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 V)

With effect from the Academic Year: 2024-2025

Shri Vile Parle Kelavani Mandal's
DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING
(Autonomous College Affiliated to the University of Mumbai)
NAAC Accredited with "A" Grade (CGPA : 3.18)

Course Structure for Undergraduate Program in Computer Science and Engineering (Data Science)

Honors in Computational Finance

(Academic Year 2025-26)

Sr. No.	Course Code	Course	Teaching Scheme (hrs.)				Semester End Examination(A)						Continuous Assessment (B)						Aggregate (A+B)	Total Credits	
			Theory (hrs)	Practical (hrs)	Tut (hrs)	Credits	Duration (hrs)	Theory /Cb	Oral	Pract	Oral & Pract	Total SEE (A)	Term Test 1 (TT1)	Term Test 2 (TT2)	Term Test 3 (TT3)	Total (TT1,TT2,TT	Term Work	Total CA(A)			
1	DJS23DCH1501	Econometric Modelling	3	--	--	3	2	60	--	--	--	60	15	15	10	40	--	40	100	3	3
		Total	**3**	**0**	**0**	**3**	**2**	**60**	**0**	**0**	**0**	**60**	**15**	**15**	**10**	**40**	**0**	**40**	**100**	**3**	**3**

Honors in Computational Finance **Semester: V**

Program: Computer Science and Engineering (Data Science)

Course: Econometric Modelling (DJS23DCH1501)

Pre-requisite: Statistics for Data Science, Financial Market and Risk Analysis, Computational Methods and Pricing Models.

Course Objectives: To develop advance statistics skills for financial data analysis.

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

1. Apply simple and multiple regression models for data analysis, while addressing violations of classical regression assumptions.
2. Analyze advanced econometric techniques for time series analysis to extract insights from economic data.
3. Evaluate practical econometric skills to solve real-world economic problems and apply theoretical knowledge to data analysis.

Econometric Modelling (DJS23DCH1501)		
Unit	**Description**	**Duration**
1	**Nature of Econometrics and Economic Data** Introduction to Econometrics, steps in Empirical Econometric Analysis, Structure of Economic Data: Cross-section data, Time-series data, Pooled Cross Sections and Panel or Longitudinal data. Causality and the Notion of Ceteris Paribus in Econometric Analysis.	**04**
2	**Simple Linear Regression Models** Two variable case, Regression Vs Correlation, Linearity Vs Non-collinearity, Stochastic specification: The significance of error term, Estimation: The principal of ordinary least squares; Assumptions under CLRM, BLUE properties of estimators; The Gauss Markov Theorem, Goodness of fit- R-squared; Tests of Hypotheses; Scaling and Units of measurement; Confidence Intervals; Forecasting. K variable linear regression model: estimation of parameters; Qualitative Independent variables-dummy variable trap.	**09**
3	**Multiple Regression Analysis and Diagnostics Tests.** Multiple Regression Model, Analysis, Derivation of the parameters, Assumptions. Geometric Interpretation, Frisch-Waugh –Lovell Theorem, Derivation of Residual Variance.	**08**
4	**Violations of Classical Assumptions: Consequences, Detection and Remedy** Heteroscedasticity: problem and Consequences; Tests, Detection and Alternative methods of estimation. Autocorrelation: Sources, Consequences, Tests of autocorrelation, Remedial measures.	**08**
5	**Multicollinearity** Nature of the Problem; Sources, Perfect multicollinearity vs Imperfect multicollinearity, Its	**05**

	consequences; Detection and Remedies of multicollinearity.	
6	**Time Series Econometrics** AR, MA, and ARMA processes. Modelling Trends and Seasonality, Linear Probability model, Introduction to Vector Autoregressive (VAR) models.	**05**
	Total	**39**

Books Recommended:

Text books:

1. Jeffrey M. Wooldridge, "Introductory Econometrics," South-Western Cengage, 7th edition, 2022.
2. Lokesh Boro and Niranjan Das, "Introductory Econometrics," Bidya Bhawan, First Edition, 2021.
3. James H. Stock & Mark W. Watson, "Introduction to Econometrics," Pearson, 4th edition, 2019.

Reference Books:

1. Brooks, Chris, "Introductory Econometrics for Finance," Cambridge, 2019.
2. Damodar Gujrati, "Basic Econometrics," McGraw Hill, 2020.
3. Francis X. Diebold, "Elements of Forecasting," Cengage South-Western, 2019.
4. Kevin P. Murphy, "Probabilistic Machine Learning: An Introduction," MIT Press, 2022.