

## PG DEPARTMENT OF BIOINFORMATICS

Name of Programme: B.Sc. Medical/Non-Medical with Bioinformatics

### B.Sc. (Bachelor of Science)

- PO 1 Critical Thinking:** The programme aims to give knowledge with facts and figures related to various subjects in pure sciences such as Physics, Chemistry, Botany, Zoology, Mathematics, Computer Science, Economics, Quantitative Techniques, Bio-informatics, Bio-technology etc.
- PO 2 Lifelong learning:** Enable the students to understand the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevance in the day-to-day life.
- PO 3 Logical experimentation:** The learners acquire the abilities in handling scientific instruments, scheduling and executing the experiments in laboratories and to draw logical inferences from the scientific experiments.
- PO 4 Creative thinking:** They become capable of thinking creatively, to propose innovative ideas in clarifying facts and figures and providing new solution to the problems.
- PO 5 Interdisciplinary approach:** To give them knowledge about developments in any science subject and how interdisciplinary approach helps in providing better solutions and new ideas for the sustainable developments.
- PO 6 Scientific aptitude:** The programme targets to develop scientific aptitude among the students to make them open- minded, critical and curious in order to deal with all aspects related to life.
- PO 7 Self reliant:** To make them capable of applying their acquired knowledge and able to work on their own hence make themselves self-reliant and self-sufficient.

### Mapping of Course Outcomes

#### Semester-I

Paper: Fundamentals of Computers, Molecular Biology & r-DNA technology

CO Number	Description	Skill	PO	Blooms Level	Assessing tools can be used to measure CO
CO 1	Students will be able to use MS Excel, MS Word and MS PowerPoint	Apply	PO3	3	Exam/Assignment/Quiz/Practical viva voce
CO 2	Students will understand the processes of replication, transcription & translation in molecular biology	Understand	PO1,PO2	2	Exam/Assignment/Quiz/Group Discussion
CO 3	Students will be able to demonstrate molecular mechanism(s) behind a biological process and its expression?	Apply	PO1, PO2, PO3	3	Exam/Assignment/Quiz/Group Discussion
CO 4	Students will be able to identify various tools used for cloning	Apply	PO1	3	Exam/Assignment/Quiz/Group Discussion

**Semester-II****Paper: Basic Mathematics, Biostatistics, DBMS**

<b>CO Number</b>	<b>Description</b>	<b>Skill</b>	<b>PO</b>	<b>Blooms Level</b>	<b>Assessing tools can be used to measure CO</b>
<b>CO 1</b>	Students will be able to classify various DBMS	Classify	PO2, PO3	2	Exam/Assignment/Quiz/Practical viva voce
<b>CO 2</b>	Students will be skilled to design and create a database	Design and create	PO4, PO5, PO6	6	Exam/Assignment/Quiz/Practical viva voce
<b>CO 3</b>	Students will be able to apply basic statistics to data	Apply	PO1,PO2,PO3	3	Exam/Assignment/Quiz/Practical viva voce
<b>CO 4</b>	Students will gain basic knowledge of mathematical functions including trigonometric, differential	understand	PO2,	2	Exam/Assignment
<b>CO 5</b>	Students will be confident in dealing with multi-dimensional data using matrices, different operations on matrices	apply	PO1, PO2	3	Exam/Assignment

**Semester-III****Paper: Introduction to Biological Databases**

<b>CO Number</b>	<b>Description</b>	<b>Skill</b>	<b>PO</b>	<b>Blooms Level</b>	<b>Assessing tools can be used to measure CO</b>
<b>CO 1</b>	Students will be able to classify various Bioinformatics databases	Analyze	PO1, PO2, PO3	4	Exam/Assignment/Quiz/Practical viva voce
<b>CO 2</b>	Students will be able to experiment with biological data mining using various databases	Apply	PO1,PO3,PO4	3	Exam/Assignment/Quiz/Practical viva voce/ Group Discussion/Case studies
<b>CO 3</b>	Students will be able to know various database retrieval and deposition systems work	Analyze	PO2	4	Exam/Assignment/Quiz/Practical viva voce
<b>CO 4</b>	Students will differentiate between various formats of biological data and know which format is suitable for a particular application.	Analyze	PO1,PO3,PO4	4	Exam/Assignment/Quiz/Practical viva voce/Group Discussion

