Faculty of Science and Humanities
B.Sc. (Microbiology) (Semester - 5)
In Effect from Academic Year 2023-24

Branch Name:	B.Sc. Microbiology
Program Code:	SC102
Course Name:	Bioinformatics
Course Code:	2SC1020521
Pre-requisite Course:	Basics of Molecular Biology and Computer

Course Objective:

1. To understandScope and applications of Bioinformatics
2. To understand Components of Bioinformatics
3. To understand Genomics&Proteomics
4. To understand Human Genome Project

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory (Marks)		Practical (Marks)		
Lecture (L)	Tutorial (T)	Practical (P)	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	Total (Marks)
2	--	--	2	35	15	--	--	50

Subject Contents:

Unit	Content	Lectures	Weightage
1	• Introduction to Bioinformatics: History and Overview, Scope of Bioinformatics, Bioinformatics and Internet • Components of Bioinformatics: Biological Databases (DNA Database, Protein Database) , Biological sequence analysis (Pair wise and Multiple Alignment), Biological Software (Rasmol, Clustal W), Molecular Terms (XML,GAME) • Genomics: Types of Genomics, Gene prediction, DNA Microarray, SAGE • Proteomics: Types of proteomics	18	60%
2	• Human Genome Project: History, Method of Sequencing Human Genome, Present Status of HGP, Application and ELSI • Bioinformatics Application: Phylogenetics, Pharmacogenomics (Drug Discovery), Crop Genomics (Agroinfomatics), Metabolomics, Transcriptomics, Chemoinformatics	12	40%

Text books:

1. Bioinformatics Concepts Skills and Applications 2Ed by RASTOGI, CBS PUBLISHERS AND DISTRIBUTORS PVT LTD.
2. Bioinformatics: Methods and Applications: Genomics, Proteomics and Drug Discovery by N. Mendiritta , P. Rastogi , S. C. Rastogi, PHI Learning; 4th edition

Reference Books:

1. Developing Bioinformatics Computer Skills C. Gibas and P. Jamback.
2. Bioinformatics A machine learning approach P. Baldi& S. Brunak
3. Bioinformatics: A Practical guide to the analysis oflienes and Proteins A. D. Bzxevanis and B. F. F. Onellette
4. Bioinformatics Methods and protocols: Methods inmolecular biology Vol. 132:S. Misenes and S. A. Krawetz (Eds)

List of Open Source Software/learning website:

1. https://www.youtube.com/watch?v=lhU3CzslFqw

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom'sTaxonomyLevel
CLO1	**Discuss** the history and scope of bioinformatics.	2 Understanding
CLO2	**Enlist** and describe the types of DNA and Protein Database.Study the comparative of the databases.	1 Remembering 2 Understanding,
CLO3	**Discuss** the mechanisms of submitting data to the database.	2 Understanding,
CLO4	Development of capacity to understand 2D Gel Electrophoresis, SAGE	3 Applying, 2 Understanding
CLO5	Describe the details about Human Genome project various tools and methods used in it.	3 Applying 4Analyze 5 Evaluate
CLO6	Enabling students to understand and correlate Proteomics, Genomics and Transcriptomics and its application in research	3 Applying 4Analyze 5 Evaluate, 6 Creating

Mapping of CLOs with Pos& PSOs

Course Learning Outcomes	Program Outcomes (POs)									Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CLO1	M	M				M		M				
CLO2	H	H	M		M			L	M			
CLO3	M	M	H					M	M		M	
CLO4	M				M				H	M		
CLO5	M		H		M					H		
CLO6				H		M	H		H		H	M

L= Low M= Medium H= High