

WOLLO UNIVERSITY
COLLEGE OF AGRICULTURE
DEPARTMENT OF ANIMAL SCIENCE

Course Outline to Biometry for Second Year AnSc students

Program: Degree in Animal Sciences
Module name/No: Livestock Research Tools /07
Course Title: Biometry
Course code: AnSc 3072
Course ECTS: 5
Course Cr Hr: 3(3+0)
Course information: Target group: 2nd Year Animal Science Students
 Academic year: **2012 E.C.** Semester **II**
 Meeting day: **Monday & Thursday**, Meeting time: **2:00-4:45** local time
 Meeting location/room: **6337**

Instructor (s) Name and Contact Information:

Name: Wubshet K., Mobile No _____
 Email lwkwk27@gmail.com, Office, **CoA-303**

Course status:

Core

Pre requisite:

Introduction to Statistics

Student's Work Load:

Lecture	Home Study	Tutorial	Field work	Group work	Total
48 hrs	31	16	8	32	135 hrs

Course Description:

Review of statistical concepts. Principles of agricultural experimentation, Commonly used experimental designs in agriculture (Completely randomized design with equal and unequal replications, randomized complete block design, Latin square design, nested design (Repeated Latin Squares, Graeco-Latin Squares), split plot design, Strip plot designs, Compact Family Block designs), change-over design (cross over, switchback). Principles of designs, randomization and experimental layout, experimental error, data structure, analysis of variance (ANOVA), mean separation, interpretation and presentation. Efficiency of blocking in case of blocked experiments and the assumptions behind the analysis of variance. Factorial experiments: principles, treatment structure, two, three or more factors factorial experiments, their ANOVA, main effect and interaction, simple linear regression, correlation, Chi-square test.

Learning Outcome (Course Objective):

The course is designed to:-

- Familiarize students methods of describing, exploring comparing and interpret data
- Provide knowledge to identify proper experimental designs related with field of specialization
- Provide chance to exercise main statistical significance test tools and statistical software packages.

Assessment Methods/ Evaluation System

- Continuous Assessment $\geq 50\%$
 - Quizzes /Tests = **10-15 %**
 - Mid- term exam = **20-30 %**
 - Assignment/presentations = **10-20 %**
 - Attendance & Participation = **5-10 %**
- Final Exam. $\leq 50\%$

Mode of delivery/Teaching and learning methods:

- Classroom contact/Lecture (block), individual work, group work (independent study)

Academic Discipline and policy:

- ❖ All the students should abide the rules and regulations of the University
- ❖ Students should switched off their cell phones in the class and examination rooms
- ❖ A student that does not involve in the group discussion and group assignments will never be evaluated or get marks
- ❖ Any student violating the rules and regulation of examination will be penalized according to the code of ethics of students the University
- ❖ Disrespect of the course instructor and ask for marks which is beyond your work after examination will criminalize the student for penalty

Preparedness: Student should come to the class on time as well as with necessary materials

Participation: - Class participation has its own value to encourage your active class participation and discussion.

Class/Practical Attendance: Students are expected to participate in all lecture and practical session (mandatory) and who misses the class up to **20%** will not qualify for final exam.

Plagiarism: Plagiarism will leads to **"F"** grade.

Grading system: Fixed scale.

References (Reading materials):

1. Gomez, K.A and Gomez, A.A., 1992. Statistical Procedures for Agricultural Research, 2nd ed. John Wiley and Sons, New York.
2. Agarwal, B.L, 1996. **Basic Statistics**. New Age International Pub. Ltd New Delhi.
3. Agarwal, B. L., 2011. Theory and Analysis of Experimental Designs. CBS publisher and distributors Pvt Ltd, New Dekhi.

4. Johnson, R.A and Bhattacharya, G.K, 1992. **Statistics: Principles and Methods**. John Wiley & Sons, New York.
5. Kaps, M. and W. Lamberson, 2004. Biostatistics for Animal Sciences. CABI publishing, UK.
6. Morris, T.R., 1999. Experimental Design and Analysis in Animal Sciences. CABI publishing, UK.

Course Topics and Subtopics:

Chapter 1. Introduction to Statistics

- 1.1. Definition of some basic Terminologies in Biometry
- 1.2. Definition and meaning of Design of Experiments
 - 1.3.1. Classification of Agricultural Experiments
 - 1.4.2. Principles of Agricultural Experiments (Replication, randomization, Blocking).

Chapter 2. Common Designs of Agricultural Experiments

2.1. Completely Randomized Design (CRD)

- 2.1.1. Introduction
- 2.1.2. Advantage and Disadvantage of CDR
- 2.1.3. Randomization and layout
- 2.1.4. One-way ANOVA model
- 2.1.5. The P-Value
- 2.1.6. The Coefficient of variation (CV)
- 2.1.7. After ANOVA
- 2.1.8. CRD with unequal replication

2.2. Randomized Complete Block Design

- 2.1.1. Blocking Techniques
- 2.1.2. Randomization and layout
- 2.1.3. ANOVA and Interpretation of Results
- 2.1.4. Missing Plot Technique
- 2.1.5. Block Efficiency
- 2.1.6. Advantage and Disadvantage of RCBD

2.3. Latin Square Design (LSD)

- 2.3.1. Blocking Techniques
- 2.3.2. Randomization and layout
- 2.3.3. ANOVA and Interpretation of Results
- 2.3.4. Missing Plot Technique
- 2.3.5. Efficiencies of Row and column - Blocking

2.4 Split- Plot Design

- 2.4.1. Randomization and layout
- 2.4.2. ANOVA and Interpretation of Results

Chapter 3. Factorial Experiments

- 3.1. Concepts of Factorial Experiments
- 3.2. Factor and levels
- 3.3. Interaction between factors
- 3.4. Types of Factorial Experiments
- 3.5. Missing Plot Technique
- 3.6. Advantage and Disadvantages

Chapter 4. Comparison Between Treatment means

- 4.2. Paired comparisons
 - 4.1.1. Least significance Difference Test
 - 4.1.2. Duncan's Multiple Range Test
- 4.2 Group Comparisons
 - 4.2.1. Between Group comparison
 - 4.2.2. Within Group comparison

Chapter 5. Problem Data

- 5.1. Missing Data
- 5.2. Data that violate the Assumptions of ANOVA

Chapter 6. Checking the Assumptions and Transformation of Data

- 6.1. The Assumption behind ANOVA
- 6.2. Data Transformation Techniques
 - 6.2.1. Logarithmic Transformation
 - 6.2.2. Square root Transformation
 - 6.2.3. Arcsine Transformation
 - 6.2.4. Other Types of Transformation

Chapter 7. Practicing Course Application

- 7.1. Field layout and randomizations of experimental designs
- 7.2. Practical data analysis of variance for each experimental design
- 7.3. Data Interpretation and Conclusions for each design
- 7.4. Correlation and regression analysis of data