GAYATRI VIDYA PARISHAD COLLEGE FOR DEGREE AND P.G. COURSES (A)
DEPARTMENT OF STATISTICS
VISAKHAPATNAM

MINOR

Subject: Statistics

W.E.F. AY 2023-24 COURSE STRUCTURE

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
I	II	1	Descriptive Statistics	3	3
			Descriptive Statistics Practical Course	2	1
II	III	2	Statistical Methods	3	3
			Statistical Methods Practical Course	2	1
	IV	3	Design and Analysis of Experiments	3	3
			Design and Analysis of Experiments Practical Course	2	1
		4	Numerical Analysis	3	3
			Numerical Analysis Practical Course	2	1
III	V	5	Applied Statistics	3	3
			Applied Statistics Practical Course	2	1
		6	Computational Statistics and R Programming	3	3
			Computational Statistics and R Programming Practical Course	2	1

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SEMESTER -II
COURSE-1: FOR 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 myself 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 applicable to their own data.

3. To deal with the situation where there is uncertainty and to measure that uncertainty by using probability, which is essential in all research areas.

4. To get knowledge related to the concepts of discrete and continuous random variables and their probability distributions including expectations.

5. To get knowledge of important discrete and continuous distributions.

II. Syllabus

Unit – 1: Statistical Description of Data (CO1)

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: Measurement of Scales- Diagramatic representation of data (CO2)

Measurement Scales – Nominal, Ordinal, Ratio and Interval. 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, frequency polygon and Ogives with simple problems.

Unit – 3: Elementary Probability (CO3)

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.

Unit – 4: Random Variable and Mathematical Expectations (CO4)

Definition of random variable, discrete and continuous random variables (r.v), functions of random variables. Probability Mass function, Probability Density Function, Distribution Function and Its properties. Mathematical expectation of random variables and functions of r.v. Moments and covariances using mathematical expectation with examples. Addition and multiplication theorem on Mathematical expectation. Definitions of MGF, CGF, PGF, CF and their properties. Moments - Central and non-central moments, their inter relationships. Shappard's corrections for grouping.

Unit – 5: Discrete and Continuous Probability Distributions (CO5)

Discrete Distributions - Binomial, Poisson, Negative binomial, Geometric distributions, means variances only MGF, CGF, PGF, CF, additive property if exists. Continuous distributions - Rectangular, Exponential, Gamma, Beta distributions, mean and variance only MGF, CGF,PGF,CF. Normal Distribution - Definition, importance, properties MGF, CF and additive property.

COURSE-1: FOR DESCRIPTIVE STATISTICS

SEMESTER - I

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. Fitting of Binomial Distribution.
6. Fitting of Poisson distribution.
7. Fitting of Negative Binomial Distribution.
8. Fitting of Normal Distribution by area's method.
9. Fitting of Normal Distribution by ordinate's method.

Note: Training shall be on establishing formulae in Excel cells and deriving 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 photos of related topics.
6. Invited lectures and presentations of stalwarts to those topics.
7. Visits/field trips of firms, research organisations etc.

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