SARDAR PATEL UNIVERSITY
Programme: MSC (Integrated Biotechnology)
Semester: II
Syllabus with effect from: December 2010

Paper Code: PS02CIGB06	**Total Credits: 3**
Title Of Paper: Biostatistics	

Unit	Description in detail	Weightage (%)
1	**Representation of Data** Definition and scope of biostatistics, Measures of central tendency (definition), characteristics of ideal measure of central tendency, Mean, mode and median for both ungrouped and grouped data (for discrete and continuous frequency distribution), Empirical relationship among mean, mode and median, Merits, demerits and uses of mean, mode and median, Graphic location of median and mode, Selection of appropriate measure of central tendency, Measures of dispersion- definition, Need of measures of dispersion, Mean deviation and standard deviation.	
2	**Probability and Standard Probability distributions** Random experiment, Definition of probability, Elementary properties of probability, mutually exclusive events, Dependant and independent events, Addition rule and multiplication rule for probability (without proof), Conditional probability, Bayes's theorem, Random variable, Discrete and continuous random variables, Probability distributions, Bernoulli trials, Binomial and Poisson distributions and their properties, Mean and variance of these distributions, Recurrence relations for probabilities related to binomial distribution and Poisson distributions, Normal distribution and its properties, standard normal variable, Fitting of binomial, Poisson and normal distributions.	
3	**Testing of Hypothesis** Need of testing of hypothesis, null and alternative hypothesis, level of significance, Type-I and Type-II errors, t-test for testing the significance of a single mean, t- test for testing the significance of difference between two means, Paired t-test, t-test for testing significance of observed correlation coefficient, Chi-square test for goodness of fit, Chi-square test for testing independence of attributes, Chi-square test for homogeneity.	
4	**Analysis of Variance Techniques, Correlation and regression** Introduction, Logic and assumptions of Analysis of variance, The ANOVA notation and formulas, The distribution of F- ratios, Variance ratio test, Analysis of variance for one way and two way classification, Examples of hypothesis testing with ANOVA, Correlation - definition and introduction, Types of correlation, Coefficient of correlation and its properties, Methods of studying linear correlation, Scatter diagram method, Karl Pearson's product moment method, Regression – definition and introduction, linear regression, regression coefficients and their properties, Lines of regression, Methods of finding regression lines, difference between regression and correlation, Introduction to probability	
	Practical:	
	• To convert ungrouped data in to grouped data using Sturge's formula. • To study representation of data by one dimensional diagram. • To study representation of data by two dimensional diagram.	

	• To study representation of data by means of graphs.(Histogram & frequency polygon). • To study the data representation by graphs (Frequency polygon & frequency curve). • To study how to calculate descriptive statistics for the given data. (Mean mode, median, standard deviation and mean deviation). • To study the concept of permutation and combination in practical counting problems. • To study the concept of normal distribution and apply it to practical problems. • To study the concept of estimation (point estimation and interval estimation). • To apply the concept of skewness in the field of biosciences. • To apply the concept of F- test for biological problems. • To apply the concept of χ^2 – test for biological problems.	

Basic Text & Reference Books:

- Methods in Biostatistics by B.K. Mahajan.
- Statistics (theory, methods, & application) by D. C. Sancheti and V.K.Kapoor
- An Introduction to Biostatistics (Third Ed.) by P.S.S. Sundar Rao and J. Richard.
- Cytology-genetics biotechnology and biostatistics by P.K.Gupta
- Biostatistics by P. N. Arora and P.K.Malhan.
- Fundamentals of Biostatistics by Khan and Khanum
- Statistical methods in biology by Bailey.
- Biostatistics: A foundation for analysis in the health sciences by Daniel.