DPL

DIPLOMA IN PROGRAMMING LANGUAGES

SYLLABUS

AiNS™
COMPUTER INSTITUTE

COURSE DURATION 8 MONTHS

CONTENTS:

- **C PROGRAMMING**
- **C ++**
- **CORE JAVA**
- **ADVANCED JAVA**
- **PYTHON**
- **SQL**
- **DATA STRUCTURE**

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An ISO 9001 :2015 Certified
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COURSE DURATION 8 MONTHS

C PROGRAMMING

- History Of C Language
- Algorithm & Flowcharts
- Keywords : Data-types, Variables
- Keywords : Constants, Expression
- Programming Structures (Loop Concepts)
- Array (1d & 2d)
- Functions (Declaration & Prototype)
- Functions (Passing & Returning Values)
- Functions (C Return Statement)
- Functions (Passing Array Elements To Function)
- Functions (Passing Array To Function)
- Recursive Functions
- String Handling (Different String Function)
- Pointers (Concept, Pointers & Arrays)
- Pointers (Character Array)
- Structures (Declaring Structure Elements)
- Structures (Accessing Structure Elements)
- Structures (Arrays Of Structure)
- Structure (Pointer & Structures)
- Unions
- File Handling (File Operation)
- File Handling (Different Modes Of Files)
- Files (Command Line, Arguments)
- Files (Misc. I/O Function)
- Files (Modes Of Files)

C ++
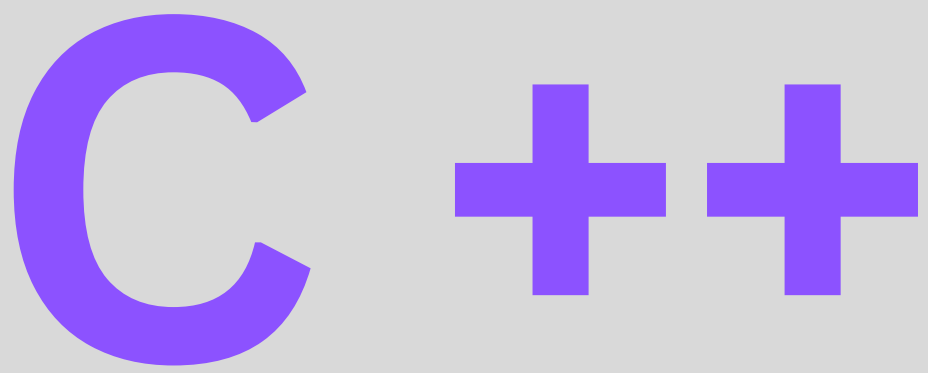
- Files And Console I/O
- Procedure V/S Object Oriented Programming
- Benefits Of OOP's
- Different OOP's Features
- Data Types, Variables
- Constants, Expressions
- Operators (Arithmetic, Logical, Relational)
- Operators (Conditional, Assignments)
- Type Conversion & Casting
- Control Structure (If, If-else, Nested If-else)
- Control Structure (Switch, While Loop)
- Control Structure (For Loop)
- Control Structure (Do While Loop)
- Control Structure (Break, Continue)
- Control Structure (Nested Loops)
- Functions (Pass By Value, Pass By Reference)
- Functions Overloading
- Functions (Inline Functions, Friend Function)
- Classes & Objects (Class Definition, Public)
- Classes & Objects (Private)
- Classes & Objects (Protected Members)
- Constructor & Destructor (Characteristics)

- **Default Constructor**
- **Constructor Overloading**
- **Parameterized Constructor, Destructor**
- **Copy Constructor, Operator Overloading**
- **Inheritance (Base & Derived Class)**
- **Single & Multilevel Inheritance**
- **Abstract Class, Virtual Base Class**
- **Virtual Function**
- **Pointer, Polymorphism, Pointer To Array**
- **Run Time & Compile Time Polymorphism**
- **Template (Template Class)**
- **C + +**
- **Template (Function Templates)**

