

SARDAR PATEL UNIVERSITY



**DEPARTMENT OF STATISTICS
FACULTY OF SCIENCE
COURSE OF STUDY**

RULES FOR CERTIFICATE COURSE IN FINANCIAL STATISTICS

R.CCFinStat.1: A candidate who has passed the Bachelor’s degree examination in any faculty of this University under 10 + 2 + 3 or an examination recognized as equivalent thereto with at least 40 percent of marks will be considered eligible for admission. In addition, the candidate should have studied a four credit course in Statistics / Mathematics. The M.Sc. (Semester IV) students of the Department are also eligible for the course if they are not offered Financial Statistics specialization.

R.CCFinStat.2: In this course the candidates will have to study the courses (i) PS04ESTA51: ECONOMETRICS AND TIME SERIES ANALYSIS (ii) PS04ESTA52: ACTUARIAL STATISTICS. These two courses are already running in the department as optional courses in the fourth semester of M.Sc.Programme of the department. Therefore, the certificate course will be run in schedule of semester IV.

R.CCFinStat.3: The course coordinator will be in charge internal test examination. Candidates will be examined in each theory paper for 100 marks. For deciding result the ratio between the internal assessment and external assessment will be 30 : 70. For the purpose of internal assessment, the Department concerned will conduct one test. The Department will also arrange Quiz, Seminar etc. for internal assessment in theory course work. The distribution of marks will be as under: -

1. Structure for each theory paper:

a)	Quiz	..	..	..	5 marks
b)	Seminar	..	..	..	5 marks
c)	Test	..	..	..	20 marks

					Total 30 marks

The following grading scheme will be adopted to issue the certificate.

Marks in percentage	Grade
70 and above	A
65-69	B+
60-65	B
55-59	C+
50-54	C
0-49	Attendance Certificate

R.CCFinStat.4: The following are the details of the courses.

Course Code	PS04ESTA51	Title of the Course	ECONOMETRICS AND TIME SERIES ANALYSIS
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	<ol style="list-style-type: none"> 1. Students have concise knowledge of basic regression analysis so that they are able to understand its applications in different fields in economics. 2. To provide students with some useful tools of econometrics which help in analysis of economic data. 3. To equip students with various forecasting techniques and knowledge on modern statistical methods for analyzing time series data
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Course Content		
Unit	Description	Weightage* (%)
1.	Econometrics: Definition, Methodology, Examples, Nature and Source of Data; Classical Linear Regression Model (CLRM): Assumptions, estimation of parameters through Maximum Likelihood Method and Ordinary Least Square Method, Properties of Estimator; Testing of Hypothesis and confidence intervals, Testing of Subset of Regressors, Point Predictor, Model Selection Criterion; R^2 , $AdjR^2$, AIC, BIC Mallow's C_p Statistic; Significance Test and Confidence Interval; Dummy Variable: Nature, introduction, examples, Chow Test, Seasonal Adjustment	25
2.	Heteroscedasticity: Reason of Heteroscedasticity; Consequences of using OLS in presence of Heteroscedasticity; Detection: Informal Method, Formal Method; Park Test, Goldfield-Quant Test; Remedial Measures, Method of Generalized Least Squares (GLS), Autocorrelation: Nature of the Problem, Consequences of Autocorrelation, Detection: Graphical Method; Durbin-Watson d Test, A General Test of Autocorrelation, The Breusch-Goldfrey (BG) Test; GLS when correlation coefficient is known as well as unknown;	25

3.	Multicollinearity Problem, Its implications and tools for handling the problem; Detection of Multicollinearity; Remedial Measures; Ridge Regression; Use of Principle Component Analysis; Introduction to Simultaneous Equation Models; The identification Problem	25
4.	Introduction to Time Series Analysis; Some Basic Concepts: white noise, stationary, non stationary time series, ACF and PACF plot; Unit Root Test (Augmented Dickey-Fuller Test); Forecasting: Exponential Smoothing Methods, AR Process, MA Process, ARMA Process, ARIMA Process; The Box-Jenkins (BJ) Methodology; VAR Model; Auto Regressive Conditional Heteroscedasticity (ARCH) and Generalized Autoregressive Conditional Heteroscedasticity (GARH) Model;	25

Teaching-Learning Methodology	Discussion and question answers based learning Black board/Multimedia projector using ICT Tools Learning through Problem solving approach Assignments and seminars are given for development of confidence among students
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	to specify assumptions, formulate and estimate appropriate models, interpret the results and test their statistical significance.
2.	explain core concepts and techniques in econometrics with special focus on the classical linear regression model.
3.	understand the assumptions upon which different econometric methods are based and their implications.
4.	distinguish regression analysis model and time series model.
5.	understand various components of time series and various time series models.

