MMB105: COMPUTER APPLICATION AND BIOSTATISTICS	
Teaching Scheme Lectures: 4 hrs/Week Credits: 4	**Examination Scheme** Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Prerequisite: - MST101, MST151 Biochemistry, MST103, MST153 Molecular Biology, MST202, MST252 Microbiology & Industrial Applications, MST203, MST253 Genetic Engineering.

Course Objectives:

The objective of this course is to give conceptual exposure of essential contents of mathematics and statistics to students.

Detailed syllabus

Unit-I

Definition of selected terms Scale of measurements Related to statistic, Methods of collecting data, Presentation of data, statistical Tables, Calculation of basic statistical parameters (mean, median, mode, standard deviation, standard error etc.). Correlation concept and applications; Regression concept and application;

Concepts of statistical population and sample need for sampling studies; Simple procedures of random sampling; Methods of sampling, Estimation of sample size for clinical experiments Basic concepts of Probability , Basic theorems of probability addition and multiplication theorems; Conditional probability of Bayes Theorems; Probability distribution definition & applications;

Unit –II

Critical region and level of significance, Test of a simple hypothesis against simple alternative, composite hypothesis, Neymen Pearson test of hypothesis, UMP test, UMP unbiased test, Likelihood ratio test, Test on the mean of normal population, Difference between the mean of two normal populations, Test on the variance of normal populations, $\chi 2$ test, $\chi 2$ goodness of fit test and test of independence of contingency tables. Test of proportion, Test of correlation and regression coefficient, , Test based on t and f, Multiple comparisons.

Unit-III

Non-parametric tests-Wilcoxon Mann Whitney, Kolmogorov Smirnov tests (two sample tests)Planning of experiments, Basic principles of experimental design, uniformity trails, analysis of variance, one-way, two-way and three-way classification models, completely randomized design (CRD), randomized block design (RBD) latin square design (LSD) and Graeco-latin square designs, Analysis of covariance (ANCOVA), ANCOVA with one concomitant variable in CRD and RBD.

Unit-IV

Introduction to MS Excel, creating a data file, data manipulations, simple statistical analysis using Excel, making graphs and charts.MS PowerPoint, different types of statistical software for analysis (introduction) MINITAB, MATLAB, R, SAS.

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Unit-V Introduction of Statistical package (SPSS), Data view and variable view, importing a file, Data transformations (compute, recode, count, If,). Sort cases, merging and appending data, Frequencies, descriptive statistics, cross tabulations. Statistical analysis: independent samples't' test, paired 't' test, ANOVA, chi square, Fisher's exact test, McNemar chi-square test, correlation and regression, Multiple Linear Regression, Principal Component Analysis (PCA). Non-parametric methods: Mann Whitney U test, Wilcoxon Signed rank test, Spearman's correlation.
TEXT / REFERENCE BOOKS: *1.Principles of Biostatistics- M. Pagano, Cengage Learning Publishers, 2ndEdition, 2008.* *2. Kempthorne, O(1966): The Design and Analysis of Experiments, John Wiley and Sons.* *3.Introduction to Biostatistics. Glover T. and Mitchell K. (2002). McGraw Hill, New York.* *4.Fundamentals of Biostatistics. Rosner Bernard (1999), Duxbury Press.* *5.R Cookbook. Paul Teetor (2011), United States of America.*

Course Outcomes:

After completing the course, students will be able to:

1. Gain broad understanding in mathematics and statistics.
2. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.
3. Have thorough knowledge of statistical techniques and application of computer in biotechnology

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