Biostatistics

Course No.	Title of Course	Credit Hours
MATH-123	Biostatistics	3(2-1)

Learning Outcomes:

To demonstrate ability in mathematical and statistical theory---including basic probability, inference, and modeling principles---necessary to understand statistical methods typically applied in data analysis.

Course Contents:

- Definition and importance of Statistics in Agriculture,
- Data Different types of data and variables
- Classification and Tabulation of data, Frequency distribution, stem-and-Leaf diagram,
- Graphical representation of data Histogram, frequency polygon, frequency curve.
- Measure of Central tendency,
- Definition and calculation of Arithmetic mean, Geometric mean, Median quantiles and Mode in grouped and un-grouped data.
- Measure of Dispersion,
- Definition and Calculation of Range, quartile deviation, Mean deviation, Standard deviation and variance, coefficient of variation.
- Basics of Software SPSS

Lecture-wise plan

1. Introduction to Statistics: Statistical data condensation of data, presentation of data by graphs, health related data, rates and their relative importance, presentation of quantitative data.
2. Central Tendency and dispersion: Concepts of central tendency, mean, median and ode and their value in health, percentiles, measure of dispersion, coefficient of variation and skewness, normal distribution, range, standard deviation and relative deviation.
3. Hypothesis: Concepts of hypothesis testing, null & alternative hypothesis, two types of errors, acceptance & rejection regions, tow sided & one sided

tests, general steps in hypothesis testing, test about means, confidence interval for mean, meaning of significance in statistical procedures and methods of inferential statistics.

4. Regression & Correlation: Scatter diagram, straight line regression model, method of least squares, sample correlation coefficient, inference about regression coefficient and correlation coefficient.

5. Introduction to Research: The question of legitimate knowledge, knowledge & decision making, the scientific method, quantitative vs qualitative research, application of scientific method, positivistic vs naturalistic paradigm.

6. Selection & Formulation of a Problem: From generic to a specific program, program statement, getting an access to primary and secondary resources, note taking and information to management, Review of related literature, questions and/or hypothesis of the study.

7. Development of a Research Plan: The ethical, legal and professional obligations, the rational of the study, the research plan, evaluation of a research plan.

8. Instrumentation and Data Collection: Tests and scales, objectivity and standardization, types of tests and scales, validity and reliability of an instrument, assessment of validity and reliability, development of tests/scale.

9. Data Analysis & Interpretation: Preparing data analysis, types of measurement scales, descriptive statistics inferential statistics, using software SPSS for data analysis.

Practical:

a. Frequency Distribution
b. Stem-and-Leaf diagram
c. Various types of Graphs
d. Mean, Geometric mean Harmonic Mean,
e. Median, Quartiles Deviation, mean Deviation.
f. Standard Deviation, Variance, Coefficient of variation,
g. Skewness and kenosis

Recommended Books:

1. Introduction to Statistical Theory Part- I by Sher Muhammad

and Dr. Shahid Kamal (Latest Edition)

2. Statistical Methods and Data Analysis by Dr. Faquir Muhammad
3. A. Concise Course in A. Level Statistic with world examples by J. Crashaw and J. Chambers (1994)

Basic Statistics an Inferential Approach 2nd ed. (1986) Fran II. Dietrich-II

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