

#	Topic	# of lectures
1	<p>Organization of Human Genome</p> <ul style="list-style-type: none"> • Nuclear and mitochondrial genome • Mitochondrial genome organization, homoplasmy and heteroplasmy, • Karyotyping- G and R stain, C stain, FISH, and SKY • Protein coding genes- Alternative splicing, pseudogenes, gene families, Genes-within-genes, overlapping genes • Non-coding genes- tRNA, rRNA, small ncRNA, lncRNA, piRNA, endogenous siRNA • Repetitive elements- Satellite DNA, Mini satellites, microsatellites • Transposable elements- DNA transposons, LTR retroposons, non-LTR retroposons 	5
2	<p>Mapping Techniques</p> <ul style="list-style-type: none"> • DNA markers-RFLP, AFLP, SSR, RAPD • Genetic mapping- Radiation hybrid mapping, Linkage analysis, LOD score • Physical mapping- Contig mapping, how the human genome was sequenced • Introduction to NGS and its applications 	4
3	<p>Mutations and Human Diseases</p> <ul style="list-style-type: none"> • Monogenic, oligogenic, and polygenic disorders • Mode of inheritance of monogenic disorders- dominant vs recessive; autosomal vs X-linked, pedigree analysis • Identifying disease genes- using genetic markers, position-dependent cloning, position-independent cloning • Allelic heterogeneity, Locus heterogeneity, Clinical heterogeneity, Compound heterozygosity • Penetrance and expressivity • Oligogenic disorders • Polygenic disorders- Linkage disequilibrium, GWAS studies to identify SNPs • Trinucleotide repeat disorders • Chromosomal aberrations • Genomic imprinting • Mitochondrial disorders 	12
4	<p>Animal models for Human Diseases Different types of animal models Creating animal models</p>	3
5	<p>Gene Therapy and identification of mutations Virus based transfection strategies Non-virus based transfection strategies Gene therapy approaches for polygenic disorders</p>	4
Total Lectures		28

Recommended Reading:

Human Molecular Genetics by Stratchan and Read

This book is available in the school library. This book used to be available from NCBI bookshelf but is no longer uploaded at the site.

I will send power point presentations well in advance and also provide journal articles.

Quiz will be in form of seminar presentations. We will start presentations with Mutations and Human Diseases. The presentations will be held every Saturday from 9 to 10.30 am. I will send the journal article and we will go in the alphabetical order. The presentation will carry 30 marks. Mid-semester exam will be of 30 marks and final examination will be of 40 marks.