Programme: - **B.Sc. Honours in Statistics (Major)**

w.e.f. AY 2023-24

Course Structure

Semester	Course Code	Course Title	Major	Hours/ Week	Credits	Marks						
						Theory			Practical			Total
						IA	EA	Total	IA	EA	Total	
Sem-I	23STAMAJ101	Essentials and Applicationsof Mathematical, Physical and Chemical Sciences	Major	3+2	4	25	75	100	0	0	0	100
	23STAMAJ102	Advances in Mathematical, Physical and Chemical Sciences	Major	3+2	4	25	75	100	0	0	0	100
Sem-II	23STAMAJ203	Descriptive Statistics	Major	3+2	4+1	25	75	100	0	50	50	150
	23STAMAJ204	Random Variables & Mathematical Expectations	Major	3+2	4+1	25	75	100	0	50	50	150
Community Service Project of 180 Hours with 4 credits												
Exit Option 1 for award of Certificate in Statistics												
Sem-III	23STAMAJ305	DISCRETE DISTRIBUTION	Major	3+2	4+1	25	75	100	0	50	50	150
	23STAMAJ306	CONTINUOUS DISTRIBUTION	Major	3+2	4+1	25	75	100	0	50	50	150
	23STAMAJ307	Statistical Methods	Major/ Minor	3+2	4+1	25	75	100	0	50	50	150
	23STAMAJ308	Inferential Statistics	Major	3+2	4+1	25	75	100	0	50	50	150
Sem-IV	23STAMAJ409	Sampling Techniques	Major/ Minor	3+2	4+1	25	75	100	0	50	50	150
	23 STAMAJ410	Design and Analysis of Experiments	Major/ Minor	3+2	4+1	25	75	100	0	50	50	150
	23 STAMAJ411	Numerical Analysis	Major	3+2	4+1	25	75	100	0	50	50	150
Short Term Internship/Apprenticeship/OJT of 180 hrs with 4 Credits												
Exit Option -2 for award of Diploma in Statistics												

G. Vasalakshmi

VIKRAMASIMHAPURIUNIVERSITY:NELLORE

MEMBERSATTENDEDTOTHETHEBOARDOFSTUDIESOFSTATISTICS(UG)ONLINEMEETING HELDON 17-12-2023 AT4PM THROUGHGOOGLEMEET

Sl. No	NameoftheMember	Capacity	Signature
1	**Dr G.Varalakshmi**Lecturer in StatisticsGovtDegreeCollege,Vidavalur Nellore	**Chairman**	G.varalakshmi
2	**DrV.Munaiah** LecturerinStatistics Govt.Degree College for men, Srikalahasti	**Member**	V Munaiah
4	**Dr T.Gangaram** LecturerinStatistics Govt.Degree College for men, Srikalahasthi	**Member**	T. Gangaram 17/12/23 T. GANGARAM BOS Member, statist VSUniversity - Nellore
4	**DrP.Maheswari** Lecturerin Statistics , Govt.Degree College, Nagiri	**Member**	P. Mahe
5	**Dr P.Lavanya Kumari**Head of the Department of Statistics , S.V.Agricultural College ,Tirupathi	**External Member**	

G.varalakshmi

SEMESTER-II
COURSE 3: DESCRIPTIVE STATISTICS

Theory Credits: 3 3 hrs/week

I. Learning Outcomes

After successful completion of the course students will be able to:

1. To acquaint with the role of statistics in different fields with special reference to business and economics.
2. To review good practice in presentation and the format most applicableto their own data.
3. To learn the measures of central tendency or averages reduce the data to a single value which is highly useful for making comparative studies.
4. To familiar with the measures of dispersion throw light on reliability of average and control of variability.
5. To deal with the situation where there is uncertainty and to measure that uncertainty by using the probability, which is essential in all research areas.

II. Syllabus

Unit – 1: Statistical Description of Data

Origin, history and definitions of Statistics. Importance, Scope and limitations Statistics. Function of Statistics – Collection, Presentation, Analysis and Interpretation. Collection of data - primary and secondary data and its methods. Classification of data – Quantitative, Qualitative, Temporal, Spatial. Presentation of data – Textual, Tabular – essential parts.

Unit – 2: Diagrammatic and graphical representation

Frequency distribution and types of frequency distributions, forming a frequency distribution. Diagrammatic representation of data – Historiagram, Bar, Multiple bar and Pie with simple problems. Graphical representation of data: Histogram, frequencypolygon and Ogives with simple problems.

