

REVISED CODE AND SYLLABUS OF M. Sc. ANIMAL GENETICS & BREEDING

SEMESTER - I

V. Sc. - 603	Livestock Production Management (LPM)	2 + 2 = 3 D
V. Sc. - 605	Animal Production Management (APM)	2 + 2 = 3 D
MAS - 711	Statistics - I	2 + 2 = 3
AGB - 706	Fundamental Genetics (FG)	2 + 2 = 3
AGB - 707	Principles of Animal Breeding (PAB)	2 + 2 = 3
		<u>15</u>

SEMESTER - II

V. Sc. - 604	Animal Health and Hygiene (AHH)	2 + 2 = 3 D
AGB - 714	Recent Advances in Animal Genetics (RAAG)	2 + 2 = 3
COMP - 705	Computer Orientation (CO)	2 + 2 = 3
MAS - 715	Statistics - II	2 + 2 = 3
AGB - 716	Poultry Breeding (PB)	2 + 2 = 3
AN - 717	Animal Physiology (AP)	2 + 0 = 2
AGB - 722	Quantitative Genetics (QG)	2 + 2 = 3
		<u>20</u>

SEMESTER - III

ECON - 705	Research Methodology (RM)	2 + 2 = 3
AGB - 880	Seminar	0 + 4 = 2
AGB - 820	Population Genetics (PG)	2 + 2 = 3
AGB - 821	Genetical Statistics (GS)	2 + 0 = 2
PP - 822	Poultry Farm Management (PFM)	2 + 2 = 3
		<u>13</u>

SEMESTER - IV

AGB - 899	Dissertation	0 + 30 = 15
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OUTLINES OF SYLLABUS OF DIFFERENT COURSES OF M.Sc. A.G.B.

DEFICIENCY COURSES

V.Sc. – 603 *LIVESTOCK PRODUCTION MANAGEMENT (LPM)* Credit : 2 + 0 + 2 = 3

Common terms, Livestock and milk production statistics, Importance of Livestock, Important breeds of cattle & buffaloes, Care and management of dairy calves, heifers, bulls and cows. Dairy farm buildings – objectives, advantages, factors affecting location and grouping, Design of barns, clean milk production, dairy farm records. Classification of feeds and fodders, agro – industrial byproducts, Management practices in feeding, soiling, ensiling, hay making, pasturing, Developing practical and economical rations. Planning supply of green fodder throughout the year, Digestive system, Digestive traits. Methods and systems of breeding, Detection of oestrus & pregnancy, Hormones and their role in production and reproduction. Reproductive organs of cow and bull, A. I., sterility and its causes.

V. Sc. – 604 *ANIMAL HEALTH & HYGIENE (AHH)* Credit : 1 + 0 + 2 = 2

Basic herd health programme, Sanitation of herd, Dipping & shearing of animals. Diagnosis of diseases, classifications of diseases, Signs of ill health and preventive measures. Principles of immunization and vaccination schedule for various farm animals. Important diseases of dairy animals, goat, sheep, pig and poultry, their etiology, symptoms, pathogenesis, diagnosis, treatment, prevention and cure.

- a) Mastitis and its control,
- b) Prevention and control of F.M.D., R.P., Rabies and Bucellosis,
- c) Prevention and cure of coccidiosis, Ranikhet and Salmonellosis.

Euthanasia of animals – conditions and various drugs used for euthenizing the animals. Anesthesia of animals – various sedatives and tranquilizers used in farm animals. Animal quarantine.

V.Sc. – 605 *ANIMAL PRODUCTION AND MANAGEMENT (APM)* Credit : 2 + 2 = 3

Goat :

Common terms, importance, Important breeds, Breeding, Feeding, care of kids, Management practices : tethering, age determination, disbudding, castration, hoof trimming, Goat housing, Preventive measures of diseases and vaccination, Goat milk and meat, Pashmina and Mohair.

