Programme	: M.Com.
Course Code	**: COO439**
Course Title	**: Financial Research Analytics**
Number of Credits	: 4
Effective from AY	: 2020-21

Need of the Course	: Financial research analytics is a segment of business intelligence that facilitates business decision making through reliable analysis of financial data. It focuses on developing strategies for various business scenarios, forecast financial performance parameters under these varied scenarios and improve organizational performance. This course is needed as organizations are increasingly relying on data driven decision making. Financial research analytics is extensively data driven and therefore it is imperative to acquire analytical skills in this area to become more productive and be a problem solver in an organization.
Description of the Course	: This course introduces the domain of financial research analytics to learners and provides preliminary exposure to relevant software applications and R programming language to begin with. Subsequently the course expands to include data visualization techniques with focus on exploratory data analysis of financial data. This course also has components on developing financial models and scenarios based on accounting and financial data at firm level. The course also enables learners to acquire machine learning application usage skills for solving varied financial management problems of a firm.
Objectives of the Course	: (i) To apprise the learners about financial analytics process and provide exposure to relevant applications and programming used in financial analytics. (ii) To develop expertise in learners in using data visualization tools and techniques for obtaining business insights. (iii) To train learners in developing financial models and scenarios using financial analytical techniques in the areas of financial performance, working capital management, capital budgeting and valuation exercises. (iv) To enable learners apply machine learning techniques in financial research.

Course Content		
Unit 1	**: Introduction to Financial Analytics**	**10 Hours**
Meaning of financial analytics – Applications of Financial analytics – Process and applications of financial modelling – Descriptive analytics – Predictive analytics – Basic R programming – Basic operations in analytics software such as Excel, Tableau, Orange.		
Unit 2	**: Exploratory Data Analysis in Finance**	**12 Hours**
Meaning of EDA – Applications of EDA - Data collection and data management – Data classification – Dealing with missing data - Data visualization: Univariate visualization, Bivariate visualization, Multivariate visualization - Graphical exploratory data analysis (Box-plots, heatmap, Histograms, Scatterplots) – Building business intelligence dashboard – Mapping – Interactive data charts – Data Mining.		

Unit 3	: Financial Modelling Using Accounting Data	12 Hours

Forecasting financial statements – Due diligence analysis - Forecasting operating revenues – Forecasting expenses – Forecasting working capital requirements – Determining project viability - Performing discounted cash flow valuation analysis – Project appraisal simulations – Determination of value drivers - Risk analysis in valuation.

Unit 4	: Applications of Machine Learning in Finance	14 Hours

Concept and applications of machine learning – Machine learning applications in stock price predictions, derivatives pricing and portfolio management – Supervised learning algorithms: Regression (Linear regression, Decision tree and Random forest) and classification (Logistic regression, Linear discriminant analysis, Random forest) - Sentiment analysis of news and social media – Prediction accuracy metrics.

Pedagogy	: lectures/ case analysis/assignments/class room interaction/lab
Reference/Readings	1. Fabozzi, F., Focardi, S., Rachev, S. and Arshanapalli, B. (2014) The Basics of Financial Econometrics: Tools, Concepts and Asset Management, Wiley. 2. Tatsat, H., Puri, S., Lookabaugh, B. (2020), Machine Learning and Data Science Blueprints for Finance, O'Reilly Media Inc., Boston, USA. 3. Mitra G. and Mitra L. (2011), The Handbook of News Analytics in Finance, Wiley. 4. Winston, W. (2016), Microsoft Excel Data Analysis and Business Modeling, 5th Edn., Pearson. 5. Bennet, M. and Hugen, D. (2016), Financial Analytics with R, Cambridge University Press. 6. Mitchelle, T. (2017), Machine Learning, McGraw Hill. 7. Kang, M. and Choi, E. (2021), Machine Learning: Concepts, Tools and Data Visualization, World Scientific. 8. Oluwa, S. (2019), Hands-on Financial Modelling With Microsoft Excel 2019, Packt Publishing Ltd., Mumbai. 9. Day (2008), Mastering Financial Modelling in Microsoft Excel: A practitioner's guide to applied corporate finance, 2e, Penguin Books.
Course Outcome	: Upon completion of the course learners will be able to: **CO1** Explain the process of financial research analytics and modelling. **CO2** Use software application to prepare data for analytical purpose and provide business insights through data visualization tools. **CO3** Develop financial models and scenarios using software applications and accounting data at firm level. **CO4** Apply machine learning techniques and tools in financial research.

Online Resources	https://www.visual-design.net/post/how-to-learn-data-visualization-for-free
	https://guides.emich.edu/data/free-data
	https://www.coursera.org/specializations/jhu-data-science
	https://developers.google.com/machine-learning/crash-course/ml-intro
	https://nptel.ac.in/courses/111/104/111104024/
	https://www.youtube.com/results?search_query=Orange+machine+learning
	https://www.wallstreetprep.com/knowledge/income-statement-forecasting/
	https://www.youtube.com/watch?v=hRqchLs4mUc
	https://www.youtube.com/watch?v=znmQ7oMiQrM
	https://canvas.ucsc.edu/courses
	https://mpra.ub.unimuenchen.de/10035/1/Risk_Analysis_in_Investment_Appraisal.pdf
	https://www.tableau.com/solutions/finance-analytics