

2023 Reading	2023 Learning Objectives	2024 Reading	2024 Learning Objectives	Notes
Topic 5	MARKET RISK MEASUREMENT AND MANAGEMENT—Part II Exam Weight 20%	Topic 5	MARKET RISK MEASUREMENT AND MANAGEMENT—Part II Exam Weight 20%	
MR-1	<p>Kevin Dowd, <i>Measuring Market Risk</i>, 2nd Edition (West Sussex, England: John Wiley & Sons, 2005)</p> <p>Chapter 3 Estimating Market Risk Measures: An Introduction and Overview</p> <ul style="list-style-type: none">Estimate VaR using a historical simulation approach.Estimate VaR using a parametric approach for both normal and lognormal return distributions.Estimate the expected shortfall given P/L or return data.Estimate risk measures by estimating quantiles.Evaluate estimators of risk measures by estimating their standard errors.Interpret quantile-quantile (QQ) plots to identify the characteristics of a distribution.	<p>MR-1</p> <p>Kevin Dowd, <i>Measuring Market Risk</i>, 2nd Edition (West Sussex, England: John Wiley & Sons, 2005)</p> <p>Chapter 3 Estimating Market Risk Measures: An Introduction and Overview</p> <ul style="list-style-type: none">Estimate VaR using a historical simulation approach.Estimate VaR using a parametric approach for both normal and lognormal return distributions.Estimate the expected shortfall given P/L or return data.Estimate risk measures by estimating quantiles.Evaluate estimators of risk measures by estimating their standard errors.Interpret quantile-quantile (QQ) plots to identify the characteristics of a distribution.	No Changes	
MR-2	<p>Chapter 4Non-parametric Approaches</p> <ul style="list-style-type: none">Apply the bootstrap historical simulation approach to estimate coherent risk measures.Describe historical simulation using non-parametric density estimation.Compare and contrast the age-weighted, the volatility-weighted, the correlation-weighted, and the filtered historical simulation approaches.Identify advantages and disadvantages of non-parametric estimation methods.	<p>MR-2</p> <p>Chapter 4Non-parametric Approaches</p> <ul style="list-style-type: none">Apply the bootstrap historical simulation approach to estimate coherent risk measures.Describe historical simulation using non-parametric density estimation.Compare and contrast the age-weighted, the volatility-weighted, the correlation-weighted, and the filtered historical simulation approaches.Identify advantages and disadvantages of non-parametric estimation methods.	No Changes	
MR-3	<p>Chapter 7Parametric Approaches (III): Extreme Value</p> <ul style="list-style-type: none">Explain the importance and challenges of extreme values in risk management.Describe extreme value theory (EVT) and its use in risk management.Describe the peaks-over-threshold (POT) approach.Compare and contrast generalized extreme value and POT approaches to estimating extreme risks.Discuss the application of the generalized Pareto (GP) distribution in the POT approach.Explain the multivariate EVT for risk management.	<p>MR-3</p> <p>Chapter 7Parametric Approaches (III): Extreme Value</p> <ul style="list-style-type: none">Explain the importance and challenges of extreme values in risk management.Describe extreme value theory (EVT) and its use in risk management.Describe the peaks-over-threshold (POT) approach.Compare and contrast generalized extreme value and POT approaches to estimating extreme risks.Discuss the application of the generalized Pareto (GP) distribution in the POT approach.Explain the multivariate EVT for risk management.	No Changes	
MR-4	<p>Philippe Jorion, <i>Value-at-Risk: The New Benchmark for Managing Financial Risk</i>, 3rd Edition. (New York: McGraw Hill, 2007)</p> <p>Chapter 6Backtesting VaR</p> <ul style="list-style-type: none">Define backtesting and exceptions and explain the importance of backtesting VaR models.Explain the significant difficulties in backtesting a VaR model.Verify a model based on exceptions or failure rates.Identify and describe Type I and Type II errors in the context of a backtesting process.Explain the need to consider conditional coverage in the backtesting framework.Describe the Basel rules for backtesting.	<p>MR-4</p> <p>Philippe Jorion, <i>Value-at-Risk: The New Benchmark for Managing Financial Risk</i>, 3rd Edition. (New York: McGraw Hill, 2007)</p> <p>Chapter 6Backtesting VaR</p> <ul style="list-style-type: none">Define backtesting and exceptions and explain the importance of backtesting VaR models.Explain the significant difficulties in backtesting a VaR model.Verify a model based on exceptions or failure rates.Identify and describe Type I and Type II errors in the context of a backtesting process.Explain the need to consider conditional coverage in the backtesting framework.Describe the Basel rules for backtesting.	No Changes	
MR-5	<p>Chapter 11VaR Mapping</p> <ul style="list-style-type: none">Explain the principles underlying VaR mapping, and describe the mapping process.Explain and demonstrate how the mapping process captures general and specific risks.Differentiate among the three methods of mapping portfolios of fixed income securities.Summarize how to map a fixed income portfolio into positions of standard instruments.Describe how mapping of risk factors can support stress testing.Explain how VaR can be computed and used relative to a performance benchmark.Describe the method of mapping forwards, forward rate agreements, interest rate swaps, and options.	<p>MR-5</p> <p>Chapter 11VaR Mapping</p> <ul style="list-style-type: none">Explain the principles underlying VaR mapping, and describe the mapping process.Explain and demonstrate how the mapping process captures general and specific risks.Differentiate among the three methods of mapping portfolios of fixed income securities.Summarize how to map a fixed income portfolio into positions of standard instruments.Describe how mapping of risk factors can support stress testing.Explain how VaR can be computed and used relative to a performance benchmark.Describe the method of mapping forwards, forward rate agreements, interest rate swaps, and options.	No Changes	
MR-6	<p>"Messages from the Academic Literature on Risk Measurement for the Trading Book," <i>Basel Committee on Banking Supervision, Working Paper, No.19, Jan 2011.</i></p> <ul style="list-style-type: none">Explain the following lessons on VaR implementation: time horizon over which VaR is estimated, the recognition of time varying volatility in VaR risk factors, and VaR backtesting.Describe exogenous and endogenous liquidity risk and explain how they might be integrated into VaR models.Compare VaR, expected shortfall, and other relevant risk measures.Compare unified and compartmentalized risk measurement.Compare the results of research on "top-down" and "bottom-up" risk aggregation methods.Describe the relationship between leverage, market value of asset, and VaR within an active balance sheet management framework.	<p>MR-6</p> <p>"Messages from the Academic Literature on Risk Measurement for the Trading Book," <i>Basel Committee on Banking Supervision, Working Paper, No.19, Jan 2011.</i></p> <ul style="list-style-type: none">Explain the following lessons on VaR implementation: time horizon over which VaR is estimated, the recognition of time varying volatility in VaR risk factors, and VaR backtesting.Describe exogenous and endogenous liquidity risk and explain how they might be integrated into VaR models.Compare VaR, expected shortfall, and other relevant risk measures.Compare unified and compartmentalized risk measurement.Compare the results of research on "top-down" and "bottom-up" risk aggregation methods.Describe the relationship between leverage, market value of asset, and VaR within an active balance sheet management framework.	No Changes	
MR-7	<p>Gunter Meissner, <i>Correlation Risk Modeling and Management</i>, 2nd Edition (Risk Books, 2019).</p> <p>Chapter 1.Correlation Basics: Definitions, Applications, and Terminology</p> <ul style="list-style-type: none">Describe financial correlation risk and the areas in which it appears in finance.Explain how correlation contributed to the global financial crisis of 2007 to 2009.Describe the structure, uses, and payoffs of a correlation swap.Estimate the impact of different correlations between assets in the trading book on the VaR capital charge.Explain the role of correlation risk in market risk and credit risk.Relate correlation risk to systemic and concentration risk.	<p>MR-7</p> <p>Gunter Meissner, <i>Correlation Risk Modeling and Management</i>, 2nd Edition (Risk Books, 2019).</p> <p>Chapter 1.Correlation Basics: Definitions, Applications, and Terminology</p> <ul style="list-style-type: none">Describe financial correlation risk and the areas in which it appears in finance.Explain how correlation contributed to the global financial crisis of 2007 to 2009.Describe how correlation impacts the price of quanto options as well as other multi-asset exotic optionsDescribe the structure, uses, and payoffs of a correlation swap.Estimate the impact of different correlations between assets in the trading book on the VaR capital charge.Explain the role of correlation risk in market risk and credit risk.Relate correlation risk to systemic and concentration risk.	New LO	
MR-8	<p>Chapter 2Empirical Properties of Correlation: How Do Correlations Behave in the Real World?</p> <ul style="list-style-type: none">Describe how equity correlations and correlation volatilities behave throughout various economic states.Calculate a mean reversion rate using standard regression and calculate the corresponding autocorrelation.Identify the best-fit distribution for equity, bond, and default correlations.	<p>MR-8</p> <p>Chapter 2Empirical Properties of Correlation: How Do Correlations Behave in the Real World?</p> <ul style="list-style-type: none">Describe how equity correlations and correlation volatilities behave throughout various economic states.Calculate a mean reversion rate using standard regression and calculate the corresponding autocorrelation.Identify the best-fit distribution for equity, bond, and default correlations.	No Changes	
MR-9	<p>Chapter 5Financial Correlation Modeling – Bottom-Up Approaches (pages 126-134 only)</p> <ul style="list-style-type: none">Explain the purpose of copula functions and how they are applied in finance.Describe the Gaussian copula and explain how to use it to derive the joint probability of default of two assets.Summarize the process of finding the default time of an asset correlated to all other assets in a portfolio using the Gaussian copula.	<p>MR-9</p> <p>Chapter 5Financial Correlation Modeling – Bottom-Up Approaches (pages 126-134 only)</p> <ul style="list-style-type: none">Explain the purpose of copula functions and how they are applied in finance.Describe the Gaussian copula and explain how to use it to derive the joint probability of default of two assets.Summarize the process of finding the default time of an asset correlated to all other assets in a portfolio using the Gaussian copula.	No Changes	
MR-10	<p>Bruce Tuckman, <i>Fixed Income Securities</i>, 3rd Edition (Hoboken, NJ: John Wiley & Sons, 2011).</p> <p>Chapter 6.....Empirical Approaches to Risk Metrics and Hedging</p> <ul style="list-style-type: none">Explain the drawback to using a DV01-neutral hedge for a bond position.Describe a regression hedge and explain how it can improve a standard DV01-neutral hedge.Calculate the regression hedge adjustment factor, beta.Calculate the face value of an offsetting position needed to carry out a regression hedge.Calculate the face value of multiple offsetting swap positions needed to carry out a two-variable regression hedge.Compare and contrast level and chance regressions.Describe principal component analysis and explain how it is applied to constructing a hedging portfolio.	<p>MR-10</p> <p>Bruce Tuckman, <i>Fixed Income Securities</i>, 3rd Edition (Hoboken, NJ: John Wiley & Sons, 2011).</p> <p>Chapter 6.....Empirical Approaches to Risk Metrics and Hedging</p> <ul style="list-style-type: none">Explain the drawback to using a DV01-neutral hedge for a bond position.Describe a regression hedge and explain how it can improve a standard DV01-neutral hedge.Calculate the regression hedge adjustment factor, beta.Calculate the face value of an offsetting position needed to carry out a regression hedge.Calculate the face value of multiple offsetting swap positions needed to carry out a two-variable regression hedge.Compare and contrast level and chance regressions.Describe principal component analysis and explain how it is applied to constructing a hedging portfolio.	No Changes	
MR-11	<p>Chapter 7The Science of Term Structure Models</p> <ul style="list-style-type: none">Calculate the expected discounted value of a zero-coupon security using a binomial tree.Construct and apply an arbitrage argument to price a call option on a zero-coupon security using replicating portfolios.Define risk-neutral pricing and apply it to option pricing.Distinguish between true and risk-neutral probabilities, and apply this difference to interest rate drift.Explain how the principles of arbitrage pricing of derivatives on fixed income securities can be extended over multiple periods.Define option-adjusted spread (OAS) and apply it to security pricing.Describe the rationale behind the use of recombining trees in option pricing.Calculate the value of a constant maturity Treasury swap, given an interest rate tree and the risk-neutral probabilities.Evaluate the advantages and disadvantages of reducing the size of the time steps on the pricing of derivatives on fixed income securities.Evaluate the appropriateness of the Black-Scholes-Merton model when valuing derivatives on fixed income securities.	<p>MR-11</p> <p>Chapter 7The Science of Term Structure Models</p> <ul style="list-style-type: none">Calculate the expected discounted value of a zero-coupon security using a binomial tree.Construct and apply an arbitrage argument to price a call option on a zero-coupon security using replicating portfolios.Define risk-neutral pricing and apply it to option pricing.Distinguish between true and risk-neutral probabilities, and apply this difference to interest rate drift.Explain how the principles of arbitrage pricing of derivatives on fixed income securities can be extended over multiple periods.Define option-adjusted spread (OAS) and apply it to security pricing.Describe the rationale behind the use of recombining trees in option pricing.Calculate the value of a constant maturity Treasury swap, given an interest rate tree and the risk-neutral probabilities.Evaluate the advantages and disadvantages of reducing the size of the time steps on the pricing of derivatives on fixed income securities.Evaluate the appropriateness of the Black-Scholes-Merton model when valuing derivatives on fixed income securities.	No Changes	
MR-12	<p>Chapter 8The Evolution of Short Rates and the Shape of the Term Structure</p> <ul style="list-style-type: none">Explain the role of interest rate expectations in determining the shape of the term structure.Apply a risk-neutral interest rate tree to assess the effect of volatility on the shape of the term structure.Estimate the convexity effect using Jensen's inequality.Evaluate the impact of changes in maturity, yield and volatility on the convexity of a security.Calculate the price and return of a zero coupon bond incorporating a risk premium.	<p>MR-12</p> <p>Chapter 8The Evolution of Short Rates and the Shape of the Term Structure</p> <ul style="list-style-type: none">Explain the role of interest rate expectations in determining the shape of the term structure.Apply a risk-neutral interest rate tree to assess the effect of volatility on the shape of the term structure.Estimate the convexity effect using Jensen's inequality.Evaluate the impact of changes in maturity, yield and volatility on the convexity of a security.Calculate the price and return of a zero coupon bond incorporating a risk premium.	No Changes	
MR-13	<p>Chapter 9The Art of Term Structure Models: Drift</p> <ul style="list-style-type: none">Construct and describe the effectiveness of a short-term interest rate tree assuming normally distributed rates, both with and without drift.Calculate the short-term rate change and standard deviation of the rate change using a model with normally distributed rates and no drift.Describe methods for addressing the possibility of negative short-term rates in term structure models.Construct a short-term rate tree under the Ho-Lee Model with time-dependent drift	<p>MR-13</p> <p>Chapter 9The Art of Term Structure Models: Drift</p> <ul style="list-style-type: none">Construct and describe the effectiveness of a short-term interest rate tree assuming normally distributed rates, both with and without drift.Calculate the short-term rate change and standard deviation of the rate change using a model with normally distributed rates and no drift.Describe methods for addressing the possibility of negative short-term rates in term structure models.Construct a short-term rate tree under the Ho-Lee Model with time-dependent drift	No Changes	

<ul style="list-style-type: none">• Describe uses and benefits of the arbitrage-free models and assess the issue of fitting models to market prices.• Describe the process of constructing a simple and recombining tree for a short-term rate under the Vasicek Model with mean reversion.• Calculate the Vasicek Model rate change, standard deviation of the rate change, expected rate in T years, and half-life.• Describe the effectiveness of the Vasicek Model.		<ul style="list-style-type: none">• Describe uses and benefits of the arbitrage-free models and assess the issue of fitting models to market prices.• Describe the process of constructing a simple and recombining tree for a short-term rate under the Vasicek Model with mean reversion.• Calculate the Vasicek Model rate change, standard deviation of the rate change, expected rate in T years, and half-life.• Describe the effectiveness of the Vasicek Model.		
