MANGALORE UNIVERSITY

DEPARTMENT OF BIOSCIENCES

M.Sc. ENVIRONMENTAL SCIENCE

ESS404 ENVIRONMENTAL STATISTICS

COURSE OUTCOMES

CO1 Learn applications of matrices in environmental impact assessment and management.
CO2 Gain the knowledge of fundamental aspects of environmental statistics
CO3 Learn the statistical packages available for environmental data analysis.
CO4 Learn sampling techniques in environmental science.

UNIT I (13 hours)

Types of sampling. Descriptive vs. Inferential Statistics. Measures of location - mean, median, mode. Measures of dispersion - variance, standard deviation, range and interpercentile ranges. Dispersion Percentages, skewness, concepts of outliers. Bi-variate data and scatter diagram. Simple (linear) correlation and regression. Coefficient of correlation and regression and their properties. Fitting of regression line. Multiple and partial correlations and regressions. Graphs and Displays-Introduction, z-Scores and Percentile Ranks, Stem and Leaf Displays.

UNIT II (13 hours)

Matrices and Determinants: Types of matrices, addition and subtraction of matrices. Multiplication of a matrix by a scalar. Products of matrices. Evaluation of 2 × 2 determinants. Inverse of 2 × 2 matrices. Combinations of transformations. Eigan value. Applications of matrices in Environmental Impact assessment.

UNIT III (13 hours)

Probability: Definition, random variables, expected value. Probability Distributions - Normal, Binomial and Poisson Distributions. Statistical hypothesis testing-basic approach, alternative hypotheses. One sample tests - Z-test on a mean with known variance, T-test on a mean with unknown variance, Z-test for non-zero correlation. Two sample tests- T-test on unpaired means with unknown variance. T-test on paired means with unknown variance. F-test for equal variances, Z-test for unpaired equal correlations, Chi Square test, ANOVA.

References:

1. Gupta, S.C. and Kapoor, V.K. Fundamentals of Mathematical Statistics, S.Chand & Co., (2012).
2. Aslam Mahmood. Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi.
3. Medhi, J.Statistical Methods: An Introductory Text, New Age International Ltd. Publishers.
4. Singh, Practical Statistics (Vol. 1&2) Atlantic Publishers.
5. Ott, W. R., Environmental Statistics and data analysis, Lewis Publishers, New Jersey.
6. Snedecor,G. W. and Cochran, W.G. Statistical Methods.
7. Piegorsh,W.W.and BailerA. J. Statistics for environmental Biology and Toxicology