**CRS 1208 INTRODUCTION TO STATISTICS**

2. COURSE INSTRUCTORS

Dr M Nabasirye (BSc, Mak; MSc; PhD)

Mr T Odong (BSc Agric, Mak; MSc; PhD)

3. COURSE TYPE

4. COURSE DESCRIPTION:

The course introduces the basic statistical concepts and methods and their use in agriculture. It covers descriptive summary and graphical display of data; elementary probability; binomial and normal distribution; estimation and hypothesis testing; simple linear regression and correlation. The course uses examples and applications to which students can easily relate.

5. COURSE OBJECTIVES:

The aim of the course is to introduce the basic statistical concepts and methods commonly used in agriculture. In particular, the students should be able to:

Present data using appropriate descriptive summaries, including tables, diagrams, graphs and descriptive statistics.

Make statistical inferences based on sample data by constructing confidence intervals for population means and differences, and testing hypotheses.

Understand the use of correlation and regression analysis.

6. COURSE OUTLINE:

Week 1 Introduction to statistics: Definitions and notation; Population, sample (2hrs)

Statistical concepts and their application in agriculture

Week 2 Data: Methods of data collection; sampling methods; (2hrs)

Sources of data, types of data and variables

Week 3 Organizing Data: Raw data, data array; (2hrs)

frequency distribution and relative frequency distribution,

cumulative frequency distribution for ungrouped and grouped data

Week 4 Organizing Data: Qualitative data; bar chart, pie-chart (2hrs)

Quantitative data: stem-and-leaf display, histogram, frequency polygon, cumulative frequency polygon

 *Hands-on exercise* on summarizing data and

Week 5 Measures of Central Tendency: (2hrs)

Median, mode, arithmetic mean, geometric mean, harmonic mean of raw data

Uses, advantages and disadvantages

Week 6 Measures of Central Tendency: Mean, median, mode of grouped data (2hrs)

Measures of Dispersion: Range, mean absolute deviation, variance, standard deviation

Week 7 Introduction to Probability: (2hrs)

Classical probability, mutually exclusive events, independent events

Additive and multiplicative laws

Mid-semester test

Week 8 Marginal, joint probability, conditional probability (2hrs)

The Binomial Distribution: probability distribution of a binomial random variable, mean, variance, and standard deviation of a binomial distribution

Week 9 Normal Distribution: (2hrs)

Probability distribution of a normal random variable; The central limit theorem; Use of the standard normal distribution table and the Student’s t-distribution table

Week 10 Sampling distributions:

Mean and standard deviation of the sampling distribution of the means 1

Week 11 Point estimate of the population mean, confidence interval; (2hrs)

Confidence interval for difference in means, independent and paired samples

Week 12 Tests of Hypotheses for a Single Population:

The null and alternative hypotheses relating to a population mean, the critical value test statistic and decision about the null hypothesis

Week 13 Tests of Hypotheses about Two Populations: (2hrs)

Independent samples t-test, paired samples t-test

Week 14 Relationship between two variables: (2hrs)

Scatter plot and its role; Correlation analysis and its application

Week 15 Relationship between two variables: (2hrs)

Regression analysis, its use and misuse

Week 16-17 Final Examination

7. COURSE STRUCTURE & LOCATION

2 Credit units: 15 lecture hours (1 contact hours per week for 15 study weeks) and 30 practical/tutorial hours (1 contact hour per week for 15 study weeks)

Lectures will be conducted from the Lower lecture theatre, Faculty of Agriculture.

8. COURSE ASSESSMENT:

One Assignment 20%

Mid semester test 20%

Final Examination 60%

9. READING LIST

* Onyango J.P. and Plews A.M. 1987. A Textbook of Basic Statistics. Heinemann Kenya Ltd.
* Bulmer, M.G. 1979. Principles of Statistics. Dover Publications, N.Y.
* Mead, R. Curnow, R.N. and Hasted, A.M. 1993. Statistical Methods in Agriculture and Experimental Biology. 2nd edition, Chapman and Hall.