MR-14	Chapter 10.....The Art of Term Structure Models: Volatility and Distribution <ul style="list-style-type: none">• Describe the short-term rate process under a model with time-dependent volatility.• Calculate the short-term rate change and determine the behavior of the standard deviation of the rate change using a model with time dependent volatility.• Assess the efficacy of time-dependent volatility models.• Describe the short-term rate process under the Cox-Ingersoll-Ross(CIR) and lognormal models.• Calculate the short-term rate change and describe the basis point volatility using the CIR and lognormal models.• Describe lognormal models with deterministic drift and mean reversion.	MR-14	Chapter 10.....The Art of Term Structure Models: Volatility and Distribution <ul style="list-style-type: none">• Describe the short-term rate process under a model with time-dependent volatility.• Calculate the short-term rate change and determine the behavior of the standard deviation of the rate change using a model with time dependent volatility.• Assess the efficacy of time-dependent volatility models.• Describe the short-term rate process under the Cox-Ingersoll-Ross(CIR) and lognormal models.• Calculate the short-term rate change and describe the basis point volatility using the CIR and lognormal models.• Describe lognormal models with deterministic drift and mean reversion.	No Changes
MR-15	Hull, Options, Futures, and Other Derivatives. 10th Edition (New York: Pearson. 2017) Chapter 20.....Volatility Smiles <ul style="list-style-type: none">• Define volatility smile and volatility skew.• Explain the implications of put-call parity on the implied volatility of call and put options.• Compare the shape of the volatility smile (or skew) to the shape of the implied distribution of the underlying asset price and to the pricing of options on the underlying asset.• Describe characteristics of foreign exchange rate distributions and their implications on option prices and implied volatility.• Describe the volatility smile for equity options and foreign currency options and provide possible explanations for its shape.• Describe alternative ways of characterizing the volatility smile.• Describe volatility term structures and volatility surfaces and how they may be used to price options.• Explain the impact of the volatility smile on the calculation of an option's Greek letter risk measures.• Explain the impact of a single asset price jump on a volatility smile.	MR-15	Hull, Options, Futures, and Other Derivatives. 10th Edition (New York: Pearson. 2017) Chapter 20.....Volatility Smiles <ul style="list-style-type: none">• Define volatility smile and volatility skew.• Explain the implications of put-call parity on the implied volatility of call and put options.• Compare the shape of the volatility smile (or skew) to the shape of the implied distribution of the underlying asset price and to the pricing of options on the underlying asset.• Describe characteristics of foreign exchange rate distributions and their implications on option prices and implied volatility.• Describe the volatility smile for equity options and foreign currency options and provide possible explanations for its shape.• Describe alternative ways of characterizing the volatility smile.• Describe volatility term structures and volatility surfaces and how they may be used to price options.• Explain the impact of the volatility smile on the calculation of an option's Greek letter risk measures.• Explain the impact of a single asset price jump on a volatility smile.	No Changes
MR-16	Hull, Risk Management and Financial Institutions, 5th Edition (Hoboken, NJ: John Wiley & Sons, 2018) Chapter 18. Fundamental Review of the Trading Book <ul style="list-style-type: none">• Describe the changes to the Basel framework for calculating market risk capital under the Fundamental Review of the Trading Book (FRTB), and the motivations for these changes.• Compare the various liquidity horizons proposed by the FRTB for different asset classes and explain how a bank can calculate its expected shortfall using the various horizons.• Explain the FRTB revisions to Basel regulations in the following areas<ul style="list-style-type: none">• Classification of positions in the trading book compared to the banking book• Backtesting, profit and loss attribution, credit risk, and securitizations	MR-16	Hull, Risk Management and Financial Institutions, 5th Edition (Hoboken, NJ: John Wiley & Sons, 2018) Chapter 18. Fundamental Review of the Trading Book <ul style="list-style-type: none">• Describe the changes to the Basel framework for calculating market risk capital under the Fundamental Review of the Trading Book (FRTB), and the motivations for these changes.• Compare the various liquidity horizons proposed by the FRTB for different asset classes and explain how a bank can calculate its expected shortfall using the various horizons.• Explain the FRTB revisions to Basel regulations in the following areas<ul style="list-style-type: none">• Classification of positions in the trading book compared to the banking book• Backtesting, profit and loss attribution, credit risk, and securitizations	No Changes
Topic 6 CREDIT RISK MEASUREMENT AND MANAGEMENT—Part II Exam Weight 120%		Topic 6 CREDIT RISK MEASUREMENT AND MANAGEMENT—Part II Exam Weight 120%		
CR-1	Jonathan Golin and Philippe Delhaise, <i>The Bank Credit Analysis Handbook, 2nd Edition</i> (Hoboken, NJ: John Wiley & Sons, 2013). Chapter 1.....The Credit Decision <ul style="list-style-type: none">• Define credit risk and explain how it arises using examples.• Explain the components of credit risk evaluation.• Describe, compare and contrast various credit risk mitigants and their role in credit analysis.• Compare and contrast quantitative and qualitative techniques of credit risk evaluation.• Compare the credit analysis of consumers, corporations, financial institutions, and sovereigns.• Describe quantitative measurements and factors of credit risk, including probability of default, loss given default, exposure at default, expected loss, and time horizon• Compare bank failure and bank insolvency.	CR-1	Sylvain Bouteille and Diane Cogan-Pushner, <i>The Handbook of Credit Risk Management: Originating, Assessing, and Managing Credit Exposures</i> (2nd Edition, Hoboken, NJ: John Wiley & Sons, 2022). Chapter 1: Fundamentals of Credit Risk <ul style="list-style-type: none">• Define credit risk and explain how it arises using examples.• Explain the distinctions between insolvency, default, and bankruptcy.• Identify and describe transactions that generate credit risk.• Describe the entities that are exposed to credit risk and explain circumstances under which• Discuss the motivations for managing or taking on credit risk.	New Reading Previous Golin LO
CR-2	Chapter 2.....The Credit Analyst <ul style="list-style-type: none">• Describe the quantitative, qualitative, and research skills a banking credit analyst is expected to have.• Assess the quality of various sources of information used by a credit analyst.• Explain the capital adequacy, asset quality, management, earnings, and liquidity (CAMEL) system used for evaluating the financial condition of a bank.	CR-2	Chapter 2: Governance <ul style="list-style-type: none">• Define risk management responsibilities in an organization and explain the three lines of defense framework for effective risk management and control.• Explain the processes that lead to risk taking including credit origination, credit risk assessment, and credit approval processes.• Discuss the following key principles underlying best practice for the governance system of credit risk: Guidelines, Skills, Limits, and Oversight.• Describe the most common parameters of a credit-sensitive transaction.• Describe the roles of the credit committee in an organization.	New Reading
		CR-3	Hennie van Greuning and Sonja Brajovic Bratanovic, <i>Analyzing Banking Risk</i> (Fourth Edition, World Bank Group, 2020). Chapter 7. Credit Risk Management <ul style="list-style-type: none">• Describe key elements of an effective lending or financing policy.• Explain the importance and challenges of setting exposure and concentration limits.• Describe the scope and allocation processes of a bank's credit facility and explain bank-specific policies and actions to reduce credit risk.• Discuss factors that should be considered during the credit asset classification process.• Describe and explain loan loss provisions and loan loss reserves.• Identify and explain the components of expected loss and distinguish between expected loss and unexpected loss.• Explain the requirements for estimating expected loss under IFRS 9.• Describe a workout procedure for loss assets and compare the following two approaches used to manage loss assets: retaining loss assets and writing off loss assets.• Explain the components of credit risk analysis.• Explain the components of credit risk management capacity, and outline key questions that the board of directors of a bank should ask.	New Reading
CR-3	Gerhard Schroeck, Risk Management & Value Creation in Financial Institutions (New York, NY: John Wiley & Sons, 2002). Chapter 5. Capital Structure in Banks (pp. 170-186 only) <ul style="list-style-type: none">• Evaluate a bank's economic capital relative to its level of credit risk• Identify and describe important factors used to calculate economic capital for credit risk: probability of default, exposure, and loss rate.• Define and calculate expected loss (EL).• Define and calculate unexpected loss (UL).• Estimate the variance of default probability assuming a binomial distribution.• Calculate UL for a portfolio and the UL contribution of each asset.• Describe how economic capital is derived.• Explain how the credit loss distribution is modeled.• Describe challenges to quantifying credit risk	CR-4	Gerhard Schroeck, Risk Management & Value Creation in Financial Institutions (New York, NY: John Wiley & Sons, 2002). Chapter 5. Capital Structure in Banks (pp. 170-186 only) <ul style="list-style-type: none">• Evaluate a bank's economic capital relative to its level of credit risk• Identify and describe important factors used to calculate economic capital for credit risk: probability of default, exposure, and loss rate.• Define and calculate expected loss (EL).• Define and calculate unexpected loss (UL).• Estimate the variance of default probability assuming a binomial distribution.• Calculate UL for a credit asset portfolio and the UL contribution of each asset under various scenarios of portfolio composition, asset characteristics, and size.• Describe how economic capital is derived.• Explain how the credit loss distribution is modeled.• Describe challenges to quantifying credit risk	Wording Added to LO
CR-4	Giacomo De Laurentis, Renato Maino, and Luca Molteni, Developing, Validating and Using Internal Ratings (West Sussex, United Kingdom: John Wiley & Sons, 2019). Chapter 3.....Ratings Assignment Methodologies <ul style="list-style-type: none">• Explain the key features of a good rating system.• Describe the experts-based approaches, statistical-based models, and numerical approaches to predicting default.• Describe a rating migration matrix and calculate the probability of default, cumulative probability of default, marginal probability of default, and annualized default rate.• Describe rating agencies' assignment methodologies for issue and issuer ratings.• Describe the relationship between borrower rating and probability of default.• Compare agencies' ratings to internal experts-based rating systems.• Distinguish between the structural approaches and the reduced-form approaches to predicting default.• Apply the Merton model to calculate default probability and the distance to default and describe the limitations of using the Merton model.• Describe linear discriminant analysis (LDA), define the Z-score and its usage, and apply LDA to classify a sample of firms by credit quality.• Describe the application of a logistic regression model to estimate default probability.• Define and interpret cluster analysis and principal component analysis.• Describe the use of a cash flow simulation model in assigning rating and default probability, and explain the limitations of the model.• Describe the application of heuristic approaches, numeric approaches, and artificial neural networks in modeling default risk and define their strengths and weaknesses.• Describe the role and management of qualitative information in assessing probability of default.	CR-5	Michalis Doupamos, Christos Lemonakis, Dimitrios Niklis, and Constantin Zopounidis, Analytical Techniques in the Assessment of Credit Risk: An Overview of Methodologies and Applications (Springer, 2019). Chapter 1. Introduction to Credit Risk Modeling and Assessment <ul style="list-style-type: none">• Explain the capital adequacy, asset quality, management, earnings, and liquidity (CAMEL) system used for evaluating the financial condition of a bank.• Describe quantitative measurements and factors of credit risk, including probability of default, loss given default, exposure at default, expected loss, and time horizon.• Estimate capital adequacy ratio of a financial institution.• Describe the judgmental approaches, empirical models, and financial models to predict default.• Apply the Merton model to calculate default probability and the distance to default and describe the limitations of using the Merton model.• Compare and contrast different approaches to credit risk modeling, such as those related to the Merton model, Credit Risk Plus (CreditRisk+), CreditMetrics, and the Moody's-KMV model.• Apply risk-adjusted return on capital (RAROC) to measure the performance of a loan.	New Reading Previous Golin Ch 2 LO Previous Golin Ch 1 LO Previous DeLaurentis Ch 3 LO Previous Stulz Ch 18 LO
		CR-6	Chapter 2. Credit Scoring and Rating <ul style="list-style-type: none">• Compare the credit scoring system to the credit rating system in assessing credit quality and describe the different types of each system.• Distinguish between through-the-cycle and point-in-time credit rating systems.• Describe the process for developing credit risk scoring and rating models.• Describe rating agencies' assignment methodologies for issue and issuer ratings, and identify the main criticisms of the credit rating agencies' ratings.	New Reading Previous DeLaurentis Ch3 LO
CR-5	René Stulz, Risk Management & Derivatives (Florence, KY: Thomson South-Western, 2002) Chapter 18.....Credit Risks and Credit Derivatives <ul style="list-style-type: none">• Using the Merton model, calculate the value of a firm's debt and equity and the volatility of firm value.• Explain the relationship between credit spreads, time to maturity, and interest rates, and calculate credit spread.• Explain the differences between valuing senior and subordinated debt using a contingent claim approach.• Explain, from a contingent claim perspective, the impact of stochastic interest rates on the valuation of risky bonds, equity, and the risk of default.• Compare and contrast different approaches to credit risk modeling, such as those related to the Merton model, CreditRisk+, CreditMetrics, and the KMV model.• Assess the credit risks of derivatives.• Describe a credit derivative, credit default swap, and total return swap.	CR-7	Michael Crouhy, Dan Galai and Robert Mark, The Essentials of Risk Management, 2nd Edition (New York: McGraw-Hill, 2014) Chapter 9.....Credit Scoring and Retail Credit Risk Management <ul style="list-style-type: none">• Analyze the credit risks and other risks generated by retail banking.• Explain the differences between retail credit risk and corporate credit risk.• Discuss the "dark side" of retail credit risk and the measures that attempt to address the problem.• Define and describe credit risk scoring model types, key variables, and applications.• Discuss the key variables in a mortgage credit assessment and describe the use of cutoff scores, default rates, and loss rates in a credit scoring model.• Discuss the measurement and monitoring of a scorecard performance including the use of cumulative accuracy profile (CAP) and the accuracy ratio (AR) techniques.• Describe the customer relationship cycle and discuss the trade-off between creditworthiness and profitability.	No Changes Previous MR-15

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		<ul style="list-style-type: none"> Define special purpose vehicles (SPVs), derivatives product companies (DPCs), monolines, and credit derivatives product companies (CDPCs) and describe the limitations of using them as risk mitigating methods. Describe the approaches used and the challenges faced in modeling derivatives risk. 	
