a currency swap based on two simultaneous bond positions.	46j	46k	
		Calculate the value of a currency swap based on a sequence of forward exchange rates.	46k	46l	
		Identify and describe other types of swaps, including commodity, volatility, credit default, and exotic swaps.	46l	46m	
		Describe the credit risk exposure in a swap position.	46m	46n	
		Explain the mechanics of a currency swap and compute its cash flows		46i	
<b>Valuation and Risk Models</b>					
47	Measures of Financial Risk	Describe the mean-variance framework and the efficient frontier.	47a	47a	
		Compare the normal distribution with the typical distribution of returns of risky financial assets such as equities.	47b	47b	
		Define the VaR measure of risk, describe assumptions about return distributions and holding periods, and explain the limitations of VaR.	47c	47c	
		Explain and calculate ES and compare and contrast VaR and ES.	47d	47d	
		Define the properties of a coherent risk measure and explain the meaning of each property.	47e	47e	
		Explain why VaR is not a coherent risk measure.	47f	47f	
48	Calculating and Applying VaR	Explain and give examples of linear and non-linear portfolios.	48a	48a	
		Describe and explain the historical simulation approach for computing VaR and ES.	48b	48b	
		Describe the delta-normal approach and use it to calculate VaR for non-linear derivatives.	48c	48c	
		Describe and calculate VaR for linear derivatives.	48d	48d	
		Describe the limitations of the delta-normal method.	48e	48e	
		Explain the Monte Carlo simulation method for computing VaR and ES and identify its strengths and weaknesses	48f	48f	
		Describe the implications of correlation breakdown for a VaR or ES analysis	48g	48g	
		Describe worst-case scenario analysis and compare it to VaR	48h	48h	
49	Measuring and Monitoring Volatility	Explain how asset return distributions tend to deviate from the normal distribution.	49a	49a	
		Explain reasons for fat tails in a return distribution and describe their implications.	49b	49b	
		Distinguish between conditional and unconditional distributions and describe regime switching	49c	49c	
		Compare and contrast different approaches for estimating conditional	49d	49d	
		Apply the exponentially weighted moving average (EWMA) approach to estimate volatility, and describe alternative approaches to weighting historical return data.	49e	49e	
		Apply the GARCH (1,1) model to estimate volatility.	49f	49f	
		Explain and apply approaches to estimate long horizon volatility/VaR and describe the process of mean reversion according to a GARCH (1,1) model.	49g	49g	
		Evaluate implied volatility as a predictor of future volatility and its	49h	49h	
		Describe an example of updating correlation estimates.	49i	49i	
50	External and Internal Credit Ratings	Describe external rating scales, the rating process, and the link between ratings and default.	50a	50a	
		Define conditional and unconditional default probabilities and explain the distinction between the two.	50b	50b	
		Define hazard rate and use it to calculate the unconditional default probability of a credit asset	50c	50c	
		Define recovery rate and calculate the expected loss from a loan.	50d	50d	
		Explain and compare the through-the-cycle and point-in-time ratings	50e	50e	
		Describe alternative methods to credit ratings produced by rating agencies.	50f	50f	
		Compare external and internal ratings approaches.	50g	50g	

Reading No.	Reading Name	Learning Outcome	2024 LOS	2023 LOS	Changes
50	External and Internal Credit Ratings	Describe and interpret a rating transition matrix and explain its uses	50h	50h	
		Describe the relationships between changes in credit ratings and changes in stock prices, bond prices, and credit default swap spreads.	50i	50i	
		Explain historical failures and potential challenges to the use of credit ratings in making investment decisions.	50j	50j	
51	Country Risk: Determinants, Measures, and Implications	Explain how a country's economic growth rates, political risk, legal risk, and economic structure relate to its risk exposure	51a	51a	
		Evaluate composite measures of risk that incorporate multiple components of country risk	51b	51b	
		Compare instances of sovereign default in both foreign currency debt and local currency debt and explain common causes of sovereign defaults.	51c	51c	
		Describe the consequences of sovereign default.	51d	51d	
		Describe factors that influence the level of sovereign default risk; explain and assess how rating agencies measure sovereign default risks.	51e	51e	
		Describe the characteristics of sovereign credit spreads and sovereign credit default swaps (CDS) and compare the use of sovereign spreads to credit ratings.	51f	51f	
52	Measuring Credit Risk	Explain the distinctions between economic capital and regulatory capital and describe how economic capital is derived.	52a	52a	
		Describe the degree of dependence typically observed among the loan defaults in a bank's loan portfolio, and explain the implications for the portfolio's default rate.	52b	52b	
		Define and calculate expected loss (EL).	52c	52c	
		Define and explain unexpected loss (UL).	52d	52d	
		Estimate the mean and standard deviation of credit losses assuming a binomial distribution.	52e	52e	
		Describe the Gaussian copula model and its application.	52f	52f	
