



Barrackpore Rastraguru Surendranath College

Teaching Plan

2022-23

Department of Statistics

NAME OF THE PROGRAMME

B.Sc.(General)withStatistics

ChoiceBasedCreditSystem

PROGRAMME OUTCOME

The student graduating with the Degree B.Sc.(General) Statistics should be able to

- Demonstrate the ability to use skills in Statistics and different practicing areas for formulating and tackling Statistics related problems and identifying and applying appropriate principles and methodologies to solve a wide range of problems associated with Statistics.
- Acquire fundamental/systematic or coherent understanding of the academic field of Statistics and its different learning areas and applications and procedural knowledge that creates different types of professionals related to subject area of Statistics, including professionals engaged in government/public service and private sectors.
- Recognize the importance of statistical modeling and computing, and the role of approximation and mathematical approaches to analyze the real problems using various statistical tools.
- Plan and execute Statistical experiments or investigations, analyze and interpret data/information collected using appropriate methods and report accurately the findings of the experiment/investigations.
- Demonstrate relevant generic skills and global competencies such as problem-solving skills that are required to solve different types of Statistics related

problems with

well-defined solutions, and tackle open-ended problems that belong to the disciplinary-
areaboundaries;investigativeskills,includingskillsofindependent thinking of Statistics-related
issues and problems.

Semester		1			
Course Title	Statistical Methods				
Course Code	STSHGEC01T	Credit	4		
Course Outcome	<p>Students will acquire</p> <p>(a) knowledge of Statistics and its scope and importance in various areas such as Medical, Engineering, Agricultural and Social Sciences etc.</p> <p>(b) knowledge of various types of data, their organization and evaluation of summary measures such as measures of central tendency and dispersion etc.</p>				
Scheme of Instruction					
Total Duration	60	Class/Week	4	Hours/week	4
Instruction Mode	Lecture				
Scheme of Examination					
Maximum Score	50	Internal	10	End Semester	40
Course Mapping					
Units	Course Content			Lecture Hour (Cumulative)	
I	Introduction, Measurement, Frequency distribution, Tabular Presentation, Graphical Presentation.			10	
II	Central Tendency, Dispersion, Moments, Skewness & Kurtosis.			30	
III	Bivariate data, Simple correlation, Multiple correlation, Partial correlation, Rank correlation, Simple linear regression, Fitting of polynomials, Exponential curves.			50	
IV	Theory of attributes, Consistency of data, Independence and association of attributes, Measures of association and contingency.			60	

Semester		1			
CourseTitle	StatisticalMethodsPractical				
CourseCode	STSHGEC01P	Credit	2		
CourseOutcome	Studentswillbeinapositionto (a) analyzeandinterpretandtakeappropriatedecisionsinsolvingreallife problems using statistical tools, (b) usedifferentStatisticalpackagesforgraphicalinterface,dataanalysis and interpretation.				
SchemeofInstruction					
TotalDuration	60	Class/Week	4	Hours/week	4
InstructionMode	Lecture& Visual				
SchemeofExamination					
MaximumScore	25	Internal	15	EndSemester	10
CourseMapping					
Units	Course Content			LectureHour (Cumulative)	
I	Graphicalrepresentationofdata.			5	
II	Problems based on measures of central tendency, Problems based on measures of dispersion, Problems basedoncombinedmeanandvarianceandcoefficient of variation, Problems based on moments, skewness and kurtosis.			25	

III	Fitting of polynomials, exponential curves, Karl Pearson correlation coefficient, Partial and multiple correlations, Spearman rank correlation with and without ties, Correlation coefficient for a bivariate frequency distribution, Lines of regression, angle between lines and estimated values of variables.	50
IV	Checking consistency of data and finding association among attributes.	60
Semester		2
Course Title	Introductory Probability	
Course Code	STSHGEC02T	Credit 4
Course Outcome	<p>Students will acquire</p> <p>(a) ability to distinguish between random and non-random experiments,</p> <p>(b) knowledge to conceptualize the probabilities of events including frequentist and axiomatic approach. Simultaneously, they will learn the notion of conditional probability including the concept of Bayes' Theorem,</p> <p>(c) knowledge related to concept of discrete and continuous random variables and their probability distributions,</p> <p>(d) knowledge of important discrete and continuous distributions.</p>	
Scheme of Instruction		
Total Duration	60	Class/Week 4 Hours/week 4
Instruction Mode	Lecture	
Scheme of Examination		
Maximum Score	50	Internal 10 End Semester 40
Course Mapping		
Units	Course Content	Lecture Hour (Cumulative)