	<p>Chapter 3. Counterparty Risk and Beyond</p> <ul style="list-style-type: none"> Describe counterparty risk and differentiate it from lending risk. Describe transactions that carry counterparty risk and explain how counterparty risk can arise in each transaction. Identify and describe institutions that take on significant counterparty risk. Describe credit exposure, credit migration, recovery, mark-to-market, replacement cost, default probability, loss given default, and the recovery rate. Describe credit value adjustment (CVA) and compare the use of CVA and credit limits in evaluating and mitigating counterparty risk. Identify and describe the different ways institutions can quantify, manage and mitigate counterparty risk. Identify and explain the costs of an OTC derivative. Explain the components of the xVaR-Value Adjustment (xVA) term 	<p>Chapter 3. Counterparty Risk and Beyond</p> <ul style="list-style-type: none"> Describe counterparty risk and differentiate it from lending risk. Describe transactions that carry counterparty risk and explain how counterparty risk can arise in each transaction. Identify and describe institutions that take on significant counterparty risk. Describe credit exposure, credit migration, recovery, mark-to-market, replacement cost, default probability, loss given default, and the recovery rate. Describe credit value adjustment (CVA) and compare the use of CVA and credit limits in evaluating and mitigating counterparty risk. Identify and describe the different ways institutions can quantify, manage and mitigate counterparty risk. Identify and explain the costs of an OTC derivative. Explain the components of the xVaR-Value Adjustment (xVA) term 	No Changes
CR-10	<p>Chapter 6Netting, Close-out and Related Aspects</p> <ul style="list-style-type: none"> Explain the purpose of an ISDA master agreement. Summarize netting and close-out procedures (including multilateral netting), explain their advantages and disadvantages, and describe how they fit into the framework of the ISDA master agreement. Describe the effectiveness of netting in reducing credit exposure under various scenarios. Describe the mechanics of termination provisions and trade compressions and explain their advantages and disadvantages. Provide examples of trade compression of derivative positions, calculate net notional exposure amount, and identify the party holding the net contract position in a trade compression. Identify and describe termination events and discuss their potential effects on parties to a transaction. 	<p>Chapter 6Netting, Close-out and Related Aspects</p> <ul style="list-style-type: none"> Explain the purpose of an ISDA master agreement. Summarize netting and close-out procedures (including multilateral netting), explain their advantages and disadvantages, and describe how they fit into the framework of the ISDA master agreement. Describe the effectiveness of netting in reducing credit exposure under various scenarios. Describe the mechanics of termination provisions and trade compressions and explain their advantages and disadvantages. Provide examples of trade compression of derivative positions, calculate net notional exposure amount, and identify the party holding the net contract position in a trade compression. Identify and describe termination events and discuss their potential effects on parties to a transaction. 	No Changes
CR-11	<p>Chapter 7. Margin (Collateral) and Settlement</p> <ul style="list-style-type: none"> Describe the rationale for collateral management. Describe the terms of a collateral and features of a credit support annex (CSA) within the ISDA Master Agreement including threshold, initial margin, minimum transfer amount and rounding, haircuts, credit quality, and credit support amount. Calculate the credit support amount (margin) under various scenarios. Describe the role of a valuation agent. Describe the mechanics of collateral and the types of collateral that are typically used. Explain the process for the reconciliation of collateral disputes. Explain the features of a collateralization agreement. Differentiate between a two-way and one-way CSA agreement and describe how collateral parameters can be linked to credit quality. Explain aspects of collateral including funding, rehypothecation and segregation. Explain how market risk, operational risk, and liquidity risk (including funding liquidity risk) can arise through collateralization. Describe the various regulatory capital requirements. 	<p>Chapter 7. Margin (Collateral) and Settlement</p> <ul style="list-style-type: none"> Describe the rationale for collateral management. Describe the terms of a collateral and features of a credit support annex (CSA) within the ISDA Master Agreement including threshold, initial margin, minimum transfer amount and rounding, haircuts, credit quality, and credit support amount. Calculate the credit support amount (margin) under various scenarios. Describe the role of a valuation agent. Describe the mechanics of collateral and the types of collateral that are typically used. Explain the process for the reconciliation of collateral disputes. Explain the features of a collateralization agreement. Differentiate between a two-way and one-way CSA agreement and describe how collateral parameters can be linked to credit quality. Explain aspects of collateral including funding, rehypothecation and segregation. Explain how market risk, operational risk, and liquidity risk (including funding liquidity risk) can arise through collateralization. Describe the various regulatory capital requirements. 	No Changes
		<p>Chapter 8. Central Clearing</p> <ul style="list-style-type: none"> Define a central counterparty (CCP) and describe the mechanics of central clearing. Explain the concept of novation under central clearing. Define netting, multilateral offset, and compression and provide examples of each. Describe the application and estimation of margin and default funds under central clearing. Discuss the risks faced by a CCP and the ways it manages its exposures. Provide examples of a loss waterfall. Explain the different methods of managing the default of one or more members of a CCP. Compare bilateral and central clearing. Compare initial margin and default fund requirements for clearing members in relation to loss coverage, cost of clearing, and moral hazard. Describe the advantages and disadvantages of central clearing. 	New Chapter
CR-12	<p>Chapter 11. Future Value and Exposure</p> <ul style="list-style-type: none"> Describe and calculate the following metrics for credit exposure: expected mark-to-market, expected exposure, potential future exposure, expected positive exposure and negative exposure, effective expected positive exposure, and maximum exposure. Compare the characterization of credit exposure to VaR methods and describe additional considerations used in the determination of credit exposure. Identify factors that affect the calculation of the credit exposure profile and summarize the impact of collateral on exposure. Identify typical credit exposure profiles for various derivative contracts and combination profiles. Explain how payment frequencies and exercise dates affect the exposure profile of various securities. Explain the general impact of aggregation on exposure, and the impact of aggregation on exposure when there is correlation between transaction values. Describe the differences between funding exposure and credit exposure. Explain the impact of collateralization on exposure, and assess the risk associated with the remarkining period, threshold, and minimum transfer amount. Assess the impact of collateral on counterparty risk and funding, with and without segregation or rehypothecation. 	<p>Chapter 11. Future Value and Exposure</p> <ul style="list-style-type: none"> Describe and calculate the following metrics for credit exposure: expected mark-to-market, expected exposure, potential future exposure, expected positive exposure and negative exposure, effective expected positive exposure, and maximum exposure. Compare the characterization of credit exposure to VaR methods and describe additional considerations used in the determination of credit exposure. Identify factors that affect the calculation of the credit exposure profile and summarize the impact of collateral on exposure. Identify typical credit exposure profiles for various derivative contracts and combination profiles. Explain how payment frequencies and exercise dates affect the exposure profile of various securities. Explain the general impact of aggregation on exposure, and the impact of aggregation on exposure when there is correlation between transaction values. Describe the differences between funding exposure and credit exposure. Explain the impact of collateralization on exposure, and assess the risk associated with the remarkining period, threshold, and minimum transfer amount. Assess the impact of collateral on counterparty risk and funding, with and without segregation or rehypothecation. 	No Changes
CR-13	<p>Chapter 17. Credit Value Adjustment (CVA)</p> <ul style="list-style-type: none"> Explain the motivation for and the challenges of pricing counterparty risk. Describe credit value adjustment (CVA). Calculate CVA and the CVA spread with no wrong-way risk, netting, or collateralization. Evaluate the impact of changes in the credit spread and recovery rate assumptions on CVA. Describe debt value adjustment (DVA) and bilateral CVA (BCVA). Explain the distinctions between unilateral CVA (UCVA) and BCVA, and between unilateral DVA (UDVA) and BCVA. Calculate DVA, BCVA, and BCVA as a spread. Explain how netting can be incorporated into the CVA calculation. Define and calculate incremental CVA and marginal CVA, and explain how to convert CVA into a running spread. Explain the impact of incorporating collateralization into the CVA calculation, including the impact of margin period of risk, thresholds, and initial margins. Describe wrong-way risk and contrast it with right-way risk. Identify examples of wrong-way risk and examples of right-way risk. Discuss the impact of collateral on wrong-way risk Identify examples of wrong-way collateral. Discuss the impact of wrong-way risk on central counterparties. Describe the various wrong-way modeling methods including hazard rate approaches, structural approaches, parametric approaches, and jump approaches. Explain the implications of central clearing on wrong-way risk. 	<p>Chapter 17. Credit Value Adjustment (CVA)</p> <ul style="list-style-type: none"> Explain the motivation for and the challenges of pricing counterparty risk. Describe credit value adjustment (CVA). Calculate CVA and the CVA spread with no wrong-way risk, netting, or collateralization. Evaluate the impact of changes in the credit spread and recovery rate assumptions on CVA. Describe debt value adjustment (DVA) and bilateral CVA (BCVA). Explain the distinctions between unilateral CVA (UCVA) and BCVA, and between unilateral DVA (UDVA) and BCVA. Calculate DVA, BCVA, and BCVA as a spread. Explain how netting can be incorporated into the CVA calculation. Define and calculate incremental CVA and marginal CVA, and explain how to convert CVA into a running spread. Explain the impact of incorporating collateralization into the CVA calculation, including the impact of margin period of risk, thresholds, and initial margins. Describe wrong-way risk and contrast it with right-way risk. Identify examples of wrong-way risk and examples of right-way risk. Discuss the impact of collateral on wrong-way risk Identify examples of wrong-way collateral. Discuss the impact of wrong-way risk on central counterparties. Describe the various wrong-way modeling methods including hazard rate approaches, structural approaches, parametric approaches, and jump approaches. Explain the implications of central clearing on wrong-way risk. 	No Changes
CR-14	<p>Stress Testing: Approaches, Methods, and Applications, Edited by Akhtar Siddique and Itekhhar Hasan (London: Risk Books, 2013)</p> <p>Chapter 4.....The Evolution of Stress Testing Counterparty Exposures (By David Lynch)</p> <ul style="list-style-type: none"> Differentiate among current exposure, peak exposure, expected exposure, and expected positive exposure Explain the treatment of counterparty credit risk (CCR) both as a credit risk and as a market risk and describe its implications for trading activities and risk management for a financial institution. Describe a stress test that can be performed on a loan portfolio and on a derivative portfolio. Calculate the stressed expected loss, the stress loss for the loan portfolio and the stress loss on a derivative portfolio Describe a stress test that can be performed on CVA. Calculate the stressed CVA and the stress loss on CVA. Calculate the debt value adjustment (DVA) and explain how stressing DVA enters into aggregating stress tests of CCR. Describe the common pitfalls in stress testing CCR. 	<p>Stress Testing: Approaches, Methods, and Applications, Edited by Akhtar Siddique and Itekhhar Hasan (London: Risk Books, 2013)</p> <p>Chapter 4.....The Evolution of Stress Testing Counterparty Exposures (By David Lynch)</p> <ul style="list-style-type: none"> Differentiate among current exposure, peak exposure, expected exposure, and expected positive exposure Explain the treatment of counterparty credit risk (CCR) both as a credit risk and as a market risk and describe its implications for trading activities and risk management for a financial institution. Describe a stress test that can be performed on a loan portfolio and on a derivative portfolio. Calculate the stressed expected loss, the stress loss for the loan portfolio and the stress loss on a derivative portfolio Describe a stress test that can be performed on CVA. Calculate the stressed CVA and the stress loss on CVA. Calculate the debt value adjustment (DVA) and explain how stressing DVA enters into aggregating stress tests of CCR. Describe the common pitfalls in stress testing CCR. 	No Changes
CR-15	<p>Michael Crouhy, Dan Galai and Robert Mark, The Essentials of Risk Management, 2nd Edition (New York: McGraw-Hill, 2014)</p> <p>Chapter 9.....Credit Scoring and Retail Credit Risk Management</p> <ul style="list-style-type: none"> Analyze the credit risks and other risks generated by retail banking. Explain the differences between retail credit risk and corporate credit risk. Discuss the "dark side" of retail credit risk and the measures that attempt to address the problem. Define and describe credit risk scoring model types, key variables, and applications. Discuss the key variables in a mortgage credit assessment and describe the use of cutoff scores, default rates, and loss rates in a credit scoring model. Discuss the measurement and monitoring of a loan's performance including the use of cumulative accuracy profile (CAP) and the accuracy ratio (AR) techniques. Describe the customer relationship cycle and discuss the trade-off between creditworthiness and profitability. Discuss the benefits of risk-based pricing of financial services. 		Crouhy Ch9 Moved to CR-7
CR-16	<p>Chapter 12.....The Credit Transfer Markets—and Their Implications</p> <ul style="list-style-type: none"> Discuss the flaws in the securitization of subprime mortgages prior to the financial crisis of 2007-2009 Identify and explain the different techniques used to mitigate credit risk, and describe how some of these techniques are changing the bank credit function. 		Crouhy Ch 12 Removed

<ul style="list-style-type: none">• Describe the originate-to-distribute model of credit risk transfer and discuss the two ways of managing a bank credit portfolio.• Describe covered bonds, funding CLOs, and other securitization instruments for funding purposes.• Describe the different types and structures of credit derivatives including credit default swaps (CDS), first-to-default puts, total return swaps (TRS), asset-backed credit-linked notes (CLN), and their applications.					
