

Punyashlok Ahilyadevi Holkar Solapur University, Solapur



NAAC Accredited-2015, 'B' Grade (CGPA 2.62)

Board of Studies in Software Development

Credit System Pattern Syllabus

For

B. Voc. Part-I (Diploma)

Diploma in Software Development

(To be implemented from the academic year: 2019-20)

BACHELOR OF VOCATION (B.Voc.)

STRUCTURE OF SYLLABUS:

To be implemented from the academic year 2019-20

1. Title of the course: Bachelor of Vocation (Software Development)

A. INTRODUCTION

All India Council for Technical Education (AICTE) Ministry of HRD, Government of India has introduced Entrepreneurship oriented Skill development courses of B.Voc/D.Voc/Skill Diploma. These courses will be run by AICTE approved institutes by using available infrastructure and facilities. In these courses the institute will conduct general education content and sector specific skills will be imparted by Skill Knowledge Providers/ Training Providers/ Industries

B. COURSE OBJECTIVES

After successfully completing the vocational course, the student should be able to acquire relevant appropriate and adequate technical knowledge together with the professional skills and competencies in the field of Software Development so that he/she is properly equipped to take up gainful employment in this Vocation. Thus he/she should have acquired.

- (a) To provide judicious mix of skills relating to a profession and appropriate content of General Education.
- (b) To ensure that the students have adequate knowledge and skills, so that they are work ready at each exit point of the programme.
- (c) To provide flexibility to the students by means of pre-defined entry and multiple exit points.
- (d) To integrate NSQF within the Diploma, undergraduate level of higher education to enhance employability of the students and meet industry requirements. Such student apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global workforce.
- (e) To provide vertical mobility to students admitted in such vocational courses.

The certification levels will lead to Diploma/Advanced Diploma/B. Voc. Degree in Software Development and will be offered by respective affiliating University/Board of Technical Education.

Students may be awarded Level Certificate/Diploma/Advance Diploma Degree as out-lined in the Table below:

Award	Duration after class X	Corresponding NSQF level
Level 3 Certificate	1 Year	3
Level 4 Certificate	2Years	4
Diploma	3 Year	5
Advance Diploma	4 Years	6
B.Voc Degree	5 Years	7

D. DURATION:

The duration of the B.Voc. Course will be of **three years** with flexibility to the students by means of pre-defined entry and multiple exit points. The certification levels will lead to Diploma/Advanced Diploma/B. Voc. Degree in Software Development and will be offered by respective affiliating University. Award of certificates after successful completion of respective years is as follows:

- ❖ **B.Voc. Year I - Diploma in Software Development**
- ❖ **B.Voc. Year II - Advanced Diploma in Software Development**
- ❖ **B.Voc. Year III - Bachelor of Vocation in Software Development**

Awards		Normal calendar duration	On Job Training (OJT)/ Qualification Packs(QP) Credits	Theory & Practical/Lab Credits
Year 1	Diploma in Software Development	Two Semesters	30	30
Year 2	Advanced Diploma in Software Development	Four Semesters	30	30
Year 3	B.Voc in Software Development	Six Semesters	30	30
TOTAL			90	90

B. Voc. Part - I (Software Development) Coursestructure

Credit System Structure of B.Voc. Part I - Diploma in Software Development
w.e.f. 2019-20

Semester I

Theory Course

Course Code	Name of Theory Course	Hrs./Week		Credits	Examination Scheme (Marks)		
		L	P		ISE	ESE	Total
5.GV.01	Communication Skills	3	-	3	20	30	50
5.GV.02	Web Designing	3	-	3	20	30	50
5.GV.03	IT Foundation and Programming Concepts	3	-	3	20	30	50
5.GV.04	Programming in C	3	-	3	20	30	50
Sub Total		12	-	12	80	120	200

Lab / Practical Course

Course Code	Name of Theory Course	Hrs./Week		Credits	Examination Scheme (Marks)	
		L	P		ICA	Total
5.GV.02	Web Designing	-	3	1.5	50	50
5.GV.04	Programming in C	-	3	1.5	50	50
Sub Total		-	6	3	100	100

On-Job-Training (OJT)/Qualification Packs

Course Code	Name of Theory Course		Hrs./Week		Credits	Examination Scheme (Marks)	
			L	P		ICA	Total
SSC/Q0505	Technical Writer	(Any one)					
SSC/Q0801	Infrastructure Engineer		5	20	15	200	200
SSC/Q2202	Associate – CRM						
Sub Total		-	5	20	15	200	200
Grand Total			17	26	30	500	500

