



Shri Vile Parle Kelavani Mandal's  
Dwarkadas J. Sanghvi College of Engineering  
(Autonomous College Affiliated to the University of Mumbai)

Scheme and Detailed syllabus (DJS23)  
of  
Honors Degree Program  
in  
**Computational Finance**  
(Semester VII)



**Scheme of Semester VII (DJS23) HONORS for Department of Computer Science and Engineering (Data Science)**  
**AY 2026-27**

| Sr. No. | Course Code  | Course                                           | Teaching Scheme |                 |                    |         | Semester End Examination (SEE) - A |        |      |       |              |               | Continuous Assessment (CA) - B |                   |                   |                                  |           |              | Aggreg-<br>ate (A+B) | Credits Earned |   |
|---------|--------------|--------------------------------------------------|-----------------|-----------------|--------------------|---------|------------------------------------|--------|------|-------|--------------|---------------|--------------------------------|-------------------|-------------------|----------------------------------|-----------|--------------|----------------------|----------------|---|
|         |              |                                                  | Theory (Hrs)    | Practical (Hrs) | Tutoria<br>l (Hrs) | Credits | Duration (Hrs)                     | Theory | Oral | Pract | Oral & Pract | SEE Total (A) | Term Test 1 (TT1)              | Term Test 2 (TT2) | Term Test 1 (TT3) | Term Test Total (TT1 + TT2+ TT3) | Term Work | CA Total (B) |                      |                |   |
| 1       | DJS23DCH1701 | Financial Analysis and Decision Science          | 3               | --              | --                 | 3       | 2                                  | 60     | --   | --    | --           | 60            | 15                             | 15                | 10                | 40                               | --        | 40           | 100                  | 3              | 4 |
| 2       | DJS23DTH1701 | Financial Analysis and Decision Science Tutorial | --              | --              | 1                  | 1       | --                                 | --     | --   | --    | --           | --            | --                             | --                | --                | --                               | 25        | 25           | 25                   | 1              |   |
| Total   |              |                                                  | 3               | --              | 1                  | 4       | 2                                  | 60     | --   | --    | --           | 60            | 15                             | 15                | 10                | 40                               | 25        | 65           | 125                  | 4              | 4 |

Prepared by

Checked by

Head of Department

Vice Principal

Principal



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

**Semester: VII**

**Course: Financial Analysis and Decision Science (DJS23DCH1701)**

**Financial Analysis and Decision Science Tutorial (DJS23DTH1701)**

**Pre-requisite:** Financial markets and risk analysis and Econometric modeling

**Objectives:** This course introduces the principles of financial and insurance decision-making under risk and uncertainty and their role in corporate finance. Students will develop analytical and computational skills to evaluate investment and financing decisions using quantitative models. The course also covers dividend, payout, and working capital strategies to optimize liquidity and firm value. Further, students will learn to integrate financial, insurance, and risk management decisions using modeling, simulation, and scenario analysis techniques to support effective decision-making in uncertain environments.

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

1. Apply financial and insurance decision-making concepts under risk and uncertainty, considering 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.

| <b>Financial Analysis and Decision Science (DJS23DCH1701)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Unit</b>                                                   | <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Duration</b> |
| <b>1</b>                                                      | <b>Foundations of Financial and Insurance Decision Frameworks:</b> 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.                                                       | <b>7</b>        |
| <b>2</b>                                                      | <b>Investment Decisions and Capital Budgeting under Risk:</b> 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.                                                                           | <b>8</b>        |
| <b>3</b>                                                      | <b>Financing and Capital Structure Decisions:</b> 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. | <b>8</b>        |
| <b>4</b>                                                      | <b>Dividend, Payout and Working Capital Management:</b> 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.                                                    | <b>7</b>        |

|   |                                                                                                                                                                                                                                                                                                                                                         |           |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 5 | <b>Financial and Insurance Risk Analytics:</b> 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 | <b>Simulation-Based Decision Modeling:</b> 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. | 6         |
|   | <b>Total</b>                                                                                                                                                                                                                                                                                                                                            | <b>42</b> |

| <b>Financial Analysis and Decision Science Tutorial (DJS23DTH1701)</b> |                                                                                    |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>Sr. No.</b>                                                         | <b>Suggested Tutorials</b>                                                         |
| 1                                                                      | Financial Statements, Ratios, and Decision Frameworks                              |
| 2                                                                      | Expected Utility Theory, Risk Aversion and Financial Forecasting under Uncertainty |
| 3                                                                      | Capital Budgeting under Risk                                                       |
| 4                                                                      | Sensitivity Analysis and Scenario Analysis for Investment Decisions                |
| 5                                                                      | Cost of Capital and Capital Structure Decisions                                    |
| 6                                                                      | Leverage Analysis and Optimal Capital Structure Determination                      |
| 7                                                                      | Dividend Policy and Working Capital Management                                     |
| 8                                                                      | Dividend Models, Share Buybacks and Payout Optimization Strategies                 |
| 9                                                                      | Financial & Insurance Risk Analytics                                               |
| 10                                                                     | Portfolio Diversification, Risk–Return Analysis and Value at Risk (VaR)            |
| 11                                                                     | Simulation-Based Decision Modeling                                                 |
| 12                                                                     | Monte Carlo Simulation and Integrated Financial–Insurance Risk Modeling Case Study |

\*The Term Work will be calculated based on Tutorial Performance (10m) and Mini project (15m)  
Mini project to be carried out using concepts from all Honors courses completed up to this semester.

### **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](https://api.pageplace.de/preview/DT0400.9781000320497_A40695981/preview-9781000320497_A40695981.pdf)

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