**Semester-IV****Paper: Computer Programming in C++ and Perl**

<b>CO Number</b>	<b>Description</b>	<b>Skill</b>	<b>PO</b>	<b>Blooms Level</b>	<b>Assessing tools can be used to measure CO</b>
<b>CO 1</b>	Students will be able to differentiate between C++ and PERL and know the effectiveness of PERL in handling biological data	Analyze	PO1, PO2	4	Exam/Assignment/Quiz/ Practical viva voce
<b>CO 2</b>	Students will be able to retrieve a specific data from a large text files of different formats	Apply	PO1,PO2, PO3,PO4	3	Exam/Assignment/Quiz/Practical viva voce/ Group Discussion/ Practical Files
<b>CO 3</b>	Students will be able to select, install and use various BIOPERL Libraries for analysis of biological data	Apply	PO3, PO6	3	Exam/Assignment/Quiz/Practical viva voce/ Practical Files
<b>CO 4</b>	Students will be able to write simple programs to analyze molecular sequence data	Create	PO6, PO7	6	Exam/Assignment/Quiz/Practical viva voce/ Practical Files/Seminar/Demonstration

**Semester-V****Paper: Computational Methods for Sequence Analysis**

<b>CO Number</b>	<b>Description</b>	<b>Skill</b>	<b>PO</b>	<b>Blooms Level</b>	<b>Assessing tools can be used to measure CO</b>
<b>CO 1</b>	Students will know how to compare DNA/Protein sequences	Apply	PO1, PO2	3	Exam/Assignment/Quiz
<b>CO 2</b>	Students will be able to classify proteins based on their structural features	Analyze	PO1	4	Exam/Assignment/Quiz
<b>CO 3</b>	Students will be able to identify various signals from raw data which can be used to create prediction models using Machine Learning algorithms	Apply	PO1, PO2, PO3, PO5,PO6, PO7	3	Exam/Assignment/Quiz/Practical viva voce/ Group Discussion/ Projects
<b>CO 4</b>	Students will be trained to predict secondary structure of proteins	Analyze	PO1, PO4	4	Exam/Assignment/Quiz/Practical viva voce/ Group Discussion/ Practical Files/Projects/Seminar
<b>CO 5</b>	Learners will be able to choose right methods for evolutionary analysis based on the underlying data	Evaluate	PO2, PO4, PO6	5	Exam/Assignment/Quiz/Practical viva voce/ Group Discussion/ Practical Files/ Projects

**Semester-VI****Paper: Structural Biology and Molecular Modeling**

<b>CO Number</b>	<b>Description</b>	<b>Skill</b>	<b>PO</b>	<b>Blooms Level</b>	<b>Assessing tools can be used to measure CO</b>
<b>CO 1</b>	Students will understand the basic concepts of molecular modeling	Understand	PO2	2	Exam/Assignment/Quiz
<b>CO 2</b>	Students will be able to apply concepts of molecular modelling to represent chemical information on computers and concept of force field	Apply	PO1, PO3, PO4, PO5, PO6	3	Exam/Assignment/Quiz
<b>CO 3</b>	Students can use computers to study molecular interactions	Analyze	PO4, PO5, PO6, PO7,	4	Exam/Assignment/Quiz/Practical viva voce/Practical Files/Case Studies/Projects/ Seminar
<b>CO 4</b>	Students will be able to choose a strategy for computer aided drug design	Evaluate	PO6, PO7	5	Exam/Assignment/Quiz/Practical viva voce/Practical Files/Case Studies/Projects/Seminar