V. P. R. P. T. P. Science College, Vallabh Vidyanagar
Add-on Certificate Courses

Course Title : **Computational Biology**
Coordinator : **Dr. J.P. Patel**
Department : **Biology**
Duration : **30 Hours**
Content :

- Biological Literature Information access, storage and retrieval systems- Primary and secondary databases of genomics, trascriptomics, proteomics and metabolomics. Knowledge on freeware and commercial software. Importance of hardware and software creations.
- Collecting and Storing Sequence Data; Sequence assembly; Submission of Sequences; Sequence databases; Sequence formats; Conversion between formats; EST databases; SNP databases; Human Genome Project. Pairwise Sequence alignment and applications: Sequence Alignment types and methods; Scoring matrices; Dot Matrix methods; Dynamic programming methods for global and local alignments tools- FASTA, BLAST; Next Generation Sequencing and analysis.
- Nucleic acid sequence analysis: Open Reading frame prediction; Translational and transcriptional signals identification; Splice site identification; Gene prediction methods; RNA secondary structure analysis; Metagenomics.
- Multiple Sequence alignment and applications: Uses; Methods available-Iterative alignment, Progressive alignment – ClustalW, T-Coffee; Profile Methods, PSI-BLAST; Clustering and Phylogeny; Methods for Phylogeny analysis: Distance and Character based methods; Motif and Domain detection; Protein family databases; Use of Structure based sequence alignment.
- Protein sequence analysis: Primary structure analysis; Protein localization prediction methods; Secondary structure prediction methods; Tertiary structure prediction; Protein-Drug and Protein- Protein interaction analysis.

Reference Books:

1. Bioinformatics: Methods and Applications (Genomics, Proteomics and Drug Discovery) Rastogi S.C., Mendiratta, Namita, Rastogi Parag Print Book ISBN : 978-81-203-4785-4
2. Bioinformatics a Beginner's Guide by Jean Michael Claverie, Cerdic Notredame, Publisher: WILEY DREAMTECH INDIA (P) LTD. ISBN-10: 8126503807 https://books.google.co.in/books/about/Bioinformatics_A_Beginner_S_Guide.html?id=o 4a47QxnzFkC&printsec=frontcover&source=kp_read_button&redir_esc=y#v=onepage & q&f=false
3. Bioinformatics: Principles and Applications by Zhumur Ghosh, Bibekanand Mallick, Publisher: OUP India, ISBN-10: 0195692306.

Bioinformatics by David W. Mount, Cold Spring Harbor Laboratory Press.