I	Introduction, Random experiments, Algebra of events, Definition of probability, Theorems on probability, Conditional probability, Bayes' theorem & its Application	10
II	Random variables, Prob. mass & density functions, Distribution function & its properties, Expectation & Variance	30
III	Probability distributions, Weak law of large numbers, Central limit theorem, Lindeberg Levy theorem.	50
IV	Standard probability distributions: Binomial, Poisson, Geometric, Negative binomial, Hypergeometric, Uniform, Normal, Exponential, Beta, Gamma.	60

Semester		2			
CourseTitle	IntroductoryProbabilityPractical				
CourseCode	STSHGEC02T	Credit	2		
CourseOutcome	Studentswillbeinapositionto (a) analyzeandinterpretandtakeappropriatedecisionsinsolvingreallife problems using statistical tools, (b) usedifferentStatisticalpackagesforgraphicalinterface,dataanalysis and interpretation.				
SchemeofInstruction					
TotalDuration	60	Class/Week	4	Hours/week	4
InstructionMode	Lecture& Visual				
SchemeofExamination					
MaximumScore	25	Internal	15	EndSemester	10
CourseMapping					
Units	Course Content			LectureHour (Cumulative)	
I	Fittingofbinomialdistributionsforand $p = q = \frac{1}{2}$ given, Fitting of binomial distributions for n and p given, Fitting of binomial distributions computing mean and variance, Application problems based on binomialdistribution.			15	
II	Fitting of Poisson distributions for given value of lambdaPage,FittingofPoissondistributionsafter computing mean, Application problems based on Poisson distribution.			30	
III	Problems based on area property of normal distribution,Applicationbasedproblemsusingnormal distribution, Fitting of normal distribution when parametersaregiven&arenot given.			60	

Semester		3			
CourseTitle	BasicsofStatisticalInference				
CourseCode	STSHGEC03T	Credit	4		
CourseOutcome	<p>Studentswillacquire</p> <p>(a) conceptofrandomsamplefromadistribution,samplingdistributionof a statistic, standard error of important estimates such as mean and proportions,</p> <p>(b) knowledgeaboutimportantinferentialaspectssuchaspoin t estimation, test of hypotheses and associated concepts,</p> <p>(c) knowledgeaboutinferencesfromBinomial,PoissonandNormal distributions as illustrations,</p> <p>(d) conceptaboutnon- parametricmethodandsomeimportantnon- parametric tests.</p>				
SchemeofInstruction					
TotalDuration	60	Class/Week	4	Hours/week	4
InstructionMode	Lecture				
SchemeofExamination					
MaximumScore	50	Internal	10	EndSemester	40
CourseMapping					
Units	Course Content			LectureHour (Cumulative)	
I	Estimation of population mean, confidence intervals for the parameters of a normal distribution (one sample and two sample problems), The basic idea of significance test. Null and alternative hypothesis, Type I & Type II errors, level of significance, concept of p-value, Tests of hypotheses for the parameters of a normal distribution (one & two sample problems).			10	

II	Categorical data: Tests of proportions, tests of association and goodness-of-fit using Chi-square test, Yates' correction.	30
III	Tests for the significance of correlation coefficient. Sign test for median, Sign test for symmetry, Wilcoxon two-sample test.	50
IV	Analysis of variance, one-way and two-way classification, Basic principles, treatment, plot and block, Analysis of completely randomized design, randomized block design, Bioassay.	60

Semester		3	
Course Title	Basics of Statistical Inference Practical		
Course Code	STSHGEC03P	Credit	2
Course Outcome	Students will be in a position to (a) analyze and interpret and take appropriate decisions in solving real life problems using statistical tools, (b) use different Statistical packages for graphical interface, data analysis and interpretation.		
Scheme of Instruction			
Total Duration	60	Class/Week	4
		Hours/week	4
Instruction Mode	Lecture & Visual		

