

DSEF04 – Financial Analytics

Masters of Commerce
Semester III
DSE – Elective Paper
Financial Analytics

Course Type/ Course Code	Course Title	Lectures	Tutorials	Practical	Credit	Pre-requisites
DSEF04	Financial Analytics	3	0	1	4	NIL

Objective: The course aims to develop a comprehensive understanding of the role of data analytics in financial decision-making. It introduces students to the techniques of descriptive, predictive, and prescriptive analytics applied in corporate finance, investment management, and risk analysis. The course integrates statistical, econometric, and machine learning tools to enable evidence-based financial insights, forecasting, and optimization. Students will learn to use financial data for improved valuation, portfolio construction, and risk management in an increasingly digital and data-driven financial ecosystem.

Learning Outcomes: After completion of the course, learners will be able to:

- Explain key concepts, methods, and applications of financial analytics across corporate finance, investments, and risk management.
- Apply data collection, cleaning, and visualization techniques using appropriate software tools to extract meaningful financial insights.
- Analyze and interpret financial datasets using descriptive and predictive analytical models to support managerial and investment decisions.
- Evaluate financial risks and apply prescriptive analytics for scenario analysis, optimization, and regulatory compliance using real-world data.

Contents:

Unit I

(10 Hours)

Concept and scope of financial analytics; role of analytics in corporate finance and investment management; data-driven decision-making; data privacy, ethics, and regulatory compliance in India;

Descriptive statistics and summary measures; visualization techniques and dashboards for financial data; pattern and anomaly detection in accounting and market data; exploratory data analysis (EDA) using Excel, Python, or R; ratio and trend analysis for financial performance evaluation; time-series visualization and seasonality analysis; applications in corporate financial statements.

Unit II

(12 Hours)

Financial and Cost Modelling using Spreadsheets, Company Business Model Analysis, Company Profitability Analysis, Product Profitability Analysis, Financial Statements and Projections - Discounted Cash Flow Analysis, Comparable Company Analysis, Precedent Transactions Analysis etc.

Unit III

(12 Hours)

Predictive modelling concepts; regression models (linear, logistic) for forecasting and credit risk assessment; time-series forecasting methods (ARIMA, exponential smoothing); machine learning algorithms for finance—decision trees, random forest, SVM, KNN, and neural networks; model evaluation metrics (MAE, RMSE, R^2 , accuracy); applications in stock price prediction, credit scoring, and earnings forecasting.

Unit IV

(11 Hours)

Prescriptive decision models for portfolio optimization and capital budgeting; scenario and sensitivity analysis; Monte Carlo simulation for risk modelling; value-at-risk (VaR) and stress testing; optimization techniques for portfolio formation; introduction to RegTech and analytics for compliance.

Practical Exercise:

(30 Hours)

Students shall be required to:

- Perform the Valuation of a company
- Perform exploratory data analysis and develop visualizations using Power BI, Tableau, or Python libraries (Matplotlib/Seaborn).
- Build a predictive model (regression or classification) to forecast credit default or stock returns.
- Conduct scenario and sensitivity analyses for investment or capital budgeting decisions.
- Simulate Value at Risk (VaR) or Monte Carlo-based risk assessment for a sample portfolio. Prepare a concise project report integrating findings and visual insights.

Suggested Readings:

Textbooks:

- Provost, F., & Fawcett, T. (2013). *Data Science for Business*. O'Reilly Media.
- Hull, J. C. (2018). *Risk Management and Financial Institutions* (5th ed.). Wiley.
- James, G., Witten, D., Hastie, T., & Tibshirani, R. (2021). *An Introduction to Statistical Learning* (2nd ed.). Springer.
- Baesens, B. (2014). *Analytics in a Big Data World: The Essential Guide to Data Science and its Applications*. Wiley.
- Muraleedharan, D. (2022). *Modern Banking: Theory and Practice* (4th ed.). PHI Learning.

- Ghosh, S., & Tripathi, R. (2023). *Financial Data Analytics: Concepts and Applications*. Routledge India.

Major Research Papers / References:

- Chen, H., Chiang, R. H. L., & Storey, V. C. (2012). Business intelligence and analytics: From big data to big impact. *MIS Quarterly*, 36(4), 1165–1188.
- Baesens, B., Setiono, R., Mues, C., & Vanthienen, J. (2010). Consumer credit-risk models via machine-learning algorithms. *Journal of Banking & Finance*, 34(11), 2767–2787.
- Dunis, C. L., Laws, J., & Naïm, P. (2010). *Artificial Intelligence in Financial Markets*. Palgrave Macmillan.
- Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018). On the FinTech revolution: Interpreting the forces of innovation, disruption, and transformation in financial services. *Journal of Management Information Systems*, 35(1), 220–265.
- Reserve Bank of India (2023). *Report on Currency and Finance: Towards a Sustainable Future*.
- SEBI (2023). *Master Circular on Risk Management Framework and Reporting Standards*.