

**SARDAR PATEL UNIVERSITY**  
**Programme: BSC (GENETICS)**  
**Semester: IV**  
**Syllabus with effect from: November 2012**

<b>Paper Code:</b> US04CGEN02	<b>Total Credit: 3</b>
<b>Title Of Paper:</b> Principles of Genetics - II	

Unit	Description in detail	Weighting (%)
<b>1</b>	<p><b>CROSSING OVER AND LINKAGE:</b> Crossing over- mitotic and meiotic crossing over. Synapsis , theories and mechanism of crossing over, cytological basis of crossing over (Stern’s experiment), kinds of crossing over, significance            Linkage - chromosome theory of linkage, kinds of linkage            Examples on linkage, linkage groups, significance            Introduction to chromosome maps.</p>	
<b>2</b>	<p><b>MATERNAL EFFECT AND CYTOPLASMIC INHERITANCE</b>            Maternal inheritance showing differences in reciprocal crosses            Maternal effects.</p> <ul style="list-style-type: none"> <li>• Coiling of shell in snail, Cytoplasmic inheritance, Kappa particles in paramecium</li> </ul> <p>Organellar genetics (Mitochondrial genetics)</p> <ul style="list-style-type: none"> <li>• Male sterility in plants and its significance in hybridization, Petite mutant in yeast</li> </ul> <p>Organellar genetics (Chloroplast genetics)</p> <ul style="list-style-type: none"> <li>• Plastid inheritance in Mirabilis jalapa, Iojap inheritance in maize,</li> </ul> <p>Non-chromosomal genes in chlamydomonas            Evolution of mitochondria and chloroplast</p>	
<b>3</b>	<p><b>FINE STRUCTURE OF GENE &amp; REGULATION OF GENE EXPRESSION:</b> Classical concept (Gene and allele), Complementation and recombination test (Classical), Position effect (Bar eye in Drosophila)            Pseudoalleles and complex loci (lozenge locus), Cistron , recon and muton            Regulation of gene expression (Operon concept), Promoter, enhancers, exons and introns, lac operon and tryptophan operon            Genetic code, Discovery and properties, Wobble hypothesis</p>	
<b>4</b>	<p><b>MUTATION:</b> Stages at which mutation occurs            Types of mutation- spontaneous Vs induced mutation, Mutagens - physical and chemical. Gene mutation, Chromosomal mutation, duplication, translocation, inversion and insertion. Change in chromosome number (aneuploidy, euploidy with examples). Practical applications of mutation</p>	

**Basic Text & Reference Books:**

- Principles of Biochemistry - Lehninger ,Cox, M. M. & Nelson, D.L., 5<sup>th</sup> Ed., W. H. Freeman, New York.
- Genes IX - Benjamin Lewin, Oxford University Press
- Principles of Genetics - D. Peter Snustad and Michael J. Simmons, John Wiley & Sons, Inc
- Genetics - Peter J. Russel 5<sup>th</sup> Ed. Benjamin Cummings Publishing Company
- Genetics - P.K. Gupta 3<sup>rd</sup> Ed. Rastogi Publications.
- Instant Notes in Genetics - P.C.Winter, G.I.Hickey & H.L.Fletcher, 2<sup>nd</sup> Ed. Viva Books Pvt.Ltd.
- Principles of Genetics - Eldon J Gardner, John Wiley & Sons, Canada.

