FINANCIAL ANALYTICS

MBA BATCH: 2016-18 / TRIMESTER: IV

DEPARTMENT OF MANAGEMENT,
AMRITA SCHOOL OF BUSINESS
AMRITA VISHWA VIDYAPEETHAM (UNIVERSITY)

INSTRUCTOR AND CONTACT INFORMATION

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COURSE OBJECTIVE

To provide a strong foundation in financial analytics in order to handle complex financial data, build advanced analytical models and deliver effective visualization product and comprehensive reports.

LEARNING OUTCOMES

The course covers a reasonable curriculum in financial analytics
At the end of the course the student should be able to

1. Analyse and model financial data
2. Construct and optimize asset portfolios
3. Evaluate and model Risk on various financial assets
4. Use the most powerful and sophisticated routines in R for analytical finance.

COURSE DESCRIPTION

The course is an application oriented one and most of the exercises have to be done with real time data. During the course basic concepts regarding computational finance will be revised and applied using real time data. Various capabilities of R environment and computational routines in R for finance will be introduced in a comprehensive manner.

REQUIRED COURSE MATERIALS AND READINGS

Prescribed Text Book for the course

Ruey S. Tsay (2012), "An Introduction to Analysis of Financial Data with R" ,
Wiley, ISBN: 978-0-470-89081-3

OPTIONAL COURSE MATERIALS & READINGS (CASES, ARTICLES, REPORTS ETC)

Argimiro Arratia (2014), "Computational Finance An Introductory Course with R", Atlantis Press, ISBN 978-94-6239-069-0

Bernhard Pfaff (2013),"Financial risk modelling and portfolio optimization with R", Wiley, ISBN 978-0-470-97870-2

Cairns, A.J. G (2004), "Interest Rate Models: An Introduction", Princeton University Press, ISBN: 9780691118949

Christian Gourieroux & Joann Jasiak (2002), "Financial Econometrics: Problems, Models, and Methods", Princeton University Press , ISBN: 9780691088723

David Ruppert (2011),"Statistics and Data Analysis for Financial Engineering", Springer, ISBN 978-1-4419-7786-1

Duffie, D. and Singleton, K.J (2003), "Credit Risk: Pricing, Measurement, and Management", Princeton University Press, ISBN: 9780691090467

John Y. Campbell, Andrew W. Lo, & A. Craig MacKinlay (1997), "The Econometrics of Financial Markets", Princeton University Press, ISBN: 9780691043012

Lando, D (2004), "Credit Risk Modeling: Theory and Applications, Princeton University Press", ISBN: 9780691089294

Ngai Hang Chan (2010)."Time Series Applications to Finance with R and S-Plus®", Second Edition, Wiley, ISBN 978-0-470-58362-3

Ren´e Carmona (2014),"Statistical Analysis of Financial Data in R", Second Edition. Springer, ISBN 978-1-4614-8787-6

Stefano M. Iacus (2011), Option Pricing and Estimation of Financial Models with R", First Edition. Wiley, ISBN: 978-0-470-74584-7

Ruey S. Tsay (2010), "Analysis of Financial Time Series", 3rd Edition, Wiley, ISBN: 978-0-470-41435-4

EVALUATION CRITERIA

Assignments & final Project, Mid term and End term examinations

Components and Weights (faculty can Decide on components

Components	**Weightage (%)**
Assignments and final projects	30%
Midterm Exam	30%
End term	40%
Total	**100%**

DETAILS OF SESSION: TENTATIVE COURSE SCHEDULE

WEEK	SESSION NO.	TOPICS TO BE COVERED	ASSIGNED READING, CASE DISCUSSION, ASSIGNMENTS
Week 1	1 to 2	Introduction to Financial Analytics: Definition, relevance and scope financial Analytics, recent trends in financial analytics	
2 to 3	3 to 8	Financial Time Series and Their Characteristics: Asset Returns, Distributional Properties of Returns, Review of Statistical Distributions and properties of financial time	Case :Weekly Regular Gasoline Price Page No:129

		series.	
4to 5	9 to 12	Asset Portfolio Models: Basics of portfolio construction, Markowitz Theorem, Capital Asset Pricing Model, Diversification and Portfolio Optimization	Case :Asset Portfolio construction from BSE
6 to 8	13 to 18	Modeling Volatility and Risk: Characteristics of volatility. Modeling volatility using ARCH/GARCH models. Measuring and modeling risk. Application of Value at Risk (VaR)	Case : ARCH Volatility Term Structure Page 244
9 to 10	19 to 22	High-Frequency Data Analysis: Non synchronous Trading, Bid–Ask Spread of trading Prices, Empirical Characteristics of Trading Data, Models for Price Changes, Duration Models	Case : Empirical Characteristics of Trading Data
11 to 12	23 to 28	Modeling Credit Risk: Corporate Liabilities as contingent claims, Endogenous default boundaries and optional Capital Structure, Intensity Modeling, Rating based term-structure models, Credit risk and interest-rate Swaps, Modeling dependent defaults	Case: VaR estimation for IBM stocks
13 to 15	29 to 30	Derivative Pricing: Issues regarding derivative markets. Brownian motion, Black - Sholes model. Modeling derivative prices	Case: Sectoral Index derivative

ANY OTHER SPECIFIC RULES

Students have to bring their laptops installed with R and R Studio. Download R from http://cran.r-project.org/ and R Studio from http://www.rstudio.com/products/rstudio/download/

Sharing computers are not allowed. They should make their own arrangement for charging the laptops.