		Describe and apply the Vasicek model to estimate default rate and credit risk capital for a bank.	52g	52g	
		Describe the CreditMetrics model and explain how it is applied in estimating economic capital.	52h	52h	
		Describe and use Euler's theorem to determine the contribution of a loan to the overall risk of a portfolio.	52i	52i	
		Explain why it is more difficult to calculate credit risk capital for derivatives than for loans.	52j	52j	
53	Operational Risk	Describe challenges to quantifying credit risk.	52k	52k	
		Describe the different categories of operational risk and explain how each type of risk can arise.	53a	53a	
		Compare the basic indicator approach, the standardized approach, and the advanced measurement approach for calculating operational risk regulatory capital.	53b	53b	
		Describe the standardized measurement approach and explain the reasons for its introduction by the Basel Committee.	53c	53c	
		Explain how a loss distribution is derived from an appropriate loss frequency distribution and loss severity distribution using Monte Carlo simulation.	53d	53d	
		Describe the common data issues that can introduce inaccuracies and biases in the estimation of loss frequency and severity distributions.	53e	53e	
		Describe how to use scenario analysis in instances when data are scarce.	53f	53f	
		Describe how to identify causal relationships and how to use Risk and Control Self-Assessment (RCSA), Key Risk Indicators (KRIs), and education to understand and manage operational risks.	53g	53g	
		Describe the allocation of operational risk capital to business units.	53h	53h	
		Explain how to use the power law to measure operational risk.	53i	53i	
Explain how the moral hazard and adverse selection problems faced by insurance companies relate to insurance against operational risk.	53j	53j			



Reading No.	Reading Name	Learning Outcome	2024 LOS	2023 LOS	Changes
54	Stress Testing	Describe the rationale for the use of stress testing as a risk management tool.	54a	54a	
		Describe the relationship between stress testing and other risk measures, particularly in enterprise-wide stress testing.	54b	54c	
		Describe stressed VaR and stressed ES, including their advantages and disadvantages, and compare the process of determining stressed VaR and ES to that of traditional VaR and ES.	54c	54d	
		Explain key considerations and challenges related to developing stress testing scenarios and building stress testing models	54d	54b	
		Describe reverse stress testing and describe an example of regulatory stress testing	54e		
		Describe the responsibilities of the board of directors, senior management, and the internal audit function in stress testing governance.	54f	54e	
		Describe the role of policies and procedures, validation, and independent review in stress testing governance.	54g	54f	
		Describe the Basel stress testing principles for banks regarding the implementation of stress testing.	54h	54g	
55	Pricing Conventions, Discounting, and Arbitrage	Define discount factor and use a discount function to compute present and future values.	55a	55a	
		Define the “law of one price,” explain it using an arbitrage argument, and describe how it can be applied to bond pricing.	55b	55b	
		Identify arbitrage opportunities for fixed-income securities with certain cash flows	55c	55c	
		Identify the components of a US Treasury coupon bond and compare the structure to Treasury STRIPS, including the difference between P-STRIPS and C-STRIPS	55d	55d	
		Construct a replicating portfolio using multiple fixed-income securities to match the cash flows of a given fixed-income security	55e	55e	
		Differentiate between “clean” and “dirty” bond pricing and explain the implications of accrued interest with respect to bond pricing.	55f	55f	
		Describe the common day-count conventions used to compute interest on a fixed-income security	55g	55g	
56	Interest Rates	Calculate and interpret the impact of different compounding frequencies on a bond's value.	56a	56a	
		Define spot rate and compute discount factors given spot rates.	56b	56b	
		Interpret the forward rate and compute forward rates given spot rates.	56c	56c	
		Define par rate and describe how to determine the par rate of a bond	56d	56d	
		Interpret the relationship between spot, forward, and par rates.	56e	56e	
		Assess the impact of a change in time to maturity on the price of a bond	56f	56f	
		Define the “flattening” and “steepening” of rate curves and describe a trade to reflect expectations that a curve will flatten or steepen.	56g	56g	
		Describe a swap transaction and explain how a swap market defines par	56h	56h	
Describe overnight indexed swaps (OIS) and distinguish OIS rates from LIBOR swap rates.		56i			
57	Bond Yields and Return Calculations	Distinguish between gross and net realized returns and calculate the realized return for a bond over a holding period including reinvestments.	57a	57a	
		Define and interpret the spread of a bond and explain how a spread is derived from a bond price and a term structure of rates.	57b	57b	
		Define, interpret, and apply a bond's yield to maturity (YTM) to bond pricing	57c	57c	
		Explain how to compute a bond's YTM given its structure and price	57d	57d	
		Calculate the price of an annuity and a perpetuity.	57e	57e	