Suggested References:

Sr. No.	References
1.	Cameron, A.C. and Trivedi, P.K. (2005). Microeconometrics Methods and Applications, Cambridge University Press
2.	Cooray, T.M.J.A. (2008). Applied Time Series Analysis and Forecasting, Narosa Publishing House, New Delhi
3.	Green, W. H. (1993). Econometric Analysis, Ed. II, MACMILLAN Publishing
4.	Greene, W.H. (2003) Econometric Analysis. Ed. V, Pearson Education
5.	Gourieroux, C and Jasiak, J. (2007). Financial Econometrics: Problems, Models and Methods, New Age International
6.	Gujarathi, D.N., Porter, D.C. and Sangeetha (2012). Basic Econometrics, Ed. V , Tata MacGraw Hill, New Delhi
7.	Johnston, J. and Dinardo, J (1997). Econometric methods, Ed. IV, McGraw Hill
8.	Ruppert, D.(2004). Statistics and Finance: An Introduction , Springer (India) Pvt. Ltd.
9.	Shumway, R.H. (1988). Applied Statistical time Series Analysis, Prentice Hall , New Jersey
10.	Theil, H. (1982) : Introduction to the theory and practice of Econometrics, John Wiley.

On-line resources to be used if available as reference material

On-line Resources

Course Code	PS04ESTA52	Title of the Course	ACTUARIAL STATISTICS
Total Credits of the Course	04	Hours per Week	04
Course Objectives:	1. To introduce various calculations related to finance. 2. To introduce certain statistical concepts exclusively used in the design insurance related instruments. 3. To make aware about reliability and survival analysis concepts being used in insurance sector. 4. To discuss in detail difference life insurance policies and annuities.		

Course Content		
Unit	Description	Weightage* (%)
1.	Utility theory, insurance and utility theory, models for individual claims and their sums, survival function, curtate future lifetime, force of mortality Life table and its relation with survival function, examples, assumptions for fractional ages, some analytical laws of mortality, select and ultimate tables. Multiple life functions, joint life and last survivor status, insurance and annuity benefits through multiple life functions evaluation for special mortality laws.	25
2.	Multiple decrement models, deterministic and random survivorship groups, associated single decrement tables, central rates of multiple decrement, net single premiums and their numerical evaluations. Distribution of aggregate claims, compound Poisson distribution and its applications. Distribution of aggregate claims, compound Poisson distribution and its applications.	25
3.	Principles of compound interest: Nominal and effective rates of interest and discount, force of interest and discount, compound interest, accumulation factor, continuous compounding. Life insurance: Insurance payable at the moment's of death and at the end of the year of death-level benefit insurance, endowment insurance, differed insurance and varying benefit insurance, recursions, commutation functions. Life annuities: Single payment, continuous life annuities, discrete life annuities, life annuities with monthly payments, commutation functions, varying annuities, recursions, complete annuities-immediate and apportion able annuities-due.	25
4.	Net Premiums: Continuous and discrete premiums, true monthly payment premiums, apportionable premiums, commutation functions, accumulation type benefits. Payment premiums, apportionable premiums, commutation functions accumulation type benefits. Net premium reserves: Continuous and discrete net premium reserve, reserves on a semi continuous basis, reserves based on true monthly premiums, reserves on an apportion able or discounted continuous basis, reserves at fractional durations, allocations of loss to policy years, recursive formulas and differential equations for reserves, commutation functions. Some practical considerations: Premiums that include expenses-general expenses types of expenses, per policy expenses. Claim amount distributions, approximating the individual model, stop-loss insurance.	25

Teaching-Learning Methodology	
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Evaluation Pattern

Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to

1.	Calculations related to life insurance policies and finance.
2.	To know statistical concepts exclusively used in the design insurance related instruments.
3.	To know reliability and survival analysis concepts being used in insurance sector.

Suggested References:

Sr. No.	References
1.	Deshmukh, S. R. (2009). Actuarial Statistics: An Introduction using R. University Press Pvt. Ltd Hyderabad (Text Book).
2.	. Bowers, N. L., Gerber, H. U., Hickman, J. C., Jones D. A. and Nesbitt, C. J. (1986). Actuarial Mathematics', Society of Actuaries, Itasca, III inois, U. S. A. Second Edition (1997) Section I – Chapters: 1, 2, 3, 8, 9, and 11, Section II – Chapters: 4, 5, 6, 7, 13, and 14
3.	Spurgeon E. T. (1972), Life Contingencies, Cambridge University Press.
4.	Neill, A. (1977). Life Contingencies, Heinemann

On-line resources to be used if available as reference material

On-line Resources

R. CC Fin.Stat.5: The total number of seats for the course is 30 and the fee structure of the course is as under.

Collection Head	Amount inRupees
Information Brochure and application form fee	300.00
Tuition Fee	5,000.00
Examination Fee	250.00
Certificate Fee	100.00
Total	5,650.00