

**COLLEGE OF FISHERIES, KISHANGANJ
BIHAR ANIMAL SCIENCES UNIVERSITY, PATNA**

Lecture plan

**Course Title: Principles of Fish Genetics and Breeding
Course No.: FGB 501 (2+1)**

Theory

Sl. No.	Name of Topics	No. of Lectures
1.	Historical development of genetics and breeding; Aim and scope of genetics and breeding; Domestication	2
2.	Society and Genetics-Ethical issues; Basic statistical parameters-Probability concepts; Mean, Variance, Coefficient of variation, Correlation, Regression and Analysis of Variance	2
3.	Cell structure, cell division and physical basis of heredity	2
4.	Mendel's Principles: Scope, Limitation; Modifications to Mendel's ratios: Multiple alleles, Epistasis	2
5.	Chromosomal theory of inheritance; Genetic variation: Causes and measurement	2
6.	Linkage and crossing over, Recombination, Interference, Linkage disequilibrium	2
7.	Modern concept of gene; DNA as genetic material, Replication of DNA	2
8.	Genetic code and protein synthesis, Transfer and regulation of genetic information	2
9.	Introduction to bioinformatics in fish genetics and breeding	2
10.	Cytogenetics; Cytogenetics and evolution; Karyotyping and chromosome banding	2
11.	Genetic basis of sex determination; Sex-linked, Sex-limited, and Sex-influenced traits, Y-linked inheritance	2
12.	Chromosome manipulation: Ploidy induction, Sex reversal, Gynogenesis and Androgenesis; Chromosomal aberrations; Mutations Natural and Induced, Mutagens	2
13.	Basic concepts of Population Genetics: Individual vs population; Gene and Genotype frequency; Hardy-Weinberg Principles and factors affecting them	2
14.	Mutation; Fate of mutant allele in the population; Genetic drift; Concept of inbreeding and its management; Application of population genetics in fish resource conservation, preservation of gametes	2
15.	Basic Concepts of Quantitative Genetics; Polygenic inheritance; Basis of genetic selection; Qualitative vs Quantitative traits; Pleiotropy; Penetrance; Natural Vs Artificial Selection; Aim of genetic selection and breeding	2
16.	Present status of selective breeding in aquaculture; Economic traits of fish Pedigree and its importance in fish breeding; Methods and aid to genetic selection, Application of selection for performance improvement Cross breeding and Hybridization	2
Total number of theory classes		32

Aishwarya

(Ms. Aishwarya Sharma)

Course Teacher

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Practical

S.No.	Name of Topics	No. of practical classes
1.	Probability in genetics	02
2.	Exercises on Mendel's principles	02
3.	Multiple alleles, Epistasis, Linkage and crossing over	03
4.	Exercises on Hardy-Weinberg principles;	01
5.	Estimation of gene and genotype frequencies	01
6.	Karyotyping	02
7.	Nucleic Acid isolation	02
8.	Quantification of Inbreeding; Estimation of kinship coefficient	01
9.	Record keeping in fish breeding; Estimation of genetic parameters	02
Total no. of practical classes		16



(Ms. Aishwarya Sharma)

Course Teacher