SECOND SEMESTER 2018-2019
Course Handout Part II

Date: 07-01-2019

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: Preparatory Sessions (9 Sessions)	This module reviews the basic concepts of Limits and Continuity; Differentiation (Chain, Product and Quotient Rules); Integrals (Definite and Indefinite); Sequences and series; Partial derivatives; Measures of Central Tendencies and Dispersion; Skewness, Moments, Kurtosis; Random Variables (Discrete and continuous) Expectation and Joint Distribution; Discrete probability distributions (Binomial, Poison	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**

	and Multinomial); Normal Distribution; Ordinary Least Squares (Single & Multiple) & Maximum Likelihood Estimation; Relaxing OLS assumptions (Heteroskedasticity & Autocorrelation); Dummy and Qualitative Response Variable (Logit and Probit); AR, MA, ARIMA, VAR Models; ARCH, GARCH Models; pricing of Forwards, Futures and Options.		
Module 2: Introductio to Complete and Efficient Markets **No. of Sessions:** 3	Banks & Risk Management, Capital regulation of bank, Value creation through risk management, financial risk systems, In this module, we will begin with the introduction to icient and complete markets, which is the precursor fo icing of financial instruments based on arbitrage and ri neutral pricing. We begin with a market on coin toss to monstrate these concepts and drive home the theory o bitrage through the Arrow-Debreu securities. We then ve from coin tosses to actual financial instruments of fo ards and options. We discuss the market efficiency and mpleteness to understand the no-arbitrage pricing and r -neutral pricing.	No arbitrage pricing models	**Credit Suisse Material (1.1)**
Module 3: Overview Financial Markets an Asset Classes **No. of Sessions:** 6	This module deals with different financial markets and eir working to enable a better understanding of how th ransactions are facilitated and also give a brief overview bout different asset classes like Equities and FX. We w start with different financial markets like Capital mar s which comprise of both Primary and Secondary mark , Money Market, Cash or Spot market, Derivatives ma ts and finally Forex and Interbank markets. We will als iscuss about different asset classes, differences among et classes and key features.	**Financial Markets and Asset Classes**	**Credit Suisse Material (2)**
Module 4: Options and Greeks **No. of Sessions:** 3	In this module, we introduce a class of derivatives ca Options and risk measures associated with these option alled Greeks. We will start with definition and types Options and then move on to discuss the basic strategie nd payoffs. We will learn about different pricing theo	Options and Greeks	**Credit Suisse Material (1.2)**

	for options like Binomial Option pricing and then disc about the Greeks and how they are utilized in risk man ement practices. We then cover about the trading of G ks before we conclude this module with brief overview basic exotic options.		
Module 5: Introduction to Risk (Market, Credit, Operation & Enterprise) and Measures of Market Risk **No. of Sessions: 3**	This module starts with a brief introduction to Risk, a highlights various types of risks like market risk, cred risk, operational risk etc before going in detail of Ma t risk. We will also describe risk and return concepts easurement of various risks. We will introduce the m widely used industry standard called Value at Risk (V). We will then dive into the details of types of VaR compare it with alternate risk measures. We then mo on to the basics of Historical Simulation model, unde ing assumptions, various return calculation methods a functions to capture the market risk. We will conclude his module by learning about the Responsive VaR mo , understanding the Exponential Weighting a Expected Shortfall approaches.	Value at Risk (VaR) Models	**Credit Suisse Material (3.1 &3.2)**
Module 6: Advanced VaR models **No. of Sessions: 6**	This module builds on from the VaR concepts introd d in the earlier model and addresses the shortcomings the basic VaR model like the distributional assumpti . We then discuss about the gaps identified in VaR m l in addressing the behaviour of market volatility call Volatility Clustering. We will introduce the remedial a roaches like EWMA, GARCH to address these gaps critically assess these methods from the practical and plementation perspective. We will conclude this modu by studying about the Principal Component Analysis CA) which explains about the estimation of VaR when here are multiple risk factors that are highly correlate	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 Cred risk and its modelling. We cover the aspects like Cre Default risk, Counterparty credit risk and concentrat risk before we move on to the various metrics to qua	Probability of Default (PD) and Loss Given Default (LGD).	**Credit Suisse Material (4)**

	fy credit risk like Probability of Default (PD) and Lo Given Default (LGD). We finally close this module w a discussion on methods to mitigate credit risk such risk based pricing, netting, collateral, covenants, dive ication 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 w egin with quantitative aspects of Basel II market risk amework; cover various capital components like Regu ory VaR, Stressed VaR and Incremental Risk Charge C). We then discuss about different regulat mandated processes like back testing and associated d ils like definition of Trading PL and its components a also regulatory notification and reporting exercises. then finally close this module by having an understan g about Limit Setting, Monitoring, RWA concept a Risk Management VaR	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 regulato andscape and the future of risk management with the troduction of new regulations knowns as FRTB and AR. Having discussed the existing framework in the lier module, we will discuss the new regulations in de l and assess the scope and impact on the current fram ork and also the capital implications due to these regu ions. Along with these external regulatory requiremen we will also briefly touch upon the internal capital m ures like Economic Risk Capital (ERC) which will ca re the exposures from the Economic perspective rath han 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: 3**	In the final module, we will conclude the key learnin of the entire course and have a working session on risk anagement through dynamic hedging, understand hedge ratios, costs, P&L related to risk managemen The course will end with rounding of risk managemen or an individual by using concepts of creating efficien ortfolios and maximizing risk return trade-off.	**Dynamic Hedging and CAPM**	**Credit Suisse Material (6 & 7.2)**

Module 11: Simulation	Simulation 1,2 and 3	1-BSM, 2-VaR, 3-PD, LGD, and EaD	Credit Suisse Material will be supplied on the simulation day

Evaluation scheme:

Components	Duration	Weightage (%)	Date	Nature of Component
Surprise Quizzes*		20%		CB
Assignments*		10%	Will be posted on CMS	OB
Mid Sem Examination	1.5 Hours	25%	16/3 9.00 - 10.30AM	CB
Comprehensive Exam	3 Hour	35%	13/05 FN	CB
Simulation (s)		10%	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: C-234; 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 InstructorinCharge/Instructor. Request for makeup 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