

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

Lecture plan

**Course Title: Molecular Breeding
Course No.: FGB 509 (1+1)**

Theory

Sl. No.	Name of Topics	No. of Lectures
1.	Introduction to Molecular Breeding	1
2.	Molecular mechanism of genetic recombination	2
3.	Molecular taxonomy and its application in Fisheries; Phylogenetics and its application	2
4.	Genetics of Sex determination; Genotypic sex determination (GSD); Environmental Sex determination (ESD); Sex manipulation, production of monosex population	2
5.	Single genes in fish breeding; Mapping and Identifying single genes;	1
6.	Types of DNA sequence responsible for alterations to create single gene effect – QTL and MAS identification; Marker assisted selection with markers in linkage disequilibrium with QTL –Molecular pedigree Assigning	2
7.	Major genes, Poly genes and QTLS, Tests for detecting major genes, Complex segregation analysis, Genetic maps and candidate genes	2
8.	Genome-wide association studies (GWAS) in pedigreed population, Methods and tools for GWAS	1
9.	Genomic selection across populations and strains, Re-estimation of the chromosome segments, Designing breeding programs with genomic information	2
10.	Factors affecting the accuracy of genomic selection, Genomic selection with low marker density	1
Total no. of theory classes		16

Aishwarya

(Ms. Aishwarya Sharma)

Course teacher

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Practical

S.No.	Topics	No. of practical classes
1.	LD Analysis	02
2.	Molecular pedigree construction	02
3.	Power of association studies	01
4.	Building the IDB matrix from linkage disequilibrium information	02
5.	Marker assisted selection with linkage disequilibrium;	02
6.	Genomic Relationships and GBLUP; Realized Genomic Relationships	02
7.	Genomic BLUP; Genomic selection using BLUP	02
8.	Genomic selection using a Bayesian approach	01
9.	Bayesian Approach using a prior for chromosome segment variances with a large weight at zero (Bayesian)	02
Total no. of practical classes		16

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