AGRICULTURAL STATISTICS

Course Code : AST 201
Course Title : Agricultural Statistics
Credit Hours : 3 (2+1) **Full Marks: 75** **Theory : 50** **Practical: 25**

OBJECTIVES

Upon the completion of this course, the students will be able to organize and analyze the data and interpret the results. They can design and experiment, analyze it and prepare a report.

I. SYLLABUS

An overview of statistics; sampling methods; measures of central tendency; frequency distribution; presentation and summarization of data; measures of dispersion; probability and probability distributions; correlation and regression; test of significance–Z–test, t-test, and x^2 –test ; analysis of variance–one–way and two–way and factorial experiments.

II. COURSE OUTLINE

A. Lecture

S.N.	Topics	No of Lectures
1.	Introduction to statistics, Definitions, scope and limitations.	1
2.	Definition of a population, sample; characteristics of a good sample, sampling methods-simple random sampling– sample selection from an agricultural field by simple random sampling, Probability proportional to size, stratified random sampling, systematic sampling, cluster sampling, multistage sampling, sampling error.	2
3.	Measures of central tendency, Definition of Arithmetic mean, Median Mode with merits, demerits and uses, properties of an ideal measure of central tendency, partition values- quartiles, Deciles and percentiles.	2
4.	Frequency Distribution–presentation and summarization of data by different classification methods- Exclusive and inclusive, Diagrammatic–Bar and Pie, and graphical methods- Histogram, Frequency polygon, Frequency curve, O gives (cumulative frequency curves).	2
5.	Measures of dispersion, Range, Quartile deviation, Mean Deviation, Standard Deviation and Variance, Coefficient of variation. Moments- Measures of skewness and kurtosis.	2

6.	Probability – Definitions of random experiment, sample space, events –independent and dependent, trial, mutually exclusive events, exhaustive events, equally likely events, simple and compound events, Definitions of probability (classical and statistical), simple problems based on probability. Addition and Multiplication theorems, conditional probabilities.	2
7.	Probability distributions- Binomial distribution, properties and simple problems, Poisson distribution and its properties and problems. Normal distribution with its properties and problems. Sampling distributions of mean and differences	2
8.	Correlation–Definition, types of correlation, scatter diagram, Karl Pearson's coefficient of correlation (linear correlation), properties	2
9.	Regression (linear), Regression equations of y on x and of x on y. Relation between correlation coefficient and regression coefficients.	2
10.	Tests of significance–introduction, definition of hypothesis, null and alternative hypotheses, degrees of freedom, levels of significance and types of error. Significance of means–one sample and two sample means in large samples (Z-test).	2
11.	Significance of means in small samples (t-test)- one sample, two samples and two related samples mean test (paired t-test), test for correlation coefficient, F test, $\div^2$ (chi-square) test–test of independence and goodness of fit.	2
12.	Principles of Field– plot experiments-Replication, Randomization, Local control, one way analysis of variance (completely Randomized Design), Two way analysis of variance (Randomized Block Design), Three way analysis of variance (Latin square Design), and Factorial experiment 2^2 and 2^3.	9
Total		**30**

B. Practical

S.N.	Topic	No. of Practicals
1.	Measures of central tendency for ungrouped and grouped data (Arithmetic mean, Median, Mode, Quartiles, Deciles, Percentiles).	1
2.	Classification of data by Exclusive and Inclusive methods, Diagrammatic representation of data by Bar and Pie chart.	1
3.	Cumulative frequency table from raw data and its graphical representation(Histogram, Frequency Polygon, Frequency curve ogives).	1
4.	Measures of dispersion of ungrouped and grouped data (Range, Quartile Deviation, Mean Deviation, standard Deviation/ariance, Coefficient of Variation.	1
5.	Measures of skewness and kurtosis.	1
6.	Simple problems on probability and probability distributions (using the definition of probability, Addition and Multiplication theorems, conditional probability, Binomial, Poisson and Normal distribution).	2
7.	Computation of correlation coefficient and regression equations of Y on X and x on y.	1
8.	Tests of significance of means in large samples (z-test: one sample and two sample means test).	1
9.	Tests of significance of means in small samples [t-test: one sample, two samples and two related samples mean test (paired 't')].	1
10.	F-test: testing of equality of two population variances	1
11.	$\div^2$ – test: test of independence and test of goodness of fit	1
12.	Analysis of variance – CRD, RCBD, and Latin Square	2
13.	Factorial experiment: 2^2 and 2^3 factorial experiment	1
	Total	**15**

REFERENCES

Agrawal, B.L. 1996. Basic Statistics (3rd Edition), New Age Internatiional Pvt. Ltd. New Delhi.

Chandel, S. R.S. 1984. A hand Book of Agricultural Statistics, Achal Prakashan Mandir, Kanpur, India.

Gupta, S. C. and V. K. Kapoor. 1988. Fundamentals of Applied Statistics, Chand and Com. New Delhi.

Singh, S. and R.P.S. Verma. 1982. Agricultural Statistics, Rama Publishers Meerut.

Tripathi, P.N. 1991. A Manual on Introductory Agricultural Statistics, Tribhuvan University, IAAS, Chitwan Nepal.