CORE JAVA

- **What is JavaHistory of Java**
- **Features of Java**
- **C++ vs Java**
- **Hello Java Program**
- **How to set path?**
- **JDK, JRE and JVMJVM: Java Virtual Machine**
- **Java Variables**
- **Java Data Types**
- **Unicode System**
- **Operators**
- **instanceof operator**
- **Control Statements**
- **Java Control Statements**
- **Java If-else**
- **Java Switch**
- **Java For Loop**
- **Java While Loop**
- **Java Do While Loop**
- **Java Break- Continue**
- **Java Comments**
- **Java Object Class**
- **Naming Convention**
- **Object and Class**
- **Constructor**
- **Wrapper**

- **Java Array**
- **Java OOPs Concepts:Inheritance/Encapsulation /Abstraction/Polymorphism**
- **Java OOPs Misc**
- **Java Recursion**
- **Method :Overloading/Overriding**
- **Covariant Return Type**
- **super /final/static /this keywords**
- **Instance Initializer block**
- **Runtime Polymorphism**
- **Dynamic Binding**
- **Object Cloning**
- **Abstract class**
- **InterfaceAbstract vs Interface**
- **Package Access**
- **Object /Math /Wrapper classes**
- **java doc tool**
- **Command Line Arg**

ADVANCE JAVA

PYTHON

Session 1: Introduction to Python

-
- **What are Python and the history of Python?**
- **Unique features of Python**
- **Python-2 and Python-3 differences**
- **Install Python and Environment Setup**
- **First Python Program**
- **Python Identifiers, Keywords, and Indentation**
- **Comments and document interlude in Python**
- **Command-line arguments**
- **Getting User Input**
- **Python Data Types**
- **What are the variables?**
- **Python Core objects and Functions**
- **Number and Maths**
- **Week 1 Assignments**

Session 2: Control Statements

- **If-else**
- **If-elif-else**
- **while loop**
- **for loop**
- **Break**
- **Continue**
- **Assert**
- **Pass**
- **return**

Session 3: List, Ranges & Tuples in Python

- **Introduction**
- **Lists in Python**
- **More about Lists**
- **Understanding Iterators**
- **Generators, Comprehensions and Lambda Expressions**
- **Introduction**
- **Generators and Yield**
- **Next and Ranges**
- **Understanding and using Ranges**
- **More About Ranges**
- **Ordered Sets with tuples**

Session 4: Python Dictionaries and Sets

- **Introduction to the section**
- **Python Dictionaries**
- **More on Dictionaries**
- **Sets**
- **Python Sets Examples**

Session 5: Input and Output in Python

- **Reading and writing text files**
- **Writing Text Files**
- **Appending to Files and Challenge**
- **Writing Binary Files Manually**
- **Using Pickle to Write Binary Files**

Session 6: Python built-in function

- **Python user-defined functions**
- **Python packages functions**
- **Defining and calling Function**
- **The anonymous Functions**
- **Loops and statement in Python**
- **Python Modules & Packages**

Session 7: Python Object Oriented

- **Overview of OOP**
- **The self variable**
- **Constructor**
- **Types Of Variables**
- **Namespaces**
- **Creating Classes and Objects**
- **Inheritance**
- **Types of Methods**
- **Instance Methods Static Methods Class Methods**
- **Accessing attributes**
- **Built-In Class Attributes**
- **Destroying Objects**
- **Abstract classes and Interfaces**
- **Abstract Methods and Abstract class**
- **Interface in Python**
- **Abstract classes and Interfaces**

Session 8: Exceptions

- **Errors in Python**
- **Compile-Time Errors**
- **Runtime Errors**
- **Logical Errors**
- **What is Exception?**
- **Handling an exception**
- **Try ...except...else**
- **try-finally clause**
- **The argument of an Exception**
- **Python Standard Exceptions**
- **Raising an exceptions**
- **User-Defined Exception**

Session 9: Python Regular Expressions

- **What are regular expressions?**
- **The match Function**
- **The search Function**
- **Matching vs searching**
- **Search and Replace**
- **Extended Regular Expressions**
- **Wildcard**

Session 10: Python Multithreaded Programming

- What is multithreading?
- Difference between a Process and Thread
- Concurrent Programming and GIL
- Uses of Thread
- Starting a New Thread
- The Threading Module
- Thread Synchronization
- Locks
- Semaphore
- Deadlock of Threads
- Avoiding Deadlocks
- Daemon Threads
- Session 11: Using Databases in Python
- Python MySQL Database Access
- Install the MySQLdb and other Packages
- Create Database Connection
- CREATE, INSERT, READ Operation
- DML and DDL Operation with Database
- Graphical User Interface
- GUI in Python
- Button Widget
- Label Widget
- Text Widget

Session 12: Django Web Framework in Python

- Introduction to MVC and MVT architecture on web development.
- Django folder structure flow of control.

