FRM P-1

Syllabus

2025

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-Aswini Bajaj

CA, CS, CFA, FRM, CAIA, CIPM, CFP, RV, CCRA, CIIB, CIRA, AIM

SYLLABUS

Subjects

Reading No.	Subject	Chapters	LOS		Weightage	No. of Questions
			Average	Total		
1	Foundations of Risk Management	11	5	52	20%	20
2	Quantitative Analysis	15	8	120	20%	20
3	Financial Markets and Products	20	9	172	30%	30
4	Valuation and Risk Models	16	8	130	30%	30
	TOTAL	**62**	**30**	**474**	**100%**	**100**

SYLLABUS

Chapters

Subject	Reading No	Reading Name	No. of LOS
Foundations of Risk Management	1	The Building Blocks of Risk Management	6
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** Reading Number is as per Schweser, not Institute Material*

Subject	Reading No	Reading Name	No. of LOS
Financial Markets and Products	30	Introduction to Derivatives	9
	31	Exchanges and OTC Markets	9
	32	Central Clearing	9
	33	Futures Markets	7
	34	Using Futures for Hedging	8
	35	Foreign Exchange Markets	12
	36	Pricing Financial Forwards and Futures	8
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	38	Options Markets	5
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	40	Trading Strategies	4
	41	Exotic Options	7
	42	Properties of Interest Rates	11
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	44	Mortgages and Mortgage-Backed Securities	10
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	46	Swaps	13
Valuation and Risk Models	47	Measures of Financial Risk	6
	48	Calculating and Applying VaR	8
	49	Measuring and Monitoring Volatility	9
	50	External and Internal Credit Ratings	10
	51	Country Risk-Determinants, Measures, and Implications	6
	52	Measuring Credit Risk	11
	53	Operational Risk	10
	54	Stress Testing	8
	55	Pricing Conventions, Discounting, and Arbitrage	7
	56	Interest Rates	8
	57	Bond Yields and Return Calculations	9
	58	Applying Duration, Convexity, and DV01	9
	59	Modeling Non-Parallel Term Structure Shifts and Hedging	7
	60	Binomial Trees	5
	61	The Black Scholes Merton Model	8
	62	Option Sensitivity Measures-The Greeks	9

SYLLABUS

Learning Outcome

Reading No.	Reading Name	LOS	Learning Outcome
Foundations of Risk Management			
1	The Building Blocks of Risk Management	a	Explain the concept of risk and compare risk management with risk taking.
		b	Evaluate, compare, and apply tools and procedures used to measure and manage risk, including quantitative measures, qualitative risk assessment techniques, and enterprise risk management
		c	Differentiate between expected loss and unexpected loss and provide examples of each.
		d	Interpret the relationship between risk and reward and explain how conflicts of interest can impact risk management.
		e	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
		f	Explain how risk factors can interact with each other and describe challenges in aggregating risk exposures.
2	How Do Firms Manage Financial Risk	a	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
		b	Explain the relationship between risk appetite and a firm's risk management decisions.
		c	Evaluate some advantages and disadvantages of hedging risk exposures and explain challenges that can arise when implementing a hedging strategy.
		d	Apply appropriate methods to hedge operational and financial risks, including pricing, foreign currency, and interest rate risk.
		e	Assess the impact of risk management tools and instruments, including risk limits and derivatives.
3	The Governance of Risk Management	a	Explain changes in regulations and corporate risk governance that occurred as a result of the 2007-2009 financial crisis.
		b	Describe best practices for the governance of a firm's risk management processes.
		c	Explain the risk management role and responsibilities of a firm's board of directors.
		d	Evaluate the relationship between a firm's risk appetite and its business strategy, including the role of incentives.
		e	Illustrate the interdependence of functional units within a firm as it relates to risk management.
		f	Assess the role and responsibilities of a firm's audit committee.
4	Credit Risk Transfer Mechanisms	a	Compare different types of credit derivatives, explain their applications, and describe their advantages.
		b	Explain different traditional approaches or mechanisms that firms can use to help mitigate credit risk.
		c	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.
		d	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.
5	Modern Portfolio Theory and Capital Asset Pricing Model	a	Explain Modern Portfolio Theory and interpret the Markowitz efficient frontier
		b	Interpret the derivation and components of the CAPM
		c	Describe the assumptions underlying the CAPM.
		d	Interpret and compare the capital market line and the security market line.
		e	Apply the CAPM in calculating the expected return on an asset.
		f	Interpret beta and calculate the beta of a single asset or portfolio.
		g	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.
6	The Arbitrage Pricing Theory and Multifactor Models of Risk and Return	a	Explain the Arbitrage Pricing Theory (APT), describe its assumptions, and compare the APT to the CAPM.
		b	Describe the inputs, including factor betas, to a multifactor model and explain the challenges of using multifactor models in hedging
		c	Calculate the expected return of an asset using a single-factor and a multifactor model.
		d	Explain how to construct a portfolio to hedge exposure to multiple factors.
		e	Describe and apply the Fama-French three-factor model in estimating asset returns.