Abbreviations: L: Lectures, P: Practical, ESE: End Semester Examination (University Examination for Theory), ICA: Internal Continuous Assessment

Theory Course

Course Code	Name of Theory Course	Hrs./Week		Credits	Examination Scheme (Marks)		
		L	P		ISE	ESE	Total
5.GV.05	Data Structures	3	-	3	20	30	50
5.GV.06	Concepts of Data Mining	3	-	3	20	30	50
5.GV.07	OOPs with Java	3	-	3	20	30	50
5.GV.08	Operating System (OS)	3	-	3	20	30	50
Sub Total		12	-	12	80	120	200

Lab / Practical Course

Course Code	Name of Theory Course	Hrs./Week		Credits	Examination Scheme (Marks)	
		L	P		ICA	Total
5.GV.05	Data Structures	-	3	1.5	50	50
5.GV.07	OOPs with Java	-	3	1.5	50	50
Sub Total		-	6	3	100	100

On-Job-Training (OJT)/Qualification Packs

Course Code	Name of Theory Course		Hrs./Week		Credits	Examination Scheme (Marks)	
			L	P		ICA	Total
SSC/Q0503	Web Developer	(Any one)	5	20	15	200	200
SSC/Q1301	Test Engineer						
Sub Total		-	5	20	15	200	200
Grand Total			17	26	30	500	500

Abbreviations: L: Lectures, P: Practical, ESE: End Semester Examination (University Examination for Theory), ICA: Internal Continuous Assessment

(5.GV.01) Communication skills

Teaching Scheme

Lectures– 3 Hours/week, (3Credits)

Examination Scheme

ISE - 20 Marks

ESE- 30 Marks

Unit 01: English Grammar

Parts of Speech :Nouns, Pronouns, Verbs, Auxiliary verbs, Modal verbs, Adjectives, Adverbs, Prepositions, Conjunctions, Interjections, Articles.**Tenses**:Present and its Sub-types, Past and its Sub-types, Future and its Sub-types.

Unit 02: Applied Grammar

Voice: Active and Passive**Degrees of Comparison**: Positive, Comparative and Superlative, One of the **Speech**: Direct and Indirect

Unit 03: Paragraph and Dialogue Writing

Paragraph and Dialogue Writing: Introduction, Guidelines for Paragraph Writing and Dialogue Writing **Types of Paragraph**: Descriptive, Narrative, Technical, Comparison and Contrast Dialogue Writing

Unit 04: Vocabulary

Words often confused, Synonyms & antonyms Prefixes & suffixes.

Unit 05: Reading Comprehension

Reading comprehension

Reference Books:

1. English Grammar Just for You. RajeevanKaral. Oxford University Press
2. Technical English.Dr. M. Hemamalini. Wiley India Pvt.
3. English for Practical Purposes, Z. N. Patil, B.S. Valke, A.R. Thorat, Zeenath Merchant
4. English Grammar &Composition ,Wrenn& Martin, S. Chand
5. Practical English Usage . Michael Swan.OUP.1995.
6. Remedial English Grammar.F.T.Wood.Macmillan.2007.

(5.GV.02) Web Designing

Teaching Scheme

Lectures– 3 Hours/week, (3 Credits)

Practical – 3 Hours/week, (1.5 Credits)

Examination Scheme

ISE –20 Marks

ESE – 50 Marks

ICA – 50 Marks

UNIT-I: Introduction

Introduction to HTTP, HTML, Basic HTML Tags, Body Tags, Coding Style, Modifying & formatting Text, Lists – Unordered, Ordered, Definition, Insert Links -Linking to another Document, Internal Links, Email Links, Relative and Absolute Links, Insert Images - Referencing Images, Clickable Images, Image Placement and Alignment, Image Size, Image Margins, Image Formats, Image Maps- Defining an Image Map, Advanced Coloring Body Content, Working with tables - Basic Tables, Table Attributes, Table Cell Attributes, Table Row Attributes, Tables Inside of Tables, Invisible Spacers, Working with Frame-Based Pages- Creating Windows, Single Window Frames, Creating Column Frames, Creating Row Frames, Creating Complex Frames.

UNIT-II: Introduction to CSS

Cascading Style Sheet (CSS) – Introduction, creating style, using inline and external CSS, Creating Divs with ID style, Creating Tag& Class style, creating borders, Navigation links, creating effects with CSS.

