SUBJECT CODE	COURSE NAME	L	T	P	C
GN1003	PRINCIPLES OF GENETICS	3	0	0	3

Branch: B.Tech Genetic Engineering **Academic Year: 2015-16** **Semester:III**

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Lecture		Topic	Learning outcome
1	MENDELIAN GENETICS	Introduction to Genetics	Understand Mendelian inheritance, Dominance and recessive, Laws of segregation and Independent assortment, method to test goodness of fit, multiple alleles
2		Mendel's experiments-monohybrid cross, dihybrid cross, trihybrid cross	
3		principles of segregation	
4		independent assortment	
5		laws of probability, Chi- square analysis	
6		gene interaction-epistasis	
7		multiple alleles- ABO blood groups	
8		lethal alleles, complementation analysis	
9	CYTOLOGY AND CYTOGENETIC TECHNIQUES	Structure of the eukaryotic chromosome	Organization of eukaryotic chromosome; extrachromosomal inheritance; Cytogenetic techniques and significance
10		Structural organization of eukaryotic chromosome	
11		Extranuclear inheritance-Chloroplasts genome	
12		Extranuclear inheritance-Mitochondrial genome	
13		Chromosome banding methods and significance	
14		Banding techniques and their significance	
15		Molecular cytogenetics-Flow cytometry	
16		Molecular cytogenetics- FISH	
17		Application of molecular cytogenetics	
18	CHANGES IN CHROMOSOME STRUCTURE AND NUMBER	Significance of genetic variations - chromosome structural variations	Understand genetic variations; mutagens and types of mutations;
19		Structural variations-deletions and duplications	
20		Structural variations-inversions	

21		Structural variations-translocations	significance of such variations
22		Mutations and mutagens- types and classification	
23		Chromosomal aberration-ploidy and its significance	
24		Euploidy, aneuploidy and its significance	
25		Genetic variations and abnormalities	
26	LINKAGE AND RECOMBINATION MAPPING	Homologous chromosome crossing over and recombination	Understand the concept of linkage and recombination; Understand genetic mapping
27		Cytolgical basis of crossing over-Mcclintock's experiment	
28		Cytolgical basis of crossing over-Stern's experiment	
29		The concept of genetic linkage	
30		Linkage and Genetic mapping-two point cross	
31		Linkage and Genetic mapping-three point cross	
32		Interference and coefficient of coincidence	
33		Somatic cell panel and hybridization	
34		Mapping in bacteria by conjugation	
35		Mapping in bacteria by transformation and transduction	
36	POPULATION GENETICS	Introduction to population genetics	Understand genetic inheritance in a population; understanding the inbreeding and polygenic inheritance
37		Hardy-Weinberg law for gene frequency - significance	
38		Frequencies of two alleles at single locus	
39		Application of Hardy-Weinberg	
40		Exceptions of Hardy-Weinberg	
41		Panmictic index	
42		Inbreeding - types of inbreeding	
43		Inbreeding depression	
44		Heterosis - types- genetic basis and significance	
45		Polygenic inheritance - introduction to QTL's	

TEXT BOOK

Dr. Gupta .P.K, "*Genetics",* 4th Rev.Ed (Ist Reprint), 2011.

REFERENCE

Gardner, Simmons, Snustad , "*Principles of Genetics*", John Wiley and Sons, Inc., 8th edition, 2003.