Shri Vile Parle Kelavani Mandal's

Dwarkadas J. Sanghvi College of Engineering

(Autonomous College Affiliated to the University of Mumbai)

Scheme and Detailed syllabus (DJS22)

of

Honors Degree Program

in

Computational Finance

(Semester VIII)

Scheme of Semester VIII (DJS22) HONORS for Department of Computer Science and Engineering (Data Science)

Sr. No.	Course Code	Course	Teaching Scheme				Semester End Examination (SEE) - A						Continuous Assessment (CA) - B					Aggregate (A+B)	Credits Earned	
			Theory (Hrs)	Practical (Hrs)	Tutorial (Hrs)	Credits	Duration (Hrs)	Theory	Oral	Pract	Oral & Pract	SEE Total (A)	Term Test 1 (TT1)	Term Test 2 (TT2)	Term Test Total (TT1 + TT2)	Term Work	CA Total (B)			
1	DJS22DSHN1C4	Financial Analysis and Decision Science	3	--	--	3	2	65	--	--	--	65	20	15	35	--	35	**100**	3	4
2	DJS22DSHN1L3	Financial Analysis and Decision Science Tutorial	--	--	1	1	--	--	--	--	--	--	--	--	--	25	25	**25**	1	
		Total	**3**	--	**1**	**4**	**2**	**65**	--	--	--	**65**	**20**	**15**	**35**	**25**	**60**	**125**	**4**	**4**

Program: B. Tech in Computer Science and Engineering (Data Science) **Semester: VIII**

Course: Financial Analysis and Decision Science (DJS22DSHN1C4)

Financial Analysis and Decision Science Tutorial (DJS22DSHN1L3)

Pre-requisite: Basic Finance Knowledge, Mathematics and Statistics

Objectives:

- Understand the principles of financial and insurance decision-making under risk and uncertainty, and their role in corporate finance.
- Develop analytical and computational skills to evaluate investment and financing decisions using quantitative models.
- Analyse dividend, payout, and working capital strategies to optimize liquidity and firm value.
- Integrate financial, insurance, and risk management decisions using modeling, simulation, and scenario analysis.

Outcomes: On completion of the course, learner will be able to

1. Explain financial and insurance decision-making concepts under risk and uncertainty, including behavioural and market factors.
2. Apply computational and quantitative methods to evaluate investment and financing decisions.
3. Analyze design dividend, payout, and working capital strategies to maintain liquidity and enhance firm value.
4. Apply integrated financial and insurance risk management techniques using simulation, scenario, and modeling tools.

Financial Analysis and Decision Science (DJS22DSHN1C4)		
Unit	**Description**	**Duration**
1	**Foundations of Financial and Insurance Decision Frameworks:** Overview of financial decision-making in data-driven contexts; Role of insurance as a risk-transfer mechanism; Expected utility theory, risk aversion; Financial statements (Balance Sheet, Income statements, Cash flow) and key ratios including profitability, liquidity, and solvency ratios; Introduction to forecasting and handling uncertainty in financial planning.	**7**
2	**Investment Decisions and Capital Budgeting under Risk:** Concept of time value of money; Techniques for investment evaluation including Net Present Value (NPV), Annual Rate of Return (ARR), Internal Rate of Return (IRR), Profitability Index (PI), and Payback Period; Risk-adjusted discount rate; Sensitivity analysis and scenario analysis for risk evaluation; Integration of insurance-based risk mitigation.	**8**
3	**Financing and Capital Structure Decisions:** Sources of finance including equity, debt, and hybrid instruments; Estimation of cost of capital—Cost of Equity (Ke), Cost of Debt (Kd), and Weighted Average Cost of Capital (WACC); Theories of capital structure including Net Income (NI) approach, Net Operating Income (NOI) approach, Modigliani–Miller (MM) proposition, and Traditional theory; Leverage impact and determination of optimal capital structure considering risk and return.	**8**

4	**Dividend, Payout and Working Capital Management:** Theories of dividend policy including Walter, Gordon models; Dividend policy models such as stable dividend, residual dividend, and constant payout ratio models; Share buyback and payout optimization strategies; Overview of working capital management including management of cash, receivables, inventory, and payables; Concepts of liquidity risk and short-term financing options.	**7**
5	**Financial and Insurance Risk Analytics:** Types of financial and insurable risks; Risk–return trade-offs and portfolio diversification principles; Basics of Value at Risk (VaR); Use of predictive analytics and data-driven forecasting techniques for financial and insurance risk assessment.	**6**
6	**Simulation-Based Decision Modeling:** Monte Carlo simulation for investment and portfolio decision-making; Scenario-based decision analysis for uncertainty modeling; Conceptual introduction to Markov Chain Monte Carlo (MCMC) methods; Integrative case on combined financial and insurance risk simulation for portfolio or project decisions.	**7**
	Total	**42**

Financial Analysis and Decision Science Tutorial (DJS22DSHN1L3**)**	
Sr. No.	**Suggested Tutorials**
1	Financial Statements, Ratios, and Decision Frameworks
2	Capital Budgeting under Risk
3	Cost of Capital and Capital Structure Decisions
4	Dividend Policy and Working Capital Management
5	Financial & Insurance Risk Analytics
6	Simulation-Based Decision Modeling

*The Term Work will be calculated based on Tutorial Performance (15m) and Mini project (10m)
Mini project to be done so that students get Hands-on experience via Real-World Case Studies

Books Recommended:

Textbooks:

1. Brigham, E. F., & Houston, J. F**.** (2022). Fundamentals of Financial Management (13th Edition). Cengage Learning.
2. Benninga, S., & Mofkadi, T. (2022). Financial Modeling (5th Edition). MIT Press, Cambridge, MA.
3. Brealey, R. A., Myers, S. C., Allen, F., & Edmans, A. (2022). Principles of Corporate Finance (14th Edition). McGraw-Hill Education.

Reference Books:

1. Bodie, Z., Merton, R. C., & Cleeton, D. L. (2025). Principles of Finance. Cambridge University Press
2. Ross, S. A., Westerfield, R. W., & Jaffe, J**.** (2024). Corporate Finance (13th Edition). McGraw-Hill Education.
3. Bigel, K. S**.** (2023). Corporate Finance. Open Touro University Press (Open Access).

Web Links:

1. Aswath Damodaran – Applied Corporate Finance: A User's Manual (4th Edition, NYU Stern) https://pages.stern.nyu.edu/~adamodar/pdfiles/acf4E/acf4Ebook.pdf
2. Aswath Damodaran – Chapter 10: Investment Return Models (Applied Corporate Finance, 3rd Edition) https://pages.stern.nyu.edu/~adamodar/pdfiles/acf3E/ch10.pdf
3. Quoc Trung Tran – Dividend Policy: A Business Perspective (Emerald Publishing, 2023) https://bookstore.emerald.com/media/preview/9781837979882-23-2.pdf

4. Quantitative Financial Analytics and Risk Modelling (Routledge, 2021) https://api.pageplace.de/preview/DT0400.9781000320497_A40695981/preview-9781000320497_A40695981.pdf

Prepared by Checked by Head of the Department Principal