Reading No.	Reading Name	LOS	Learning Outcome
7	Principles for Effective Data Aggregation and Risk Reporting	a	Explain the potential benefits of having effective risk data aggregation and reporting.
		b	Explain challenges to the implementation of a strong risk data aggregation and reporting process and the potential impacts of using poor-quality data.
		c	Describe key governance principles related to risk data aggregation and risk reporting.
		d	Describe characteristics of effective data architecture, IT infrastructure, and risk-reporting practices.
8	Enterprise Risk Management and Future Trends	a	Describe Enterprise Risk Management (ERM) and compare an ERM program with a traditional silo-based risk management program.
		b	Describe the motivations for a firm to adopt an ERM initiative.
		c	Explain best practices for the governance and implementation of an ERM program
		d	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.
		e	Explain the role of scenario analysis in the implementation of an ERM program and describe its advantages and disadvantages
		f	Explain the use of scenario analysis in stress testing programs and capital planning.
9	Learning from Financial Disasters	a	Analyze the following factors that contributed to the given case studies of financial disasters and examine the key lessons learned from these case studies: - Interest rate risk, including the 1980s savings and loan crisis in the US. - Funding liquidity risk, including Lehman Brothers, Continental Illinois, and Northern Rock. - Constructing and implementing a hedging strategy, including the Metallgesellschaft case. - Model risk, including the Niederhoffer case, Long Term Capital Management, and the London Whale case. - Rogue trading and misleading reporting, including the Barings case. - Financial engineering, including Bankers Trust, the Orange County case, and Sachsen - Landesbank.Reputation risk, including the Volkswagen case. - Corporate governance, including the Enron case. - Cyber risk, including the SWIFT case.
10	Anatomy of the Great Financial Crisis of 2007-2009	a	Describe the historical background and summarize the major events of the 2007-2009 financial crisis.
		b	Describe the build-up to the financial crisis and the factors that played an important role.
		c	Explain the role of subprime mortgages and collateralized debt obligations (CDOs) in the crisis
		d	Compare the roles of different types of institutions in the financial crisis, including banks, financial intermediaries, mortgage brokers and lenders, and rating agencies.
		e	Describe trends in the short-term wholesale funding markets that contributed to the financial crisis, including their impact on systemic risk
		f	Describe responses made by central banks in response to the crisis.
11	GARP Code of Conduct	a	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.
		b	Describe the potential consequences of violating the GARP Code of Conduct.
Quantitative Analysis			
12	Fundamentals of Probability	a	Describe an event and an event space
		b	Describe independent events and mutually exclusive events.
		c	Explain the difference between independent events and conditionally independent events.
		d	Calculate the probability of an event for a discrete probability function.
		e	Define, describe, and calculate a conditional probability
		f	Differentiate between conditional and unconditional probabilities
		g	Explain and apply Bayes' rule.
13	Random Variables	a	Describe and differentiate a probability mass function from a cumulative distribution function and explain the relationship between these two
		b	Describe and apply the concept of a mathematical expectation of a random variable
		c	Describe the four common population moments.
		d	Explain the differences between a probability mass function and a probability density function.
		e	Describe the quantile function and quantile-based estimators
		f	Explain the effect of a linear transformation of a random variable on the mean, variance, standard deviation, skewness, kurtosis, median, and interquartile range.

