## CURRICULUM PLAN 2021-22 (ODD Semesters: III, V) ONLINE TEACHING Via GOOGLE MEET Dr. Ranjana Roy Mishra

## Semester-III (semester system) B. Sc. (H) Botany LOCF Core Paper: Genetics

Name of Paper & Code	Allocation of Lectures	Month wise schedule followed by the Department	Tutorial/Assignment etc.	Suggested readings
Paper Core course VII Genetics				
Paper Core course VII Genetics   Unit 1: Mendelian genetics and its extension   Mendelism: History; Principles of inheritance; Chromosome theory of inheritance; Autosomes   and sex chromosomes; Probability and pedigree analysis; Incomplete dominance and   codominance; Multiple alleles, Lethal alleles, Epistasis, Pleiotropy, Recessive and Dominant   traits, Penetrance and Expressivity, Numericals; Polygenic inheritance.	16	Department Mid July- August 2021		1. Gardner, E.J., Simmons, M.J., Snustad, D.P. (1991). Principles of Genetics, John Wiley & sons, India. 8th edition. 2. Snustad, D.P. and Simmons, M.J. (2010). Principles of Genetics, John Wiley & Sons Inc., India. 5th edition. 3. Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). Concepts of Genetics. Benjamin Cummings,
				U.S.A. 10th edition.

				4. Griffiths, A.J.F., Wessler, S.R., Carroll, S.B., Doebley, J. (2010). Introduction to Genetic Analysis. W. H. Freeman and Co., U.S.A. 10th edition.
Unit 2: Extrachromosomal Inheritance Chloroplast mutation: Variegation in Four o'clock plant; Mitochondrial mutations in yeast; Maternal effects-shell coiling in snail; Infective heredity- Kappa particles in Paramecium.	06	Mid August 2021	Presentation by students	
Unit 3: Linkage, crossing over and chromosome mapping (12L) Linkage and crossing over- Cytological basis of crossing over; Recombination frequency, two factor and three factor crosses; Interference and coincidence; Numericals based on gene mapping; Sex Linkage.		Mid September 2021		
Unit 4: Variation in chromosome number and structure (8 lectures) Deletion, Duplication, Inversion, Translocation, Position effect, Euploidy and Aneuploidy	08		Presentation by students	
Unit 5: Gene mutations . (7 lectures) Types of mutations; Molecular basis of Mutations; Mutagens—physical and chemical (Base analogs, deaminating, alkylating and intercalating agents); Detection of mutations: CIB method. Role of Transposons in mutation. DNA repair mechanisms.	07	Mid September to Mid October 2021		

Unit 6: Fine structure of gene (5 lectures) Classical vs molecular concepts of gene; Cis-Trans complementation test for functional allelism; Structure of Phage T4, rll Locus.	05	Mid October to November 2021	
Unit 6. Population and Evolutionary Genetics (7 lectures) Allele frequencies, Genotype frequencies, Hardy-Weinberg Law, role of natural selection mutation, genetic drift. Genetic variation and Speciation.	06	November 2021	
PRACTICALS	I	L	

1. To study Meiosis through temporary squash preparation in Allium.	August 2021
2. Gene interactions through seed ratios using Chi square analysis.	August2021
3. To do problems based on Hardy-Weinberg's law.	August 2021
4. Pedigree analysis.	September 2021
5. To study listed human dominant and recessive traits and to observe the listed physical traits among the students present in the class. Data thus generated may be used for calculating allelic and genotypic frequencies using Hardy-Weinberg's principle.	September 2021
6.To Study syndromes: Down's, Klinefelter's , Turner's, Patau & Edward's syndromes	September 2021
7. To syudy colour blindness/ haemophilia (Ishiara cards for colour blindness).	September 2021
8. Chromosomal aberrations: Complex Translocation Ring,quadrivalents Lagging chromosomes and Inversion / DicentricBridge.	October 2021
9.Sickle cell anemia, XerodermaPigmentosum,	October 2021

## Semester-V (semester system) B. Sc. (Prog) Life Sciences LOCF

## **Discipline Specific Elective: Cell and Molecular Biology**

PRACTICALS	Schedule
<b>1.</b> To study prokaryotic cells ( <i>E. coli</i> ), viruses (TMV, T2phage), eukaryotic cells (Plants & Animals) with	July 2021
the help of electron micrographs.	
2. Study of photomicrographs of cell organelles( Nucleus, Mitochondria, Chloroplast, Golgi Complex,	July 2021
ER, lysosomes.	
3. Study of plant cell structure with the help of temporary peel mount of <i>Allium/Crinum</i> .	August 2021
4. To study structure of animal cells by temporary mounts of squamous epithelial cell and nerve cell	August 2021
through photograph	
5. To study striated muscle fiber through photograph.	August 2021
6. To prepare temporary stained preparation of mitochondria from cheek epithelial cells using vital stain	August 2021
Janus green.	-
7. Study mitosis (temporary mounts) and meiosis (permanent slides).	September 2021
8. Study the effect of organic solvent and temperature on semi permeable membrane	September 2021
9. Demonstration of dialysis of starch and simple sugar	September 2021
10. Demonstration of plasmolysis and deplasmolysis on <i>Rhoeo</i> leaf.	October 2021
11. Measurement of cell size (either length/breadth/diameter) by micrometry in Allium.	October 2021
12. Study of structure of nuclear pore complex by photograph (from Gerald Karp), Study of special	October 2021
chromosomes (Polytene & Lampbrush) either by slides or photographs.	October 2021
13. Study DNA packaging by micrographs.	November 2021
	November 2021