



**Course Title: Basic Genetics**

**Course Code: GCMB201**

**Credit Units: 4**

**Level: UG (B.Sc Biotechnology, B.Sc Medical Biotechnology and BSc + MSc Dual)**

L	T	P/S	FW/S W	TOTAL CREDIT UNITS
3	0	2	0	4

**Course Objectives:**

The objective of this course is to focus on the basic principles of genetics which will provide each student with an understanding of the basics of hereditary mechanisms to apply in biotechnology.

**Prerequisites:**

Knowledge in life sciences

**Student Learning Outcomes:**

1. Define basic concepts of hereditary and population genetics and learn fundamental genetic calculations
2. Explain the central role of genes in the inheritance of traits and the complex variations in inheritance patterns due to interaction of genes with each other and with the environment.
3. Students shall be able to compare with the terminology used in genetics research literature.
4. Assess common chromosomal and molecular mechanisms that underlie inheritance and the structure of DNA, genes and chromosomes

Course Contents / Syllabus:	Weightage
<b>Module I</b>	<b>25%</b>
Mendel's laws of inheritance. Gene interaction. Polygenic inheritance, Multiple allele, Extranuclear inheritance in chloroplast and mitochondria : snail, paramecium, chloroplast and mitochondrial genome. Linkage and crossing over- a brief account.	
<b>Module II</b>	<b>10%</b>

Basic structure of DNA and RNA. Basic aspects of DNA replication in prokaryotes.	
<b>Module III</b>	<b>15 %</b>
Cell cycle, Mitosis, Meiosis, significance of Mitosis and Meiosis. Monozygotic and dizygotic twins. Sex linked inheritance.	
<b>Module IV</b>	<b>15%</b>
Gene mutation (tautomerisation; transition, transversion and frame shift), physical and chemical mutagen.	
<b>Module V</b>	<b>20%</b>
Deletion, duplication, inversion & translocation, Aneuploidy & Polyploidy-types.	
<b>Module VI</b>	<b>15%</b>
Classical and modern concept including complementation and Allelism.	
<p><b>List of Practicals:</b></p> <ol style="list-style-type: none"> <li>1. Mendelian laws and gene interaction using seeds</li> <li>2. Chi-square and probability.</li> <li>3. Study of Human Karyotype (normal and abnormal).</li> <li>4. Pedigree analysis of some human inherited traits.</li> </ol>	
<p><b>Pedagogy for Course Delivery:</b></p> <p>The class will be taught using theory and case based method. In addition to assigning the case studies, the course instructor will spend considerable time in understanding the concept of genetics using examples.</p> <p>Lectures: 44,Classes Test: 1,Total 45</p>	

Practical: 28,Class Test :2,Total: 30								
<b>Assessment/ Examination Scheme:</b>								
<b>Theory L/T (%)</b>	<b>Lab/Practical/Studio (%)</b>			<b>Total</b>				
75	25			100				
<b>Theory Assessment (L&amp;T):</b>								
<b>Continuous Assessment/Internal Assessment</b>								
<b>Components (Drop down)</b>	Mid-Term Exam	Project	Viva	Attendance	End Term Examination	<b>Total</b>		
<b>Weightage (%)</b>	10	10	5	5	70	100		
<b>Lab/ Practical/ Studio Assessment:</b>								
	<b>Continuous Assessment/Internal Assessment</b>				<b>End Term Examination</b>			
<b>Components (Drop down)</b>	<b>Class test</b>	<b>Lab record</b>	<b>Viva</b>	<b>Attendance</b>	<b>Performance</b>	<b>Lab Record</b>	<b>Viva</b>	<b>Total</b>
<b>Weightage (%)</b>	15	5	5	5	40	10	20	100

**Text:**

1. Snustad, D.P., Simmons, M.J. (2009). Principles of Genetics. V Edition. John Wiley and Sons Inc.
2. Klug, W.S, Cummings, M.R , Spencer,C.A. and Palladino, M.A. Concept of Genetics, Pearson education IXth Edition(2009).
3. Gupta, P.K. Genetics; Classical to Modern. Rastogi Publication (2007)

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