

**INTERNATIONAL MANAGEMENT INSTITUTE, BHUBANESWAR**  
**FN607: Financial Engineering and Risk Management**  
**PGDM**  
**Term V Academic Year 2014-2015**  
**CREDIT: Full (3 credits)**  
**SESSION DURATION: 90 Minutes**

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**Objectives**

The basic purpose of Financial Engineering and Risk Management course is to develop understanding of concepts, issues and strategies for management of risk. It will develop necessary skills to identify and measure risk, quantify risk and create risk response strategies for suitable decision making for market and credit risk.

Another objective of this course is to be able to synthesize custom exposures using liquid instruments. Since very often an instrument with sufficient liquidity may not exist that gives the desired exposure, it becomes important to be able to create a synthetic instrument that gives that exposure. Financial engineering refers to the engineering of this synthetic instrument by using building block instruments that have sufficient liquidity. This allows not only the ability to take a desired exposure but also the ability to unwind that exposure by selling the liquid building block instruments.

Risk management is an underlying motivation behind the need to create the synthetic exposures through financial engineering. This may apply to a corporate with a hedging motivation that wants to reduce an existing risk exposure by engineering a synthetic with an opposite exposure. This may also apply to a corporate with a speculation motivation that wants to engineer a synthetic to take on a certain risk exposure based on a view of the uncertainty in the price of an underlying asset.

This course assumes a detailed understanding of derivative instruments encompassing futures, swaps, and options. At the end of the course the students should be able:

- To measure an organization's risk exposure to market risk and credit risk
- To develop a hedging strategy in line with an organization's existing risk exposures
- To determine the custom exposures to risk factors an organization must take to implement its hedging strategy
- To value financially engineered instruments such as mortgage-backed securities and collateralized mortgage obligations.

**Pedagogy**

Classroom lectures and spreadsheet modeling.

### Evaluation Criteria (%)

Quizzes (Best 2 out of 3)	10
Assignment / Project Report	20
Mid-term Exam	30
End-term Exam	40
<b>Total</b>	<b>100</b>

### Reading Material

#### Text book

1. Hull, J. C., *Risk Management and Financial Institutions*, 3<sup>rd</sup> Edition, Wiley India, 2013 (Low Price Edition).

#### Reference books

1. Veronesi, P., *Fixed Income Securities-Valuation, Risk and Risk Management*, Wiley India, 2010.
2. Hull, J. C. & Basu, S., *Options, Futures and Other Derivatives*, Pearson Education India, 2010.

### Session Plan

Session No.	Topic	Reading from text book	Instructor
1-3	Interest rate risk management	Veronesi: Ch. 3, 4	Padmini Jindal
4-5	Measuring Volatility	Hull: Chapter 10 (Text book)	Padmini Jindal
6-8	Value at Risk Measure, Market risk measurement (Historical Simulation Approach)	Hull: Chapter 9 (Text book)	Padmini Jindal
9-10	Market Risk VaR: Model Building approach	Hull: Chapter 15 (Text book)	Padmini Jindal
11-12	Financial Engineering-Basics of Mortgage Backed Securities, Collateralized Mortgage Obligations	Veronesi: Ch.8	R. K. Arora
13-15	Credit risk default probabilities	Hull: Chapter 16 (Text book)	R. K. Arora
16-18	Credit VaR	Hull: Chapter 18 (Text book)	R. K. Arora
19-20	Operational Risk & Liquidity Risk	Hull: Chapter 20-21 (Text book)	R. K. Arora

(Some extra sessions on **Options, Option Pricing, Binomial Trees, Black-Scholes-Merton Model, Trading strategies involving options, Forwards and Futures** will be taken before starting this given course outline. For this portion Reference Book 2 will be used.)