Reading No.	Reading Name	LOS	Learning Outcome
14	Common Univariate Random Variables	a	Illustrate the key properties and applications of the following distributions: Bernoulli distribution, binomial distribution, Poisson distribution, uniform distribution, normal distribution, lognormal distribution, Chi-squared distribution, Student's t distribution, F distribution, exponential distribution, and the Beta distribution.
		b	Construct mixture distributions, and explain the creation and characteristics of mixture distributions
15	Multivariate Random Variables	a	Explain how a probability matrix can be used to express a probability mass function.
		b	Calculate the marginal and conditional distributions of a discrete bivariate random variable
		c	Explain how the expectation of a function is calculated for a bivariate discrete random variable
		d	Define covariance and explain what it measures.
		e	Explain the relationship between the covariance and correlation of two random variables, and how
		f	Explain and illustrate the effects of applying linear transformations on the covariance and correlation between two random variables
		g	Calculate the variance of a weighted sum of two random variables
		h	Calculate the conditional expectation of a component of a bivariate random variable
		i	Describe the features of an independent and identically distributed (iid) sequence of random variables.
		j	Explain how the iid property is helpful in calculating the mean and variance of a sum of iid random variables
16	Sample Moments	a	Estimate the mean, variance, and standard deviation using sample data.
		b	Explain the difference between a population moment and a sample moment.
		c	Differentiate between an estimator and an estimate
		d	Describe the bias of an estimator and explain what the bias measures.
		e	Explain what is meant by the statement that the mean estimator is BLUE.
		f	Describe the consistency of an estimator and explain the usefulness of this concept.
		g	Explain how the Law of Large Numbers (LLN) and Central Limit Theorem (CLT) apply to the sample mean.
		h	Estimate and interpret the skewness and kurtosis of a random variable.
		i	Estimate quantiles, including the median, using sample data
		j	Estimate the mean of two variables and apply the CLT.
		k	Estimate the covariance and correlation between two random variables.
		l	Explain how coskewness and cokurtosis are related to skewness and kurtosis.
17	Hypothesis Testing	a	Construct an appropriate null hypothesis and alternative hypothesis and differentiate between the two
		b	Differentiate between a one-sided and a two-sided test and identify when to use each test.
		c	Explain the difference between Type I and Type II errors and how these relate to the size and power of a test.
		d	Explain how a hypothesis test and a confidence interval are related
		e	Explain what the p-value of a hypothesis test measures.
		f	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
		g	Identify the steps to test a hypothesis about the difference between two population means.
		h	Explain the problem of multiple testing and how it can lead to biased results.
18	Linear Regression	a	Describe the models which can be estimated using linear regression and differentiate them from those which cannot.
		b	Interpret the results of an ordinary least squares (OLS) regression with a single explanatory variable.
		c	Describe the key assumptions of OLS parameter estimation.
		d	Describe the properties of OLS estimators and their sampling distributions
		e	Construct, apply, and interpret hypothesis tests and confidence intervals for a single regression coefficient in a regression.
		f	Explain the steps needed to perform a hypothesis test in a linear regression.
		g	Describe the relationship among a t-statistic, its p-value, and a confidence interval.
		h	Estimate the correlation coefficient from the R2 measure obtained in linear regressions with a single explanatory variable
19	Regression with Multiple Explanatory Variables	a	Differentiate between the relative assumptions of single and multiple regression
		b	Interpret regression coefficients in a multiple regression.
		c	Interpret goodness-of-fit measures for single and multiple regressions, including R2 and adjusted-R2.
		d	Construct, apply, and interpret joint hypothesis tests and confidence intervals for multiple coefficients in a regression.

Reading No.	Reading Name	LOS	Learning Outcome
19	Regression with Multiple Explanatory Variables	e	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.
20	Regression Diagnostics	a	Explain how to test whether a regression is affected by heteroskedasticity
		b	Describe approaches to using heteroskedastic data.
		c	Explain the concept of multicollinearity and differentiate between multicollinearity and perfect collinearity
		d	Describe and illustrate the consequences of excluding a relevant explanatory variable from a model, and contrast those with the consequences of including an irrelevant regressor
		e	Explain two model selection procedures and how these relate to the bias-variance trade-off
		f	Describe the various methods of visualizing residuals and their relative strengths.
		g	Describe methods for identifying outliers and their impact.
		h	Determine the conditions under which OLS is the best linear unbiased estimator.
21	Stationary Time Series	a	Describe the requirements for a series to be covariance stationary.
		b	Define the autocovariance function and the autocorrelation function.
		c	Define white noise, and describe independent white noise and normal (Gaussian) white noise
		d	Define and describe the properties of autoregressive (AR) processes.
		e	Define and describe the properties of moving average (MA) processes.
		f	Explain how a lag operator works.
		g	Explain mean reversion and calculate a mean-reverting level.
		h	Define and describe the properties of autoregressive moving average (ARMA) processes.
		i	Describe the application of AR, MA, and ARMA processes.
		j	Describe sample autocorrelation and partial autocorrelation.
		k	Describe the Box-Pierce Q statistic and the Ljung-Box Q statistic.
		l	Explain how forecasts are generated from ARMA models.
		m	Describe the role of mean reversion in long-horizon forecasts.
		n	Explain how seasonality is modeled in a covariance-stationary ARMA.
22	Non-Stationary Time Series	a	Describe linear and nonlinear time trends.
		b	Explain how regression analysis can be used to model seasonality
		c	Describe a random walk and a unit root.
		d	Explain the challenges of modeling time series containing unit roots
		e	Describe how to test if a time series contains a unit root.
		f	Explain how to construct an h-step-ahead point forecast for a time series with seasonality
		g	Calculate the estimated trend value and construct an interval forecast for a time series
23	Measuring Returns, Volatility, and Correlation	a	Calculate, differentiate, and convert between simple and continuously compounded returns
		b	Define and differentiate between volatility, variance rate, and implied volatility
		c	Describe how the first two moments may be insufficient to describe non-normal distributions.
		d	Calculate the Jarque-Bera test statistic and explain how it is used to determine whether returns are normally distributed
		e	Describe the power law and its use for non-normal distributions.
		f	Define correlation and covariance and differentiate between correlation and dependence.
		g	Describe properties of correlations between normally distributed variables when using a one-factor model.
		h	Compare and contrast the different measures of correlation used to assess dependence.
24	Simulation and Bootstrapping	a	Describe the basic steps to conduct a Monte Carlo simulation and illustrate how this simulation method is used to approximate moments or other quantities
		b	Describe ways to reduce Monte Carlo sampling error.
		c	Explain the use of antithetic and control variates in reducing Monte Carlo sampling error.
		d	Describe the bootstrapping method and its advantage over Monte Carlo simulation.
		e	Describe pseudo-random number generation.
		f	Describe situations where the bootstrapping method is ineffective.
		g	Describe the disadvantages of the simulation approach to financial problem solving