Scheme of Examination					
Maximum Score	25	Internal	15	End Semester	10
Course Mapping					
Units	Course Content			Lecture Hour (Cumulative)	
I	Estimators of population mean.			10	
II	Confidence interval for the parameters of a normal distribution (one sample and two sample problems), Tests of hypotheses for the parameters of a normal distribution (one sample and two sample problems).			25	
III	Chi-square test of proportions, Chi-square test of association, Chi-square test of goodness-of-fit.			45	
IV	Test for correlation coefficient.			50	
V	Sign test for median, Sign test for symmetry.			60	

Semester		4			
Course Title	Applied Statistics				
Course Code	STSHGEC04T	Credit	4		
Course Outcome	<p>Students will know about</p> <p>(a) time series data, its applications to various fields and components of time series,</p> <p>(b) fitting and plotting of various growth curves,</p> <p>(c) fitting of trend by Moving Average method,</p> <p>(d) measurement of Seasonal Indices by Ratio-to-Trend,</p> <p>(e) commonly used measures of demography pertaining to its three basic aspects, viz. the fertility, mortality and migration,</p> <p>(f) Construction and implication of life tables,</p>				
Scheme of Instruction					
Total Duration	60	Class/Week	4	Hours/week	4
Instruction Mode	Lecture				
Scheme of Examination					
Maximum Score	50	Internal	10	End Semester	40
Course Mapping					
Units	Course Content			Lecture Hour (Cumulative)	
I	<p>Economic Time Series: Components of time series, Decomposition of time series - Additive and multiplicative model with their merits and demerits, Illustrations of time series, Measurement of trend by method of free-hand curve, method of semi-averages and method of least squares (linear, quadratic and modified exponential), Measurement of seasonal variations by method of ratio to trend.</p>			15	

II	Index numbers: Definition, Criteria for a good index number, different types of index numbers. Construction of index numbers of prices and quantities, consumer price index number. Uses and limitations of index numbers.	30
III	Statistical Quality Control: Importance of statistical methods in industrial research and practice, Determination of tolerance limits, Causes of variations in quality: chance and assignable. General theory of control charts, process & product control, Control charts for variables: X-bar and R-charts, Control charts for attributes: p and c-charts.	45
IV	Demographic Methods: Introduction, measurement of population, rates and ratios of vital events, Measurement of mortality: CDR, SDR (w.r.t. age and sex), IMR, Standardized death rates, Life (mortality) tables: definition of its main functions and uses, Measurement of fertility and reproduction: CBR, GFR, and TFR, Measurement of population growth: GRR, NRR.	60

Semester		4			
CourseTitle	AppliedStatisticsPractical				
CourseCode	STSHGEC04P	Credit	2		
CourseOutcome	Studentswillbeinapositionto (a) analyzeandinterpretandtakeappropriatedecisionsinsolvingreallife problems using statistical tools, (b) usedifferentStatisticalpackagesforgraphicalinterface,dataanalysis and interpretation.				
SchemeofInstruction					
TotalDuration	60	Class/Week	4	Hours/week	4
InstructionMode	Lecture& Visual				
SchemeofExamination					
MaximumScore	25	Internal	15	EndSemester	10
CourseMapping					
Units	Course Content			LectureHour (Cumulative)	
I	Measurement of trend: Fitting of linear, quadratic trend,exponentialcurveandplottingoftrendvalues and comparing with given data graphically, Measurement of seasonal indices by Ratio-to-trend method and plotting of trend values and comparing withgivendata graphically.			15	
II	Construction of price and quantity index numbers by Laspeyres' formula, Paasche's formula, Marshall- Edgeworth's formula, Fisher's Formula. Comparison and interpretation, Construction of wholesale price indexnumber,fixedbaseindexnumberandconsumer priceindexnumberwithinterpretation.			30	

III	ConstructionandinterpretationofXbar&R-chart, Constructionandinterpretationp-chart(fixedsample size) and c-chart.	45
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IV	Computation of measures of mortality, Completion of life table, Computation of measures of fertility and population growth.	60
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