# **Module Title : Statistics**

**Module Code : STS301**

**Credit Value : 12**

**Tutor : D.B. Gurung**

**General Objectives of the Module**

This module aims to teach basics of statistics to students who can make use in specific subjects and writing research papers. This subject deals in collection and processing and analyses of data using SPSS in an efficient and correct way.

**Learning Outcomes**

At the end of the module delivery, students will be able to:

* Explain the data types
* Test normality of data,
* Explain and use the basic concepts of sampling in experiments and surveys,
* Use SPSS to analyse experimental and survey data,
* Calculate descriptive statistics like central tendencies & dispersion,
* Explain the basic concepts of hypothesis testing,
* Use different statistical tests for making inferences,
* Analyse categorical data,
* Measure associations between variables,
* Conduct Factorial Design ANOVA,
* Report results and interpret statistical analyses confidently.

**Teaching and Learning Approach**

Lecture 50 hours

Assignments 40 hours

Self-study 30 hours

**Total 120 hours**

**Assessment**

**a) Continuous assessment (60%)**

Test 20%

Assignment (individual) 20%

Assignment (group) 20%

**b) Final examination (40%)**

Written exam 40%

**Subject Matter**

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| **Unit** | **Contents** |
| Introduction to Statistics | * Statistics – what is it? * Population * Sample   + Sampling unit   + Sampling frame   + Sampling intensity   + Types of sampling * Accuracy and precision * Statistical power * Type I & Type II error * Effect size * One tailed or two tailed tests * Alpha and the role of the distribution tails * Hypothesis testing * Statistical decision making * Normal distribution * Theoretical sampling probability distribution * Binomial distribution |
| Introduction to SPSS | * Introduction to SPSS * Exploring data editors & output viewers * Data entry * Data organization * Data analysis * Generating graphs * Saving results & outputs * Retrieving files |
| Exploring Data | * Data types and measures * Testing of normality of data – Kolmogorov-Smirnov test * Assumptions (parametric & non-parametric data) * Correcting problems in data – outliers, box plots * Test homogeneity of variance – Levene’s test |
| Simple Statistical Models & Descriptive Statistics | * Mean, harmonic mean, weighted mean * Median * Mode * Range * Variance, coefficient of variation * Confidence interval * Skewness * Kurtosis * Standard deviation * Standard error * Frequencies |
| Inferential statistics | * One sample t-test * Two samples *t*-tests   + Parametric (Independent sample t-test, Paired (related) sample t-test)   + Non-parametric (Mann-Whitney test, Wilcoxon signed-ranked test) * Several (multiple) samples   + Parametric (ANOVA, ANCOVA, Factorial Design ANOVA)   + Non-parametric (Kruskal-Wallis test, Friedman’s test) * Correlation * Regression * Chi-square tests (analysis of categorical data) |
| Interpretations and reporting | * Reporting test results (Descriptive statistics; Inferential statistics) * Interpretations of test results (Tables, Figures, etc.) |

**Reading List**

**Essential reading**

1. Field, A. (2009). Discovering Statistics Using SPSS, 3rd Edition. Sage Publication, Delhi.
2. Hampton, R.E. (1994). Introductory Biological Statistics, edited by Elizabeth M. Stevers, Printed by W.C. Brown Communications, Inc., USA.
3. Fielding, J. and Gilbert, N. (2000). Understanding Social Statistics, Sage Publication Ltd., London, Thousand Oaks and New Delhi.
4. Gomez, K.A. & Gomez, A.A. (1994). Statistical Procedures for Agricultural Research (2ndEdition), A Wiley-Interscience Publication, John Wiley and Sons, Singapore.

**Additional reading**

1. Hennjnk, H. (1986). Basic Calculations in Agriculture and Animal Production, Edited by B. Gietema, Published by Tool Foundation, Amsterdam, The Netherlands.
2. Jansen, G.B. (2003). Advanced Animal Breeding, Notes for Fall 2003, University of Guelph, (internet source).
3. Wright, D.B. (2002). First Steps in Statistics, Cromwell Press Ltd, Sage publication Ltd, London, Thousand Oaks, New Delhi.
4. Gonick, L. and Smith, W. (1993). The Cartoon Guide to Statistics, Harper Collins Publisher, New York.

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