Reading No.	Reading Name	LOS	Learning Outcome
25	Machine Learning Methods	a	Discuss the philosophical and practical differences between machine learning techniques and classical econometrics.
		b	Compare and apply the two methods utilized for rescaling variables in data preparation.
		c	Explain the differences among the training, validation, and test data sub-samples, and how each is used.
		d	Examine the differences between and consequences of underfitting and overfitting, and describe potential remedies for each.
		e	Explain how principal components analysis is used to reduce the dimensionality of a set of features.
		f	Describe how the K-means algorithm separates a sample into clusters.
		g	Explain the mechanics behind natural language processing and how it is used.
		h	Differentiate among unsupervised, supervised, and reinforcement learning models.
		i	Explain how reinforcement learning operates, and calculate Q-values utilized in the decision-making process.
26	Machine Learning and Prediction	a	Explain the role of linear regression and logistic regression in prediction.
		b	Evaluate the predictive performance of logistic regression models.
		c	Describe and apply methods used to encode categorical variables.
		d	Discuss why regularization is useful, and compare the ridge regression and LASSO approaches.
		e	Illustrate how a decision tree is constructed and interpreted.
		f	Describe how ensembles of learners are built.
		g	Explain the intuition and processes behind the K nearest neighbors and support vector machine methods for classification.
		h	Explain how neural networks are constructed and how their weights are determined.
		i	Compare the logistic regression and neural network classification approaches using a confusion matrix.
Financial Markets and Products			
27	Banks	a	Identify the major risks faced by banks and explain how these risks can arise.
		b	Compare the characteristics and applications of economic capital and regulatory capital.
		c	Summarize the Basel committee regulations for regulatory capital and their motivations.
		d	Explain how deposit insurance gives rise to a moral hazard problem.
		e	Describe investment banking financing arrangements, including private placement, public offering, best efforts, firm commitment, and Dutch auction approaches.
		f	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.
		g	Describe the distinctions between the banking book and the trading book of a bank.
		h	Explain the originate-to-distribute banking model and discuss its benefits and drawbacks.
28	Insurance Companies and Pension Plans	a	Describe the key features of the various categories of insurance companies and identify the risks facing insurance companies.
		b	Describe the use of mortality tables and calculate the premium payments for a policy holder.
		c	Differentiate between mortality risk and longevity risk and describe how to hedge these risks.
		d	Describe defined benefit plans and defined contribution plans and explain the differences between them.
		e	Compare the various types of life insurance policies.
		f	Calculate and interpret loss ratio, expense ratio, combined ratio, and operating ratio for a property-casualty insurance company.
		g	Describe moral hazard and adverse selection risks facing insurance companies, provide examples of each, and describe how to overcome these risks.
		h	Evaluate the capital requirements for life insurance and property-casualty insurance companies.
		i	Compare the guaranty system and the regulatory requirements for insurance companies with those for banks.
29	Fund Management	a	Differentiate among open-end mutual funds, closed-end mutual funds, and exchange-traded funds (ETFs).
		b	Identify and describe potential undesirable trading behaviors at mutual funds.
		c	Explain the concept of net asset value (NAV) of an open-end mutual fund and how it relates to share price.
		d	Explain the key differences between hedge funds and mutual funds.