Unit – 3: Measures of Central Tendency (MCT)

Arithmetic Mean – properties, methods. Median, Mode, Geometric Mean (GM), Harmonic Mean (HM). Calculation of mean, median, mode, GM and HM for grouped and ungrouped data. Median and Mode through graph. Empirical relation between mean, media and mode. Features of good average.

Unit – 4: Measures of Dispersion

Concept and problems – Range, Quartile Deviation, Mean Deviation and Standard Deviation, Variance. Central and Non – Central moments and their interrelationship. Sheppard's correction for moments. Skewness and its methods, kurtosis.

Unit – 5: Elementary Probability

Basic Concepts of Probability, random experiments, trial, outcome, sample space, event, mutually exclusive and exhaustive events, equally likely and favourable outcomes. Mathematical, Statistical, axiomatic definitions of probability. Conditional Probability and independence of events, Addition and multiplication theorems of probability for 2 and for n events and simple problems. Boole's inequality, Bayes theorem and its applications in real life problems.

SEMESTER-II

COURSE 3: DESCRIPTIVE STATISTICS

Practical Credits: 1 2 hrs/week

Syllabus

1. Writing a Questionnaire in different situations.
2. Forming a grouped and ungrouped frequency distribution table.
3. Diagrammatic presentation of data – Bar, multiple Bar and Pie.
4. Graphical presentation of data – Histogram, frequency polygon, Ogives.
5. Computation of measures of central tendency – Mean, Median and Mode.
6. Computation of measures of dispersion – Q.D., M.D and S.D.
7. Computation of non-central, central moments, β_1 and β_2 for ungrouped data.
8. Computation of non-central, central moments, β_1 and β_2 and Sheppard's corrections for grouped data.
9. Computation of Karl Pearson's and Bowley's Coefficients of Skewness.

Note: Training shall be on establishing formulae in Excel cells and derive the results. The excel output shall be exported to MS word for writing inference.

III. References

1. S. C. Gupta & V. K. Kapoor: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
2. O. P. Gupta: Mathematical Statistics, Kedar nath Ram nath & Co.
3. P. N. Arora & S. Arora: Quantitative Aptitude Statistics – Vol II, S. Chand & Company Ltd.
4. K. Rohatgi & Ehsanes Saleh: An Introduction to Probability and Statistics, John Wiley & Sons.

IV. Suggested Co-curricular Activities:

1. Training of students by related industrial experts
2. Assignments including technical assignments if any.
3. Seminars, Group Discussions, Quiz, Debates etc. on related topics.
4. Preparation of audio and videos on tools of diagrammatic and graphical representations.
5. Collection of material/figures/photos/author photoes of related topics.
6. Invited lectures and presentations of stalwarts to those topics.
7. Visits/field trips of firms, research organizations etc.

SEMESTER-II

COURSE 4: RANDOM VARIABLES AND MATHEMATICAL EXPECTATIONS

Theory Credits: 3 3 hrs/week

I. Learning Outcomes

After successful completion of the course students will be able to:

1. To acquaint with the role of statistics in dealing with the univariate random variables.
2. To learn the extension of the univariate data to bivariate data.
3. To learn the measure of randomness mathematically by using expectations.
4. To get the familiarity about the generating functions, law of large numbers and central limit theorem, further to apply in research and allied fiends.

II. Syllabus

Unit – 1: Univariate Random Variables

Definition of random variable (r.v.), discrete and continuous random variables, functions of random variable. Probability mass function, Probability density function, Distribution function and itsproperties. Calculation of moments, coefficient of skewness and kurtosis for a given pmf and pdf.

Unit – 2: Bivariate Random Variables

Bivariate random variable - meaning, joint, marginal and conditional Distributions, independence of random variables and simple problems.

Unit – 3: Mathematical Expectation

Mathematical expectation of function a random variable. Moments and covariance using mathematical expectation with examples. Addition and Multiplication theorems on expectation. Properties of expectations, variance, covariance. Chebyshev and Cauchy - Schwartz inequalities and their applications

Unit – 4: Generating functions

Definitions of Moment Generating Function, Cumulant Generating Function, Characteristic Function and Probability Generating Function and their properties. Weak Law of Large Numbers (WLLN), Strong Law of Large Numbers (SLLN).

Unit – 5: Limit Theorems

Concept – Population, Sample, Parameter, statistic, Sampling distribution, Standard error. Convergence in probability and convergence in distribution, concept of Central limit theorem. Lindberg – Levy CLT and its applications, Statement of Lyapunov's CLT, relationship between CLT and WLLN.

SEMESTER-II

COURSE 4: RANDOM VARIABLES AND MATHEMATICAL EXPECTATIONS

Theory Credits: 3 3 hrs/week

I. Learning Outcomes

After successful completion of the course students will be able to:

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