2. Sheep :

Common terms, importance, important breeds, Breeding, Feeding, Management practices – lambing, care of ewe at and after lambing, Care of lamb, Docking, castration, Dipping, Shearing, Observation regarding sick vs. healthy animals, wool – related terms, wool yield, grading parameters for judging wool quality.

3. Pigs :

Common terms, importance, important breeds, Feeding, Management of piglets, sow and boar, Breeding, Housing, Pig fenders, selection of hogs for slaughter and methods of slaughter, and Health care.

4. Poultry :

Common terms, importance of poultry industry, layers feeding and management, broiler management, Grading of eggs, selection of eggs for hatching, Egg preservation, Culling of layers

CORE COURSES

A.G.B. – 706 FUNDAMENTAL GENETICS (FG) Cr.: 3(2 + 2)

1. Introduction to genetics, history of genetics, milestones in the field from Mendel to genetic engineering
2. Mendelian Genetics : Mendel's experiment and laws of inheritance, interaction of genes.
3. Cell Mechanis : cell division – mitosis and meiosis.
4. Sex determination and sex linkage: mechanism of sex determination, sex differentiation, sex – influenced inheritance, sex linked gene action and sex limited inheritance.
5. Gene Mapping : Linkage and crossing over, chromosome and gene mapping.
6. Mutation : Types and causes of mutation.
7. Chromosomal Abbreviations : Variation in chromosome structure and number
8. Extra chromosomal inheritance : Maternal effects, plasmids, episomes and cytoplasmic and mitochondnal inheritance.

AGB – 707 PRINCIPLES OF ANIMAL BREEDING (PAB) Cr.: 3(2 + 2)

1. Systems of Mating : Outbreeding and inbreeding, genetic and phenotypic consequences of outbreeding and inbreeding; Importance of mating plans in formulating the breeding plans.
2. Inbreeding depression and heterosis, its importance in breeding experiments.
3. General and specific combining ability, methods of estimation and application.
4. Selection : Criteria and methods of selection, response to selection, selection differential, intensity of selection, genetic gain, realized heritability, correlated response to selection, indirect selection, short term and long term results of selection.
5. Methods of sire evaluation : Sire index, selection index; their merits and demerits.

AGB – 714 RECENT ADVANCES IN ANIMAL GENETICS (RAAG) Cr.: 3(2 + 2)

1. Genetic Material : DNA the genetic material, DNA structure and replication of DNA.
2. Structure and replication of Eukaryotic Chromosome : Genome complexity, chemical composition of Euchromatin and heterochromatin, Repetitive DNA sequences and replication of Eukaryotic chromosome.
3. Gene expression : Protein Synthesis – Transcription and translation in prokaryotes as well as in Eukaryotes, genetic code.
4. Somatic cell Genetics.

5. Histocompatibility Polymorphisms : Histocompatibility in animals, genetic control of immune response.
6. Molecular Genetics : DNA fingerprinting, gene cloning, DNA technology.
7. Genetic engineering and the future.
8. Embryo Cloning, microinjection of DNA, Transgenic animals and gene therapy.

AGB - 716

POULTRY BREEDING (PB)

Cr.: 3(2 + 2)

Origin of domestic fowl, Classification of poultry, selection and storage of hatchery eggs, factors affecting fertility and hatchability of eggs, sexing. A.I. in poultry. Inheritance of quantitative and economic traits and their application, Inter - specific crossing and parthenogenesis. Selection and mating plans for egg and meat. Breeding for feed efficiency, disease resistance, stress tolerance etc. Population size and flock structure in poultry breeding experiments. Control population, random sample tests, Genotype - environments interaction. Poultry breeding programmes in the country.

Practical : Recording and handling poultry data, Trapnesting for determining intensity of egg production, Setting of mating plans. Pedigree hatching, computation of breeding values evaluation of genotype - environment interaction.

