GUJARAT TECHNOLOGICAL UNIVERSITY
Bachelor of Engineering
Subject Code: 3150409
BIOSTATISTICS
B.E. 5th SEMESTER

Type of course: B.E. (Biotechnology)

Prerequisite: practiced in simple calculations and primary knowledge of biotechnology.

Rationale:

The objective of this course is to teach the students basics of biostatistics and its applications in various fields like biology, agriculture and genetics.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	1	0	3	70	30	0	0	100

Course Contents:

Sr. No.	Topics	Teaching Hours	Module Weightage
1.	**UNIT I: Introduction to Biostatistics** Introduction, Statistical terms, aims and applications of statistics, limitations of statistics	1	3%
2.	**UNIT II: Collection, Classification and Presentation of Data** Data: Numerical Representation, types of sampling, Non probability sampling, Organization and classification of data, Methods of classification of data, Frequency Distribution Tabular and Graphic presentation, types of graphs, significance and limitations of graphs, illustrative examples.	2	6.25%
3.	**UNIT III: Central Tendency** Characteristics, Measures of central tendency: mean, median, mode, Standard score or Z – score, Percentiles, Quartiles, Quintiles, Deciles	5	15.62%
4.	**UNIT IV: Variability** Definition, importance, measures of dispersion : range, selected percentiles, quartiles, variance, standard deviation, mean deviation and coefficient of variation, standard error and degree of freedom	4	12.5%
5.	**UNIT V: Skewness and Kurtosis** Skewness – features, measures, significance Kurtosis – features, measures, significance	1	3%
6.	**UNIT VI: Correlation and Regression** Introduction and significance of correlation, significance, and regression with methods of calculations including coefficients.	5	15.62%

7.	**UNIT VII: Basic concepts in probability** Normal Distribution, Pascal's Triangle, Poisson Distribution, Set Theory, Probability, Baye's Theory	2	6.25%
8.	**UNIT VIII: Test of Significance and Analysis of Variance** Introduction, Test of Significance, Types of Hypothesis, Two tailed and one tailed test, Assumptions. Tests of ANOVA- Computations, comparisions.	6	18.75%
9.	**UNIT IX: Student's t-Test, Z-Test, F- Test. Chi Square Test** Introduction, Assumptions and types of t-Tests, Formula for determination of chi square, Chi square distribution, Characteristics and working rule for chi square test, characteristics of z-test and its applications, F-test, assumptions and working procedure	4	12.5%
10.	**UNIT X: Non Parametric Tests** Overview of non-parametric tests and its comparison with parametric tests.	2	6.25%

Suggested Specification table with marks (Theory):

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
3	7	16	16	21	7

Legends: R= Remembrance**; U**= Understanding**; A**= Application**; N** = Analyze**;**
E = Evaluate; **C** = Create and above Levels (**Revised Bloom's Taxonomy**)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Fundamentals of Biostatistics by Veer Bala Rastogi, Publisher: Ane Books Pvt. Ltd.

2. Introduction to Biostatistics by Dr. Pranab Kumar Banerjee, Publisher: S. Chand & Company Pvt. Ltd.

3. Fundamentals of Biostatistics by Khan and Khanum, Publisher : Ukaaz Publications

Course Outcome:

After learning the course, the students should be able to:

1. Recognize the role of statistics in modern research through simple calculations in knowing the type of data to facilitate further analysis

2. Apply the knowledge in choosing methods of data collection and measurement of relevant parameters.

3. Analyze the data to find fit of mathematical equation/methods relevant to it

4. Use various statistical tests to filter significant parameter affecting a process.

List of Open Source Software/learning website:

Students can refer to video lectures available on the websites including NPTEL. Students can refer to the CDs which are available with some reference books.