DEPARTMENT OF ANIMAL GENETICS AND BREEDING

SEMESTER- I

BIO-STATISTICS AND COMPUTER APPLICATION

AGB-111   **Credit Hours 2+1=3**

THEORY

A. Basic Statistics:
Introduction and importance. Statistics, parameters, observation, recording and graphical representation of data Probability and probability distributions: binomial, Poisson and normal. Measures of central tendency and measures of dispersion (simple and grouped data). Moments and skewness to kurtosis. Correlation and regression. Tests of hypothesis and t Z, X^2 and F tests of significance and their interrelationship. Livestock census procedure and census. Introduction to sample survey methods for livestock and livestock products. Bioassay - meaning and uses.

B. Experimental designs:
Completely Randomized Design (CRD.) and Randomized Block Design (R,B.D). Analysis of variance.

C. Computer application:
Computer and its components; Types of computers; Hardware, software, human ware and firm ware. Type of memories. Computer languages and their scope and limitations. Computer programming : Data types: Constants, variables, expressions, operations, functions, flow charts, commands, simple programs and their execution- scope and limitations. Data base management system: Storage of data, filing, retrieving, reproduction. Use of computer in animal husbandry and veterinary practices.

PRACTICAL
Systematic approach of data, tabulation, simple probability problems. Estimation of measures of central tendency (mean, median, mode) and estimation of measures of dispersion (variance, standard deviation, standard error and coefficient of variation): for simple and grouped data. Graphical representation of data. Tests of significance -t Z. X^2 and F tests. Estimation of correlation. Estimation of regression. Analysis of variance: CRD., R.B.D. Computer basics and components of computer. Simple operations: Entering and saving biological data, database management systems. MS-Office. Spread sheet Internet e-mail and geographic Information system (GIS).

DEMONSTRATION

Use of word processor and spreadsheet Graphics and their uses. Data retrieving and analysis through computer (Data base). Use of local area network (LAN) and other network systems. Retrieving library information through network. G.I.S. and Its use.

REFERENCE BOOKS

1. Statistical methods – Snedecor & Cochran
2. Fundamentals of Statistics – S.C. Gupta
3. Fundamentals of applied statistics – Gupta & Kapur
4. Statistical Methods for Biological workers – Pillai & Sinha
5. Biostatistical Analysis – Zar
6. Fundamentals of Biostatistical Analysis – Rosner

SEMESTER- II

PRINCIPLES OF ANIMAL GENETICS AND POPULATION GENETICS

AGB-121   **Credit Hours: 2+1=3**

THEORY

History of Genetics. Chromosome numbers and types in livestock and poultry. Mitosis, Meiosis and gametogenesis. Overview of Mendelian principles; Modified Mendelian inheritance: gene interaction; multiple alleles; lethals; sex-linked, sex limited and sex influenced traits; linkage and crossing over, Mutation, Chromosomal aberrations; Cytogenetics, Extra-chromosomal inheritance. Gene concept -classical and molecular.
Population genetics: Genetic structure of population: Gene and genotypic frequency: Hardy - Weinberg law and its application; Forces {eg Mutation, migration, selection and drift) changing gene and genotypic frequencies.
Quantitative genetics: Nature and properties; Values and means. Components of phenotypic and genotypic variance; Concept of genotype and environment interaction, Resemblance between relatives; Heritability, repeatability, genetic and phenotypic correlations.

PRACTICAL

Demonstration of karyotype of Farm animal species; Solving problems on inheritance of Mendelian traits. Linkage and Crossing over. Calculation of gene and genotypic frequencies, Testing a population for Hardy-Weinberg equilibrium; Calculation of effects of various forces that change gene frequencies, Computation of population mean; Estimation of heritably, repeatability, Most probable producing ability (MPPA), genetic and phenotypic correlations.

REFERENCE BOOKS

1. Genetics by Monroe W. Strickberger
2. Principles of Geneetics by Gardner/Simmons/Snustad
3. Introduction to Quantitative Genetics by D.S. Falconer
4. Concepts f Genetics by Klug and Cummings
5. Textbook of Population Genetics (Volume I and Volume II) by Sukhvir Singh Tomar
6. Textbook of Animal Breeding by S.S.Tomar

LIVESTOCK AND POULTRY BREEDING

AGB-211   **Credit Hours 2+1=3**

THEORY

History of Animal Breeding; Classification of breeds; Economic characters of livestock and poultry and their importance; Breeding/Selection techniques for optimal production. Selection: Response to selection and factors affecting it; Bases of selection individual, pedigree, family, sib, progeny and combined; Indirect selection; Multitrait selection.

Classification of mating systems; Inbreeding and out breeding-genetic and phenotypic consequences viz., inbreeding depression and heterosis: Systems of utilization of heterosis; Selection for combining ability; Breeding methods for the improvement of dairy cattle and buffaloes {crossbreeding, sire evaluation, field progeny testing, open nucleus breeding system (ONBS)}, sheep, goat, swine and poultry; Breed development; Conservation of germplasm, Current livestock and poultry breeding programmes in the state and country.

PRACTICAL

Description and measurement of economic traits of Livestock & poultry. Standardization of performance records, Computation of selection differential, generation interval and expected genetic gain; Construction of selection index; Sire indices. Measurement of inbreeding and relationship coefficients; Estimation of heterosis.

REFERENCE BOOKS

1. "Introduction to Quantitative Genetics" by D.S. Falconer
2. "Dairy Bovine Production" by C.K. Thomas and N.S.R. Sastry
3. Handbook of Animal Husbandry Sciences by Amalendu Chakraborti
4. Genetics and Breeding of Farm Animals by D. P. Mukherjee and G.C. Banergee
5. Understanding Animal Breeding by Richard M. Bourdon
6. Animal Breeding by Gerald Weiner
7. Veterinary Genetics by F.W. Nicholas
8. Handbook of Animal Husbandry 0 ICAR publication
9. Principles and Practice of Poultry Husbandry by Tom Newman
10. Textbook of Animal Breeding by S.S. Tomar
11. Dalton's Introduction to Practical Animal Breeding by Malcolm B. Willis
12. Genetics of Livestock Improvement by John F. Lasley
13. Breeding and improvement of farm animal by Warwick, E.J. and Legates, J.E.