



BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI

Pilani Campus

INSTRUCTION DIVISION FIRST SEMESTER 2015-16 Course Handout Part II

Date: 07/01/2016

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

Course No. : BITS F449/ECON F413/MBA C475
Course Title : FINANCIAL ENGINEERING
Instructor-in-charge : UDAYAN CHANDA

1. Scope & Objective:

The objective of the course is to provide knowledge about preliminary understanding of financial engineering tools and techniques in the present market environment such as applications of Future & Options for hedging, asset price dynamics and use of simulation in decision making. Financial Engineering is a multidisciplinary field involving financial theory, the methods of engineering, the tools of mathematics and the practice of programming. The Financial Engineering Concentration encompasses the design, analysis, and construction of financial contracts to meet the needs of enterprises. It involves the development and creative application of financial theory and financial instruments to structure solutions to complex financial problems and to exploit financial opportunities. The course on financial engineering would enable students to respond to the professional requirements particularly related to investment banking, financial management, treasury operations, asset management, risk management, consulting and capital markets etc.

3. Text book:

T1. Salih N. Neftci, Principles of Financial Engineering, Academic Press Publishers, 2009

4. Reference books:

R1. David A. Duff-Schmidt and Thomas W. Miller, Jr., Derivatives Valuation and Risk Management, Oxford University Press.

R2. David G. Luenberger, Investment Science, Oxford University Press

R3. Futures, Options and Other Derivatives by John C Hull, 8th Edition, Prentice Hall

R4. Derivatives and Risk Management by Rajiv Srivastava, Second Edition, Oxford University Press



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5. Course Plan:

Lecture No.	Learning Objectives	Topics to be covered	Reference (Chapter number)
1	Introduction to financial engineering, its tools and techniques etc.	Definition of financial engineering	Class notes
2-3	Introduction to financial players and markets and instruments and related conventions.	Markets, players, instruments, orders, deals and process of settlement.	Chap 2 of T1 +class notes
4-6	Introduction to fixed income securities.	Concept of interest rates & term-structure. Bonds basics and dynamics of bond price, Duration & Modified Duration, yield-maturity-price relationship.	Class notes
7-9	Basics of derivatives. Determination of Forwards and Futures prices,	Basics of Futures, forwards, options & swaps and their pay-off. Hedging Strategies using Futures, synthetic	Class notes+ Chap3 of T1 + R3
10-13	Basics of swaps and their different types and uses.	Swaps, types & mechanics of swap. Framework for swaps, term structure modeling and dynamics	Chap 5 & 13 of T1+R1+ R3 + class notes
14-17	Learning convexity of bond and yield volatility.	Bond convexity trades and sources of convexity	Chap 9 of T1+ class notes
18-20	Wiener process and Ito's Lemma	The Markov property, continuous time stochastic processes, the process for a stock price, the parameters, correlated processes, Ito's lemma, the lognormal property	R3 + class notes
21-29	Options Pricing, Option mechanics, options engineering and its application.	Valuation of Options, Options pricing using Black-Scholes and Binomial model. Greeks and their uses. Options strategies.	Chap 8&10 of T1, + R3 plus class notes
30-33	Volatility swaps, Smiles and volatility trading.	Volatility positions, smile effects	Chap 13-15 of T1 + R3+ class notes
34-38	Estimating volatilities and correlations	Estimating volatility, the exponential weighted moving average model, the GARCH (1,1) model, choosing between	





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		the models, maximum likelihood methods, using GARCH (1,1) to forecast future volatility	R3 + class notes
39-42	V-a-R, Learning Tools of financial engineering in pricing and application of fundamental theorems	Understanding Value at Risk and the Monte Carlo approach for simulation, calibration and Quantos	Chapter 11&12

6. Evaluation Component

S. No.	Evaluation Component	Duration	Max. Marks	Date & Time	Remarks
1	Mid-Semester Examination		30	14/3 2:00 -3:30 PM	OB
2	Surprise Quizzes		20		CB
3	Case Study /Article Presentations/ Project or Assignment		10		
4	Comprehensive Examination	3 Hours	40	4/5 FN	CB

7. **Chamber Consultation Hour:** 12 AM -Thursday

8. **Notice:** All notices will be displayed on **Department of Management Notice Board**.

Instructor-In-Charge



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