JavaScript – Introduction, use of JavaScript in webpages. Understand JavaScript event model, use some basic event and control webpage behavior.

UNIT-III: Designing Websites

DESIGNING WEBSITES WITH DREAMWEAVER/EXPRESSION Web/AMAYA/COFEE CUP WYSIWYG HTML Editor - Introduction to WYSIWYG HTML editor, advantages of using HTML editors, Creating a New Site, Creating a New Page, Adding Images with Alternate Text, Inserting & Formatting Text, Aligning Images, Creating an Email Link, Linking to Other Websites, Testing & Targeting Links, Organizing Files & Folders

CREATING & INSERTING IMAGES - Optimizing Images for the Web, Saving GIFs & PNGs in Photoshop, Inserting GIFs, Adjusting Transparency Settings, Saving JPGs for the Web

UNIT-IV: Designing Accessible Tables

DESIGNING ACCESSIBLE TABLES - Understanding Tables & Accessibility, Using Tables for Tabular Data, styling a Table, Editing Table Layouts, Adding Style to a Table Using CSS CREATING WEBSITES WITH FRAMES - Introducing Frames, creating a Frameset, Opening Pages into Frames, Controlling Scrollbars & Borders, Targeting Links in Frames CUSTOMIZING THE INTERFACE - Opening an Existing Site, Reviewing Menu Options & Preferences, Comparing the Macintosh & PC Interfaces, Previewing in Browsers & Device Central

Introduction to Responsive Web Designing – Introduction, advantages, creating and using responsive web pages.

UNIT-V: Web Hosting

Web Hosting - What is Domain? Introduction to DNS, how to register a Domain? What is web hosting? How to get a web hosting? Host your website on web Server. FTP - FTP Introduction, FTP Commands Viewing Files and Directories, FTP Commands Transfer and Rename files, FTP with WS FTP/ CuteFTP, Filezilla on Windows.

Term Work:

- Generic awareness about Hyper Text Markup Language (HTML).
- Designing of websites.
- Basics of HTML tags.
- Cascading Style Sheet (CSS).
- Functional knowledge of web hosting

Reference Books:

1. [Internet & Web Development, Soma Das Gupta, Khanna Publishing House](#)
2. [Web Designing and Development, TanweerAlam, Khanna Publishing House](#)

(5.GV.03) IT Foundations & Programming Concepts

Teaching Scheme

Lectures– 3 Hours/week, (3 Credits)

Examination Scheme

ISE - 20 Marks

ESE- 30 Marks

Unit 1: Computer characteristics

Speed, storage, accuracy, diligence; Digital signals, Binary System, ASCII; Classification of computers: Microcomputer, Minicomputer, mainframes, Supercomputers; Personal computers: Desktop, Laptops, Palmtop, Tablet; Hardware & Software.

Unit 2: Hardware

CPU, Memory, Input devices, output devices. Memory units: RAM (SDRAM, DDR RAM, RDRAM etc. feature wise comparison only); ROM-different types: Flash memory; Auxiliary storage: Magnetic devices, Optical Devices; Hard disk, Memory stick, CD, DVD, CD/DVD-Writer; Input devices - keyboard, mouse, scanner, speech input devices, digital camera, Touch screen Voice Input, Joystick, Optical readers, bar code reader; Output devices: Display device, size and resolution; LCD, LED; Printers: Dot-matrix, Inkjet, Laser; Plotters, Sound cards & speaker.

Unit 3: Software

System software, Application software; concepts of files and folders, Introduction to Operating systems, Different types of operating systems: single user, multitasking, time-sharing multi-user; Basic features of two GUI operating systems: Windows & Linux (Basic desk top management); Databases; Application software: Generic Features of Word processors, Spread sheets and Presentation software; Computer Viruses & Protection, Free software, open source.

Unit 4: Computer Networks and Internet

Connecting computers, Requirements for a network: Server, Workstation, switch, router, network operating systems; Internet: brief history, World Wide Web, Websites, URL, browsers, search engines, search tips; Internet connections: ISP, Dial-up, cable modem, WLL, DSL, leased line Wireless and Wi-Fi connectivity ; email, email software features (send receive, filter, attach, forward, copy, blind copy);

Unit 5: Information Technology And Society

Indian IT Act, Intellectual Property Rights, issues. Application of information Technology in Railways, Airlines, Banking, Insurance, Inventory Control, Financial systems, Hotel management, Education, Video games, Telephone exchanges, Mobile phones, Information kiosks, special effects in Movies.

