

(Dec-2014)

**Course Name** : Certificate Course in Visual Basic & Oracle

**Course Code** : C05

Module	Subject	Topics	Total Duration	Theory	Practical
C05-01	Object oriented Programming	Basic Concepts of Programming & OOPs	25	15	10
C05-02	Visual Basic (VB 7.0)	Programming using Visual Basic	70	30	40
C05-03	RDBMS Concepts	Basic Concept of RDBMS	95	45	50
	<b>Total (Hrs)</b>		<b>190</b>	<b>90</b>	<b>100</b>

**Module Code C05-01****Module Name:** Object oriented Programming**Topics:** Basic Concepts of Programming & OOPs**T- 15****P-10***Programming Using C++*

Introduction to object oriented programming, characteristics of object programming languages.

**Overview of C++:** Characters and string literals, variables, objects and their declarations, operators.

**Principles of Object-Oriented Programming:** Software Crisis; Software Evolution; A Look at Procedure-Oriented Programming; Object Oriented Programming Paradigm; Basic Concepts of Object-Oriented Programming; Benefits of OOP; Object Oriented Languages; Applications of OOP.

**Beginning with C++:** What is C++?, Applications of C++, Character and string literals, object and their declarations, operators, A Simple C++ Program, More C++ Statements, An Example with Class; Structure of C++ Program, Creating the Source File, Compiling and Linking.

**Tokens, Expressions and Control Structures:** Introduction; Tokens; Keywords; Identifiers; Basic Data Types; User-Defined Data Types; Derived Data Types; Symbolic Constants; Type Compatibility; Declaration of Variables; Dynamic Initialization of Variables; Reference Variables; Operators in C++; Scope Resolution Operator; Member Dereferencing Operators; Memory Management Operators; Manipulators; Type Case Operator; Expressions and Implicit Conversions; Operator Overloading; Operator Precedence; Control Structures.

**Functions in C++:** Introduction; The Main Function; Function Prototyping; Call by Reference; Inline Functions; Default Arguments; const Arguments; Function Overloading; Friend and Virtual Functions.

**Statements:** Simple statements, conditional statements, compound conditions, book lean, expressions, nested conditions, switch statements, Type Conversion.

**Loops and Iterations:** While statement, do... while, for, break, continue.

**Functions:** Library functions, user defined functions, declaration and definitions, local variables and functions, function types, passing by reference, passing by constant reference, scope of functions, overloading.

**Overloading:** Overloading the assignment operator, arithmetic operator, relational operators, increment and decrement operators, conversion operators. String classes, composition and

inheritance, stream I/O templates. Elements of Visual C++, working with forms, communicating with other applications, class libraries.

**Arrays:** Defining arrays, array elements, initializing and processing arrays, passing arrays to functions, sorting and searching arrays, type definitions, multidimensional arrays.

**Pointers and References:** Introduction to pointers and references, objects and values, returning a reference, array and pointers, new and delete operators, pointers to pointers and functions.

**Classes and Objects:** Introduction; C Structures Revisited; Specifying a Class; Defining Member Functions; A C++ Program with Class; Making an Outside Function Inline; Nesting of Member Functions; Private Member Functions; Arrays Within a Class; Memory Allocation for Objects; Static Data Members; Static Member Functions; Arrays of Objects; Objects as Function Arguments; Friendly Functions; Returning Objects; const Member Functions; Pointers to Members.

**Constructors and Destructors:** Introduction; Constructors; Parameterized Constructors; Multiple Constructors in a Class; Constructors with Default Arguments; Dynamic Initialization of Objects; Copy Constructor; Dynamic Constructors; Constructing Two-Dimensional Arrays; Destructors.

**Operator Overloading and Type Conversions:** Introduction; Defining Operator Overloading; Overloading Unary Operators; Overloading Binary Operators; Overloading Binary Operators Using Friends; Manipulation of Strings Using Operators; Rules for Overloading Operators; Type Conversions.