CR-17	Moorad Choudhry, Structured Credit Products: Credit Derivatives & Synthetic Securitisation, 2nd Edition (New York: John Wiley & Sons, 2010) Chapter 12:.....An Introduction to Securitisation <ul style="list-style-type: none">• Define securitization, describe the securitization process, and explain the role of participant in the process.• Explain the terms over-collateralization, first-loss piece, equity piece, and cash waterfall within the securitization process.• Analyze the differences in the mechanics of issuing securitized products using a trust versus a special purpose vehicle (SPV) and distinguish between the three main SPV structures: amortizing, revolving, and master trust.• Explain the reasons for and the benefits of undertaking securitization.• Describe and assess the various types of credit enhancements.• Explain the various performance analysis tools for securitized structures and identify the asset classes they are most applicable to.• Define and calculate the delinquency ratio, default ratio, monthly payment rate (MPR), debt service coverage ratio (DSCR), the weighted average coupon(WAC), the weighted average maturity (WAM), and the weighted average life (WAL) for relevant securitized structures.• Explain the prepayment forecasting methodologies and calculate the constant prepayment rate (CPR) and the Public Securities Association (PSA) rate.		CR-23	Moorad Choudhry, Structured Credit Products: Credit Derivatives & Synthetic Securitisation, 2nd Edition (New York: John Wiley & Sons, 2010) Chapter 12:.....An Introduction to Securitisation <ul style="list-style-type: none">• Define securitization, describe the securitization process, and explain the role of participant in the process.• Explain the terms over-collateralization, first-loss piece, equity piece, and cash waterfall within the securitization process.• Analyze the differences in the mechanics of issuing securitized products using a trust versus a special purpose vehicle (SPV) and distinguish between the three main SPV structures: amortizing, revolving, and master trust.• Explain the reasons for and the benefits of undertaking securitization.• Describe and assess the various types of credit enhancements.• Explain the various performance analysis tools for securitized structures and identify the asset classes they are most applicable to.• Define and calculate the delinquency ratio, default ratio, monthly payment rate (MPR), debt service coverage ratio (DSCR), the weighted average coupon(WAC), the weighted average maturity (WAM), and the weighted average life (WAL) for relevant securitized structures.• Explain the prepayment forecasting methodologies and calculate the constant prepayment rate (CPR) and the Public Securities Association (PSA) rate.	No Changes
CR-18	Adam Ashcraft and Til Schuermann, "Understanding the Securitization of Subprime Mortgage Credit," Federal Reserve Bank of New York Staff Reports, no. 318, (March 2008). <ul style="list-style-type: none">• Explain the subprime mortgage credit securitization process in the United States.• Identify and describe key frictions in subprime mortgage securitization, and assess the relative contribution of each factor to the subprime mortgage problems.• Compare predatory lending and borrowing.• Describe the various features of subprime MBS and explain how these features are designed to protect investors from losses on the underlying mortgage loans.• Distinguish between corporate credit ratings and asset-backed securities (ABS) credit ratings.• Explain how through-the-cycle ABS rating can amplify the housing cycle	Ashcraft Removed			
Topic 7 OPERATIONAL AND INTEGRATED RISK MANAGEMENT—Part II Exam Weight 20% I		Topic 7 OPERATIONAL AND INTEGRATED RISK MANAGEMENT—Part II Exam Weight 20% I			
ORR-1	Global Association of Risk Professionals. Operational Risk and Resiliency, New York, NY: Pearson, 2022. Chapter 1. Introduction to Operational Risk and Resilience <ul style="list-style-type: none">• Describe an operational risk management framework and assess the types of risks that can fall within the scope of such a framework.• Describe the seven Basel II event risk categories and identify examples of operational risk events in each category.• Explain characteristics of operational risk exposures and operational loss events, and challenges that can arise in managing operational risk due to these characteristics.• Describe operational resilience, identify the elements of an operational resilience framework, and summarize regulatory expectations for operational resilience.	No Changes	ORR-1	Global Association of Risk Professionals. Operational Risk and Resiliency, New York, NY: Pearson, 2022. Chapter 1. Introduction to Operational Risk and Resilience <ul style="list-style-type: none">• Describe an operational risk management framework and assess the types of risks that can fall within the scope of such a framework.• Describe the seven Basel II event risk categories and identify examples of operational risk events in each category.• Explain characteristics of operational risk exposures and operational loss events, and challenges that can arise in managing operational risk due to these characteristics.• Describe operational resilience, identify the elements of an operational resilience framework, and summarize regulatory expectations for operational resilience.	No Changes
ORR-2	Chapter 2. Risk Governance <ul style="list-style-type: none">• Explain the Basel regulatory expectations for the governance of an operational risk management framework.• Describe and compare the roles of different committees and the board of directors in operational risk governance.• Describe the "three lines of defense" model for operational risk governance and compare roles and responsibilities for each line of defense.• Explain best practices and regulatory expectations for the development of a risk appetite for operational risk and for a strong risk culture.	No Changes	ORR-2	Chapter 2. Risk Governance <ul style="list-style-type: none">• Explain the Basel regulatory expectations for the governance of an operational risk management framework.• Describe and compare the roles of different committees and the board of directors in operational risk governance.• Describe the "three lines of defense" model for operational risk governance and compare roles and responsibilities for each line of defense.• Explain best practices and regulatory expectations for the development of a risk appetite for operational risk and for a strong risk culture.	No Changes
ORR-3	Chapter 3. Risk Identification <ul style="list-style-type: none">• Compare different top-down and bottom-up approaches and tools for identifying operational risks.• Describe best practices in the process of scenario analysis for operational risk.• Describe and apply an operational risk taxonomy and give examples of different taxonomies of operational risks.• Describe and apply the Level 1, 2, and 3 categories in the Basel operational risk taxonomy.	No Changes	ORR-3	Chapter 3. Risk Identification <ul style="list-style-type: none">• Compare different top-down and bottom-up approaches and tools for identifying operational risks.• Describe best practices in the process of scenario analysis for operational risk.• Describe and apply an operational risk taxonomy and give examples of different taxonomies of operational risks.• Describe and apply the Level 1, 2, and 3 categories in the Basel operational risk taxonomy.	No Changes
ORR-4	Chapter 4. Risk Measurement and Assessment <ul style="list-style-type: none">• Explain best practices for the collection of operational loss data and reporting of operational loss incidents, including regulatory expectations.• Explain operational risk-assessment processes and tools, including risk control self-assessments (RCSAs), likelihood assessment scales, and heatmaps.• Describe the differences among key risk indicators (KRIs), key performance indicators (KPIs), and key control indicators (KCIs).• Describe and distinguish between the different quantitative approaches and models used to analyze operational risk.• Estimate operational risk exposures based on the fault tree model given probability assumptions.• Describe approaches used to determine the level of operational risk capital for economic capital purposes, including their application and limitations.• Describe and explain the steps to ensure a strong level of operational resilience, and to test the operational resilience of important business services.	LO Removed New LO	ORR-4	Chapter 4. Risk Measurement and Assessment <ul style="list-style-type: none">• Explain best practices for the collection of operational loss data and reporting of operational loss incidents, including regulatory expectations.• Explain operational risk-assessment processes and tools, including risk control self-assessments (RCSAs), likelihood assessment scales, and heatmaps.• Describe the differences among key risk indicators (KRIs), key performance indicators (KPIs), and key control indicators (KCIs).• Describe the use of factor-based models that quantitatively assess operational risk, and explain the application of the Swiss cheese model and the bowtie tool.• Estimate operational risk exposures based on the fault tree model given probability assumptions.• Describe approaches used to determine the level of operational risk capital for economic capital purposes, including their application and limitations.• Describe and explain the steps to ensure a strong level of operational resilience, and to test the operational resilience of important business services.	LO Removed New LO
ORR-5	Chapter 5. Risk Mitigation <ul style="list-style-type: none">• Explain different ways firms address their operational risk exposures.• Describe and provide examples of different types of internal controls, and explain the process of internal control design and control testing.• Describe methods to improve the quality of an operational process and reduce the potential for human error.• Explain how operational risk can arise with new products, new business initiatives, or mergers and acquisitions, and describe ways to mitigate these risks.• Identify and describe approaches firms should use to mitigate the impact of operational risk events.• Describe methods for the transfer of operational risks and the management of reputational risk, and assess their effectiveness in different situations.	Wording added Wording removed and combined with LO Below New LO (content in black taken from LO above)	ORR-5	Chapter 5. Risk Mitigation <ul style="list-style-type: none">• Explain and compare different ways firms address their operational risk exposures.• Compare different types of internal controls and provide examples of each type of internal control.• Describe control automation, internal control design, and control testing, including risks and challenges that arise in these processes and ways to make them more effective.• Describe methods to improve the quality of an operational process and reduce the potential for human error.• Explain how operational risk can arise with new products, new business initiatives, or mergers and acquisitions, and describe ways to mitigate these risks.• Identify and describe approaches firms should use to mitigate the impact of operational risk events.• Describe methods for the transfer of operational risks and the management of reputational risk, and assess their effectiveness in different situations.	Wording added Wording removed and combined with LO Below New LO (content in black taken from LO above)
ORR-6	Chapter 6. Risk Reporting <ul style="list-style-type: none">• Identify roles and responsibilities of different organizational committees, and explain how risk reports should be developed for each committee or business function.• Describe components of operational risk reports and explain best practices in operational risk reporting.• Describe challenges to reporting operational risks, including characteristics of operational loss data, and explain ways to overcome these challenges.• Explain best practices for reporting risk exposures to regulators and external stakeholders.	No Changes	ORR-6	Chapter 6. Risk Reporting <ul style="list-style-type: none">• Identify roles and responsibilities of different organizational committees, and explain how risk reports should be developed for each committee or business function.• Describe components of operational risk reports and explain best practices in operational risk reporting.• Describe challenges to reporting operational risks, including characteristics of operational loss data, and explain ways to overcome these challenges.• Explain best practices for reporting risk exposures to regulators and external stakeholders.	No Changes
ORR-7	Chapter 7: Integrated Risk Management <ul style="list-style-type: none">• Describe the role of risk governance, risk appetite, and risk culture in the context of an enterprise risk (ERM) framework• Summarize the role of Basel regulatory capital and the process of determining internal economic capital.• Describe elements of a stress-testing framework for financial institutions and explain best practices for stress testing.• Explain challenges and considerations when developing and implementing models used in stress testing operational risk.	No Changes	ORR-7	Chapter 7: Integrated Risk Management <ul style="list-style-type: none">• Describe the role of risk governance, risk appetite, and risk culture in the context of an enterprise risk management (ERM) framework• Summarize the role of Basel regulatory capital and the process of determining internal economic capital.• Describe elements of a stress-testing framework for financial institutions and explain best practices for stress testing.• Explain challenges and considerations when developing and implementing models used in stress testing operational risk.	No Changes
ORR-8	"Cyber-resilience: Range of practices." (Basel Committee on Banking Supervision Publication, December 2018). <ul style="list-style-type: none">• Define cyber-resilience and compare recent regulatory initiatives in the area of cyber-resilience.• Describe current practices by banks and supervisors in the governance of a cyber risk management framework, including roles and responsibilities.• Explain methods for supervising cyber-resilience, testing and incident response approaches, and cybersecurity and resilience metrics.• Explain and assess current practices for the sharing of cybersecurity information between different types of institutions.• Describe practices for the governance of risks of interconnected third-party service providers.	No Changes	ORR-8	"Cyber-resilience: Range of practices." (Basel Committee on Banking Supervision Publication, December 2018). <ul style="list-style-type: none">• Define cyber-resilience and compare recent regulatory initiatives in the area of cyber-resilience.• Describe current practices by banks and supervisors in the governance of a cyber risk management framework, including roles and responsibilities.• Explain methods for supervising cyber-resilience, testing and incident response approaches, and cybersecurity and resilience metrics.• Explain and assess current practices for the sharing of cybersecurity information between different types of institutions.• Describe practices for the governance of risks of interconnected third-party service providers.	No Changes
ORR-9	Global Association of Risk Professionals. Operational Risk and Resiliency, New York, NY: Pearson, 2022. Chapter 9. Case Study: Cyberthreats and Information Security Risks <ul style="list-style-type: none">• Provide examples of cyber threats and information security risks, and describe frameworks and best practices for managing cyber risks.• Describe lessons learned from the Equifax case study	No Changes	ORR-9	Global Association of Risk Professionals. Operational Risk and Resiliency, New York, NY: Pearson, 2022. Chapter 9. Case Study: Cyberthreats and Information Security Risks <ul style="list-style-type: none">• Provide examples of cyber threats and information security risks, and describe frameworks and best practices for managing cyber risks.• Describe lessons learned from the Equifax case study	No Changes