Reading No.	Reading Name	LOS	Learning Outcome
29	Fund Management	e	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
		f	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.
		g	Describe characteristics of mutual fund and hedge fund performance and explain the effect of measurement biases on performance measurement.
30	Introduction to Derivatives	a	Define derivatives, describe the features and uses of derivatives, and compare linear and non-linear derivatives
		b	Describe the specifics of exchange-traded and over-the-counter markets, and evaluate the advantages
		c	Differentiate between options, forwards, and futures contracts.
		d	Identify and calculate option and forward contract payoffs.
		e	Differentiate among the broad categories of traders: hedgers, speculators, and arbitrageurs.
		f	Calculate and compare the payoffs from hedging strategies involving forward contracts and options.
		g	Calculate and compare the payoffs from speculative strategies involving futures and options.
		h	Describe arbitrageurs' strategy and calculate an arbitrage payoff.
		i	Describe some of the risks that can arise from the use of derivatives.
31	Exchanges and OTC Markets	a	Describe how exchanges can be used to alleviate counterparty risk.
		b	Explain the developments in clearing that reduce risk.
		c	Define netting and describe a netting process.
		d	Describe the implementation of a margining process, explain the determinants of and calculate initial and variation margin requirements
		e	Describe the process of buying stock on margin without using CCP and calculate margin requirements.
		f	Compare exchange-traded and OTC markets and describe their uses.
		g	Identify risks associated with OTC markets and explain how these risks can be mitigated.
		h	Describe the role of collateralization in the OTC market and compare it to the margining system.
		i	Explain the use of special purpose vehicles (SPVs) in the OTC derivatives market.
32	Central Clearing	a	Describe characteristics and mechanics of a central counterparty (CCP)
		b	Describe the role of CCPs and distinguish between bilateral and centralized clearing.
		c	Describe advantages and disadvantages of central clearing of OTC derivatives.
		d	Explain regulatory initiatives for the OTC derivatives market and their impact on central clearing.
		e	Compare margin requirements in centrally cleared and bilateral markets and explain how margin can mitigate risk
		f	Compare netting in bilateral markets vs centrally cleared markets.
		g	Assess the impact of central clearing on the broader financial markets.
		h	Identify and explain the types of risks faced by CCPs.
		i	Identify and distinguish between the risks to clearing members and to non-members.
33	Futures Markets	a	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.
		b	Explain the convergence of futures and spot prices.
		c	Describe the role of an exchange in futures transactions.
		d	Describe the mechanics of the delivery process and contrast it with cash settlement.
		e	Describe and compare different trading order types.
		f	Describe the application of marking to market and hedge accounting for futures.
		g	Compare and contrast forward and futures contracts.
34	Using Futures for Hedging	a	Define and differentiate between short and long hedges and identify their appropriate uses.
		b	Describe the arguments for and against hedging and the potential impact of hedging on firm
		c	Define and calculate the basis, discuss various sources of basis risk, and explain how basis risks arise when hedging with futures.
		d	Define cross hedging and calculate and interpret the hedge ratio and hedge effectiveness
		e	Calculate the profit and loss on a short or a long hedge
		f	Calculate the optimal number of futures contracts needed to hedge an exposure and explain and calculate the "tailing the hedge" adjustment
		g	Explain how to use stock index futures contracts to change a stock portfolio's beta.
		h	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

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

Reading No.	Reading Name	LOS	Learning Outcome
40	Trading Strategies	a	Explain the motivation to initiate a covered call or a protective put strategy.
		b	Describe principal protected notes (PPNs) and explain necessary conditions to create them.
		c	Describe the use and calculate the payoffs of various spread strategies.
		d	Describe the use and explain the payoff functions of combination strategies.
41	Exotic Options	a	Define and contrast exotic derivatives and plain vanilla derivatives.
		b	Describe some of the reasons that drive the development of exotic derivative products.
		c	Explain how any derivative can be converted into a zero-cost product.
		d	Describe how standard American options can be transformed into nonstandard American options.
		e	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.
		f	Describe and contrast volatility swaps and variance swaps
		g	Explain the basic premise of static option replication and how it can be applied to hedging exotic options.
42	Properties of Interest Rates	a	Describe Treasury rates, LIBOR, Secured Overnight Financing Rate (SOFR), and repo rates, and explain what is meant by the "risk-free" rate.
		b	Calculate the value of an investment using different compounding frequencies.
		c	Calculate value of a bond based on coupon and yield
		d	Calculate the theoretical price of a bond using spot rates.
		e	Calculate the Macaulay duration, modified duration, and dollar duration of a bond.
		f	Evaluate the limitations of duration and explain how convexity addresses some of them.
		g	Calculate the change in a bond's price given its duration, its convexity, and a change in interest rates.
		h	Calculate forward interest rates using a set of spot rates
		i	Calculate the value of the cash flows using a forward rate agreement (FRA)
		j	Calculate zero-coupon rates using the bootstrap method.
		k	Compare and contrast the major theories of the term structure of interest rates.
43	Corporate Bonds	a	Describe features of bond trading and explain the behavior of bond yield
		b	Describe a bond indenture and explain the role of the corporate trustee in a bond indenture.
		c	Define high-yield bonds and describe types of high-yield bond issuers and some of the payment features unique to high-yield bonds.
		d	Differentiate between credit default risk and credit spread risk.
		e	Describe event risk and explain what may cause it to manifest in corporate bonds.
		f	Describe different characteristics of bonds such as issuer, maturity, interest rate, and collateral.
		g	Describe the mechanisms by which corporate bonds can be retired before maturity
		h	Define recovery rate and default rate, and differentiate between an issue default rate and a dollar default rate.
		i	Evaluate the expected return from a bond investment and identify the components of the bond's expected return.
44	Mortgages and Mortgage-Backed Securities	a	Describe the various types of residential mortgage products.
		b	Calculate a fixed-rate mortgage payment and its principal and interest components.
		c	Summarize the securitization process of mortgage-backed securities (MBS), particularly the formation of mortgage pools, including specific pools and to-be-announced (TBAs)
		d	Calculate the weighted average coupon, weighted average maturity, single monthly mortality rate (SMM), and conditional prepayment rate (CPR) for a mortgage pool.
		e	Describe the process of trading pass-through agency MBS.
		f	Explain the mechanics of different types of agency MBS products, including collateralized mortgage obligations (CMOs), interest-only securities (IOs), and principal-only securities (POs).
		g	Describe a dollar roll transaction and how to value a dollar roll.
		h	Describe the mortgage prepayment option and factors that affect it; explain prepayment modeling and its four components: refinancing, turnover, defaults, and curtailments.
		i	Describe the steps in valuing an MBS using Monte Carlo simulation.
		j	Define Option Adjusted Spread (OAS) and explain its uses and challenges
45	Interest Rate Futures	a	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.
		b	Calculate the conversion of a discount rate to a price for a US Treasury bill

