MANGALORE UNIVERSITY

DEPARTMENT OF BIOSCIENCES

M.Sc. ENVIRONMENTAL SCIENCE

ESS454 ANALYTICAL AND STATISTICAL METHODS

Course Outcomes:

CO1 Learn the methodology of data collection and classification.
CO2 Gain the knowledge of fundamental aspects of environmental statistics.
CO3 Learn the instruments used for analysis.
CO4 Learn sampling techniques in environmental science.

UNIT I (13 hours)

Inorganic analytical methods: Coulometric titration – titration curves with EDTA, indicators, masking and damasking techniques. Principle, description and applications of chromatography, calorimetry, spectrophotometry, nephlometry/turbidometry, flame spectrometry, microscopy, Flourometry, X-ray fluorescence, radiometry, micrometry, AAS, GC/MS and NMR.

UNIT II (13 hours)

Introduction to basic statistics: Types of data - primary and secondary, collection of data, classification and tabulation of data. Diagrammatic and graphical representation of data – bar, pie, pictograms, histograms, frequency polygon, frequency curve and cumulative frequency curves. Measures of central tendency - mean, median, mode; measures of dispersion – range, standard deviation, quartile deviation, mean deviation, relative measures of dispersion skewness and kurtosis, standard error, variance.

UNIT III (13 hours)

Distributions: Principles, properties and applications of binomial, poison and normal distributions. Theory of sampling, sampling distributions –'t', Chi- square, F distributions. Test of significance – 't' Test, Chi-square test, F-test. ANOVA- One way and two way classification. Application of statistics in environment studies.

References

1. McGarigal, K., 2002. Multivariate statistics for Wildlife and Ecology Research, Springer Verlag New York.
2. Magurran, A.E., 1988, Ecological diversity and its measurement. Chapman & Hall, London.
3. Sokal, R.R. and Rohif, F.J., 1995. Biometry, 3rd Ed., W.H. Freeman, New York.
4. Wilkinson, L., 1989. SYSTAT: the system for statistics. SYSTAT Inc. Evanston, lllionois.
5. Zar, J.H., 1974. Biostatistical analysis. Prentice – Hall, Inc., Englewood Cliffs., NJ.
6. Christian, G.D., 1996. Analytical Chemistry, 4th Ed., John Wiley.
7. Day and Underwood, 1988. Quantitative analysis. Prentice Hall, India.
8. Srivasthava, A.K. and Jain, P.C., 1997. Chemical Analysis. S. Chand and Co. New Delhi.

9. Sawichi Mulik, Wittgen and Stoin, 1978. Ion Chromatographic analysis of Environmental Pollutants.
10. Williams and Wilson, 1984. A Biologist's Guide to Principles and Techniques of Practical Biochemistry.
11. Sndecor, G.W. and Cochran, W.G. Statisical Methods, Lowa state University Press.
12. Dixon, W.J. Massey Jr., F.J., McGraw Hill., Introduction to Statistical Analysis.
13. Fisher, R.A. Statistical Methods for Research Works, Oliver and Boyd, London.
14. Green, R.H., 1979. Sampling Design and Statistical Methods for Environmental Biologists, John Wiley & Sons.
15. Wardlow, A.C. 1985. Practical Statistics for Experimental Biologists. John Wiley and Sons.