**Inheritance: Extending Classes:** Introduction; Defining Derived Classes; Single Inheritance; Making a Private Member Inheritable; Multilevel Inheritance; Multiple Inheritance; Hierarchical Inheritance; Hybrid Inheritance; Virtual Base Classes; Abstract Classes; Constructors in Derived Classes; Member Classes: Nesting of Classes.

**Pointers and References, Virtual Functions and Polymorphism:** Introduction to pointers and references; Pointers to Objects; objects and values, returning a reference, array and pointers, new and delete operators, pointers to pointers and functions, this Pointer; Pointers to Derived Classes; Virtual Functions; Pure Virtual Functions.

**Strings:** Strings, string I/O arrays of strings, string related library functions.

**Classes:** Introduction, class declaration, constructors, access functions, copy constructor, class destructor.

**Managing Console I/O Operations:** Introduction; C++ Streams; C++ Stream Classes; Unformatted I/O Operations; Formatted Console I/O Operations; Managing Output with Manipulators.

**Working with Files:** Introduction; Classes for File Stream Operations; Opening and Closing a File; Detecting End-of-File; More About Open(): File Modes; File Pointers and Their Manipulations; Sequential Input and Output Operations; Updating a File: Random Access; Error Handling During File Operations; Command-Line Arguments.

**Object-Oriented Systems Development:** Introduction; Procedure-Oriented Paradigms; Procedure-Oriented Development Tools; Object-Oriented Paradigm; Object-Oriented Notations and Graphs; Steps in Object-Oriented Analysis; Steps in Object-Oriented Design; Implementation; Prototyping Paradigm; Wrapping Up.

**Module Code C05-02**  
**Module Name: Visual Basic.NET(VB 7.0)**  
**Topics:Programming using VB.NET**

**T- 20**

**P- 40**

## **Visual Basic.NET**

- **Introduction to the .NET-.NET Framework** and the common language Runtime,components of .NET framework,NET Framework class library,.NET architecture, What is new in VB.NET
- **Introduction to Visual Basic-** VB.Net – Overview, Integrated Development Environment (IDE) For VB.Net, Visual Basic.NET as a programming language; Program Structure, Event driven Programming, VB.NET as an object oriented programming language, Strong Programming Features,compile and execute VB.NET program.
- **Visual basic.NET Constructs-** constants, variables,data types, keywords,modifiers,arrays and dynamic arrays, strings, VB.NET operators,directives,date and time, statements (declaration,decision making,loops,selection,with statement), sub procedures and functions,exception handling
- **Windows Forms-** Windows MDI forms,event handling,working with multiple forms, using visual inheritance between forms,text boxes,Rich text boxes,labels,link labels,buttons,checkboxes,radio buttons,panels and group boxes,list boxes,checked list boxes,combo boxes,picture boxes,scroll bars,splitters,trackbars,pickers,notify icons,tool tips,timers, built in Dialog boxes,menus printing documents,image lists,tree views,list views,tool bars,status bars,progress bars,tab controls.
- **VB.NET as an object oriented programming language-** classes and objects, fields, properties, methods, events,abstraction,encapsulation,inheritance,inheritance modifiers, (public, private, protected, friend)polymorphism,overloading,overriding,shadowing, constructors and destructors
- **Graphics and file handling-** Handling images using Graphics class,pen class and brush class,file handling using file class,directory class,BinaryReader and BinaryWriter classes,StreamReader and StreamWriter classes
- **.NET Assemblies-** .NET Assemblies,shared assemblies,private assemblies,configuring assembly lookup
- **ADO.NET-** databases,accessing data with ServerExplorer,Accessing data with Data Adaptors and datasets,working with ADO.NET,displaying data in a data Grid,simple binding,complex binding,binding data to controls,navigating in datasets
- **Multithreading-** creating threads,starting threads, suspending threads, resuming threads, stopping threads,sleeping threads ,synchronizing threads ,joining threads,web user controls

- **Security in .NET**- Overview of security, understanding Role-Based security

## **Module Code C05-03**

**Module Name:** RDBMS Concepts

**Topics:** Basic Concept of RDBMS

**T- 45**

**P-50**

### ***RELATIONAL DATA BASE MANAGEMENT SYSTEM (RDBMS)***

**An Overview of DBMS and DB Systems Architecture:** Introduction to Database Management systems; Data Models; Database System Architecture; Relational Database Management systems; Candidate Key and Primary Key in a Relation; Foreign Keys; Relational Operators; Set Operations on Relations; Attribute domains and their Implementation.

