**BIOINFORMATICS CREDIT HOURS (1+2)**

**LEARNING OUTCOMES:**

**Students will be able to:**

1. To familiarize students with biological data mining from online databases
2. use of various bioinformatics tools for extracting and processing biological data.

**COURSE CONTENTS:**

Introduction; bio-computing; biological databases - types and retrieval of nucleic acid (or genomic) or protein sequence information; sequence alignment - pairwise, multiple; phylogenetics; *in silico* identification of protein motifs and domains; structural bioinformatics of proteins and RNAs including protein modeling and prediction of their interactions with other proteins and small molecules; identification of genes and promoter regions within genomes; networks; strategies for whole genome sequencing and assembly.

**PRACTICALS:**

1. NCBI, PDB, EcoCyc, DDBJ, SWISS-PROT, TIGR, KEGG etc.

2. Bioedit, Repeatmasker, PHRED, PHRAP, BLAST, Prosite/BLOCKS/PFAM,CLUSTALW, Emotif, RasMol, Oligo, Primer3, Molscript, Treeview, Alscript,Genetic Analysis Software, Phylip, MEGA4.0 etc.

**RECOMMENDED BOOKS:**

1. Egelhofer, V., 2016. Textbook Bioinformatics; Volume 1, Herstallung und virlag BoD Norderstedt, Germany.
2. Claverie, J.M. and Notredame, C., 2006. Bioinformatics for Dummies; 2ndEdition; Wiley Publishing, USA.
3. Xiong, J., 2006. Essential Bioinformatics; 1stEdition; Cambridge University Press, UK.
4. Xia, X., 2007. Bioinformatics and the Cell: Modern Computational Approaches in Genomics, Proteomics and Transcriptomics; 1stEdition, Springer, USA.
5. Mathura, V. and Kangueane, P., 2009. Bioinformatics: A Concept-Based Introduction; Springer, USA.
6. Mount, D.W., 2004. Bioinformatics Sequence and Genome Analysis. 2ndEdition, Cold Spring Harbor Laboratory Press.
7. Sperschneider, V., 2008. Bioinformatics: Problem Solving Paradigms; Springer, USA.
8. Loging, W.T., 2016. Bioinformatics and Computational Biology in Drug Discovery and Development; 1stEdition,Cambridge university press UK.
9. Setubal, J.C. and Almeida, N.F., 2010. Introduction to Bioinformatics Using Bacterial Genomics; 1stEdition,Springer, USA.
10. Jopp, F., Lange, C. and Goesmann, A., 2017. Computational Biology; 1stEdition,Springer Spektrum, Berlin Heidelberg