Programme	BS Biochemistry	Course Code	BCBT. 301	Credit Hours	3
Course Title	**Biostatistics**				

Course Introduction

This course provides an introduction to the field of Biostatistics, designed for undergraduate students majoring in Biochemistry and Biotechnology. The curriculum covers statistical methods and their applications in biological research. Students will learn about descriptive statistics, probability distributions, hypothesis testing, regression analysis, and ANOVA. The course will also introduce statistical software and its application in analyzing biological data.

Learning Outcomes

On the completion of the course, the students will:

- Understand basic statistical concepts and methods used in biological research.
- Apply statistical techniques to analyze and interpret biological data.
- Use software tools (RPrograming) to perform statistical analyses for experimental results.

Course Content

- Introduction to Biostatistics, Overview of Biostatistics, Importance and Applications
- What is Data? Types of Data, Difference between Categorical and Numerical Data, Discretization of Data
- How to Get Data? Experimental Design and Observational Studies
- Confounding Variables, Outliers in Data
- Sampling Strategies: Random Sampling, Stratified Sampling, Cluster Sampling and Multistage Sampling
- Descriptive Statistics: Fundamentals of Descriptive Statistics
- Concept of Central Tendencies**,** Mode and its properties, IQR
- Fundamentals of Correlation**,** Pearson Correlation, Kendal's Correlation**,** Spearman Correlation
- Regression: Fundamentals of Regression, Simple Linear Regression, Multiple Linear Regression, Logistic Regression
- Probability: Fundamentals of Probability, Classical Probability, Empirical Probability, Subjective Probability, Conditional Probability
- Hypothesis Testing, Null and Alternative Hypothesis, Use of Pvalue, Distribution Curve for Hypothesis Testing, T-test, Z-test, F-test, Chi-Square Test
- One Way ANOVA, Two Way ANOVA
- Use of R in Statistical Calculations, Installation of R and Rstudio, Fundamental Use of R and R studio
- Future Directions in Biostatistics, Emerging Techniques Overview, Innovations in Biostatistics, Integration with Other Disciplines

Textbooks and Reading Material

Textbooks.

- Sullivan, L. M. (2022). *Essentials of biostatistics for public health*. Jones & Bartlett Learning.

- Baronov, D. (2022). *Biostatistics: An Introduction and Conceptual Critique*. Routledge.
- Lepš, J., & Šmilauer, P. (2020). *Biostatistics with R: an introductory guide for field biologists*. Cambridge University Press.

Teaching Learning Strategies

- Class lecture
- Class Discussions
- Class Tutorials

Assignments: Types and Number with Calendar

- st Quiz in 4th Week of 5 marks
- 2nd Quiz in 0th Week of 5 marks
- 3rd Quiz in 4th Week of 5 marks
- st Assignment in 8th Week of 0 marks

Assessment

Sr. No.	Elements	Weightage	Details
1	Midterm Assessment	35%	Written Assessment at the midpoint of the semester.
2	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, handsonactivities, short tests, projects, practical, reflections, readings, quizzes etc.
3	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.