## Module 4: Computer Programming

Total 234 hrs

Theory 43 hrs

Practical 191 hrs

**Duty 1: Program in Q-Basic**

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| **S.No.** | **TASK** | **RELATED KNOWLEDGE** | **TIME (in hours)** | |
| **Theory** | **PRAC.** |
| 1 | Collect basic information for programming. | * Programming   + Introduction   + Types   + Function   + Importance * Computer Programming   + Introduction   + Types   + Function   + Importance * Programming language   + Introduction   + Types   (Language, Machine Language, Machine Levels, Middle Levels, High Levels.)   * + Function   + Importance * Problem solving with Computer * Translation (interpreter and compiler) * Procedural based language * Structure Language * Object-oriented language | 1 | 0 |
| 2. | Familiarize basic data types | * Data types   + Definition   + Basic   + User defined * Strings: (Variable-length, Fixed length) * Integer (Long integer, Short integer) * Precision (Single & double) | 1 | 3 |
| 3. | Familiarize constants | * Numeric constants (String and numeric) | 1 | 2 |
| 4. | Familiarize variables | * Constants   + Introduction   + Types   + Function   + Importance * Conversion of constants, * Reserved words, * User defined words | 1 | 2 |
| 5. | Familiarize the QBasic language elements | * Basic statements   + Introduction   + Function   + Importance * Different data type suffixes * Basic program line * Line numbers * Alphanumeric line labels * Basic line length | 1 | 3 |
| 6. | Familiarize the expressions/ operators | * Arithmetic, Relational, Logical, Functional and String operators * Hierarchy of operations | 1 | 2 |
| 7 | Write function and sub function statement |  | 1 | 2 |
| 8. | Develop Pseudo code |  | 1 | 2 |
| 9. | Draw flowchart | * Features, types, advantage, disadvantage of flow chart. * Flow chart symbols | 1 | 3 |
| 10. | Handle file | * Sequential file processing | 1 | 2 |
| 11. | Handle matrix | * Types of matrix * Matrix operation: Reading, printing, addition, subtraction, multiplication, transposing and inversion | 1 | 3 |
| 12. | Project work |  |  | 5 |
| **Sub-Total** | | | **11** | **29** |

**Duty 2: Program in C**

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| **S. No.** | **TASK** | **RELATED KNOWLEDGE** | **TIME (in hours)** | |
| **Theory** | **PRAC.** |
| 1 | Start C programming | * C language   + Introduction   + C programming tool * Integer and floating * Symbols   + Introduction   + Types   + Functions   + Important * Making and saving programs * Compile programs * Build programs * Execute programs | 1 | 2 |
| 2 | Develop Flowchart | * Logical statements * Pseudo code | 1 | 3 |
| 3 | Design programming styles | * Suitable indent, space and line break * Style of Naming variables, user-defined functions and structures * The better way of writing comments * Define value and its use | 1 | 2 |
| 4. | Identify the skeleton of C | * Reserved words and reserved characters * Capital and small characters in C language * Including header files, starting from “main” function, bracket types, functions of semicolon, single and double quotation, etc. | 1 | 2 |
| 5. | Familiarize with data type for C programs | * Variable * Numerical variable * String variable | 1 | 3 |
| 6. | Familiarize the Input / Output | * Format Input / Output * Un-format Input / Output | 1 | 4 |
| 7. | Select and write operators | * Arithmetic operators * Parallel operators * Logical operators | 2 | 4 |
| 8. | Develop control statement | * For statement * While, do while statement * If-else statement * Switch-case statement | 2 | 4 |
| 9. | Develop array | * Array Variable * One-dimensional Array * Multi-dimensional Array | 1 | 4 |
| 10. | Define functions | * Introduction to Function * Declaration of Function * Types of Function and their Usage | 2 | 10 |
| 11. | Define pointer | * Introduction of Pointer * Pointer and Array * Pointer and Function | 2 | 12 |
| 12. | Define structures | * Introduction of Structure * Structure & Pointer | 1 | 3 |
| 13 | Develop Algorithm | * Importance of algorithm in Problem Solving * Examples of Basic simple algorisms (searching prime numbers, bobble and quick sort, list and tree structure, hash, etc) | 2 | 6 |
| 14. | Handle file | * Introduction to file | 1 | 3 |
| 15. | Initialize graphics | * Introduction to graphics * Simple Graphics Function | 1 | 3 |
| 16. | Project work |  |  | 5 |
| **Sub-Total** | | | **20** | **70** |

