Course Code : ANB 211

Course Title: Principles of Genetics and Animal Breeding
Credit Hours : 3(2+1) Full Marks : 75 Theory : 50 Practical : 25

Objective

Upon the completion of this course, students will be able to understand basic principles and fundamentals of genetics and its application in animal breeding.

Syllabus

Study of chromosome, DNA, central dogma and gene expression. Mendelian genetics, population genetics and quantitative genetics. Different types of gene interaction. Selection and mating systems. Animal genetic resources of Nepal and their conservation.

Course Breakdown
Theory

S.N.	Topic	No. of Lectures
1.	Animal cell and cell division	2
2.	Gametogenesis	2
3.	Chromosomal study: karyotyping, chromosomal variation and abbreviation	3
4.	Mendelian genetics: experiment, principle and extension	3
5.	Gene interaction and epistasis	2
6.	Linkage, crossing over, recombination and gene mapping	3
7.	DNA and its structure, DNA replication, transcription, translation and expression	3
8.	Proteins and gene regulation	2
9.	Population genotypic frequency, Hardy-Weinberg law, causes of changing gene and genotype frequency in the population	2
10.	Quantitative genetics: phenotypic variation, estimation and concept of heritability and repeatability	3
11.	Concept of selection and mating systems	2
12.	Animal genetic resources and their conservation in Nepal	3
	Total	**30**

Practical

S.N.	Topic	No. of Practical
1.	Demonstration of cell and cell division	1
2.	Calculation of linkage map, coincidence, interference	2
3.	Demonstration of DNA structure, DNA replication, transcription and translation	2
4.	Calculation of gene and genotypic frequency: complete dominance, Incomplete dominance, sex linked genes, multiple genes, selection, mutation, migration	3
5.	Estimation of repeatability	2
6.	Estimation of heritability	2
7.	Estimation of selection parameters	2
8.	Estimation of heterosis	1
	Total	**15**

References

Chandar, N and S. Viselli. 2019. Cellular and Molecular Biology, 2nd edition.

Klug, W.S, M.R. Cummings, C.A. Spencer and M.A. Palladiono. 2016. Concepts of Genetics, 11th edition. Pearson Education, England.

Hartwell, L.H., M.L. Goldbery, J.A. Fisher and L. Hood. 2018. Genetics: From Genes to Genomes, 6th edition.

Nischoll, D.S.T. 2008. An Introduction to Genetic Engineering, 3rd edition. Cambridge University Press, The UK.

Snustad, D.P. and M.J. Simmons. 2012. Principles of Genetics. 6th edition. John Wiley and Sons Inc., USA.