ORR-10	"Sound Management of Risks related to Money Laundering and Financing of Terrorism" (Basel Committee on Banking Supervision, January 2014, revised July 2020), (through p.16, para. 83) <ul style="list-style-type: none">• Explain best practices recommended by the Basel committee for the assessment, management, mitigation, and monitoring of money laundering and financing of terrorism (ML/FT) risks.• Describe recommended practices for the acceptance, verification, and identification of customers at a bank.• Explain practices for managing ML/FT risks in a group-wide and cross-border context.	No Changes	ORR-10	"Sound Management of Risks related to Money Laundering and Financing of Terrorism" (Basel Committee on Banking Supervision, January 2014, revised July 2020), (through p.16, para. 83) <ul style="list-style-type: none">• Explain best practices recommended by the Basel committee for the assessment, management, mitigation, and monitoring of money laundering and financing of terrorism (ML/FT) risks.• Describe recommended practices for the acceptance, verification, and identification of customers at a bank.• Explain practices for managing ML/FT risks in a group-wide and cross-border context.	No Changes
ORR-11	Global Association of Risk Professionals. Operational Risk and Resiliency. New York, NY: Pearson, 2022. Chapter 11, Case Study: Financial Crime and Fraud <ul style="list-style-type: none">• Describe elements of a control framework to manage financial fraud risk and money laundering risk.• Summarize the regulatory findings and describe the lessons learned from the USAA case study.	No Changes	ORR-11	Global Association of Risk Professionals. Operational Risk and Resiliency. New York, NY: Pearson, 2022. Chapter 11, Case Study: Financial Crime and Fraud <ul style="list-style-type: none">• Describe elements of a control framework to manage financial fraud risk and money laundering risk.• Summarize the regulatory findings and describe the lessons learned from the USAA case study.	No Changes
ORR-12	"Guidance on Managing Outsourcing Risk." Board of Governors of the Federal Reserve System, December 2013. <ul style="list-style-type: none">• Explain how risks can arise through outsourcing activities to third-party service providers, and describe elements of an effective program to manage outsourcing risk.• Explain how financial institutions should perform due diligence on third-party service providers.• Describe topics and provisions that should be addressed in a contract with a third-party service provider.	No Changes	ORR-12	"Guidance on Managing Outsourcing Risk." Board of Governors of the Federal Reserve System, December 2013. <ul style="list-style-type: none">• Explain how risks can arise through outsourcing activities to third-party service providers, and describe elements of an effective program to manage outsourcing risk.• Explain how financial institutions should perform due diligence on third-party service providers.• Describe topics and provisions that should be addressed in a contract with a third-party service provider.	No Changes

ORR-13	<p>Global Association of Risk Professionals. Operational Risk and Resiliencv. New York, NY: Pearson. 2022.</p> <p>Chapter 13. Case Study: Third-party Risk Management</p> <ul style="list-style-type: none"> • Explain how risks related to the use of third parties can arise and describe characteristics of an effective third-party risk management framework. • Describe the lessons learned from the case study involving a data breach caused by a third-party vendor employee 	ORR-13	<p>Global Association of Risk Professionals. Operational Risk and Resiliencv. New York, NY: Pearson. 2022.</p> <p>Chapter 13. Case Study: Third-party Risk Management</p> <ul style="list-style-type: none"> • Explain how risks related to the use of third parties can arise and describe characteristics of an effective third-party risk management framework. • Describe the lessons learned from the presented case studies 	No Changes
ORR-14	<p>Chapter 14. Case Study: Investor Protection and Compliance Risks in Investment Activities</p> <ul style="list-style-type: none"> • Summarize important regulations designed to protect investors in financial instruments, including MFID, MiFID II, and Dodd-Frank. • Describe and provide lessons learned from the case studies involving violations of investor protection or compliance regulations. 	ORR-14	<p>Chapter 14. Case Study: Investor Protection and Compliance Risks in Investment Activities</p> <ul style="list-style-type: none"> • Summarize important regulations designed to protect investors in financial instruments, including MFID, MiFID II, and Dodd-Frank. • Describe and provide lessons learned from the case studies involving violations of investor protection or compliance regulations. 	
ORR-15	<p>"Supervisory Guidance on Model Risk Management," Federal Deposit Insurance Corporation, June 7, 2017.</p> <ul style="list-style-type: none"> • Describe model risk and explain how model risk can arise in the implementation of a model. • Describe elements of an effective process to manage model risk. • Explain best practices for the development and implementation of a model. • Describe elements of a strong model validation process and challenges to an effective validation process. 	ORR-15	<p>"Supervisory Guidance on Model Risk Management," Federal Deposit Insurance Corporation, June 7, 2017.</p> <ul style="list-style-type: none"> • Describe model risk and explain how model risk can arise in the implementation of a model. • Describe elements of an effective process to manage model risk. • Explain best practices for the development and implementation of a model. • Describe elements of a strong model validation process and challenges to an effective validation process. 	No Changes
ORR-16	<p>Global Association of Risk Professionals. Operational Risk and Resiliency, New York, NY: Pearson. 2022.</p> <p>Chapter 16. Case Study: Model Risk and Model Validation</p> <ul style="list-style-type: none"> • Define a model and describe different ways that financial institutions can become exposed to model risk. • Describe the role of the model risk management function and explain best practices in the model risk management and validation processes. • Describe lessons learned from the three case studies involving model risk. 	ORR-16	<p>Global Association of Risk Professionals. Operational Risk and Resiliency, New York, NY: Pearson. 2022.</p> <p>Chapter 16. Case Study: Model Risk and Model Validation</p> <ul style="list-style-type: none"> • Define a model and describe different ways that financial institutions can become exposed to model risk. • Describe the role of the model risk management function and explain best practices in the model risk management and validation processes. • Describe lessons learned from the three case studies involving model risk. 	No Changes
ORR-17	<p>"Stress Testing Banks," Tili Schuermann, International Journal of Forecasting 30, no. 3, (2014): 717-728</p> <ul style="list-style-type: none"> • Describe the evolution of the stress testing process and compare methodologies of historical ESA, CCAR and SCAP stress tests. • Explain challenges in designing stress test scenarios, including the problem of coherence in modeling risk factors. • Explain challenges in modeling a bank's revenues, losses, and its balance sheet over a stress test horizon period. 	ORR-17	<p>"Stress Testing Banks," Tili Schuermann, International Journal of Forecasting 30, no. 3, (2014): 717-728</p> <ul style="list-style-type: none"> • Describe the evolution of the stress testing process and compare methodologies of historical ESA, CCAR and SCAP stress tests. • Explain challenges in designing stress test scenarios, including the problem of coherence in modeling risk factors. • Explain challenges in modeling a bank's revenues, losses, and its balance sheet over a stress test horizon period. 	No Changes
ORR-18	<p>Michael Crouhy, Dan Galai and Robert Mark. The Essentials of Risk Management. 2nd Edition (New York: McGraw-Hill. 2014)</p> <p>Chapter 17..... Risk Capital Attribution and Risk-Adjusted Performance Measurement</p> <ul style="list-style-type: none"> • Define, compare and contrast risk capital, economic capital and regulatory capital, and explain methods and motivations for using economic capital approaches to allocate risk capital. • Describe the RAROC (risk-adjusted return on capital) methodology and its use in capital budgeting. • Compute and interpret the RAROC for a project, loan, or loan portfolio, and use RAROC to compare business unit performance. • Explain challenges that arise when using RAROC for performance measurement, including choosing a time horizon, measuring default probability, and choosing a confidence level. • Calculate the hurdle rate and apply this rate in making business decisions using RAROC. • Compute the adjusted RAROC for a project to determine its viability. • Explain challenges in modeling diversification benefits, including aggregating a firm's risk capital and allocating economic capital to different business lines. • Explain best practices in implementing an approach that uses RAROC to allocate economic capital. 	ORR-18	<p>Michael Crouhy, Dan Galai and Robert Mark. The Essentials of Risk Management. 2nd Edition (New York: McGraw-Hill. 2014)</p> <p>Chapter 17..... Risk Capital Attribution and Risk-Adjusted Performance Measurement</p> <ul style="list-style-type: none"> • Define, compare and contrast risk capital, economic capital and regulatory capital, and explain methods and motivations for using economic capital approaches to allocate risk capital. • Describe the RAROC (risk-adjusted return on capital) methodology and its use in capital budgeting. • Compute and interpret the RAROC for a project, loan, or loan portfolio, and use RAROC to compare business unit performance. • Explain challenges that arise when using RAROC for performance measurement, including choosing a time horizon, measuring default probability, and choosing a confidence level. • Calculate the hurdle rate and apply this rate in making business decisions using RAROC. • Compute the adjusted RAROC for a project to determine its viability. • Explain challenges in modeling diversification benefits, including aggregating a firm's risk capital and allocating economic capital to different business lines. • Explain best practices in implementing an approach that uses RAROC to allocate economic capital. 	No Changes
ORR-19	<p>"Range of Practices and Issues in Economic Capital Frameworks," (Basel Committee on Banking Supervision Publication, March 2009)."</p> <ul style="list-style-type: none"> • Within the economic capital implementation framework describe the challenges that appear in: <ul style="list-style-type: none"> o Defining and calculating risk measures o Risk aggregation o Validation of models o Dependency modeling in credit risk o Evaluating counterparty credit risk o Assessing interest rate risk in the banking book • Describe the BIS recommendations that supervisors should consider to make effective use of internal risk measures, such as economic capital, that are not designed for regulatory purposes. • Explain benefits and impacts of using an economic capital framework within the following areas: <ul style="list-style-type: none"> o Credit portfolio management o Risk based pricing o Customer profitability analysis o Management incentives • Describe best practices and assess key concerns for the governance of an economic capital framework. 	ORR-19	<p>"Range of Practices and Issues in Economic Capital Frameworks," (Basel Committee on Banking Supervision Publication, March 2009)."</p> <ul style="list-style-type: none"> • Within the economic capital implementation framework describe the challenges that appear in: <ul style="list-style-type: none"> o Defining and calculating risk measures o Risk aggregation o Validation of models o Dependency modeling in credit risk o Evaluating counterparty credit risk o Assessing interest rate risk in the banking book • Describe the BIS recommendations that supervisors should consider to make effective use of internal risk measures, such as economic capital, that are not designed for regulatory purposes. • Explain benefits and impacts of using an economic capital framework within the following areas: <ul style="list-style-type: none"> o Credit portfolio management o Risk based pricing o Customer profitability analysis o Management incentives • Describe best practices and assess key concerns for the governance of an economic capital framework. 	No Changes
ORR-20	<p>"Capital Planning at Large Bank Holding Companies: Supervisory Expectations and Range of Current Practice," Board of Governors of the Federal Reserve System, August 2013</p> <ul style="list-style-type: none"> • Describe the Federal Reserve's Capital Plan Rule and explain the seven principles of an effective capital adequacy process for bank holding companies (BHCs) subject to the Capital Plan Rule. • Describe practices that can result in a strong and effective capital adequacy process for a BHC in the following areas: <ul style="list-style-type: none"> o Risk identification o Internal controls, including model review and validation o Corporate governance o Capital policy, including setting of goals and targets and contingency planning o Stress testing and stress scenario design o Estimating losses, revenues, and expenses, including quantitative and qualitative methodologies o Assessing the impact of capital adequacy, including risk-weighted asset RWA and balance sheet projections 	ORR-20	<p>"Capital Planning at Large Bank Holding Companies: Supervisory Expectations and Range of Current Practice," Board of Governors of the Federal Reserve System, August 2013</p> <ul style="list-style-type: none"> • Describe the Federal Reserve's Capital Plan Rule and explain the seven principles of an effective capital adequacy process for bank holding companies (BHCs) subject to the Capital Plan Rule. • Describe practices that can result in a strong and effective capital adequacy process for a BHC in the following areas: <ul style="list-style-type: none"> o Risk identification o Internal controls, including model review and validation o Corporate governance o Capital policy, including setting of goals and targets and contingency planning o Stress testing and stress scenario design o Estimating losses, revenues, and expenses, including quantitative and qualitative methodologies o Assessing the impact of capital adequacy, including risk-weighted asset RWA and balance sheet projections 	No Changes
