Birla Institute of Technology & Science, Pilani
Hyderabad Campus

SECOND SEMESTER 2019-2020

Course Handout Part II

Date: 03-04-2020

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : **FIN F414**
Course Title : ***FINANCIAL RISK ANALYTICS & MANAGEMENT***
Instructor-in-Charge : ***Thota Nagaraju (****nagaraju@hyderabad.bits-pilani.ac.in)*

Scope and Objective of the Course:

Textbooks:

1. John C. Hull, Risk Management & Financial Institutions, 4th Edition, Wiley

Reference books

1) Phillipe Jorion (2007). Value at Risk, 3rd Edition: The New Benchmark for Managing Financial Risk John C Hull (2015). Options, Futures, and Other Derivatives, 9th Edition
2) Michel Crouhy (2014). The Essentials of Risk Management, 2nd Edition. John C Hull (2012). Risk Management and Financial institutions, 3rd Edition.
3) Advanced Engineering Mathematics by Erwin Kreyszig, 10th Edition
4) A First Course in Probability by Sheldon Ross
5) Introductory econometrics for finance" by Chris Brooks 2nd Edition
6) Basic Econometrics, Damodar Gujarati , Dawn Porter , and Sangeetha Gunasekar, 5th edition.

Course Plan:

Lecture No.	Learning objectives	Topics to be covered	Chapter in the Text Book
Module 1: Preparato Sessions (9 Sessions)	This module reviews the basic concepts of Limits a Continuity; Differentiation (Chain, Product a Quotient Rules); Integrals (Definite and Indefini Sequences and series; Partial derivatives; Measures Central Tendencies and Dispersion; Skewne Moments, Kurtosis; Random Variables (Discrete a continuous) Expectation and Joint Distributi Discrete probability distributions (Binomial, Poi and Multinomial); Normal Distribution; Ordin	OLS, Hetroscedasticity , Multicollinearity , Autocorrelation, AR, AM, ARIMA, GARCH, and VAR Models	**R5: Ch3, 4, 5, 6, 7, 8, 9 R6: ch 5, 6 and 8**

	Least Squares (Single & Multiple) & Maxim Likelihood Estimation; Relaxing OLS assumpti (Heteroskedasticity & Autocorrelation); Dummy Qualitative Response Variable (Logit and Probit); MA, ARIMA, VAR Models; ARCH, GAR Models; pricing of Forwards, Futures and Option		
Module 2: Introducti to Complete and Efficient Markets **No. of Sessions:** 3	Banks & Risk Management, Capital regulation bank, Value creation through risk manageme financial risk systems, In this module, we will begin with the introductio efficient and complete markets, which is the precurso pricing of financial instruments based on arbitrage and neutral pricing. We begin with a market on coin tos demonstrate these concepts and drive home the theor arbitrage through the Arrow-Debreu securities. We t move from coin tosses to actual financial instrument forwards and options. We discuss the market efficie and completeness to understand the no-arbitrage pric and risk-neutral pricing.	No arbitrage pricing models	**Credit Suisse Material (1.1)**
Module 3: Overvi Financial Markets a Asset Classes **No. of Sessions:** 6	This module deals with different financial markets their working to enable a better understanding of how transactions are facilitated and also give a brief overv about different asset classes like Equities and FX. We start with different financial markets like Capital mark which comprise of both Primary and Secondary mark Money Market, Cash or Spot market, Derivatives mark and finally Forex and Interbank markets. We will discuss about different asset classes, differences am asset classes and key features.	**Financial Markets and Asset Classes**	**Credit Suisse Material (2)**
Module 4: Options a Greeks **No. of Sessions:** 3	In this module, we introduce a class of derivatives ca Options and risk measures associated with these opti called Greeks. We will start with definition and type Options and then move on to discuss the basic strate and payoffs. We will learn about different pricing theo for options like Binomial Option pricing and then dis about the Greeks and how they are utilized in	Options and Greeks	**Credit Suisse Material (1.2)**

