Shirpur Education Society's

R. C. Patel Institute of Technology, Shirpur

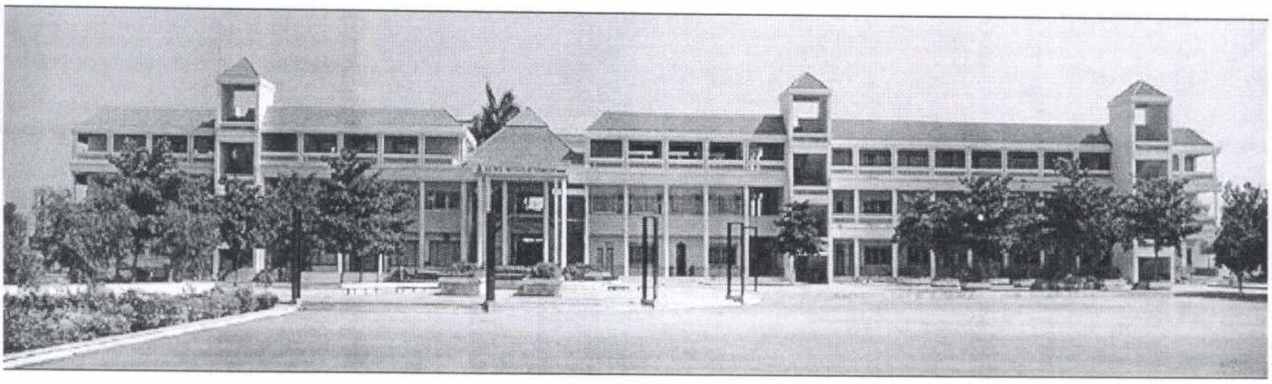
(An Autonomous Institute)

Course Structure and Syllabus

Honors Degree Program in Computational Finance

Computer Science and Engineering (Data Science)

With effect from Year 2025-26



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Honors Degree Program in Computational Finance Sem-V (w.e.f. 2025-26)														
Sr	Course Category	Course Code	Course Title	Teaching Scheme			Evaluation Scheme					Total	Credit	
							Continuous Assessment (CA)							
							TA	Term Test 1 (TT1)	Term Test 2 (TT2)	Average of (TT1 & TT2)	ESE			
				L	T	P	[A]			[B]	[C]	[A+B+C]		
Sem-V														
1	H1	RCP23DCH1501	Econometric Modelling	3			25	15	15	15	60	100	3	3

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Director

Program: Honors in Computational Finance Computer Science & Engineering (Data Science)	T. Y. B.Tech.	Semester: V
Econometric Modelling (RCP23DCH1501)		

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

Course Objective(s):

To develop advance statistics skills for financial data analysis.

Course Outcomes:

CO	Course Outcomes	Blooms Level	Blooms Description
CO1	Apply simple and multiple regression models for data analysis, while addressing violations of classical regression assumptions.	L3	Apply
CO2	Analyze advanced econometric techniques for time series analysis to extract insights from economic data.	L4	Analyze
CO3	Evaluate practical econometric skills to solve real-world economic problems and apply theoretical knowledge to data analysis.	L5	Evaluate

Econometric Modelling (RCP23DCH1501)
Course Contents

Unit-I — 04 Hrs.

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.

Unit-II — 09 Hrs.

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.

Unit-III — 08 Hrs.

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

Unit-IV — 08 Hrs.

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.

Unit-V — 05 Hrs.

Multicollinearity

Nature of the Problem; Sources, Perfect multicollinearity vs Imperfect multicollinearity, Its consequences; Detection and Remedies of multicollinearity.

Unit-VI — 05 Hrs.

Time Series Econometrics

AR, MA, and ARMA processes. Modelling Trends and Seasonality. Linear Probability model. Introduction to Vector Autoregressive (VAR) models.

Text Books:

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