ORR-21	<p>Mark Carey, "Capital Regulation Before the Global Financial Crisis," GARP Risk Institute, April 2019.</p> <ul style="list-style-type: none"> • Explain the motivations for introducing the Basel regulations, including key risk exposures addressed, and explain the reasons for revisions to Basel regulations over time. • Explain the calculation of risk-weighted assets and the capital requirement per the original Basel I guidelines. • Describe measures introduced in the 1995 and 1996 amendments, including guidelines for netting of credit exposures and methods to calculate market risk capital for assets in the trading book. • Describe changes to the Basel regulations made as part of Basel II, including the three pillars. • Compare the standardized IRB approach, the Foundation Internal Ratings-Based (IRB) approach, and the advanced IRB approach for the calculation of credit risk capital under Basel II. • Calculate credit risk capital under Basel II utilizing the IRB approach. • Compare the basic indicator approach, the standardized approach, and the Advanced Measurement Approach for the calculation of operational risk capital under Basel II. • Summarize elements of the Solvency II capital framework for insurance companies. 	ORR-21	<p>Mark Carey, "Capital Regulation Before the Global Financial Crisis," GARP Risk Institute, April 2019.</p> <ul style="list-style-type: none"> • Explain the motivations for introducing the Basel regulations, including key risk exposures addressed, and explain the reasons for revisions to Basel regulations over time. • Explain the calculation of risk-weighted assets and the capital requirement per the original Basel I guidelines. • Describe measures introduced in the 1995 and 1996 amendments, including guidelines for netting of credit exposures and methods to calculate market risk capital for assets in the trading book. • Describe changes to the Basel regulations made as part of Basel II, including the three pillars. • Compare the standardized IRB approach, the Foundation Internal Ratings-Based (IRB) approach, and the advanced IRB approach for the calculation of credit risk capital under Basel II. • Calculate credit risk capital under Basel II utilizing the IRB approach. • Compare the basic indicator approach, the standardized approach, and the Advanced Measurement Approach for the calculation of operational risk capital under Basel II. • Summarize elements of the Solvency II capital framework for insurance companies. 	No Changes
ORR-22	<p>Mark Carey, "Solvency, Liquidity and Other Regulation After the Global Financial Crisis," GARP Risk Institute, April 2019.</p> <ul style="list-style-type: none"> • Describe and calculate the stressed value-at-risk measure introduced in Basel 2.5, and calculate the market risk capital charge. • Explain the process of calculating the incremental risk capital charge for positions held in a bank's trading book. • Describe the comprehensive risk (CR) capital charge for portfolios of positions that are sensitive to correlations between default risks. • Define in the context of Basel III and calculate where appropriate: <ul style="list-style-type: none"> • Tier 1 capital and its components • Tier 2 capital and its components • Required Tier 1 equity capital, total Tier 1 capital, and total capital • Describe the motivations for and calculate the capital conservation buffer and the countercyclical buffer, including special rules for globally systemically important banks (G-SIBs). • Describe and calculate ratios intended to improve the management of liquidity risk, including the required leverage ratio, the liquidity coverage ratio and the net stable funding ratio. • Describe the mechanics of contingent convertible bonds (CoCos) and explain the motivations for banks to issue them. • Provide examples of legislative and regulatory reforms that were introduced after the 2007 – 2009 financial crisis. 	ORR-22	<p>Mark Carey, "Solvency, Liquidity and Other Regulation After the Global Financial Crisis," GARP Risk Institute, April 2019.</p> <ul style="list-style-type: none"> • Describe and calculate the stressed value-at-risk measure introduced in Basel 2.5, and calculate the market risk capital charge. • Explain the process of calculating the incremental risk capital charge for positions held in a bank's trading book. • Describe the comprehensive risk (CR) capital charge for portfolios of positions that are sensitive to correlations between default risks. • Define in the context of Basel III and calculate where appropriate: <ul style="list-style-type: none"> • Tier 1 capital and its components • Tier 2 capital and its components • Required Tier 1 equity capital, total Tier 1 capital, and total capital • Describe the motivations for and calculate the capital conservation buffer and the countercyclical buffer, including special rules for globally systemically important banks (G-SIBs). • Describe and calculate ratios intended to improve the management of liquidity risk, including the required leverage ratio, the liquidity coverage ratio and the net stable funding ratio. • Describe the mechanics of contingent convertible bonds (CoCos) and explain the motivations for banks to issue them. • Provide examples of legislative and regulatory reforms that were introduced after the 2007 – 2009 financial crisis. 	No Changes
ORR-23	<p>"High-level summary of Basel III reforms," (Basel Committee on Banking Supervision Publication, December 2017)</p> <ul style="list-style-type: none"> • Explain the motivations for revising the Basel III framework and the goals and impacts of the December 2017 reforms to the Basel III framework. • Summarize the December 2017 revisions to the Basel III framework in the following areas: <ul style="list-style-type: none"> • The standardized approach to credit risk • The internal ratings-based (IRB) approaches for credit risk • The CVA risk framework • The operational risk framework • The leverage ratio framework • Describe the revised output floor introduced as part of the Basel III reforms and approaches to be used when calculating the output floor. 	ORR-23	<p>"High-level summary of Basel III reforms," (Basel Committee on Banking Supervision Publication, December 2017)</p> <ul style="list-style-type: none"> • Explain the motivations for revising the Basel III framework and the goals and impacts of the December 2017 reforms to the Basel III framework. • Summarize the December 2017 revisions to the Basel III framework in the following areas: <ul style="list-style-type: none"> • The standardized approach to credit risk • The internal ratings-based (IRB) approaches for credit risk • The CVA risk framework • The operational risk framework • The leverage ratio framework • Describe the revised output floor introduced as part of the Basel III reforms and approaches to be used when calculating the output floor. 	No Changes
ORR-24	<p>"Basel III: Finalising post-crisis reforms," (Basel Committee on Banking Supervision Publication, December 2017): 128-136.</p> <ul style="list-style-type: none"> • Explain the elements of the new standardized approach to measure operational risk capital, including the business indicator, internal loss multiplier, and loss component, and calculate the operational risk capital requirement for a bank using this approach. 	ORR-24	<p>"Basel III: Finalising post-crisis reforms," (Basel Committee on Banking Supervision Publication, December 2017): 128-136.</p> <ul style="list-style-type: none"> • Explain the elements of the new standardized approach to measure operational risk capital, including the business indicator, internal loss multiplier, and loss component, and calculate the operational risk capital requirement for a bank using this approach. 	No Changes

<ul style="list-style-type: none">• Compare the SMA to earlier methods of calculating operational risk capital, including the Advanced Measurement Approaches (AMA).• Describe general and specific criteria recommended by the Basel Committee for the identification, collection, and treatment of operational loss data.		<ul style="list-style-type: none">• Compare the SMA to earlier methods of calculating operational risk capital, including the Advanced Measurement Approaches (AMA).• Describe general and specific criteria recommended by the Basel Committee for the identification, collection, and treatment of operational loss data.		
(NEW) Topic 8	Liquidity and Treasury Risk Measurement and Management – Part II Exam Weight 15% (LTR)	(NEW) Topic 8	Liquidity and Treasury Risk Measurement and Management – Part II Exam Weight 15% (LTR)	
LTR-1	<p>John C. Hull, Risk Management and Financial Institutions, 5th Edition (Hoboken, NJ: John Wiley & Sons, 2018)</p> <p>Chapter 24. Liquidity Risk</p> <ul style="list-style-type: none">• Explain and calculate liquidity trading risk via cost of liquidation and liquidity-adjusted VaR (LVaR).• Identify liquidity funding risk, funding sources, and lessons learned from real cases: Northern Rock, Ashanti Goldfields, and Metallgesellschaft.• Evaluate Basel III liquidity risk ratios and BIS principles for sound liquidity risk management.• Explain liquidity black holes and identify the causes of positive feedback trading.	LTR-1	<p>John C. Hull, Risk Management and Financial Institutions, 5th Edition (Hoboken, NJ: John Wiley & Sons, 2018)</p> <p>Chapter 24. Liquidity Risk</p> <ul style="list-style-type: none">• Explain and calculate liquidity trading risk via cost of liquidation and liquidity-adjusted VaR (LVaR).• Identify liquidity funding risk, funding sources, and lessons learned from real cases: Northern Rock, Ashanti Goldfields, and Metallgesellschaft.• Evaluate Basel III liquidity risk ratios and BIS principles for sound liquidity risk management.• Explain liquidity black holes and identify the causes of positive feedback trading.	No Changes
LTR-2	<p>Allan Malz, Financial Risk Management: Models, History, and Institutions (Hoboken, NJ: John Wiley & Sons, 2011).</p> <p>Chapter 12.Liquidity and Leverage</p> <ul style="list-style-type: none">• Differentiate between sources of liquidity risk and describe specific challenges faced by different types of financial institutions in managing liquidity risk.• Summarize the asset-liability management process at a fractional reserve bank, including the process of liquidity transformation.• Compare transactions used in the collateral market and explain risks that can arise through collateral market transactions.• Describe the relationship between leverage and a firm's return profile (including the leverage effect), and distinguish the impact of different types of transactions on a firm's leverage and balance sheet.• Distinguish methods to measure and manage funding liquidity risk and transactions liquidity risk.• Calculate the expected transactions cost and the spread risk factor for a transaction, and calculate the liquidity adjustment to VaR for a position to be liquidated over a number of trading days.• Discuss interactions between different types of liquidity risk and explain how liquidity risk events can increase systemic risk.	LTR-2	<p>Allan Malz, Financial Risk Management: Models, History, and Institutions (Hoboken, NJ: John Wiley & Sons, 2011).</p> <p>Chapter 12.Liquidity and Leverage</p> <ul style="list-style-type: none">• Differentiate between sources of liquidity risk and describe specific challenges faced by different types of financial institutions in managing liquidity risk.• Summarize the asset-liability management process at a fractional reserve bank, including the process of liquidity transformation.• Compare transactions used in the collateral market and explain risks that can arise through collateral market transactions.• Describe the relationship between leverage and a firm's return profile (including the leverage effect), and distinguish the impact of different types of transactions on a firm's leverage and balance sheet.• Distinguish methods to measure and manage funding liquidity risk and transactions liquidity risk.• Calculate the expected transactions cost and the spread risk factor for a transaction, and calculate the liquidity adjustment to VaR for a position to be liquidated over a number of trading days.• Discuss interactions between different types of liquidity risk and explain how liquidity risk events can increase systemic risk.	No Changes
LTR-3	<p>Shyam Venkat, Stephen Baird, Liquidity Risk Management (Hoboken, NJ: John Wiley & Sons, 2016)</p> <p>Chapter 6. Early Warning Indicators</p> <ul style="list-style-type: none">• Evaluate the characteristics of sound Early Warning Indicators (EWI) measures.• Identify EWI guidelines from banking regulators and supervisors (OCC, BCBS, Federal Reserve).• Discuss the applications of EWIs in the context of the liquidity risk management process.	LTR-3	<p>Shyam Venkat, Stephen Baird, Liquidity Risk Management (Hoboken, NJ: John Wiley & Sons, 2016)</p> <p>Chapter 6. Early Warning Indicators</p> <ul style="list-style-type: none">• Evaluate the characteristics of sound Early Warning Indicators (EWI) measures.• Identify EWI guidelines from banking regulators and supervisors (OCC, BCBS, Federal Reserve).• Discuss the applications of EWIs in the context of the liquidity risk management process.	No Changes
LTR-4	<p>Peter Rose, Sylvia Hudgins, Bank Management & Financial Services, Ninth Edition (New York, NY: McGraw-Hill, 2013)</p> <p>Chapter 10. The Investment Function in Financial Services Management</p> <ul style="list-style-type: none">• Compare various money market and capital market instruments and discuss their advantages and disadvantages.• Identify and discuss various factors that affect the choice of investment securities by a bank.• Apply investment maturity strategies and maturity management tools based on the yield curve and duration.	LTR-4	<p>Peter Rose, Sylvia Hudgins, Bank Management & Financial Services, Ninth Edition (New York, NY: McGraw-Hill, 2013)</p> <p>Chapter 10. The Investment Function in Financial Services Management</p> <ul style="list-style-type: none">• Compare various money market and capital market instruments and discuss their advantages and disadvantages.• Identify and discuss various factors that affect the choice of investment securities by a bank.• Apply investment maturity strategies and maturity management tools based on the yield curve and duration.	No Changes
LTR-5	<p>Chapter 11. Liquidity and Reserves Management: Strategies and Policies</p> <ul style="list-style-type: none">• Calculate a bank's net liquidity position and explain factors that affect the supply and demand of liquidity at a bank.• Compare strategies that a bank can use to meet demands for additional liquidity.• Estimate a bank's liquidity needs through three methods (sources and uses of funds, structure of funds, and liquidity indicators).• Summarize the process taken by a US bank to calculate its legal reserves.• Differentiate between factors that affect the choice among alternate sources of reserves.	LTR-5	<p>Chapter 11. Liquidity and Reserves Management: Strategies and Policies</p> <ul style="list-style-type: none">• Calculate a bank's net liquidity position and explain factors that affect the supply and demand of liquidity at a bank.• Compare strategies that a bank can use to meet demands for additional liquidity.• Estimate a bank's liquidity needs through three methods (sources and uses of funds, structure of funds, and liquidity indicators).• Summarize the process taken by a US bank to calculate its legal reserves.• Differentiate between factors that affect the choice among alternate sources of reserves.	No Changes
LTR-6	<p>Shyam Venkat, Stephen Baird, Liquidity Risk Management (Hoboken, NJ: John Wiley & Sons, 2016)</p> <p>Chapter 4. Intraday Liquidity Risk Management</p> <ul style="list-style-type: none">• Identify and explain the uses and sources of intraday liquidity.• Discuss the governance structure of intraday liquidity risk management.• Differentiate between methods for tracking intraday flows and monitoring risk levels.	LTR-6	<p>Shyam Venkat, Stephen Baird, Liquidity Risk Management (Hoboken, NJ: John Wiley & Sons, 2016)</p> <p>Chapter 4. Intraday Liquidity Risk Management</p> <ul style="list-style-type: none">• Identify and explain the uses and sources of intraday liquidity.• Discuss the governance structure of intraday liquidity risk management.• Differentiate between methods for tracking intraday flows and monitoring risk levels.	No Changes