Session 13: Web scraping in python

Session 14: Introduction to Data Science

SQL

Chapter 1: - Introduction to Basic Database Concepts

- What is Data, Field, Record and database?
- Limitations of File Management System.
- Basic Concepts of Advantages of DBMS,
- Level of abstraction, Database models,
- Exploring Relational DBMS,
- Discuss the basic design, theoretical, and physical aspects
- of a relational database
- Understanding Client and Server,
- What is MySQL?

Chapter 2: Introduction to SQL

- MySQL datatypes
- Basics of Types of SQL Statements
- Create and use Database
- Categorize the different types of SQL statements: DDL, DML, DQL, DCL and TCL
- Data types in SQL
- Exploring DDL Statements on Table

Chapter 3: Writing Basic SQL Statement

- **List the capabilities of SQL SELECT statements**
- **Generate a report of data from the output of a basic select statement**
- **Select All Columns**
- **Select Specific Columns**
- **Use Column Heading Defaults**
- **Use Arithmetic Operators**
- **Understand Operator Precedence**
- **Learn the DESCRIBE command to display the table structure**
- **Using Parentheses**
- **Defining a Null**
- **Defining a Column Alias**
- **Using Column Aliases**
- **Concatenation Operator**
- **Using the Concatenation Operator**
- **Literal Character Strings**
- **Using Literal Character Strings**
- **Duplicate Rows**
- **Eliminating Duplicate Rows**

Chapter 4: Restricting and Sorting Data

- **Limiting Rows Using a Selection**
- **Limiting the Rows Selected**
- **Using the WHERE Clause**
- **Character Strings and Dates**
- **Comparison Conditions**
- **Using Comparison Conditions**
- **Other Comparison Conditions**
- **Using the BETWEEN Condition**
- **Using the IN Condition**
- **Using the LIKE Condition**
- **Using the NULL Conditions**
- **Logical Conditions**
- **Using the AND Operator**
- **Using the OR Operator**
- **Using the NOT Operator**
- **Rules of Precedence**
- **ORDER BY Clause**
- **Sorting in Descending Order**
- **Sorting by Column Alias**
- **Sorting by Multiple Columns**

Chapter 5: Advance DDL Commands

- **Alter Table Statements**
- **Drop Table Statements**
- **Various Constraints**
- **Commit**
- **Rollback**
- **Savepoint**
- **Creating Views**

Chapter 6: Working on DML statements

- Data Manipulation Language
- Adding a New Row to a Table
- The INSERT Statement Syntax
- Inserting New Rows
- Inserting Rows with Null Values
- Inserting Special Values
- Inserting Specific Date Values
- Creating a Script
- Copying Rows from another Table
- Changing Data in a Table
- The UPDATE Statement Syntax
- Updating Rows in a Table
- Updating Two Columns with a Subquery
- Updating Rows Based on another Table
- Updating Rows: Integrity Constraint Error
- Removing a Row from a Table
- The DELETE Statement
- Deleting Rows from a Table
- Deleting Rows Based on another Table
- Deleting Rows: Integrity Constraint Error
- Using a Subquery in an INSERT Statement

Chapter 7: Use of built-in function in SQL

- Conversion Function
- Logical Functions
- Math Function
- Aggregate Functions
- String Functions
- Date Functions
- Chapter 8: Working on multiple tables and Retrieve records from multiple tables
- Self-Join
- Inner Join
- Left Join
- Right Join
- Cross Join

DATA STRUCTURE

- **Algorithms**
- **What Is Data Structure?**
- **Array**
- **Lists**
- **Stacks**
- **Queues**
- **Trees**
- **Graphs**
- **Sorting Methods**
- **Searching Techniques**
- **Tables**
- **Files**