

1. Course offered :: UG, PG , PhD - Semester / Year wise

- List of UG Courses (B.V.Sc& AH) As per latest MSVE Guidelines) ,
B.Tech. (D.T.) and B.F.Sc as per ICAR – V Deans Committee – 2016.

Sr No	Course No.	Title	Credit	Course offered in the Year
1.	AGB-I & II	Animal Genetics & Breeding Paper-I & II	3+1	II

- List of PG Courses (MVSc) and M.Tech. (Dairy Technology)

Department of Animal Genetics and Breeding
M.V.Sc. Semester-wise Course Programme

Sr. No.	Course No.	Title of the Course	Credits	Core / Optional Course
Semester – I				
1.	AGB 601	Animal Cytogenetics and Immunogenetics I	2 + 1 = 3	Core
2.	AGB 602	Molecular Genetics I	2 + 1 = 3	Core
3.	AGB 603	Population and Quantitative Genetics	2 + 1 = 3	Core
4.	AGB 604	Selection Method and Breeding System	2 + 1 = 3	Core
Total			8 + 4 = 12	
Semester – II				
1.	AGB 605	Biometrical Genetics I	2 + 1 = 3	Core
2.	AGB 606	Conservation of Animal Genetics Resources	2 + 0 = 2	Optional
3.	AGB 607	Cattle and Buffalo Breeding	2 + 1 = 3	Optional
4.	AGB 608	Sheep and Goat Breeding	2 + 0 = 2	Optional
5.	AGB 609	Poultry Breeding	2 + 1 = 3	Optional
6.	AGB 610	Laboratory Animal and Rabbit Breeding	2 + 0 = 2	Optional
7.	AGB 611	Swine Breeding	1 + 0 = 1	Optional
8.	AGB 612	Pet Animal Breeding (Dogs and Cats)	1 + 0 = 1	Optional
9.	AGB 613	Wild Animal Genetics and Breeding	1 + 0 = 1	Optional
10.	AGB 614	Equine Breeding	1 + 0 = 1	Optional
11.	AGB 615	Camel Breeding	1 + 0 = 1	Optional
12.	AGB 616	Yak and Mithun Breeding	1 + 0 = 1	Optional
13.	AGB 617	Statistical Methods in Animal Breeding	2 + 1 = 3	Optional
Total			2 + 1 = 3	
Semester – III				
1.	AGB 691	Masters Seminar	1 + 0 = 1	Core
2.	AGB 699	Masters Research	0 + 10 =10	Core

3.	PGS 601	Technical Writing and Communications Skills	1 + 0 = 1	Core
4.	PGS 602	Agricultural Research, Research Ethics and Rural Development Programmes	1 + 0 = 1	Core
5.	PGS-603	Basic concepts in laboratory techniques	0 + 1 = 1	Core
6.	PGS 604	Intellectual Property and its management in Agriculture	1 + 0 = 1	Core
7.	PGS 605	Library and Information Services	0 + 1 = 1	Core
Total			4 + 12 = 16	
Semester – IV				
1.	AGB 699	Masters Research	0 + 20 = 20	Core
Total			0 + 20 = 20	

2. Lecture Schedule – UG, PG , PhD - Theory / Practical Schedule – Approved by BoS – Subject wise

UG: B.V.Sc.& A.H. (VCI, MSVE 2016 Regulations) PROFESSIONAL YEAR: II NAME OF DISCIPLINE : Animal Breeding and Genetics including Biostatistics Animal Genetics & Breeding Paper-I & II (3+1=4) CREDIT HOURS: 3+1 BoS- Approval Resolution No.: MAFSU/BS/ABGB/27/03/2020			
Sr. No.	Unit No.	Lecture/No.	Topic to be covered
1.	I	1	Introduction and Importance of statistics and biostatistics: Elementary statistical definitions
2.		2	Classification and Tabulation of Data, Parameter, Statistic and Observation.
3.		3	Graphical (Histogram, Frequency polygon, Ogive) and diagrammatic (Bar diagram, Pie diagram) representation of data.
4.		4-5	Measure of central tendency (simple and grouped data) Concept: Mean, Median, Mode Weighted mean, Geometric mean, Harmonic mean.
5.		6	Measure of dispersion (Simple and grouped data) Concept: Range, Inter quartile range, Mean deviation
6.		7	Standard deviation, Variance, Standard Error, Coefficient of Variance
7.		8	Elements of Probability : definition and its laws
8.		9-10-11-	Probability distribution: Binomial, Poisson, Normal
9.		12	Moments, Skewness, Kurtosis
10.		13-14	Correlation: Introduction, Concept, types, Properties and its uses. Rank Correlation
11.		15	Regression: Introduction, Concept, Properties and its uses