LTR-7	<p>Antonio Castagna, Francesco Fede, Measuring and Managing Liquidity Risk (United Kingdom, John Wiley & Sons, 2013).</p> <p>Chapter 6. Monitoring Liquidity</p> <ul style="list-style-type: none">• Distinguish between deterministic and stochastic cash flows and provide examples of each.• Describe and provide examples of liquidity options, and explain the impact of liquidity options on a bank's liquidity position and its liquidity management process.• Describe and apply the concepts of liquidity risk, funding cost risk, liquidity generation capacity, expected liquidity, cash flow at risk.• Interpret the term structure of expected cash flows and cumulative cash flows.• Discuss the impact of available asset transactions on cash flows and liquidity generation capacity.	LTR-7	<p>Antonio Castagna, Francesco Fede, Measuring and Managing Liquidity Risk (United Kingdom, John Wiley & Sons, 2013).</p> <p>Chapter 6. Monitoring Liquidity</p> <ul style="list-style-type: none">• Distinguish between deterministic and stochastic cash flows and provide examples of each.• Describe and provide examples of liquidity options, and explain the impact of liquidity options on a bank's liquidity position and its liquidity management process.• Describe and apply the concepts of liquidity risk, funding cost risk, liquidity generation capacity, expected liquidity, cash flow at risk.• Interpret the term structure of expected cash flows and cumulative cash flows.• Discuss the impact of available asset transactions on cash flows and liquidity generation capacity.	No Changes
LTR-8	<p>Darrell Duffie, 2010, "The Failure Mechanics of Dealer Banks," Journal of Economic Perspectives 24:1, 51-72.</p> <ul style="list-style-type: none">• Compare and contrast the major lines of business in which dealer banks operate and the risk factors they face in each line of business.• Identify situations that can cause a liquidity crisis at a dealer bank and explain responses that can mitigate these risks.• Assess policy measures that can alleviate firm-specific and systemic risks related to large dealer banks.	LTR-8	<p>Darrell Duffie, 2010, "The Failure Mechanics of Dealer Banks," Journal of Economic Perspectives 24:1, 51-72.</p> <ul style="list-style-type: none">• Compare and contrast the major lines of business in which dealer banks operate and the risk factors they face in each line of business.• Identify situations that can cause a liquidity crisis at a dealer bank and explain responses that can mitigate these risks.• Assess policy measures that can alleviate firm-specific and systemic risks related to large dealer banks.	No Changes
LTR-9	<p>Shyam Venkat, Stephen Baird, Liquidity Risk Management (Hoboken, NJ: John Wiley & Sons, 2016)</p> <p>Chapter 3. Liquidity Stress Testing</p> <ul style="list-style-type: none">• Differentiate between various types of liquidity, including funding, operational, strategic, contingent, and restricted liquidity.• Estimate contingent liquidity via the liquid asset buffer.• Discuss liquidity stress test design issues such as scope, scenario development, assumptions, outputs, governance, and integration with other risk models.	LTR-9	<p>Shyam Venkat, Stephen Baird, Liquidity Risk Management (Hoboken, NJ: John Wiley & Sons, 2016)</p> <p>Chapter 3. Liquidity Stress Testing</p> <ul style="list-style-type: none">• Differentiate between various types of liquidity, including funding, operational, strategic, contingent, and restricted liquidity.• Estimate contingent liquidity via the liquid asset buffer.• Discuss liquidity stress test design issues such as scope, scenario development, assumptions, outputs, governance, and integration with other risk models.	No Changes
LTR-10	<p>Moorad Choudhry, The Principles of Banking Institutions (Singapore: John Wiley & Sons, 2012)</p> <p>Chapter 14. Liquidity Risk Reporting and Stress Testing</p> <ul style="list-style-type: none">• Identify best practices for the reporting of a bank's liquidity position.• Compare and interpret different types of liquidity risk reports.• Explain the process of reporting a liquidity stress test and interpret a liquidity stress test report.	LTR-10	<p>Moorad Choudhry, The Principles of Banking Institutions (Singapore: John Wiley & Sons, 2012)</p> <p>Chapter 14. Liquidity Risk Reporting and Stress Testing</p> <ul style="list-style-type: none">• Identify best practices for the reporting of a bank's liquidity position.• Compare and interpret different types of liquidity risk reports.• Explain the process of reporting a liquidity stress test and interpret a liquidity stress test report.	No Changes
LTR-11	<p>Shyam Venkat, Stephen Baird, Liquidity Risk Management (Hoboken, NJ: John Wiley & Sons, 2016)</p> <p>Chapter 7. Contingency Funding Planning</p> <ul style="list-style-type: none">• Discuss the relationship between contingency funding plan and liquidity stress testing.• Evaluate the key design considerations of a sound contingency funding plan.• Assess the key components of a contingency funding plan (governance and oversight, scenarios and liquidity gap analysis, contingent actions, monitoring and escalation, data and reporting).	LTR-11	<p>Shyam Venkat, Stephen Baird, Liquidity Risk Management (Hoboken, NJ: John Wiley & Sons, 2016)</p> <p>Chapter 7. Contingency Funding Planning</p> <ul style="list-style-type: none">• Discuss the relationship between contingency funding plan and liquidity stress testing.• Evaluate the key design considerations of a sound contingency funding plan.• Assess the key components of a contingency funding plan (governance and oversight, scenarios and liquidity gap analysis, contingent actions, monitoring and escalation, data and reporting).	No Changes
LTR-12	<p>Peter Rose, Sylvia Hudgins, Bank Management & Financial Services, Ninth Edition (New York, NY: McGraw-Hill, 2013)</p> <p>Chapter 12. Managing and Pricing Deposit Services</p> <ul style="list-style-type: none">• Differentiate between the various transaction and non-transaction deposit types.• Compare different methods used to determine the pricing of deposits and calculate the price of a deposit account using cost-plus, marginal cost, and conditional pricing formulas.• Explain challenges faced by banks that offer deposit accounts, including deposit insurance, disclosures, overdraft protection, and basic (lifeline) banking.	LTR-12	<p>Peter Rose, Sylvia Hudgins, Bank Management & Financial Services, Ninth Edition (New York, NY: McGraw-Hill, 2013)</p> <p>Chapter 12. Managing and Pricing Deposit Services</p> <ul style="list-style-type: none">• Differentiate between the various transaction and non-transaction deposit types.• Compare different methods used to determine the pricing of deposits and calculate the price of a deposit account using cost-plus, marginal cost, and conditional pricing formulas.• Explain challenges faced by banks that offer deposit accounts, including deposit insurance, disclosures, overdraft protection, and basic (lifeline) banking.	No Changes
LTR-13	<p>Chapter 13. Managing Nondeposit Liabilities</p> <ul style="list-style-type: none">• Distinguish between the various sources of non-deposit liabilities at a bank.• Describe and calculate the available funds gap.• Discuss factors affecting the choice of non-deposit funding sources.• Calculate overall cost of funds using both the historical average cost approach and the pooled-funds approach.	LTR-13	<p>Chapter 13. Managing Nondeposit Liabilities</p> <ul style="list-style-type: none">• Distinguish between the various sources of non-deposit liabilities at a bank.• Describe and calculate the available funds gap.• Discuss factors affecting the choice of non-deposit funding sources.• Calculate overall cost of funds using both the historical average cost approach and the pooled-funds approach.	No Changes
LTR-14	<p>Bruce Tuckman, Angel Serrat, Fixed Income Securities: Tools for Today's Markets, 3rd Edition (New York: Wiley, 2011)</p> <p>Chapter 12.Repurchase Agreements and Financing</p> <ul style="list-style-type: none">• Describe the mechanics of repurchase agreements (repos) and calculate the settlement for a repo transaction.• Discuss common motivations for entering into repos, including their use in cash management and liquidity management.• Discuss how counterparty risk and liquidity risk can arise through the use of repo transactions.• Assess the role of repo transactions in the collapses of Lehman Brothers and Bear Stearns during the (2007 - 2009) credit crisis.• Compare the use of general and special collateral in repo transactions.• Identify the characteristics of special spreads and explain the typical behavior of US Treasury special spreads over an auction cycle.• Calculate the financing advantage of a bond trading special when used in a repo transaction.	LTR-14	<p>Bruce Tuckman, Angel Serrat, Fixed Income Securities: Tools for Today's Markets, 3rd Edition (New York: Wiley, 2011)</p> <p>Chapter 12.Repurchase Agreements and Financing</p> <ul style="list-style-type: none">• Describe the mechanics of repurchase agreements (repos) and calculate the settlement for a repo transaction.• Discuss common motivations for entering into repos, including their use in cash management and liquidity management.• Discuss how counterparty risk and liquidity risk can arise through the use of repo transactions.• Assess the role of repo transactions in the collapses of Lehman Brothers and Bear Stearns during the (2007 - 2009) credit crisis.• Compare the use of general and special collateral in repo transactions.• Identify the characteristics of special spreads and explain the typical behavior of US Treasury special spreads over an auction cycle.• Calculate the financing advantage of a bond trading special when used in a repo transaction.	No Changes
LTR-15	<p>Joel Grant, 2011, "Liquidity Transfer Pricing: A Guide to Better Practice," Occasional Paper, Financial Stability Board, Bank for International Settlements.</p> <ul style="list-style-type: none">• Discuss the process of liquidity transfer pricing (LTP) and identify best practices for the governance and implementation of an LTP process.• Discuss challenges that may arise for banks during the implementation of LTP.• Compare the various approaches to liquidity transfer pricing (zero cost, average cost, matched maturity marginal cost).• Describe the contingent liquidity risk pricing process and calculate the cost of contingent liquidity risk.	LTR-15	<p>Joel Grant, 2011, "Liquidity Transfer Pricing: A Guide to Better Practice," Occasional Paper, Financial Stability Board, Bank for International Settlements.</p> <ul style="list-style-type: none">• Discuss the process of liquidity transfer pricing (LTP) and identify best practices for the governance and implementation of an LTP process.• Discuss challenges that may arise for banks during the implementation of LTP.• Compare the various approaches to liquidity transfer pricing (zero cost, average cost, matched maturity marginal cost).• Describe the contingent liquidity risk pricing process and calculate the cost of contingent liquidity risk.	No Changes

LTR-16	<p>Patrick McGuire, Gotz von Peter, 2009. "The US Dollar Shortage in Global Banking and the International Policy Response," BIS Working Papers, Bank for International Settlements.</p> <ul style="list-style-type: none"> Identify the causes of the US Dollar shortage during the Great Financial Crisis. Evaluate the importance of assessing maturity/currency mismatch across the balance sheets of consolidated entities. Discuss how central bank swap agreements overcame challenges commonly associated with international lenders of last resort. 	No Changes
LTR-17	<p>Claudio Borio, Robert McCauley, Patrick McGuire, Vladyslav Sushko, 2016. "Covered Interest Rate Parity Lost: Understanding the Cross-Currency Basis," BIS Quarterly Review.</p> <ul style="list-style-type: none"> Differentiate between the mechanics of FX swaps and cross-currency swaps. Identify key factors that affect the cross-currency swap basis. Assess the causes of covered interest rate parity violations after the financial crisis of 2008. 	No Changes
LTR-18	<p>Peter Rose, Sylvia Hudgins, Bank Management & Financial Services, Ninth Edition (New York, NY: McGraw-Hill, 2013) Chapter 7, Risk management for Changing Interest Rates: Asset-Liability Management and Duration Techniques</p> <ul style="list-style-type: none"> Discuss how asset-liability management strategies can help a bank hedge against interest rate risk. Describe interest-sensitive gap management and apply this strategy to maximize a bank's net interest margin. Describe duration gap management and apply this strategy to protect a bank's net worth. Discuss the limitations of interest-sensitive gap management and duration gap management. 	No Changes
LTR-19	<p>Andrew Ang, Asset Management: A Systematic Approach to Factor Investing (New York: Oxford University Press, 2014), Chapter 13.....Illiquid Assets</p> <ul style="list-style-type: none"> Evaluate the characteristics of illiquid markets. Examine the relationship between market imperfections and illiquidity. Assess the impact of biases on reported returns for illiquid assets. Explain the unsmoothing of returns and its properties. Compare illiquidity risk premiums across and within asset categories. Evaluate portfolio choice decisions on the inclusion of illiquid assets. 	No Changes
Topic 9 RISK MANAGEMENT AND INVESTMENT MANAGEMENT—Part II Exam Weight (15%)		
IM-1	<p>Andrew Ang, Asset Management: A Systematic Approach to Factor Investing (New York: Oxford University Press, 2014), Chapter 6.....Factor Theory</p> <ul style="list-style-type: none"> Provide examples of factors that impact asset prices, and explain the theory of factor risk premiums. Describe the capital asset pricing model (CAPM) including its assumptions, and explain how factor risk is addressed in the CAPM. Explain implications of using the CAPM to value assets, including equilibrium and optimal holdings, exposure to factor risk, its treatment of diversification benefits, and shortcomings of the CAPM. Describe multifactor models, and compare and contrast multifactor models to the CAPM. Explain how stochastic discount factors are created and apply them in the valuation of assets. Describe efficient market theory and explain how markets can be inefficient. 	No Changes
IM-2	<p>Chapter 7.....Factors</p> <ul style="list-style-type: none"> Describe the process of value investing, and explain reasons why a value premium may exist. Explain how different macroeconomic risk factors, including economic growth, inflation, and volatility affect risk premiums and asset returns Assess methods of mitigating volatility risk in a portfolio, and describe challenges that arise when managing volatility risk. Explain how dynamic risk factors can be used in a multifactor model of asset returns, using the Fama-French model as an example. Compare value and momentum investment strategies, including their risk and return profiles. 	No Changes
IM-3	<p>Chapter 10.....Alpha (and the Low-Risk Anomaly)</p> <ul style="list-style-type: none"> Describe and evaluate the low-risk anomaly of asset returns. Define and calculate alpha, tracking error, the information ratio, and the Sharpe ratio. Explain the impact of benchmark choice on alpha, and describe characteristics of an effective benchmark to measure alpha. Describe Grinold's fundamental law of active management, including its assumptions and limitations, and calculate the information ratio using this law. Apply a factor regression to construct a benchmark with multiple factors, measure a portfolio's sensitivity to those factors and measure alpha against that benchmark. Explain how to use style analysis to handle time-varying factor exposures. Describe issues that arise when measuring alphas for nonlinear strategies. Compare the volatility anomaly and beta anomaly, and analyze evidence of each anomaly. Describe potential explanations for the risk anomaly. 	No Changes
