



Shri Vile Parle Kelavani Mandal's

Dwarkadas J. Sanghvi College of Engineering

(Autonomous College Affiliated to the University of Mumbai)

Scheme and detailed Syllabus (DJ19)

of

Honors Degree Program

in

Computational Finance

Revision: 1 (2022)

With effect from the Academic Year: 2022-2023



Proposed scheme for Honors in Computational Finance
 (Academic Year 2022-2023)

Sr.	Course Code	Course	Teaching Scheme (hrs.)				Continuous Assessment (A) (marks)			Semester End Assessment (B) (marks)					(A+B)	Total Credits
			Th	P	T	Credits	Th	T/W	Total CA (A)	Th / Cb	O	P	O & P	Total SEA (B)		
Sem V																
1	DJ19DSHN1C1	Econometric Modelling	4	--	--	4	25	--	25	75	--	--	--	75	100	4
Sem VI																
2	DJ19DSHN1C2	Financial Computing	4	--	--	4	25	--	25	75	--	--	--	75	100	4
	DJ19DSHN1L1	Financial Computing Laboratory	--	2	--	1	--	25	25	--	--	--	25	25	25	1
Sem VII																
3	DJ19DSHN1C3	Quantitative Portfolio Management	4	--	--	4	25	--	25	75	--	--	--	75	100	4
4	DJ19DSHN1L2	Quantitative Portfolio Management Laboratory	--	2	--	1	--	25	25	--	--	--	25	25	25	1
Sem VIII																
5	DJ19DSHN1C4	Stochastic Calculus	4	--	--	4	25	--	25	75	--	--	--	75	100	4
Total			16	4	0	18	100	50	150	300	0	0	50	325	450	18



Honors in Computational Finance

Semester: V

Program: Computer Science and Engineering (Data Science)

Course: Econometric Modelling (DJ19DSHN1C1)

Pre-requisite: --

1. Statistics for Data Science.

Objectives:

1. To develop advance statistics skills for financial data analysis.

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

1. demonstrate an understanding of the challenges of empirical modelling in economics and business
2. demonstrate an understanding of the shortcomings of the standard linear regression model and Multiple Regression.
3. apply important extensions to the linear regression model
4. express new econometric methods mathematically to understand time series data.
5. demonstrate clarity of thought regarding the relationship between data, model and estimation in econometrics.

Econometric Modelling (DJ19DSHN1C1)		
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.	06
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.	10
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, Inference.	10
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.	10

5	Multicollinearity Nature of the Problem; Sources, Perfect multicollinearity vs Imperfect multicollinearity, Its consequences; Detection and Remedies of multicollinearity.	06
6	Time Series Econometrics AR, MA and ARMA processes. Modelling Trends and Seasonality, Linear Probability model, Introduction to VARs. Stationarity and Unit Root Testing. Basics of cointegration	10
	Total	52

Books Recommended:

Text books:

1. Jeffrey M. Wooldridge, "Introductory Econometrics," South-Western Cengage, 4th edition, 2012.
2. William H. Greene, "Econometric Analysis," Pearson, 7th edition, 2018.
3. Lokesh Boro and Niranjana Das, "Introductory Econometrics," Bidya Bhawan, First Edition, 2021.

Reference Books:

1. Brooks, Chris, "Introductory Econometrics for Finance," Cambridge, 2019.
2. Damodar Gujarati, "Basic Econometrics," McGraw Hill, 5th edition, 2011.

Prepared by

Checked by

Head of the Department

Principal



Continuous Assessment (A):

Course	Assessment Tools	Marks	Time (hrs.)
Theory	One Term test (based on 40 % syllabus)	25 each (Avg.25)	1
	Second Term test (next 40 % syllabus) / presentation / assignment / course project / group discussion / any other.		as applicable
Audit course	Performance in the assignments / quiz / power point presentation / poster presentation / group project / any other tool.	--	
Laboratory	Performance in the laboratory and documentation.	25	
Tutorial	Performance in each tutorial & / assignment.	25	
Laboratory & Tutorial	Performance in the laboratory and tutorial.	25	

The final certification and acceptance of term work will be subject to satisfactory performance upon fulfilling minimum passing criteria in the term work / completion of audit course.

Semester End Assessment (B):

Course	Assessment Tools	Marks	Time (hrs.)
Theory / * Computer based	Written paper based on the entire syllabus.	75	3
	* Computer based assessment in the college premises.		
Oral	Questions based on the entire syllabus.	25	as applicable
Practical	Performance of the practical assigned during the examination and the output / results obtained.	25	2
Oral & Practical	Project based courses - Performance of the practical assigned during the examination and the output / results obtained. Based on the practical performed during the examination and on the entire syllabus.	as per the scheme	2

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Checked by

Department Coordinator

Principal