**Duty 3: Program in Visual Basic**

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| --- | --- | --- | --- | --- |
| **S. No.** | **TASK** | **RELATED KNOWLEDGE** | **TIME (in hours)** | |
| **Theory** | **PRAC.** |
| 1. | Familiarize Visual Basic | * Design, editing features, tool box | ½ | 2 |
| 2. | Perform VB editor | * Adding components to project, Naming the components, Overview of the entire project, The quality of components/forms | ½ | 2 |
| 3. | Create interface | * Properties windows, Rapid Application Development (RAD), Properties of a text box, Tool tips to assist the user, Application Running and testing, Saving the application, Tab Index properties | 1 | 3 |
| 4. | Write first code | * The code window, Basic programming steps, Assigning the text to a Text Box, Command Dialog components | ½ | 2 |
| 5. | Flesh out first application | * The testing processes, Auto Syntax Check / Auto Members features, Saving and printing text, Importing and exporting from windows clipboard, Launching separate application from within VB | 1 | 3 |
| 6. | Explore option buttons / Check boxes / simple dialogs | * Use of more than one form, The effect of a cancel button on the programming, hiding and showing commands with the forms | 1 | 3 |
| 7. | Work with text boxes | * The default text box, text box's properties, The Properties Window | ½ | 2 |
| 8. | Add/ format labels |  | ½ | 2 |
| 9. | Work with list and combo boxes |  | ½ | 2 |
| 10. | Work with graphics | * Difference between Image and Picture Box controls, Displaying graphics, Graphics at run time, Animation features, Adding graphics to other controls (Command Buttons etc.), Line and Shape controls | 1 | 3 |
| 11. | Develop adding menus | * The basic menus, VB application wizard, Attaching program to menu item, Menu Editor, Context menu, Parameters / constants | 1 | 3 |
| 12. | Inform user with dialog boxes | * The msg box features, Arguments, Buttons and Icons * Input box | ½ | 2 |
| 13. | Familiarize with common dialog components | * Five common dialogs, File access to the user, Colors/ Font properties | ½ | 2 |
| 14. | Describe procedures/ parameters / functions / argument-passing modes / single stepping / redundancies / data types |  | 1 | 4 |
| 15. | Explore variables / scope | * Text and numeric data, Naming and manipulating variables, Working with scope | ½ | 2 |
| 16. | Explore the VB's built in functions | * Literals, constants, expressions, strings, numeric functions, data conversion and querying, Numbering format, Financial functions, Date and time functions | 1 | 6 |
| 17. | Explore various operators | * Arithmetic, Comparison and Logical operators | ½ | 4 |
| 18. | Work in arrays / Looping/ Branching | * Creation and manipulation of arrays, Simple loops; *For Next, Do…Loops, While…Wend loops*, Decision loops; *For…Next, Else, Select… Case, Is and To* | 1 | 6 |
| 19 | Handle error disposal | * Error handling with *On Error* statement * Error object | ½ | 2 |
| 20 | Access files | * Finding existence of files * Handling files. Open, write, read, and close files | 1 | 4 |
| 21. | Apply timers / controls arrays | * Timer controls, Gang-programming, reducing redundancies | ½ | 3 |
| 22. | Track down / fix the bugs | * Typos and bad punctuation, dealing with run time errors, locating logic bugs and debugging tools | 1 | 6 |
| 23. | Design an application | * Adding features, User interface, Single Document Interface (SDI), Multiple Document Interface (MDI), Records, Fields, Tables and Indexes | 1 | 6 |
| 24. | Build user interface | * Primary components, sizing and positioning the components, Shortcut keys, Some basic code, TabIndex | 1 | 4 |
| 25 | Explore Libraries | * MSDN library for Visual Basic | ½ | 2 |
| 26. | Execute the windows application program | * Deploying the project, Package and Deployment wizard | ½ | 2 |
| 27. | Project Work |  |  | 10 |
| **Sub-Total** | | | **12** | **92** |