SRM University
School of Bioengineering
Department of Biotechnology

B. Tech. Biotechnology
II Year/III Semester
BT1012 –GENETICS AND CYTOGENETICS
Total hours: 45

Lesson plan

Unit	Hours	Lecture Topics	Page Nos.	Reference	Learning Outcomes
I	1	Introduction to Mendelian Genetics	20-30	1	• Knowing about the fundamental Laws of Genetics. • Learning about the interaction of genes during its expression. • Knowing about sex determination and sex linkage.
	2	Monohybrid Experiment Dihybrid Experiment Mendel's laws		1	
	3	Allelic Interaction ABO and Rh factor inheritance	33-37	1	
	4	Non-allelic Interaction - Epistasis		1	
	5	Lethal genes & supplementary gene interaction		1	
	6	Cytoplasmic inheritance	536-538	1	
	7	sex determination	69	1	
	8	pedigree analysis	600-601	1	
	9	sex linked Inheritance	82-89,535	1	
II	10	Chromosome Structure	130-147 and first and last cover page for diagram	1	• Explains chromosome structure and packing of DNA into chromosomes. • Learning about giant chromosome and its function. • Explains mapping of genes in humans by somatic cell hybridization. • Discusses about linked genes and crossing over • Use of two and three factor cross in mapping of genes.
	11	Chromosome Organization		1	
	12	Giant chromosomes- Polytene Chromosome		1	
	13	Lampbrush Chromosome		1	
	14	Linkage & crossing over	158-186	1	
	15	cytological basis of crossing over Sterns experiment		1	
	16	Mapping –two and three factor cross		1	
	17	preparation of linkage map, CGH		1	
	18	somatic cell hybridization		1	
III	19	Mutation -	288	1	• Knowing about mutation
	20	Changes in chromosome and number	488-533	1	

	21	Non-disjunction, Aneuploids in humans	521-522	1	and classification of mutation. Learning about Karyotyping and its use in detecting mutation
	22	Autosomal - Downs, Patau and Edwards syndrome;	517-522	1	
	23	Allosomes - Klinefelter and Turner syndrome, mosaics		1	
	24	position effect	498-499	1	
	25	chromosome preparation – leucocytes,	520	1	
	26	Bone marrow, amniotic fluid, chorionic villi, Banding	501-509	1	
	27	karyotype preparation and analysis		1	
		FISH, Prenatal diagnosis	180-181	1	
IV	28	**Recombination And Mapping in Bacteria Introduction**		1	Learning about the different methods of mapping of genes in bacteria
	29	Mechanisms of recombination	205-228	1	
	30	Mapping – transformation		1	
	31	Transduction mapping -generalized		1	
	32	specialized transduction		1	
	33	conjugation – interrupted mating analysis		1	
	34	Fine structure in merozygotes		1	
V	37	**Population Genetics - Introduction**	566-590	1	• .Knowing about population genetics Finding the frequency of allelles
	38	Hardy Weinberg equilibrium		1	
	39	calculating allelic frequency		1	
	40	Application of Hardy		1	
	41	Weinberg equilibrium		1	
	42	Random genetic drift,		1	
	43	founders effect		1	
	44	Genetic equilibrium		1	
	45	Overall Discussion		1	

TEXT BOOK

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

REFERENCE

1. Monroe W. Strickberger, "*Genetics*," 3rd edition – Phi Learning, 2008.

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