	management practices. We then cover about the trad of Greeks before we conclude this module with b overview of basic exotic options.		
Module 5: Introduct to Risk (Market, Cre Operation & Enterpri and Measures of Mar Risk **No. of Sessions: 3**	This module starts with a brief introduction to Risk, highlights various types of risks like market risk, cr risk, operational risk etc before going in detail of Mar risk. We will also describe risk and return conce measurement of various risks. We will introduce most widely used industry standard called Value at R (VaR). We will then dive into the details of types of V and compare it with alternate risk measures. We t move on to the basics of Historical Simulation mo underlying assumptions, various return calcula methods and functions to capture the market risk. will conclude this module by learning about Responsive VaR model, understanding the Exponer Weighting and Expected Shortfall approaches.	Value at Risk (VaR) Models	**Credit Suisse Material (3.1 &3.2)**
Module 6: Advance VaR models **No. of Sessions: 6**	This module builds on from the VaR conce introduced in the earlier model and addresses shortcomings of the basic VaR model like distributional assumptions. We then discuss about gaps identified in VaR model in addressing the behavi of market volatility called Volatility Clustering. We introduce the remedial approaches like EWM GARCH to address these gaps and critically assess th methods from the practical and implementat perspective. We will conclude this module by study about the Principal Component Analysis (PCA) wh explains about the estimation of VaR when there multiple risk factors that are highly correlated.	Advanced Value at Risk (VaR) Models	**Credit Suisse Material (3.2)**
Module 7: Credit Risk Modelling **No. of Sessions: 3**	In this module, we will introduce the concepts of Cr risk and its modelling. We cover the aspects like Cr Default risk, Counterparty credit risk and concentrat risk before we move on to the various metrics to quan credit risk like Probability of Default (PD) and L Given Default (LGD). We finally close this module w	Probability of Default (PD) and Loss Given Default (LGD).	**Credit Suisse Material (4)**

	a discussion on methods to mitigate credit risk such risk based pricing, netting, collateral, covena diversification etc.		
Module 8: Market Risk Regulatory Framework **No. of Sessions: 3**	This module gives the basic understanding of regulat framework from the market risk perspective. We begin with quantitative aspects of Basel II market framework; cover various capital components Regulatory VaR, Stressed VaR and Incremental R Charge (IRC). We then discuss about differ regulatory mandated processes like back testing associated details like definition of Trading PL and components and also regulatory notification reporting exercises. We then finally close this module having an understanding about Limit Setti Monitoring, RWA concept and Risk Management V	Regulatory VaR, Stressed VaR and Incremental Risk Charge (IRC).	**Credit Suisse Material (3.2)**
Module 9: FRTB & CCAR & ERC **No. of Sessions: 3**	In this module, we cover about the evolving regulat landscape and the future of risk management with introduction of new regulations knowns as FRTB CCAR. Having discussed the existing framework in earlier module, we will discuss the new regulations detail and assess the scope and impact on the curr framework and also the capital implications due to th regulations. Along with these external regulat requirements, we will also briefly touch upon the inter capital measures like Economic Risk Capital (EI which will capture the exposures from the Econo perspective rather than from an accounting view.	FRTB, CCAR and Economic Risk Capital (ERC)	**Credit Suisse Material (7.2)**
Module 10: Dynamic Hedging and CAPM (Portfolio Risk Management for Individuals) **No. of Sessions: 2**	In the final module, we will conclude the key learni of the entire course and have a working session on management through dynamic hedging, understand hedge ratios, costs, P&L related to risk managem The course will end with rounding of risk managem for an individual by using concepts of creating effic portfolios and maximizing risk return trade-off.	**Dynamic Hedging and CAPM**	**Credit Suisse Material (6 & 7.2)**

Evaluation scheme:

Components	Duration	Weightage (%)	Date	Nature Component
Surprise Quizzes*		5%		CB
Assignments* 1 (Individual)		20%	22nd April 2020; 5 PM	OB
Mid Sem Examination	1.5 Hours	25%	8/3 3.30-5 PM	CB
Comprehensive Exam	3 Hour	45%	10/5 FN	CB
Simulation (s)		5%	Will be posted on CMS	OB

Note:** ***No make-ups for the quizzes & Assignments.

All quizzes & assignments will be counted for final grade calculation.
Chamber Consultation Hour: K-229; Wednesday & Thursday 4:00 PM to 5:00 PM.
Notice: All notices will be displayed on CMS and Economics & Finance Notice Board.
Make-up policy: Make-up will be given only on Doctor's/Warden's recommendation and with prior (at least 01 day before the test/exam) permission of the Instructor-in-Charge/Instructor. Request for make-up made by phone/sms or during/after the test/exam would ***NOT*** be entertained at all.
Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor-in-Charge
FIN F414