Reading No.	Reading Name	LOS	Learning Outcome
45	Interest Rate Futures	c	Differentiate between the clean and dirty price for a US Treasury bond; calculate the accrued interest and dirty price on a US Treasury bond
		d	Explain and calculate a US Treasury bond futures contract conversion factor
		e	Calculate the cost of delivering a bond into a Treasury bond futures contract.
		f	Describe the impact of the level and shape of the yield curve on the cheapest-to-deliver Treasury bond decision.
		g	Calculate the theoretical futures price for a Treasury bond futures contract.
		h	Calculate the duration-based hedge ratio and create a duration-based hedging strategy using interest rate futures.
		i	Explain the limitations of using a duration-based hedging strategy.
46	Swaps	a	Explain the mechanics of a plain vanilla interest rate swap and calculate its cash flows
		b	Explain how a plain vanilla interest rate swap can be used to transform an asset or a liability and calculate the resulting cash flows.
		c	Explain the role of financial intermediaries in the swaps market.
		d	Describe the role of confirmation in a swap transaction
		e	Describe the comparative advantage argument for the existence of interest rate swaps and evaluate some of the criticisms of this argument.
		f	Explain how the discount rates in a plain vanilla interest rate swap are calculated
		g	Calculate the value of a plain vanilla interest rate swap based on two simultaneous bond positions.
		h	Calculate the value of a plain vanilla interest rate swap from a sequence of FRAs.
		i	Explain how a currency swap can be used to transform an asset or a liability and calculate the resulting cash flows
		j	Calculate the value of a currency swap based on two simultaneous bond positions.
		k	Calculate the value of a currency swap based on a sequence of forward exchange rates.
		l	Identify and describe other types of swaps, including commodity, volatility, credit default, and exotic swaps.
		m	Describe the credit risk exposure in a swap position.
Valuation and Risk Models			
47	Measures of Financial Risk	a	Describe the mean-variance framework and the efficient frontier.
		b	Compare the normal distribution with the typical distribution of returns of risky financial assets such as equities.
		c	Define the VaR measure of risk, describe assumptions about return distributions and holding periods, and explain the limitations of VaR.
		d	Explain and calculate ES and compare and contrast VaR and ES.
		e	Define the properties of a coherent risk measure and explain the meaning of each property.
		f	Explain why VaR is not a coherent risk measure
48	Calculating and Applying VaR	a	Explain and provide examples of linear and non-linear portfolios
		b	Describe and explain the historical simulation approach for computing VaR and ES.
		c	Describe the delta-normal approach and calculate VaR for non-linear derivatives using delta-normal approach
		d	Describe and calculate VaR for linear derivatives.
		e	Describe the limitations of the delta-normal method.
		f	Explain the Monte Carlo simulation method for calculating VaR and ES and identify its strengths and weaknesses
		g	Describe the implications of correlation breakdown for a VaR or ES analysis
		h	Describe worst-case scenario analysis and compare it to VaR
49	Measuring and Monitoring Volatility	a	Explain how asset return distributions tend to deviate from the normal distribution.
		b	Explain reasons for fat tails in a return distribution and describe their implications.
		c	Differentiate between conditional and unconditional distributions and describe regime switching
		d	Compare and contrast different approaches for estimating conditional volatility
		e	Apply the exponentially weighted moving average (EWMA) approach to estimate volatility, and describe alternative approaches to weighting historical return data.
		f	Apply the GARCH (1,1) model to estimate volatility.

