SCHOOL OF PURE AND APPLIED SCIENCESCOURSE OUTLINE

DEPARTMENT: PURE AND APPLIED SCIENCES

PROGRAMME: BSC. APPLIED STATISTICS **YEAR**: 2 **SEMESTER**: II

UNIT CODE: SPS 2247 **UNIT TITTLE:** STATISTICAL PROGRAMMING I

LECTURER HOURS: 45

Pre-requisites Probability and Statistics I

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1.0 COURSE PURPOSE

To equip the learner with use statistical programming software with its inbuilt macros/functions including performing simulations.

2.0 LEARNING OUTCOMES

At the end of the course the learner shall be able to:

i) develop user defined functions
ii) differentiate and integrate univariate functions using R
iii) generate discrete and continuous random variables and distributions
iv) compute confidence interval of a given population parameter using simulation.
v) carry out hypothesis testing using R

3.0 COURSE DESCRIPTION

WEEK	TOPIC	REMARKS
1	Grouping, loops and conditional execution.	
2	User defined functions,	
3	Error analysis; Mean squared Error Central Limit Theorem; Binomial, Poisson and Normal.	

4	Calculus; Differentiation, Integration of univariate functions.	
5	**CAT I**	
6	Optimization: determining roots of equations, and local maxima and minima of univariate and multivariate functions.	
7	Pseudo random number generators.	
8	Generation of random variates;	
9	Discrete and continuous distributions.	
10	**CAT II (PRACTICAL CAT)**	
11	Monte Carlo simulation:	
12	Confidence interval and Power of a test.	
13	Hypothesis testing: t-test (one sample and two samples for mean),	
14	Hypothesis testing: F-test (one sample and two samples test for variance).	
15-16	**EXAM**	

4.0 TEACHING METHODOLOGY

The course will be conducted using lectures, practicals and tutorials, case studies, review of projects and Journal articles

5.0 INSTRUCTIONAL MATERIALS

The course will be delivered by Computers/internet, Overhead projector and LCD, whiteboard and whiteboard markers.

6.0 COURSE ASSESMENT

The course shall be assessed as follows;

Written CATs	20%
Assignment	10 %
Final Examination	70 %
Total	100%

7.0 COURSE TEXTBOOKS

i) John, W. B. Duncan, J. M. (2008). *A First Course in Statistical Programming with R,* Cambridge University Press, ISBN: 9780748774739.

ii) Torsten, H. Everitt, B. S. (2010). *A Handbook of Statistical Analysis Using R,* 2nd ed. Chapman and Hall, ISBN: 9781420079333.

iii) Peter, D. (2008). *Introductory Statistics with R,* 2nd ed. Springer, ISBN: 9780387790534.

8.0 REFERENCE TEXTBOOKS

i) Crawley, M. (2005). *Statistics: An Introduction Using R*, John Wiley and Sons, ISBN: 0470022981.

ii) Hogg, R. V. McKean, J. W. Craig, A. T. (2004). *Introduction to Mathematical Statistics,* 6th ed. Prentice Hall, ISBN: 978-0130085078.

iii) Miller, I. Miller, M. (2012). *John E Freund's Mathematical Statistics with Applications,* 8th ed. New Jersey: Pearsons Education, Prentice Hall, ISBN: 9780321807090.

9.0 COURSE JOURNALS

i) Journal of computational and graphical statistics,Taylor & Sons, ISSN: 1061-8600

ii) International Journal of scientific and statistical computing, Springer, ISSN: 2180-1339

iii) Journal of Global optimization,Springer, ISSN: 0925-5001

10.0 REFERENCE JOURNALS

i) Journal of survey statistics and methodology, Oxford University Press, ISSN: 2325-0984

ii) Statistics and Risk Modeling, De Gruyter, ISSN: 2196-7040,

iii) Journal of Statistical software, Journal of Statistical software, ISSN: 1548-7660