**The Normalization Process:** Introduction; first Normal Form; data Anomalies in 1NF Relations; Partial Dependencies; Second Normal Form; data Anomalies in 2NF Relations; Transitive Dependencies; Third Normal Form; data Anomalies in 3NF Relations;

**The Entity Relation Ship Model:** The Entity Relationship Model; Entities and Attributes; Relationships; One-One Relationships; Many-to-one Relationships; Normalizing the Model; Table instance charts.

**Interactive SQL:** SQL commands ; Data Definition Language Commands; Data Manipulation Language Commands; The Data types a cell can hold; insertion of data into the tables; Viewing of data into the tables; Deletion operations; updating the contents of the table; modifying the structure of the table; renaming table; destroying tables; Data Constraints; Type of Data Constraint; Column Level Constraint; Table Level Constraint; Null value Concepts; The UNIQUE Constraint; The PRIMARY constraint; The FOREIGN key constraint; The CHECK Constraint; Viewing the User Constraints;

**Viewing The Data:** Computations on Table Data; Arithmetic Operators; Logical Operators; Comparison Operators; Range Searching; Pattern Searching; ORACLE FUNCTIONS; Number Functions; Group Functions; Scalar Functions; Data Conversion Functions; Manipulating Dates in SQL ; Character Functions;

**Sub queries and Joins:** Joins; Equi Joins; Non Equi Joins; Self Joins; Outer Joins; SubQueries; Correlated Queries; Using Set Operators:- Union , Intersect; Minus ;

**Views and Indexes:** Definition and Advantages Views; Creating and Altering Views; Using Views; Indexed Views; Partitioned views; Definition and Advantages of Indexes; Composite

Index and Unique Indexes; Accessing Data With and without Indexes; Creating Indexes and Statistics.

**Introduction to PL/SQL:** Advantage of PL/SQL; The Generic PL/SQL Block; The Declaration Section; The Begin Section; The End Section; The Character set; Literals; PL/SQL Data types; Variables; Constants; Logical Comparison; Conditional Control in PL/SQL; Iterative Control;

**Advanced PL/SQL:** Types of Cursors; Implicit Cursor; Explicit Cursor; Explicit Cursor attributes; Cursor For Loop; Parameterized Cursor; Error Handling in PL/SQL; Internal Exceptions; User Defined Exceptions.

**Database Objects:** Sequences, Creating Sequences; Referencing Sequences; altering a Sequence; Dropping a Sequence, Stored Procedures and Functions:- Advantages of using a Procedure or Function; Procedure Versus Functions; Creating stored Procedures and Functions; Parameters to Procedures and Functions; Deleting a Stored Procedure or a Functions; Packages:- Components of a Package; Package Objects; Private and Public ; Package state; Package Dependency; Triggers:- Use of Database Triggers; Database Triggers V/s Procedures; Database Triggers V/S Integrity constraints; RAISE\_APPLICATION\_ERROR PROCEDURE; Types of Triggers:- Row Triggers, statement Triggers; Before V/S After Triggers; Deleting a Trigger;

**Object Types and Varying Arrays:** User Defined Data Types, Creating a Type, Varying Array, Creating and Using a Varying array, Nested Tables.

**Objects/Basic Database Administration:** Basic Data Base Administration; Creating User; Using Tables in Another schema; Creating roles for Applications; Granting and Revoking previliges; System and Object Privileges;