IM-4	<p>Richard Grinold and Ronald Kahn, Active Portfolio Management: A Quantitative Approach for Producing Superior Returns and Controlling Risk, 2nd Edition (New York: McGraw-Hill, 2000), Chapter 14.....Portfolio Construction</p> <ul style="list-style-type: none"> Distinguish among the inputs to the portfolio construction process. Evaluate the motivation for and the methods used for refining alphas in the implementation process. Describe neutralization and the different approaches used for refining alphas to be neutral. Describe the implications of transaction costs on portfolio construction. Describe practical issues in portfolio construction, including the determination of an appropriate risk aversion, aversions to specific risks, and proper alpha coverage. Describe portfolio revisions and rebalancing, and analyze the tradeoffs between alpha, risk, transaction costs, and time horizon. Determine the optimal no-trade region for rebalancing with transaction costs. Evaluate the strengths and weaknesses of the following portfolio construction techniques: screens, stratification, linear programming, and quadratic programming. Describe dispersion, explain its causes, and describe methods for controlling forms of dispersion. 	No Changes
IM-5	<p>Jorion, Value-at-Risk: The New Benchmark for Managing Financial Risk, 3rd Edition (2007) Chapter 7.....Portfolio Risk: Analytical Methods</p> <ul style="list-style-type: none"> Define, calculate, and distinguish between the following portfolio VaR measures: diversified and undiversified portfolio VaR, individual VaR, incremental VaR, marginal VaR, and component VaR. Explain the role of correlation on portfolio risk. Apply the concept of marginal VaR to guide decisions about portfolio VaR. Explain the risk-minimizing position and the risk and return-optimizing position of a portfolio. Explain the difference between risk management and portfolio management, and describe how to use marginal VaR in portfolio management. 	No Changes
IM-6	<p>Chapter 17.....VaR and Risk Budgeting in Investment Management</p> <ul style="list-style-type: none"> Define risk budgeting. Describe the impact of horizon, turnover, and leverage on the risk management process in the investment management industry. Describe the investment process of large investors such as pension funds. Describe the risk management challenges associated with investments in hedge funds. Distinguish among the following types of risk: absolute risk, relative risk, policy-mix risk, active management risk, funding risk, and sponsor risk. Explain the use of VaR to check manager compliance and monitor risk. Explain how VaR can be used in the development of investment guidelines and for improving the investment process. Describe the risk budgeting process and calculate risk budgets across asset classes and active managers. 	No Changes
IM-7	<p>Robert Litterman and the Quantitative Resources Group, Modern Investment Management: An Equilibrium Approach (Hoboken, NJ: John Wiley & Sons, 2003), Chapter 17.....Risk Monitoring and Performance Measurement</p> <ul style="list-style-type: none"> Describe the three fundamental dimensions behind risk management, and their relation to VaR and tracking error. Describe risk planning, including its objectives, effects, and the participants in its development. Describe risk budgeting and the role of quantitative methods in risk budgeting. Describe risk monitoring and its role in an internal control environment. Identify sources of risk consciousness within an organization. Describe the objectives and actions of a risk management unit in an investment management firm. Describe how risk monitoring can confirm that investment activities are consistent with expectations. Describe Liquidity Duration Statistic and how it can be used to measure liquidity. Describe the objectives of performance measurement tools Describe the use of alpha, benchmark, and peer group as inputs in performance measurement tools. 	No Changes
IM-8	<p>Zvi Bodie, Alex Kane, and Alan J. Marcus, Investments, 12th Edition (New York, NY: McGraw-Hill, 2020), Chapter 24.....Portfolio Performance Evaluation</p> <ul style="list-style-type: none"> Differentiate between time-weighted and dollar-weighted returns of a portfolio and describe their appropriate uses. Describe and distinguish between risk-adjusted performance measures, such as Sharpe's measure, Jensen's measure (Jensen's alpha), and information ratio and identify the circumstances under which the use of each measure is most relevant. 	No Changes

LTR-16	<p>Patrick McGuire, Gotz von Peter, 2009. "The US Dollar Shortage in Global Banking and the International Policy Response," BIS Working Papers, Bank for International Settlements.</p> <ul style="list-style-type: none"> Identify the causes of the US Dollar shortage during the Great Financial Crisis. Evaluate the importance of assessing maturity/currency mismatch across the balance sheets of consolidated entities. Discuss how central bank swap agreements overcame challenges commonly associated with international lenders of last resort. 	No Changes
LTR-17	<p>Claudio Borio, Robert McCauley, Patrick McGuire, Vladyslav Sushko, 2016. "Covered Interest Rate Parity Lost: Understanding the Cross-Currency Basis," BIS Quarterly Review.</p> <ul style="list-style-type: none"> Differentiate between the mechanics of FX swaps and cross-currency swaps. Identify key factors that affect the cross-currency swap basis. Assess the causes of covered interest rate parity violations after the financial crisis of 2008. 	No Changes
LTR-18	<p>Peter Rose, Sylvia Hudgins, Bank Management & Financial Services, Ninth Edition (New York, NY: McGraw-Hill, 2013) Chapter 7, Risk management for Changing Interest Rates: Asset-Liability Management and Duration Techniques</p> <ul style="list-style-type: none"> Discuss how asset-liability management strategies can help a bank hedge against interest rate risk. Describe interest-sensitive gap management and apply this strategy to maximize a bank's net interest margin. Describe duration gap management and apply this strategy to protect a bank's net worth. Discuss the limitations of interest-sensitive gap management and duration gap management. 	No Changes
LTR-19	<p>Andrew Ang, Asset Management: A Systematic Approach to Factor Investing (New York: Oxford University Press, 2014), Chapter 13.....Illiquid Assets</p> <ul style="list-style-type: none"> Evaluate the characteristics of illiquid markets. Examine the relationship between market imperfections and illiquidity. Assess the impact of biases on reported returns for illiquid assets. Explain the unsmoothing of returns and its properties. Compare illiquidity risk premiums across and within asset categories. Evaluate portfolio choice decisions on the inclusion of illiquid assets. 	No Changes
Topic 9 RISK MANAGEMENT AND INVESTMENT MANAGEMENT—Part II Exam Weight (15%)		
IM-1	<p>Andrew Ang, Asset Management: A Systematic Approach to Factor Investing (New York: Oxford University Press, 2014), Chapter 6.....Factor Theory</p> <ul style="list-style-type: none"> Provide examples of factors that impact asset prices, and explain the theory of factor risk premiums. Describe the capital asset pricing model (CAPM) including its assumptions, and explain how factor risk is addressed in the CAPM. Explain implications of using the CAPM to value assets, including equilibrium and optimal holdings, exposure to factor risk, its treatment of diversification benefits, and shortcomings of the CAPM. Describe multifactor models, and compare and contrast multifactor models to the CAPM. Explain how stochastic discount factors are created and apply them in the valuation of assets. Describe efficient market theory and explain how markets can be inefficient. 	No Changes
IM-2	<p>Chapter 7.....Factors</p> <ul style="list-style-type: none"> Describe the process of value investing, and explain reasons why a value premium may exist. Explain how different macroeconomic risk factors, including economic growth, inflation, and volatility affect risk premiums and asset returns Assess methods of mitigating volatility risk in a portfolio, and describe challenges that arise when managing volatility risk. Explain how dynamic risk factors can be used in a multifactor model of asset returns, using the Fama-French model as an example. Compare value and momentum investment strategies, including their risk and return profiles. 	No Changes
IM-3	<p>Chapter 10.....Alpha (and the Low-Risk Anomaly)</p> <ul style="list-style-type: none"> Describe and evaluate the low-risk anomaly of asset returns. Define and calculate alpha, tracking error, the information ratio, and the Sharpe ratio. Explain the impact of benchmark choice on alpha, and describe characteristics of an effective benchmark to measure alpha. Describe Grinold's fundamental law of active management, including its assumptions and limitations, and calculate the information ratio using this law. Apply a factor regression to construct a benchmark with multiple factors, measure a portfolio's sensitivity to those factors and measure alpha against that benchmark. Explain how to use style analysis to handle time-varying factor exposures. Describe issues that arise when measuring alphas for nonlinear strategies. Compare the volatility anomaly and beta anomaly, and analyze evidence of each anomaly. Describe potential explanations for the risk anomaly. 	No Changes
IM-4	<p>Richard Grinold and Ronald Kahn, Active Portfolio Management: A Quantitative Approach for Producing Superior Returns and Controlling Risk, 2nd Edition (New York: McGraw-Hill, 2000), Chapter 14.....Portfolio Construction</p> <ul style="list-style-type: none"> Distinguish among the inputs to the portfolio construction process. Evaluate the motivation for and the methods used for refining alphas in the implementation process. Describe neutralization and the different approaches used for refining alphas to be neutral. Describe the implications of transaction costs on portfolio construction. Describe practical issues in portfolio construction, including the determination of an appropriate risk aversion, aversions to specific risks, and proper alpha coverage. Describe portfolio revisions and rebalancing, and analyze the tradeoffs between alpha, risk, transaction costs, and time horizon. Determine the optimal no-trade region for rebalancing with transaction costs. Evaluate the strengths and weaknesses of the following portfolio construction techniques: screens, stratification, linear programming, and quadratic programming. Describe dispersion, explain its causes, and describe methods for controlling forms of dispersion. 	No Changes
IM-5	<p>Jorion, Value-at-Risk: The New Benchmark for Managing Financial Risk, 3rd Edition (2007) Chapter 7.....Portfolio Risk: Analytical Methods</p> <ul style="list-style-type: none"> Define, calculate, and distinguish between the following portfolio VaR measures: diversified and undiversified portfolio VaR, individual VaR, incremental VaR, marginal VaR, and component VaR. Explain the role of correlation on portfolio risk. Apply the concept of marginal VaR in making portfolio management decisions Explain the risk-minimizing position and the risk and return-optimizing position of a portfolio. Explain the difference between risk management and portfolio management, and describe how to use marginal VaR in portfolio management. 	No Changes
IM-6	<p>Chapter 17.....VaR and Risk Budgeting in Investment Management</p> <ul style="list-style-type: none"> Define risk budgeting. Describe the impact of horizon, turnover, and leverage on the risk management process in the investment management industry. Describe the investment process of large investors such as pension funds. Describe the risk management challenges associated with investments in hedge funds. Distinguish among the following types of risk: absolute risk, relative risk, policy-mix risk, active management risk, funding risk, and sponsor risk. Explain the use of VaR to check manager compliance and monitor risk. Explain how VaR can be used in the development of investment guidelines and for improving the investment process. Describe the risk budgeting process and calculate risk budgets across asset classes and active managers. 	No Changes
IM-7	<p>Robert Litterman and the Quantitative Resources Group, Modern Investment Management: An Equilibrium Approach (Hoboken, NJ: John Wiley & Sons, 2003), Chapter 17.....Risk Monitoring and Performance Measurement</p> <ul style="list-style-type: none"> Describe the three fundamental dimensions behind risk management, and their relation to VaR and tracking error. Describe risk planning, including its objectives, effects, and the participants in its development. Describe risk budgeting and the role of quantitative methods in risk budgeting. Describe risk monitoring and its role in an internal control environment. Identify sources of risk consciousness within an organization. Describe the objectives and actions of a risk management unit in an investment management firm. Describe how risk monitoring can confirm that investment activities are consistent with expectations. Describe Liquidity Duration Statistic and how it can be used to measure liquidity. Describe the objectives of performance measurement tools Describe the use of alpha, benchmark, and peer group as inputs in performance measurement tools. 	No Changes
IM-8	<p>Zvi Bodie, Alex Kane, and Alan J. Marcus, Investments, 12th Edition (New York, NY: McGraw-Hill, 2020), Chapter 24.....Portfolio Performance Evaluation</p> <ul style="list-style-type: none"> Differentiate between time-weighted and dollar-weighted returns of a portfolio and describe their appropriate uses. Describe and distinguish between risk-adjusted performance measures, such as Sharpe's measure, Jensen's measure, Treynor's measure (Jensen's alpha), and information ratio and identify the circumstances under which the use of each measure is most relevant. 	No Changes

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• Describe the operation of a central bank's monetary policy in a low-inflation regime and evaluate indicators a central bank can use for timely detection of transitions to a high-inflation regime.	
[Ci-7]	<div><div><div>"The Blockchain Revolution: Decoding Digital Currencies," David Andolfatto and Fernando M. Martin, Federal Reserve Bank of St. Louis Review, Third Quarter 2022, pp. 149-65</div><div><ul style="list-style-type: none">• Explain how a blockchain-based cryptocurrency system works and compare cryptocurrencies to conventional money and payments systems.• Describe elements of a decentralized finance structure, including smart contracts, tokenized assets, decentralized autonomous organizations, and decentralized exchanges.• Define stablecoins and assess their advantages and disadvantages, including their potential contribution to systemic risk and regulatory considerations.• Explain the advantages, disadvantages, and potential applications of a central bank digital currency.</div></div><div>New Reading</div></div>
[Ci-8]	<div><div><div>"The future monetary system, Annual Economic Report", (Basel Committee on Banking Supervision Publication, June 2022, 28 pages)</div><div><ul style="list-style-type: none">• Identify and describe the benefits and limitations of crypto and decentralized finance (DeFi) innovations.• Describe the role of stablecoins in DeFi ecosystems and differentiate among the types of stablecoins.• Discuss possible advantages and disadvantages of a monetary system based on CBDCs.• Understand the risks posed by the centralization that occurs in DeFi ecosystems and crypto exchanges (CEX).• Outline the regulatory actions recommended by the BIS to manage risks in the crypto monetary system.</div></div><div>New Reading</div></div>
[Ci-10]	<div><div><div>"Digital Resilience and Financial Stability. The Quest for Policy Tools in The Financial Sector" (April 13, 2023). Jose Ramon Martinez, Banco de Espana.</div><div><ul style="list-style-type: none">• Describe characteristics of cyber risks and information/communication technology (ICT) risks faced by financial institutions.• Assess the interactions between cyber and ICT risks and financial risks and explain how cyber and ICT risk events at financial institutions can lead to systemic financial risk.• Describe potential macroprudential tools and policy measures that can be used to address cyber risks and ICT risks and explain challenges to the adoption of each one.</div></div><div>New Reading</div></div>