Reading No.	Reading Name	LOS	Learning Outcome
49	Measuring and Monitoring Volatility	g	Explain and apply approaches to estimate long horizon volatility/VaR and describe the process of mean reversion according to a GARCH (1,1) model.
		h	Evaluate implied volatility as a predictor of future volatility and its shortcomings.
		i	Describe an example of updating correlation estimates.
50	External and Internal Credit Ratings	a	Describe external rating scales, the rating process, and the link between ratings and default.
		b	Define conditional and unconditional default probabilities and explain the distinction between the two.
		c	Define hazard rate and calculate the unconditional default probability of a credit asset using hazard rate
		d	Define recovery rate and calculate the expected loss from a loan.
		e	Explain and compare the through-the-cycle and point-in-time ratings approaches
		f	Describe alternative methods to credit ratings produced by rating agencies.
		g	Compare external and internal ratings approaches.
		h	Describe, calculate, and interpret a rating transition matrix and explain its uses
		i	Describe the relationships between changes in credit ratings and changes in stock prices, bond prices, and credit default swap spreads.
		j	Explain historical failures and potential challenges to the use of credit ratings in making investment decisions.
51	Country Risk-Determinants, Measures, and Implications	a	Explain how a country's economic growth rates, political risk, legal risk, and economic structure relate to its risk exposure.
		b	Evaluate composite measures of risk that incorporate multiple components of country risk
		c	Compare instances of sovereign default in both foreign currency debt and local currency debt and explain common causes of sovereign defaults.
		d	Describe the consequences of sovereign default.
		e	Describe factors that influence the level of sovereign default risk; explain and assess how rating agencies measure sovereign default risks.
		f	Describe the characteristics of sovereign credit spreads and sovereign credit default swaps (CDS) and compare the use of sovereign spreads to credit ratings.
52	Measuring Credit Risk	a	Explain the distinctions between economic capital and regulatory capital and describe how economic capital is derived.
		b	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.
		c	Define and calculate expected loss (EL).
		d	Define and explain unexpected loss (UL).
		e	Estimate the mean and standard deviation of credit losses assuming a binomial distribution.
		f	Describe the Gaussian copula model and its application.
		g	Describe and apply the Vasicek model to estimate default rate and credit risk capital for a bank.
		h	Describe the CreditMetrics model and explain how it is applied in estimating economic capital.
		i	Describe and apply Euler's theorem to determine the contribution of a loan to the overall risk of a portfolio
		j	Explain why it is more difficult to calculate credit risk capital for derivatives than for loans.
		k	Describe challenges to quantifying credit risk.
53	Operational Risk	a	Describe the different categories of operational risk and explain how each type of risk can arise.
		b	Compare the basic indicator approach, the standardized approach, and the advanced measurement approach for calculating operational risk regulatory capital.
		c	Describe the standardized measurement approach and explain the reasons for its introduction by the Basel Committee.
		d	Explain how a loss distribution is derived from an appropriate loss frequency distribution and loss severity distribution using Monte Carlo simulation.
		e	Describe the common data issues that can introduce inaccuracies and biases in the estimation of loss frequency and severity distributions.
		f	Describe how to use scenario analysis in instances when data are scarce.
		g	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.

Reading No.	Reading Name	LOS	Learning Outcome
53	Operational Risk	h	Describe the allocation of operational risk capital to business units.
		i	Explain how to use the power law to measure operational risk.
		j	Explain how the moral hazard and adverse selection problems faced by insurance companies relate to insurance against operational risk.
54	Stress Testing	a	Describe the rationale for the use of stress testing as a risk management tool.
		b	Describe the relationship between stress testing and other risk measures, particularly in enterprise-wide stress testing.
		c	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.
		d	Explain key considerations and challenges related to developing stress testing scenarios and building stress testing models
		e	Describe reverse stress testing and describe an example of regulatory stress testing
		f	Describe the responsibilities of the board of directors, senior management, and the internal audit function in stress testing governance.
		g	Describe the role of policies and procedures, validation, and independent review in stress testing governance.
		h	Describe the Basel stress testing principles for banks regarding the implementation of stress testing.
55	Pricing Conventions, Discounting, and Arbitrage	a	Define discount factor and calculate present and future values using a discount function
		b	Define the "law of one price," explain it using an arbitrage argument, and describe how it can be applied to bond pricing.
		c	Identify arbitrage opportunities for fixed-income securities with certain cash flows
		d	Identify the components of a U.S. Treasury coupon bond and compare the structure to Treasury STRIPS, including the difference between P-STRIPS and C-STRIPS
		e	Construct a replicating portfolio using multiple fixed-income securities to match the cash flows of a given fixed-income security
		f	Differentiate between "clean" and "dirty" bond pricing and explain the implications of accrued interest with respect to bond pricing.
		g	Describe the common day-count conventions used to calculate interest on a fixed-income security
56	Interest Rates	a	Calculate and interpret the impact of different compounding frequencies on a bond's value.
		b	Define spot rate and calculate discount factors given spot rates
		c	Interpret the forward rate and calculate forward rates given spot rates
		d	Define par rate and describe how to determine the par rate of a bond
		e	Interpret the relationship between spot, forward, and par rates.
		f	Assess the impact of a change in time to maturity on the price of a bond
		g	Define the "flattening" and "steepening" of rate curves and describe a trade to reflect expectations that a curve will flatten or steepen.
		h	Describe a swap transaction and explain how a swap market defines par rates.
57	Bond Yields and Return Calculations	a	Differentiate between gross and net realized returns and calculate the realized return for a bond over a holding period including reinvestments
		b	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.
		c	Define, interpret, and apply a bond's yield to maturity (YTM) to bond pricing
		d	Explain how to calculate a bond's YTM given its structure and price
		e	Calculate the price of an annuity and a perpetuity.
		f	Explain the relationship between spot rates and YTM.
		g	Define the coupon effect and explain the relationship between coupon rate, YTM, and bond prices.
		h	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.
		i	Describe the common assumptions made about interest rates when calculating carry roll-down, and calculate carry roll-down under these assumptions
58	Applying Duration, Convexity, and DV01	a	Describe a one-factor interest rate model and identify common examples of interest rate factors.
		b	Define and calculate the DV01 of a fixed-income security given a change in rates and the resulting change in price

