

Introduction to molecular biology, Central dogma of molecular biology. Cell structure DNA, RNA, Protein, Gene expression, translation, transcription.

Mutations: SNPs, Indels, CNVs, variable number tandem repeats (VNTR), mitochondrial variation, mobile elements, epigenetic variation.

Introduction to statistics and computational basics for bio-informatics.

Amino acid sequences, Ramachandran plot. Protein sequence and structure. Sequence Alignment, BLAST. Multiple Sequence Alignment. Protein structure similarity measures.

Micro-array data analysis.

Phylogenetic trees

Gene prioritization. Introduction and computational methods for gene prioritization. Protein Protein Interaction Networks (PPIN) and gene prioritization algorithms on PPIN.

REFERENCES:

Bioinformatics- Baldi and Brunak (MIT Press)

Bioinformatics- David W. Mount (Cold Spring Harbor Laboratory Press)

An Introduction to Bioinformatics Algorithms- Neil C. Jones and Pavel Pevzner

Molecular Biology of Cell- Alberts et al.

Introduction to Protein structure- Branden and Tooze

ONLINE RESOURCES:

Online Mendelian Inheritance in Man: An Online Catalog of Human Genes and Genetic Disorders: <http://www.omim.org/>

Disease-related variation databases: Human and Clinical Genetics, LUMC: www.humgen.nl/mutationDB.html

Protein Protein Interaction Network database: STRING database

KEGG PATHWAY Database - GenomeNet: www.genome.jp/kegg/pathway.html

GENE DATABASES:

www.ncbi.nlm.nih.gov/gene

www.genedb.org

PROTEIN DATABASES:

RCSB PDB: RCSB Protein Data Bank: www.rcsb.org/

www.ncbi.nlm.nih.gov/protein

PINTA - Gene Prioritization by Network Analysis - KU Leuven: www.esat.kuleuven.be/pinta

Gene Prioritization Portal: www.esat.kuleuven.be/gpp

PROTEIN STRUCTURE SIMILARITY:

PDBe < Fold < EMBL-EBI: www.ebi.ac.uk/msd-srv/ssm/

MinRMS: A Tool for Determining Protein Similarity:

<http://www.rbvi.ucsf.edu/Research/projects/minrms/>