

Syllabus Prescribed for 2024 Year**UG. Program****Programme****B.Sc. Bioinformatics****Semester VI****Code of the Course Subject Title of the Coues /Subject****No. of periods/week****DSC VI****Advanced BIO-Computing****06****Cos:**

1. To train the students in writing programs in C++ language.
2. To introduce them to the concepts of object-oriented language through C++ language.
3. To introduce the concepts of DBMS using SQL.
4. To design and handle database, effective management and analysis of biological data using SQL.

UNIT I:	Principles of object oriented programming (OOP): Software evolution, OOP paradigm, basic concepts of OOP, object oriented languages, applications of OOP. Introduction to C++: Tokens, keywords, Identifiers, Variables, Operators, Manipulators, Expressions and control structures in C++. Functions in C++ (main function, function types, call by reference, return by reference), function overloading (friend and virtual function).
UNIT II:	Classes and objects: constructors, destructors, operating overloading and type conversions. Inheritance: Types – single, multilevel, hierarchical and hybrid inheritance. Pointers, virtual functions and polymorphism. Managing console I/O operations. Working with files: Classes for file stream operations, opening and closing a file, end of file (EOF), file Detection, file pointers, updating a file, error handling during file operations, command line arguments.
UNIT III:	Perl Programming: -Introduction to PERL, History and uses, PERL Basics, Data types, Basic Operators Control Statements: if, if else, if else, Loops: do, while, until, for, for each, labels, lists, Arrays and associative arrays. Variables, Perl operations, scalars, Arrays and Hashes - Perl Interpreter, Operators, Using standard Perl modules – CPAN – Array-Based Character Manipulation - simple programs. Control Structures and Perl Subroutines: Perl debugger - Perl control structures - Perl subroutines and Functions - simple programs. Perl one-liners using command-line options.
UNIT IV:	Database Concepts: Advantages, Applications, Three Level Architecture: Physical, Logical, View level; Data Independence, Data Models. Database Languages: DDL, DML, DCL, Attributes, Constraints, Keys, Normalization(1NF,2NF,3NF,BCNF)
UNIT V:	Basic SQL queries: Built-in functions: individual numeric functions, aggregate functions, string Functions. Set operators: union, intersect, minus; Clauses: Group by, Having, Where; Boolean Operators: AND, OR, NOT; Pattern Matching: LIKE statement and wildcard characters(% , _); BETWEEN operator, IN operator; Sub queries.
UNIT VI:	Transactions: Rollback, commit, save point, Rollback segment. Users, Roles and Privilege : Concept, creating users, system and object privilege, GRANT privilege, REVOKE privilege, passing on privileges, creating roles.

Suggested Reading:

1. Balagurusamy, E. 1995. Object oriented programming with C++, TMH.
2. Herbert Schidt, 1995. C++ The complete Reference, 2 nd Edition, Osborne, MGH.
3. Jeffery D. Ulman, 1998. Principles of database system, Galgotia Publishers.
4. Jdate C.J., 1995. An Introduction to Database System, Third Ed. Narosa Publishing Company.
5. Henry F. Korth and Abraham Silberschatz, 2000. Database system concepts, McGraw Hill
a. International Publication.
6. SQL Quickstart Guide: The Simplified Beginner's Guide to SQL Paperback

Learning Outcome:

Upon completion of the course successfully, students would be able to

1. Discuss the basics of programming.
2. Learn about SQL basis of database creation, table creation, and other table related operations.
3. Use the databases and its real world applications.

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B.Sc. Bioinformatics

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AECIV

R- programming

01

Cos:

Upon completion of the course successfully, students would be able to Write a code in R

Unit I (Introduction to R programming)

R programming – Introduction and preliminaries, Simple manipulation, Objects and Modules, Orders, Arrays, Lists, Reading data from files, Loops and conditions, Functions creation, Packages.

Suggested Reading:

1. James Tisdall, Beginning R for Bioinformatics, O'Reilly, 2000
2. D Curtis Jamison, R Programming for Biologists, John Wiley & Sons, INC, 200
3. . Michael Moorhouse, Paul Barry, Bioinformatics Biocomputing and Perl, Wiley, 2004.

Learning Outcome:

Upon completion of the course successfully, students would be able to

1. 1. Acquire knowledge and understanding of the R concepts as applicable to diverse areas such as medical, industrial, environment, genetics, agriculture, food and others.

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Advanced BIO-Computing

01

Practical-VI

Cos: Upon completion of the course successfully, students would be able to adapt basic knowledge on C++ and SQL.

1.	WAP to demonstrate a simple program structure
2.	WAP to demonstrate arithmetic operators using C++
3.	WAP for nested if... else statement using C++
4.	WAP for "for...loop" statement using C++
5.	WAP for inline function
6.	WAP to demonstrate function overloading using C++
7.	WAP in C++ to demonstrate the concept of class and objects using inside member function definition.
8.	WAP in C++ to demonstrate parameterized constructor
9.	WAP for Implementing the inheritance in C++
10.	WAP to study DDL (create) and DML (insert) command
11.	WAP to study delete command
12.	WAP to study an update command
13.	WAP to retrieve data from database using the WHERE clause
14.	WAP to study numeric function
15.	WAP to study character function
16.	WAP to study transaction control commands

Learning Outcome:

Upon completion of the course successfully, students would be able to

Apply the C++ and SQL in order to solve problems in bioinformatics.

1. Creation of Databases.
2. Practical's on various operators.
3. Practical's based on OOPs.