Semester:	6		
Course Code:	ENCM 42732		
Course Name:	Statistics for Environmental Studies		
Credit Value:	2		
Status	Compulsory for BSc Honours in ENCM degree		
Pre-requisites	ENCM 22802		
Co-requisites	None		
Hourly Breakdown	Theory	Practical	Independent Learning
	20	30	50

Intended Learning Outcomes:

After completion of this course unit, the student will be able to;

1. define relevant statistical terms,
2. calculate descriptive statistics of biological data,
3. explain properties of selected probability distributions,
4. state assumptions and decision rules of relevant statistical tests,
5. apply appropriate statistical methods for the analysis of biological data, and
6. analyze biological data using Minitab and Primer software packages to test hypotheses, and
7. interpret results and make conclusions.

Course Content:

Introduction to statistics and types of environmental data. Definitions: variable, population, sample, sampling unit, observation. Scales of measurement. Sampling theory. Descriptive statistics, confidence limits and population parameters. Estimation of frequencies, frequency histograms and bar graphs. Probability and cumulative density functions. Probability distributions: binomial, hypergeometric, Poisson and Chi-square; F-distribution, normal distribution, t-distribution. Testing the normality of data, data transformation methods. Statistical decision theory. Parametric and non-parametric tests: chi-square tests, z-test, Student's t-test, paired t-test, Mann-Whitney Utest, Wilcoxon signed-rank test, Pearson's Product moment correlation analysis, Spearman's rank correlation, Simple linear regression, One-way and Two-way Analysis of Variance. Comparison of means: Tukey's test, Scheffe's method, Dunnett's test. Kruskal-Wallis test. Probit analysis. Introduction to multivariate statistics: Similarity matrix, Cluster analysis, Multi-dimensional Scaling and Principal Component Analysis. Laboratory sessions on the testing of hypotheses of the above-mentioned statistical tests for the given data sets using Minitab and Primer software packages, interpretation of results and making conclusions

Teaching /Learning Methods:
A combination of lectures, Practical sessions, computer based learning, self-studies, practical based assignments and small group discussions, laboratory reports.

Assessment Strategy: Continuous assessment and end of semester examination. Percentage given for each sub-component indicates the percent contribution to the final marks.			
Continuous Assessment 20 %	Final Assessment 80 %		
Details: Assignments 10 Practical reports 10	Theory 60	Practical 20	Other

Recommended Readings:

1. Fowler, J. & L. Cohen (1994). Practical Statistics for Field Biology, 2nd edition, Open University Press.
2. Weaver, K. F., V. Morales, S. L. Dunn, K. Godde & P. F. Weaver (2017). An Introduction to Statistical Analysis in Research: with applications in the biological and life Sciences. John Wiley & Sons.
3. Sokal, R. R. & F. Rohlf (1995). Biometry. W.H. Freeman and company.
4. Zar, J. H. (2010). Biostatistical analysis. 5th Edition. Pearson