		Explain the relationship between spot rates and YTM.	57f	57f	
		Define the coupon effect and explain the relationship between coupon rate, YTM, and bond prices.	57g	57g	
		Explain the decomposition of the profit and loss (P&L) for a bond position or portfolio into separate factors including carry roll-down, rate change, and spread change effects.	57h	57h	

Reading No.	Reading Name	Learning Outcome	2024 LOS	2023 LOS	Changes
57	Bond Yields and Return Calculations	Describe the common assumptions made about interest rates when calculating carry roll-down, and calculate carry roll-down under these assumptions	57i	57i	
58	Applying Duration, Convexity, and DV01	Describe a one-factor interest rate model and identify common examples of interest rate factors.	58a	58a	
		Define and compute the DV01 of a fixed-income security given a change in rates and the resulting change in price	58b	58b	
		Calculate the face amount of bonds required to hedge an interest rate-sensitive position given the DV01 of each	58c	58c	
		Define, compute, and interpret the effective duration of a fixed-income security given a change in rates and the resulting change in price	58d	58d	
		Compare and contrast DV01 and effective duration as measures of price sensitivity.	58e	58e	
		Define, compute, and interpret the convexity of a fixed-income security given a change in rates and the resulting change in price	58f	58f	
		Calculate the DV01, duration, and convexity of a portfolio of fixed-income securities	58g	58g	
		Explain the hedging of a position based on effective duration and convexity	58h	58h	
		Construct a barbell portfolio to match the cost and duration of a given bullet investment and explain the advantages and disadvantages of bullet and barbell portfolios	58i	58i	
59	Modeling Non-Parallel Term Structure Shifts and Hedging	Describe principal components analysis and explain its use in understanding term structure movements.	59a	59a	
		Describe key rate shift analysis and define key rate 01 (KR01)	59b	59c	
		Calculate the KR01s of a portfolio given a set of key rates	59c	59d	
		Compute the positions in hedging instruments necessary to hedge the key rate risks of a portfolio.	59d	59e	
		Apply key rate analysis and principal components analysis to estimating portfolio volatility	59e	59g	
		Describe an interest rate bucketing approach, define forward bucket 01, and compare forward bucket 01s to KR01s	59f		
		Calculate the corresponding duration measure given a KR01 or forward bucket 01	59g		
		Define key rate exposures and know the characteristics of key rate exposure factors, including partial 01s and forward-bucket 01s.		59b	
Relate key rates, partial 01s, and forward-bucket 01s and calculate the forward-bucket 01 for a shift in rates in one or more buckets.		59f			
60	Binomial Trees	Calculate the value of an American and a European call or put option using a one-step and two-step binomial model.	60a	60a	
		Describe how volatility is captured in the binomial model.	60b	60b	
		Describe how the value calculated using a binomial model converges as time periods are added.	60c	60c	
		Define and calculate delta of a stock option.	60d	60d	
		Explain how the binomial model can be altered to price options on stocks with dividends, stock indices, currencies, and futures.	60e	60e	
61	The Black-Scholes-Merton Model	Explain the lognormal property of stock prices, the distribution of rates of return, and the calculation of expected return.	61a	61a	
		Compute the realized return and historical volatility of a stock.	61b	61b	
		Describe the assumptions underlying the Black-Scholes-Merton option pricing model.	61c	61c	
		Compute the value of a European option on a non-dividend-paying stock using the Black-Scholes-Merton model.	61d	61d	
		Define implied volatilities and describe how to compute implied volatilities from market prices of options using the Black-Scholes-Merton model.	61e	61e	
		Explain how dividends affect the decision to exercise early for American call and put options.	61f	61f	

Reading No.	Reading Name	Learning Outcome	2024 LOS	2023 LOS	Changes
61	The Black-Scholes-Merton Model	Compute the value of a European option on a dividend-paying stock, futures, or foreign currency using the Black-Scholes-Merton model	61g	61g	
		Describe warrants, calculate the value of a warrant, and calculate the dilution cost of the warrant to existing shareholders.	61h	61h	
62	Option Sensitivity Measures: The Greeks	Describe and assess the risks associated with naked and covered option positions.	62a	62a	
		Describe the use of a stop-loss hedging strategy, including its advantages and disadvantages, and explain how this strategy can generate naked and covered option positions.	62b	62b	
		Compute the delta of an option.	62c	62d	
		Explain delta hedging for an option position, including its dynamic aspects.	62d	62c	
		Define and describe vega, gamma, theta, and rho for option positions and calculate the gamma and vega of an option.	62e		
		Explain how to implement and maintain a delta-neutral and gamma-neutral position.	62f	62h	
		Describe the relationship between delta, theta, gamma, and vega.	62g	60i	
		Calculate the delta, gamma, and vega of a portfolio.	62h	62f+ 62g	
	Describe how to implement portfolio insurance and how this strategy compares with delta hedging.	62i	62j		