

SARDAR PATEL UNIVERSITY
Programme: MSC (Integrated Biotechnology)
Semester: III
Syllabus with effect from: June 2011

Paper Code: PS03CIGB06	Total Credits: 3
Title Of Paper: Introduction to Genetics	

Unit	Description in detail	Weightage (%)
1	<p>Fundamentals of Genetics: Introduction, Significance of genetics in agriculture, society and evolution; Mendel's principle of inheritance (Experimental material, Laws formulated with reference to Mono- and Di-hybrid crosses, Test cross, Back cross) and Applications using Punnet square and Probability method; Mendel's principle in Human genetics (Pedigrees and Genetic counseling). Concept of pseudo-alleles, Co-dominance, Incomplete dominance, Pleiotropy, Penetrance, Expressivity (Example of each).</p>	
2	<p>Interaction of Genes and Sex determination Epitasis: Duplicate gene action (15:1), Complementary gene action (9:7), Supplementary gene action (9:3:4), Inhibitory gene action (13:3), Masking gene action (12:3:1), Polymeric gene action (9:6:1), Additive gene action (1:4:6:4:1), Molecular basis for gene interaction Sex determination: Introduction (Chromosome type and number), Mechanisms of Sex determination (Environmental, Chromosomal and genic), Sex determination in animals (Drosophila, Reptiles and Mammals,) and Plants; Dosage compensation of x-linked gene</p>	
3	<p>Linkage and Crossing over: Introduction, Chromosome theory of Linkage, Coupling and Repulsion phase, Types of Linkage, Linkage groups and Linkage maps; Crossing over - Introduction, Theories on the mechanism of crossing over and Types of Crossing over. Maternal effects and extra-chromosomal inheritance: Maternal effects in snails, plastid inheritance in <i>Mirabilis jalapa</i> and male sterility in plants</p>	
4	<p>Chromosomal aberrations: {a} Alterations in chromosome number - Ploidy- Aneuploidy and Euploidy, Polyploidy and its significance in plants; Genetic disorders, Alteration in chromosome structure - Deletions, duplications, inversions and translocations, {b} Quantitative genetics, Polygenic inheritance, Gene and genotype frequency, Hardy-Weinberg law and its significance</p>	
	Practical:	
	<ul style="list-style-type: none"> • Problems in different topics of Genetics (Mendelian inheritance) its use in Genetics • Problems related to Interaction of genes • Problems related to Linkage • Problems related to Sex determination in plants and animals 	



Basic Text & Reference Books:

- Concept of Genetics 7th Edition, (2003) by William S.Klug & Micheal R. Cummings. Pearson Education. ISBN: 81-7808-884-3.
- Fundamentals of Genetics. (2004), B.D. Singh, Kalyani Publishers. (ISBN: 81-272-1331-4).
- General Genetics by M. Sr & R. W. Owen., W. H. Freeman & Company, Sanfrancisco.
- Genes (2000), 7th Ed., Lewin B, Oxford Univ. Press, Oxford.
- Genetics – its concepts & implications .Anna C. Pai & Helen M. Roberts., Prentic – Hall Inc. Engle clifts, New Jersey. USA
- Genetics: Analysis of Genes and Genomes, 6th Ed. By Daniel L. Hartl, Elizabeth W. Jones, Bartlett Publishers (ISBN 0-7637-1511-5)
- Genetics by Strickberger M. W.. Third Edition. Macmillan Publishing co. New York.Robert Weaber & Philip W. Hedrick. Basic Genetics, Second Edition. W. M. C. Brown Publishers Dubuque lowq.
- Genetics (2000), P.S.Verma and V.K. Agarwal, . S. Chand and Company. (ISBN:81-219- 0262-2), New Delhi.
- Genetics.P. K. Gupta, Rastogi Publications. ISBN: 81-7133-779-1. Shivaji Road Meerut, India.
- Principles of Genetics (2001) Edmund W. Sinnott, L. C. Dunn & T. Dobzhansky, . McGraw Hill Book company Inc. New York, USA.
- Principles of Genetics by Gardener, John Wiley & Sons, New York, USA, (ISBN 9971-51-346-3).
- University Botany-2 (2003), S.M. Reddy, New Age International Publishers, New Delhi (ISBN 81-224-1477-X)