12.		16-17	Introduction to sample methods: Simple Random Sampling (SRS), Stratified sampling, Systematic sampling, Cluster sampling, etc.
13.		18	Testing of hypothesis: Simple and composite hypothesis, Null hypothesis, types of error, one tailed and two tailed, test, confidence interval, Power test.
14.		19-20	Test of hypothesis: t – test for single mean, difference of mean and paired t – test, testing of correlation coefficient
15.		21-22	Z-test, Chi – Square test for goodness of fit and test of attributes.
16.		23	Analysis of variance: One-way classification
17.		24	Analysis of variance: Two-way classification
18.		25	Design of Experiments: Concept and Principles (Replication, Randomization, Local control)
19.		26	Complete Randomized Design (CRD)
20.		27	Randomized Block Design (RBD), F- TEST OF Significance
21.		28	Introduction to Non-parametric tests (Rank test, Median, Mann-Whitney)
22.		29	Computer Application: Introduction to Computer languages,
23.		30	Data Base Management
24.		31-32	Review of MS-Office and its components (Ms-Word, Excel, Power Point and Access)
After 30% course completion – FIRST INTERNAL ASSESSMENT			
25.	I	33.	Analysis of data using MS-Excel
26.		34.	Concept of computer networks, Internet and e-mail.
27.	II	35.	History of Genetics
28.		36.	Mitosis v/s Meiosis
29.		37.	Chromosome numbers and types in livestock and poultry
30.		38.	Overview of Mendelian principles
31.		39.	Overview of Mendelian principles
32.		40.	Modified Mendelian inheritance
33.		41.	Modified Mendelian inheritance
34.		42.	Pleiotropy, Penetrance and expressivity
35.		43.	Multiple alleles
36.		44.	Lethals
37.		45.	sex-linked inheritance
38.		46.	sex limited inheritance and sex influenced inheritance
39.		47.	Sex determination
40.		48.	Linkage and construction of linkage map
41.		49.	Crossing over
42.		50.	Mutation
43.		51.	Cytogenetics
44.		52.	Chromosomal aberrations
45.		53.	Extra-chromosomal inheritance
46.		54.	Gene concept, Molecular genetics

47.		55.	Nucleic acids-structure and function
48.		56.	DNA and its replication
49.		57.	Introduction to molecular techniques
50.		58.	Introduction to population genetics
51.		59.	Individual v/s population
52.		60.	Genetic structure of population: Gene and genotypic frequency
53.		61.	Hardy – Weinberg law and its application
54.		62.	Forces changing gene and genotypic frequencies (eg. Mutation, migration)
55.		63.	Forces changing gene and genotypic frequencies (eg. Selection and drift)
56.		64.	Quantitative v/s qualitative genetics
57.		65.	Concept of average effect and breeding value
After 60% course completion – SECOND INTERNAL ASSESSMENT			
58.		66.	Components of Variance
59.		67.	Concept of correlation and interaction between Genotype and Environment
60.		68.	Heritability
61.		69.	Repeatability
62.		70.	Genetic and Phenotypic Correlations
63.		71.	History of Animal Breeding
64.		72-73	Classification of breeds
65.		74-75	Economic characters of cattle, buffalo, sheep, goat and their importance
66.		76.	Economic characters of pig, poultry and their importance
67.	III	77.	Selection, types of selection
68.		78.	response to selection and factors affecting it
69.		79.	Bases of selection: individual, pedigree
70.		80.	Bases of selection: family, sib,
71.		81.	Bases of selection: progeny and combined, indirect selection
72.		82.	Method of selection, Single and Multi trait
73.		83.	Classification of mating systems
74.		84.	Inbreeding coefficient
75.		85.	Coefficient of relationship
76.		86.	Genetic and phenotypic consequences of inbreeding, inbreeding depression, application of inbreeding
77.		87.	Out breeding and its different forms
78.		88.	Genetic and phenotypic consequences of outbreeding, application of outbreeding,
79.		89.	Heterosis
80.		90.	Systems of utilization of heterosis; Selection for combining ability (RS and RRS)
81.		91.	Breeding strategies for the improvement of dairy cattle and buffalo
82.		92-93	Breeding strategies for the improvement of sheep, goat, swine and poultry

