SCHOOL OF PURE AND APPLIED SCIENCES
COURSE OUTLINE

DEPARTMENT: PURE AND APPLIED SCIENCES

PROGRAMME: BSC. STATISTICS **YEAR**: 3 **SEMESTER**: I

UNIT CODE: SPS 2347 **UNIT TITTLE:** STATISTICAL PROGRAMMING II

LECTURER HOURS: 45

Pre-requisites STATISTICAL PROGRAMMING I

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a. Purpose

Upon completion, students will be able to design, enter and prepare effectively the data used in thepresentation of required reports and execute a complete data management plan.

b. Objectives

By the end of the course, the student will be able to:

1) Handle arithmetic and logical operations, complex numbers and elementaryfunctions using a computer.
2) Develop statistical Macros/Functions to perform computations on vectors andmatrices including determinant and inverses of a matrix. Kronecker products solutions systems of linear equations, eigenvalues and eigenvectors.
3) Estimate time series parameters using a computer software.
4) Use the computer to determine roots of equations, local maxima and minima for agiven function.
5) Use the computer to make numerical estimates of integrals, differences and derivatives.
6) Use computer programs to solve linear programming problems.
7) Use computer program to develop control limits in quality control.

c. LECTURE SCHEDULE

WEEK	TOPIC	SUBTOPIC
1 , 2	**Basic maths operations and Matrix computation**	• Addition, subtraction, logarithms, exponentials. • Identity • Determinant and inverse of a matrix • Kronecker products
3,4	**Solutions of systemsof linear equations and linear programming**	• Solving systems of linear equations for both a square and a non-square matrix. • Simplex method for both maximization and minimizationproblem. • Bounded and unboundedness, degenerate problems and constrained optimization.
5	C.A.T ONE	CAT ONE AND ITS REVISION
6	**Confidence intervalestimation**	• Estimating the mean of a data set, median and regression coefficients
7	**Multiple linear regression**	• Estimation of model parameters, (regression coefficients), p-values, interpretation of the model
8	**Integration, differentiation anddifferences**	• Finding the integration and differentiation of a function.
9	**Time series analysis**	• Variate differences. • Moving averages, AR,MA
10	**C.A.T TWO**	**CAT TWO AND ITS REVISION**
11	**Principle Component analysis**	• Eigen values and Eigen vectors
12	**Quality Control**	• Charting and statistical process control
13 -14	STUDENTS REVISION AND EXAMS	

d. Teaching Methods

1) Lecture: oral presentation generally incorporating additional activities, e.g. writing onchalk-board, exercises, class questions and discussions, or student presentations.

2) Practical: a laboratory experiment/session as a means of further actively involvingstudents.

3) Tutorial: to give the students more attention.

e. Instructional Material/Equipment

Include course notes, black-and white-board, chalk, white-board marker, duster, computer andprojector.

f. Assessment

1) Written end of semester Examination comprising 70% of the total marks

2) Continuous Assessment Tests within the semester comprising 30% of the totalmarks (Tests 15%, Assignments 10%)

g. Course Text Books

1) Montgomery Applied Statistics and Probability for Engineers 4th edition 978-81-265-2315-3 John Wiley & Sons.
2) Crawley. Statistics: An Introduction Using R. John Wiley & Sons, 2005ISBN 0-470-02297-3

h. Course Journals

1) International Journal of Applied Mathematics and Statistics ISSN: [0973-1377]

3) International Journal of Mathematical and Statistical Sciences ISSN: [1055-7490)
4) Journal of Statistical Computation and Simulation (J. Stat. Computer Simulation)[0094-9655]

5) Communications in Statistics. Simulation and Computations (Commun. StatSimulation Computer.) [0361-0918; 1532-4141]
6) Robert J. Schalkoff. Programming Language and Methodologies. Jones & BarlettPublishers; 2006 ISBN-10: 0763740594 ISBN-13: 978-0763740597.

Further Reference Text Books and Journals

1) Simon Bennett, Steve McRobb, Ray Farmer. *Object-Oriented Systems Analysisand Design Using UML. 3rded Edition*. McGraw-Hill. 2006 ISBN-10: 0077110005/ISBN-13: 978-0077110000

2) Communications in Statistics. Theory and Methods (Commun. Stat., TheoryMethods) [0361-0926; 1532-415X]

3) Computational Statistics (Computer. Stat.) [0943-4062]

4) Computational Statistics Quarterly (Computer. Stat. Q.) [0723-712X]

5) Computational Statistics and Data Analysis (Computer. Stat. Data Anal.) [0167-9473]

6) Journal of Statistics Computation and Simulation. (J Stat Comput Simulat)Published/Hosted by Taylor and Francis Group. ISSN: 0094-9655.

7) Computational Statistics and Data Analysis (Computer. Stat. Data Anal.)Published/Hosted by Elsevier Science. ISSN: 0167-9473.