

Subject Code:02MA0503
Subject Name: FINANCIAL MATHEMATICS
M.Sc. Year – II (Sem: 3)

Objective: 1. The objective of the course is to understand the basic concept of financial markets and derivatives.

Credits Earned: 5 Credits

Course Outcomes: After completion of this course, student will be able to

- to understand the fundamental concepts such as cash flows, Present value ,future value ,yield and probability etc..
- to understand the basics of stochastic process and simple model for stock price.
- to understand the hedging, arbitrage and option pricing problems in finance ,able to solve these problems by using mathematical models and understand the computational techniques.

Pre-requisite of course: NA

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	Mid Sem (M)	Internal (I)	Viva (V)	Term work (TW)	
4	2	-	5	60	30	10	25	25	150

Contents:

Unit	Topics	Contact Hours
1	Types of interest rates : Interest rates and Present value analysis ,rate of return ,continuously varying rate, treasury rate ,Libor rate ,Libid rate ,Repo rate ,Continuously Compounding interest rate, Forward rate, n-year zero interest rate	10
2	Basic Option theory, European And American options ,forward and future contracts , hedgers , speculators and arbitrageurs , hedging ,arbitrage and speculation using options .	10
3	Stochastic Processes: Markov process, Wiener process, Ito process, Simple model for stock price, Ito's lemma, the log normal property.	10

4	One step and Two step Binomial models for European options, Risk Neutral Valuation.	10
5	Partial Differential equations, Put call Parity, black Schole–Merton Differential equations and its formulae, examples.	10
	Total Hours	50

Recommended Books:

- (1) The mathematics of financial derivatives, P. Wilmott, S. Howison and J. Dewynne Cambridge Uni.Press, 1995.
- (2) An elementary introduction to mathematical finance, Sheldon M. Ross Cambridge Uni. Press, 2003.
- (3) Options, futures and other derivatives, John C. Hull 7th edition, Prentice Hall.
- (4) Financial derivatives: theory, concepts and problems, Gupta S. L., Prentice Hall of India

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
20%	20%	30%	15%	10%	5%

Instructional Method:

- a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
- b. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- c. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- d. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

Supplementary Resources:

1. https://en.wikipedia.org/wiki/Mathematical_finance
2. <https://plus.maths.org/content/what-financial-mathematics>
3. <http://www.sheir.org/financial-mathematics-notes.html>
4. <http://www.imar.ro/~purice/Inst/2012/imarLectureOne.pdf>