Reading No.	Reading Name	LOS	Learning Outcome
58	Applying Duration, Convexity, and DV01	c	Calculate the face amount of bonds required to hedge an interest rate-sensitive position given the DV01 of each
		d	Define, calculate, and interpret the effective duration of a fixed-income security given a change in rates and the resulting change in price
		e	Compare and contrast DV01 and effective duration as measures of price sensitivity.
		f	Define, calculate, and interpret the convexity of a fixed-income security given a change in rates and the resulting change in price
		g	Calculate the DV01, duration, and convexity of a portfolio of fixed-income securities
		h	Explain the hedging of a position based on effective duration and convexity
		i	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
59	Modeling Non-Parallel Term Structure Shifts and Hedging	a	Describe principal components analysis and identify the factors that are the most important drivers of term structure movements
		b	Describe key rate shift analysis and define key rate 01 (KR01)
		c	Calculate the KR01s of a portfolio given a set of key rates
		d	Calculate the positions in hedging instruments necessary to hedge the key rate risks of a portfolio
		e	Apply key rate analysis and principal components analysis to estimating portfolio volatility
		f	Describe an interest rate bucketing approach, define forward bucket 01, and compare forward bucket 01s to KR01s
		g	Calculate the corresponding duration measure given a KR01 or forward bucket 01
60	Binomial Trees	a	Calculate the value of an American and a European call or put option using a one-step and two-step binomial model.
		b	Describe how volatility is captured in the binomial model.
		c	Describe how the value calculated using a binomial model converges as time periods are added.
		d	Define and calculate delta of a stock option.
		e	Explain how the binomial model can be altered to price options on stocks with dividends, stock indices, currencies, and futures.
61	The Black Scholes Merton Model	a	Explain the lognormal property of stock prices, the distribution of rates of return, and the calculation of expected return.
		b	Calculate the realized return and historical volatility of a stock
		c	Describe the assumptions underlying the Black-Scholes-Merton option pricing model.
		d	Calculate the value of a European option on a non-dividend-paying stock using the Black-Scholes-Merton model
		e	Define implied volatilities and describe how to calculate implied volatilities from market prices of options using the Black-Scholes-Merton model
		f	Explain how dividends affect the decision to exercise early for American call and put options.
		g	Calculate the value of a European option on a dividend-paying stock, futures, or foreign currency using the Black-Scholes-Merton model
		h	Describe warrants, calculate the value of a warrant, and calculate the dilution cost of the warrant to existing shareholders.
62	Option Sensitivity Measures-The Greeks	a	Describe and assess the risks associated with naked and covered option positions.
		b	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.
		c	Calculate the delta of an option
		d	Explain delta hedging for an option position, including its dynamic aspects.
		e	Define and describe vega, gamma, theta, and rho for option positions and calculate the gamma and
		f	Explain how to implement and maintain a delta-neutral and gamma-neutral position.
		g	Describe the relationship between delta, theta, gamma, and vega.
		h	Calculate the delta, gamma, and vega of a portfolio.
		i	Describe how to implement portfolio insurance and how this strategy compares with delta hedging.

SYLLABUS

Combined Topics

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

** Reading Number is as per Schweser, not Institute Material*

Reading No	Reading Name	Reading No. (Combined)	Reading Name (Combined)
51	Country Risk-Determinants, Measures, and Implications		
52	Measuring Credit Risk		
53	Operational Risk		
54	Stress Testing		
55	Pricing Conventions, Discounting, and Arbitrage	55 to 57	Fixed Income
56	Interest Rates		
57	Bond Yields and Return Calculations		
58	Applying Duration, Convexity, and DV01		
59	Modeling Non-Parallel Term Structure Shifts and Hedging		
60	Binomial Trees		
61	The Black Scholes Merton Model		
62	Option Sensitivity Measures-The Greeks		