**BT901 Research Methodology for Biotechnology 4-0-0-4**

**Unit-1 *Research Design- Concepts and Methods***

Literature Review: Use of databases, Framing query with examples, Bibliometrics- Citation, Impact factor, H-index, Eigen factor

Research Frameworks: Hypothesis driven, Discovery driven

Experimental Design: Importance of including the right controls

Data Analysis and the correct representation of the data

Scientific Communication:

Written:     Concept notes/SOPs etc.     Manuscripts     Grant writing

Oral:  Presentation skills

**Unit-II *Descriptive Statistics:*** how to enter data into statistical software, sample mean, measures of variability, correlation, scatter-plot and box-plot, 2x2 tables, relative risk, odds ratio, calculating descriptive statistics with statistical software.

**Unit-III *Inferential Statistics:*** review of probability theory, introduction to estimation, introduction to hypothesis testing, p-values, confidence intervals, comparing groups of continuous data, comparing groups of categorical data, multiple-comparison procedures, estimation and hypothesis testing with statistical software.

**Unit-IV *Statistical Models****:* introduction to analysis of variance, simple linear regression, multiple linear regression, logistic regression, introduction to survival analysis, cox regression, fitting statistical models with statistical software.

**Unit-V *Design of Experiments:*** parallel group designs, crossover designs, dose-finding designs, sample size calculations with statistical software.

**TEXT BOOKS/ REFERENCES:**1) Myra Samuels, Jeffrey Witmer, Andrew Schaffner (2012), Statistics for the Life Sciences

2) Robert Sokal and James Rohlf (2016), Introduction to Biostatistics

3) Douglas Altman (1991), Practical Statistics for Medical Research

4) ISBN/Journal # 978-1-621821-12-0; Using R at the Bench: Step-by-Step Data Analytics for Biologists

5) ISBN/Journal # 978-1-621820-41-3; Experimental Design for Biologists, Second Edition 6) ISBN/Journal # [978-1-936113-71-2](https://www.cshlpress.com/default.tpl?cart=154875875460659553&action=full&--eqSKUdatarq=973); Lab Math: A Handbook of Measurements, Calculations, and Other Quantitative Skills for Use at the Bench, 2nd edition