



GUJARAT TECHNOLOGICAL UNIVERSITY

BACHELOR OF ENGINEERING SYLLABUS

Subject Code : 3174204

Subject Name : Bio-informatics

WEF Academic Year :	2020-21
Semester :	7
Category of the Course :	Professional Elective IV

Prerequisite: Basic concept of Biological concept, data mining and machine learning.

Rationale: It involves the use and applications of biological database in machine learning and also use of visualization.

Course Scheme:

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
L	T	PR		C	Theory		Practical	
			ESE (E)		PA(M)	ESE (V)	PA (I)	
3	0	0	3	70	30	0	0	100

Course Content:

Sr. No.	Course Content	No. of Hours	% of Weightage
1	Bio-Informatics Introduction, Need for Bioinformatics technologies, Why should we use bioinformatics, Application of bioinformatics, Overview of gnome	5	10%
2	Database for Bio-Informatics What is database? Sequence database, structural database, molecular visualization, specialized sequence database, Gnome mapping database, biological culture and stock collection database, Enzymes and metabolic pathway databases, information retrieval from biological database.	6	15%
3	DATAWAREHOUSING AND DATAMINING IN BIO-INFORMATICS Bioinformatics data, Data warehousing architecture, data quality, Biomedical data analysis, DNA data analysis, Protein data analysis, Neural network architecture and applications in bioinformatics.	7	25%
4	MODELING FOR BIO-INFORMATICS Hidden markov modeling for biological data analysis, Sequence identification, Sequence classification, multiple alignment generation, Comparative modeling, Protein modeling, genomic modeling, Probabilistic modeling, Bayesian networks, Boolean networks, Molecular modeling.	9	25%



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5	PATTERN MATCHING AND VISUALIZATION Gene regulation, motif recognition, motif detection, strategies for motif detection, Visualization, Fractal analysis, DNA walk models, one dimension, two dimension, higher dimension, Game representation of Biological sequences, DNA, Protein, Amino acid sequences.	9	25%
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Reference Book:

1. Fundamental of Bioinformatics, Harisha S.I.K.International.
2. Yi-Ping Phoebe Chen (Ed), "BioInformatics Technologies", First Indian Reprint, Springer Verlag, 2007.
3. Bryan Bergeron, "Bio Informatics Computing", Second Edition, Pearson Education, 2003.
4. Arthur M Lesk, "Introduction to Bioinformatics", Second Edition, Oxford University Press, 2005

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level*
01	understand the bioinformatics and its application in various field	UN
02	Familiarity with biological databases	UN
03	Develop the ability to perform sequence alignment, sequence identification and classification	CR
04	Different types of machine learning and its utility in bioinformatics	AP
05	The students will be able to develop models of biological data	AP
06	The students will be able to understand representation of biological sequence	RM

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create