

Branch Name:	B.Sc. Biotechnology
Program Code:	SC101
Course Name:	Mendelian Genetics
Course Code:	2SC1010503
Pre-requisite Course:	Basics of cell

Course Objectives:

1. This course is designed to acquire basic knowledge inheritance and to enable students to brush up the concepts of classical genetics.
2. To understand sex determination and differentiation.
3. To give insight of mutation and human cytogenetics.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	--	--	3	70	30	--	--	100

Subject Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	Mendel's work, laws of heredity, Back & Test cross, Complete and Incomplete dominance Linkage: History, Kinds of Linkage, linkage groups, Concept of linkage map, genetic distance Vs physical distance, Determination of linkage map. Types of Crossing over, mechanism of Meiotic Crossing over Introduction of mapping by tetrad analysis, cytological detection of Crossing over, significance of Crossing over. Allelic Variation & Gene function: Multiple allele, Genetic interaction: Epistatic interactions, Non-Epistatic interactions, Pleiotropism	15	33
2	Sex linkage in Drosophila/ Neurospora, Sex-Limited and Sex Influenced Traits Determination of sex and sex differentiation: Genetically controlled of sex determination mechanism Metabolically and hormonally controlled sex determination mechanism Environmentally controlled sex determination Sex differentiation Non-Mendelian/ Cytoplasmic inheritance Eugenics and eugenics, Euphenics	15	33
3	Human cytogenetics: Human karyotype, Banding techniques, , Inborn metabolic disorders, inherited disorders- Autosomal (Klinefelter's syndrome and Turner's Syndrome), Autosomal (Down syndrome and Cri-Du chat Syndrome), Pedigree analysis Mutations: Types-Spontaneous and Induced, Mutagen-Physical and Chemical, Mutation at Molecular level, Chromosomal variation in Number & Structure	15	34

Text Books:

Cell biology & Genetics: Verma and Agrawal

Reference Books:

Genetics: principles and analysis. 4 th edition 1998, Denial L. Hartl, Elizabeth tones.

Principles of genetics: E.J. Gardner.

Genes 9: Benjamin Levi

Lehninger Principles of Biochemistry, 5th Edition, Nelson DL and Cox MM (2008)., W.H. Freeman and Company,

Microbiology Powar and Dagainawala

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Discuss the Mendelian work and understand mechanism of heredity.	2 Understanding
CLO2	List the types of genetic interactions.	1 Remembering
CLO3	Enabling students to understand types, advantages and disadvantages mutagens.	2 Understanding,
CLO4	Development of capacity to understand sex determination and how there is differentiation.	3 Applying, 2 Understanding
CLO5	Learn about chromosomal variations, evaluate syndromes associated with it, identify and compare the numerical and structural variations.	5,3, 4 Evaluate,Applying, Analyze
CLO6	Discuss the mechanisms involved in crossing over predict outcomes of it.	6 Creating

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO1	M	H	H	M	H	M	H	H	M		L	H	L	M	H
CLO2	M	L		M	L	H	M	H	L		M	H		L	
CLO3	M	M	L			L	M	M	H	L		H	L		M
CLO4	L	H	L	M	H	L		L	M	M	H	L	M	H	
CLO5	H	L	M	M	M	H	L	M		M	M	H	M	M	H
CLO6	M	M	L		M	M	L	M	M	L	H	M			M

H: High, M: Medium, L: Low