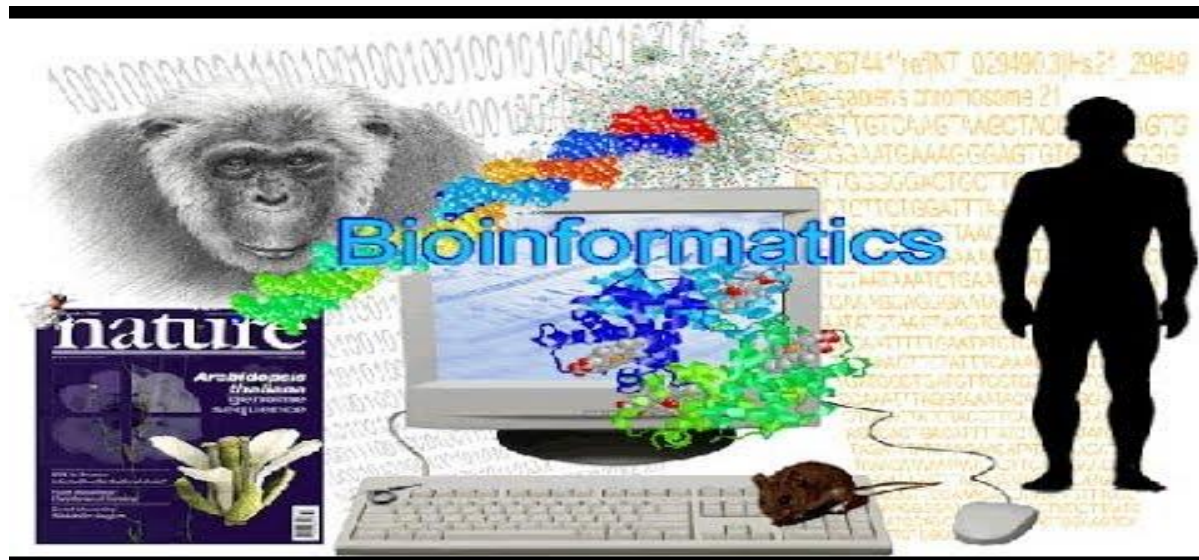


***T.Y.B.Sc. Biotechnology 2019 - 2020***

# ***Bioinformatics***



***SEMESTER - V***

***BIO-V.E-12***

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## COURSE SCHEDULE

### THEORY

**Mondays** – 12:30pm to 01:30pm; **Wednesdays** – 12:30 to 01:30pm and **Thursdays** – 11:30am to 12:30pm in **Class (D303)**

Lecture	Lecture topics	References
L1	Introduction to the Course Bioinformatics	Murthy.C.S.V.
L2	Introduction to use of computers, internet & softwares in biology	
L3	Introduction to use of computers, internet & softwares in medicine	
L4	Introduction to use of computers, internet & softwares in research	
L5	Historical developments in Biology	
L6	Background of DNA, RNA and Proteins, ORF	Harisha, S.
L7	Review of Transcription and Translation	
L8	Introduction to HGP, Objectives and achievements	
L9	Ethical and Social issues of HGP	
L10	Definition and Scope of Bioinformatics	Rastogi, S.C.
L11	Bioinformatics vs Computational biology	
L12	Components of Bioinformatics and Applications	
L14	Introduction to information resources overview	Ignacimuthu, S. & Mount, D.W.
L15	Introduction, aim and objectives of NCBI	
L16	Introduction, aim and objectives of NLM	
L17	Introduction, aim and objectives of NIH	
L18	Introduction, aim and objectives of EBI	
L19	Introduction, aim and objectives of SRS	
L20	Biological databases - Types of data	
L21	Types of biological databases	
L22	<b>CA-1: Assignment submission and Viva voce (30marks)</b> <b>Review of CA-1 test</b>	
L23	Primary databases: Gen Bank and EMBL, DDBJ	Ignacimuthu, S. & Mount, D.W.
L24	Biological databases - Types of data	
L25	Types of biological databases	
L26	Primary databases: Gen Bank and EMBL, DDBJ	
L27	Secondary databases: Swiss-PROT	
L28	Secondary databases: PDB & PIR	
L29	Composite databases: OWL & PROSITE	
L30	Structural databases - PDB, MMDB	
L31	Structural databases - CATH & SCOP	
L32	Visualization of proteins – Cn3D	
L33	Visualization of proteins – Rasmol	
L34	Literature databases - Pubmed	Ignacimuthu, S.  and Mount, D.W.
L35	Literature databases - MedLINE	
L36	Literature databases - OMIM	
L37	Introduction to BLAST and types of BLAST	
L38	Introduction to FASTA	
L39	Characteristics of FASTA	
L40	Sequence Alignment tools	Harisha, S.
L41	Pairwise sequences alignment	
L42	Multiple sequence alignment using Clustal-W Omega	

L43	Introduction to phylogeny, Definition, construction, structure of phylogenetic trees	Harisha, S.
L44	Types of phylogenetic trees and differences between cladogram and phylogenetic tree	
L45	<b>CA-2: Written (subjective test) for 30 marks</b>	
L46	<b>Review of CA 3</b>	

## **REFERENCES**

1. Harisha, S. (2007). Fundamentals of Bioinformatics, I.K. International Publishing House, Mumbai.
2. Ignacimuthu, S. (2005). Basic Bioinformatics, Narosa Publishing House, New Delhi.
3. Mount, D.W. (2004). Bioinformatics – sequence and Genome analysis, CBS Publishers.
4. Murthy, C.S.V. (2003). Bioinformatics, Himalaya Publishing House, Mumbai.
5. Rastogi, S.C., Mendiratta, N. & Rastogi, P. (2004). Bioinformatics: Concepts, Skills and Applications, CBS Publishers.
6. Xiong, J. (2006). Essential Bioinformatics, Cambridge University.

## **PRACTICAL SCHEDULE**

**Wednesdays from 1:30pm to 3:30pm in Biotechnology laboratory**

<b>Practical No.</b>	<b>Practical topics</b>
P1	Introduction to Bioinformatics and its Applications
P2	Study of Human Genome Project
P3	Usage of NCBI resources
P4	Biological data search using NCBI – Protein or amino acid sequences
P5	Biological data search using NCBI – DNA or gene sequences
P6	Biological data search using NCBI – Literature databases
P7	Biological data search using NCBI – Structure databases
P8	Database search & Pairwise sequence alignment using NCBI BLAST: BLASTp
P9	Database search & Pairwise sequence alignment using NCBI BLAST: BLASTn
P10	Multiple sequence alignment using Clustal-W
P11	Multiple sequence alignment using Clustal-W
P12	Construction of phylogenetic tree using Clustal-W
P13	DNA sequence analysis to find restriction enzymes sites using NEBcutter
P14	Visualization of protein structures using Cn3D/ Rasmol
P15	Visualization of protein structures using Cn3D/ Rasmol

**\* MANDATORY ITEMS TO BE CARRIED FOR PRACTICALS;**

**1) Laptop with college or personal wifi/data connectivity**

**\*Note: 1. Practical protocols have been uploaded on Google Classrooms for your reference.  
2. You are requested to go through the same and come prepared for better understanding during the practical session**

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