

**CORE COURSE VII - BIOSTATISTICS AND COMPUTER APPLICATIONS IN  
BIOLOGY**

**A. BIOSTATISTICS**

**Unit-I**

Definition – development of Biostatistics, data in Biostatistics – samples and population, variables, accuracy and precision, derived variables, frequency distribution, handling of data.

**Unit-II**

Descriptive Statistics: arithmetic mean, other means, median, mode, range, standard deviation, practical methods for computing mean and standard deviation, coefficient of variations, probability distribution – binomial and Poisson distribution, estimation and hypothesis testing – Student's t, confidence limit, analysis of variance, single classification, two way analysis of variance, assumptions, regression, correlation, analysis of frequencies.

**Unit-III**

Multivariate analysis – Definition and derivation of Principal components, statistical properties of Principal components, Principal components using correlation matrix, Principal components with equal and/or zero variance.

**B. COMPUTER APPLICATIONS**

**Unit-IV**

Graphical representation of data using simple statistics, univariate and multivariate analysis, spatial data representation, Statistical packages – BMDP, GENSTAT, MINITAB, SAS, SPSS, STATISTICA, EISPACK.

**Unit-V**

MS Excel, MS Word for data entry, simple statistics with statistical packages, graphics and plotting using advanced packages (SIGMAPLOT), Advanced method of PCA using statistical packages.

**Statistical Packages**

MINITAB, : 215 Pond Laboratory  
University Park,  
Pennsylvania – 16802, USA.

SPSS : SPSS INC,  
444 n. Michigan Avenue,  
Chicago, Illinois 60611, USA

SAS : SAS Software Ltd,  
68, High Street,  
Waybridge, Surrey,  
KT138BL, UK.

GENSTAT : The GENSTAT Co-ordinator,  
Numerical Algorithms Group  
2, Banbury,  
Oxford, OX27DE, UK

BMDP : BMDP Statistical Software Inc.  
1964, Westwood Boulevard Suite 202  
Los Angeles, CA, 90025, USA

### **References**

1. BAILEY, N.T.J. (1997), Statistical Methods in Biology, III Ed., Cam. University Press, N.Y.
2. SOKAL, R. and JAMES, F. (1973), Introduction to Biostatistics, W.H. Freeman and Company Ltd., Tokyo, Japan.