AN - 717

ANIMAL PHYSIOLOGY (AP)

Cr.: (2 + 0) = 2

Intercellular organization and chemical composition of the cell. Body fluids : Blood - composition and properties, Homeostasis and control of acid - base balance system. Reflex and conditioned reflexes. Physiology and endocrines and role of hormones in lactation and reproduction. Physiology of ruminant and non - ruminant digestive system, Physiology of reproductive systems of farm animals including poultry, milk secretion. Physiological factors for maximizing reproductive efficiency, growth and lactation. Growth in farm animals and factors affecting it.

AGB - 722

QUANTITATIVE GENETICS (QG)

Cr.: 3(3 + 0 + 1)

1. Introduction to quantitative genetics, continuous variation and quantitative inheritance.
2. Values and means : Population mean, average effect, breeding value, dominance deviation and interaction deviation.
3. Variance : Components of variance, correlation and interaction between genotype and environment.
4. Resemblance between relatives : Genetics covariance, environmental covariance and phenotypic covariance.
5. Estimation of genetic parameters : Heritability : Methods of Estimation and application. Repeatability : Methods of estimation and application. Correlation : Methods of estimation and application. Scale and Threshold characters.

AGB - 820

POPULATION GENETICS (PG)

Cr.: 3(2 + 2)

1. Large random mating population : Individual vs. population, genetic structure of population, factors affecting gene and genotypic frequencies, Hardy-Weinberg Law, properties of equilibrium population.

2. Theory of Path Coefficient : Cause and effect, systems of relationship-independent cause, chains of independent causes, correlated cause.
3. Small population and effective size : Effect of small size, effective size of population – unequal number of sexes, reproductive inequality among individuals, periodic depletion in size, reduction due to inbreeding.
4. Use of reproductive Technologies for genetic Improvement : A. I. ONBS, CNBS, Juvenile scheme, Progeny Testing, Embryo transfer, sexing and slicing, Gene cloning and micromanipulation.
5. Conservation of Domestic animals. Breeding policies for cattle, buffalo, sheep, goat and poultry.

AGB – 821

GENETICAL STATISTICS (GS)

Cr.2(2 + 0)

1. Introductory Matrix Algebra – matrix types of matrix : square matrix, triangular and symmetric matrix. Basic matrix operations transpose and ranks of matrix, addition, subtraction, multiplication and inversion of matrix.
2. Univariate model with one effect and multiple effect, concept of random and fixed model. Multivariate model in animal breeding data analysis.
3. Least square analysis for estimating the genetic parameters in animal breeding data.
4. Genetic evaluation of animal with different sources of records.

PP – 822

POULTRY FARM MANAGEMENT (PFM)

Credit :2 + 2 = 3

Present status, future scope of poultry industry in India, Importance and constraints of poultry industry, Distinguishing features of different types of chicken, merits and demerits of local vs. foreign breeds, Performance of hybrid varieties of chicken developed in India, starting poultry farm, chicken management – natural and artificial brooding, Management of brooder house, Grower's management – Pullet and cockerels. Management of breeding stock, layers management, Broilers management, management problems and remedies, Poultry housing – purpose, functional requirement, location, essentials, systems of housing, Types of house construction, layer house equipments, housing hygiene, litter management, Trapnesting, Record keeping. Poultry farm waste management, Technical standards for poultry.

Practical : Handling birds, Trapnesting, Record keeping, economics of poultry, House design, litter management.

AGB – 880
AGB – 899

SEMINAR
DISSERTATION

Cr.: 2(0 + 4)
Cr.: 15(0 + 30)

SUPPORTING COURSES :

COMP – 609
MAS – 711
MAS-715
ECM-705

COMPUTER ORIENTATION
STATISTICS – I

Statistics – II
Research Methodology

Cr.: 3(2 + 0 + 2)
Cr.: 3(2 + 0 + 2)
Cr.: 3(2 + 0 + 2)
Cr.: 3(2 + 0 + 2)