

Syllabus

BIostatISTICS & RESEARCH METHODOLOGY

(Course Code: BP801T)

Module 1

(10 Hours)

Introduction

- Statistics, Biostatistics, Frequency distribution.

Measures of Central Tendency

- Mean, Median, Mode- Pharmaceutical examples.

Measures of Dispersion

- Dispersion, Range, standard deviation, Pharmaceutical problems.

Correlation

- Definition, Karl Pearson's coefficient of correlation, Multiple correlation -Pharmaceuticals examples.

Module 2

(10 Hours)

Regression

- Curve fitting by the method of least squares, fitting the lines $y = a + bx$ and $x = a + by$, Multiple regression, standard error of regression- Pharmaceutical Examples.

Probability

- Definition of probability, Binomial distribution, Normal distribution, Poisson's distribution, properties – problems, Sample, Population, large sample, small sample, Null hypothesis, alternative hypothesis, sampling, essence of sampling, types of sampling, Type I Error, Type II Error, Standard error of mean (SEM)- Pharmaceutical examples.

Parametric Test

- t-test (Sample, Pooled or Unpaired and Paired), ANOVA, (One way and Two way), Least Significance difference.

Module 3

(10 Hours)

Non-Parametric Tests

- Wilcoxon Rank Sum Test, Mann-Whitney U test, Kruskal-Wallis test, Friedman Test

Introduction to Research

- Need for research, Need for design of Experiments, Experiential Design Technique, and plagiarism

Graphs

- Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph

Designing the Methodology

- Sample size determination and Power of a study, Report writing and presentation of data, Protocol, Cohorts studies, Observational studies, Experimental studies, Designing clinical trial, various phases.

Module 4

(08 Hours)

- Blocking and confounding system for Two-level factorials.

Regression Modelling

- Hypothesis testing in Simple and Multiple regression models.
- Introduction to Practical components of Industrial and Clinical Trials Problems.
- Statistical Analysis Using Excel, SPSS, MINITAB®, DESIGN OF EXPERIMENTS, R - Online Statistical Software's to Industrial and Clinical trial approach.

Module 5

(07 Hours)

Design and Analysis of Experiments

Factorial Design

- Definition, 2², 2³ design. Advantage of factorial design.

Response Surface Methodology

- Central composite design, Historical design, Optimization Techniques.