83.		94.	Sire evaluation
84.		95.	Open nucleus breeding system (ONBS)
85.		96.	Development of new breeds or strains
86.		97.	Current livestock and poultry breeding policies and programmes in the state and country
After 90% course completion- THIRD INTERNAL ASSESSMENT			
87.	III	98.	Methods of conservation- livestock and poultry conservation programmes in the state and country
88.		99.	Application of reproductive and biotechnological tools for genetic improvement of livestock and poultry
89.		100.	Breeding for disease resistance
90.		101.	Classification of dog and cat breeds
91.		102.	Pedigree sheet, selection of breeds and major breed traits
92.		103.	Breeding management of dogs and cats
93.		104.	Common pet birds seen in India and their breeding management
94.		105.	Population dynamics and effective population size of wild animals in captivity or zoo or natural habitats
95.		106.	Planned breeding of wild animals
96.		107.	Controlled breeding and assisted reproduction
97.		108.	Breeding for conservation of wild animals

Practicals:

Sr. No.	Unit No.	Practical No.	Topic to be covered
1.	I	1.	Graphical and diagrammatical representation of data.
2.		2.	Estimation of measured of Central Tendency for simple and grouped data :Mean, Median, Mode
3.		3.	Estimation of measured of dispersion for simple and grouped data : Range, mean deviation, Standard deviation, Standard error, Variance, Coefficient of Variance
4.		4.	Estimation of correlation and regression.
5.		5.	Simple Probability problems
6.		6.	Normal Distribution. Test of significance: Z – test
7.		7.	Test of significance : student t – test for single mean, difference of mean and paired t – test
8.		8.	Test of significance : Chi – Square test,
9.		9.	Test of significance : F – test
10.		10.	Completely Randomized Design (C.R.D.)
11.		11.	Randomized Block Design (R.B.D.)
12.		12.	Computer Basics and components of computer, Simple operations, entry of biological data
13.		13.	Internet and e-mail. Entering and saving biological data through MS – Office, MS-Excel.
14.		14.	Problems based on monohybrid cross ratio & its modifications
15.		15.	Problems based on dihybrid cross ratio & its modifications

16.	II	16.	Problems based on Multiple alleles & Sex linked inheritance
17.		17.	Problems based on Linkage and crossing over
18.		18.	Demonstration of Karyotyping in farm animals
19.		19.	Calculation of gene and genotypic frequencies
20.		20.	Testing a population for Hardy-Weinberg equilibrium
21.		21.	Calculation of effects of various forces that change gene frequencies
22.		22.	Computation of population mean, average effect of gene and gene substitution
23.		23.	Computation of breeding value
24.		24.	Estimation of repeatability
25.		25.	Estimation of heritability (Half-sib correlation method)
26.		26.	Estimation of heritability (ISRD)
27.		27.	Estimation of genetic and phenotypic correlations
28.	III	28.	Computation of selection differential and intensity of selection, Generation interval, expected genetic gain
29.		29.	Computation of correlated response, EPA
30.		30.	Computation of Most probable producing ability (MPPA)
31.		31.	Estimation of inbreeding coefficient
32.		32.	Estimation of relationship coefficient
33.		33.	Estimation of heterosis
34.		34.	Computation of sire indices
35.		35.	Computation of selection index