Unit 6: Programming Concepts & Techniques

Program Concept, Characteristics of Programme, Stages in Program Development, Tips for Program Designing, Programming Aids, Algorithms, Pseudo code, Notations, Design, Flowcharts, Symbols, Rules, compiler & Interpreter. Introduction to programming techniques, Unstructured, & Modular programming, Debugging, Syntax & Logical Errors, Linking and Loading, Testing and Debugging, Documentation.

Reference Books:

1. [Programming in C, R.S. Salaria, Khanna Publishing House](#)
2. [Computer Concepts and Programming in C, R.S. Salaria, Khanna Publishing House](#)
3. [Handbook of Computer Fundamentals, N.S. Gill, Khanna Publishing House](#)

(5.GV.04) Programming in C

Teaching Scheme

Lectures– 3 Hours/week, (3 Credits)

Practical – 3 Hours/week, (1.5 Credits)

Examination Scheme

ISE –20 Marks

ESE –30 Marks

ICA – 50 Marks

Unit 1: Introduction to 'C' Language

Character set, Variables and Identifiers, Built-in Data Types, Variable Definition, Arithmetic operators and Expressions, Constants and Literals, Simple assignment statement, Basic input/output statement, Simple 'C' programs.

Unit 2: Conditional Statements and Loops

Decision making within a program, Conditions, Relational Operators, Logical Connectives, if statement, if-else statement, Loops: while loop, do while, for loop, Nested loops, Infinite loops, Switch statement, structured Programming.

Unit 3: Arrays

One dimensional arrays: Array manipulation; Searching, Insertion, Two dimensional arrays, Addition/Multiplication of two matrices, Transpose of a square matrix; Null terminated strings as array of characters, Standard library string functions

Unit 4: Functions

Top-down approach of problem solving, Modular programming and functions, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Block structure, Passing arguments to a Function: call by reference, call by value, Recursive Functions, arrays as function arguments.

Unit 5: Storage Classes

Scope and extent, Storage Classes in a single source file: auto, extern and static, register, Storage Classes in a multiple source files: extern and static

Unit 6: Structures and Unions

Structure variables, initialization, structure assignment, nested structure, structures and functions, structures and arrays: arrays of structures, structures containing arrays

Unit 7: Pointers

Address operators, pointer type declaration, pointer assignment, pointer initialization, pointer arithmetic, functions and pointers, Arrays and Pointers, pointer arrays, pointers and structures.

Unit 8: File Processing Concept of Files, File opening in various modes and closing of a file, reading from a file, writing onto a file

Term Work:

Programming Fundamentals

- Data Types: Concept of data types; Built-in data types - byte, short, int, long, float, double, char, string, boolean
- Variables: Need to use variable, declaring variables, variable naming convention, assigning value to variables;
- Integer object method: parseInt
- Double object method: parseDouble, parseFloat
- Control Structures: Decision Structure – if, if-else, switch; Looping Structure- while, do . . while, for;

Programming Guidelines:

- General Concepts; Modular approach;
- Stylistic Guidelines: Clarity and simplicity of expressions and names; Comments, Indentation;
- Running and debugging programs, Syntax Errors, Run-Time Errors, Logical Errors;
- Problem Solving Methodology: Understanding of the problem, identifying minimum number of inputs required for output, breaking down problem into simple logical steps.

Reference Books:

1. [Programming in C, R.S. Salaria, Khanna Publishing House](#)
2. [Computer Concepts and Programming in C, R.S. Salaria, Khanna Publishing House](#)
[Test your Skills in C, R. S. Salaria, Khanna Publishing House](#)

Level 5 (Semester II)

(5.GV.05) Data Structure

Teaching Scheme

Lectures– 3 Hours/week, (3 Credits)

Practical – 3 Hours/week, (1.5 Credits)

Examination Scheme

ISE –20 Marks

ESE –30 Marks

ICA – 50 Marks

UNIT-I: An Overview of Computers and Programming

An Overview of Computers and Programming - Simple program logic, The steps involved in the program development cycle, Pseudo code statements and flowchart symbols, Programming and user environments

UNIT-II: The concept of data structure

The concept of data structure, Abstract data structure, Analysis of Algorithm, The concept of List Introduction to stack & primitive operation on stack, Stack as an abstract data type, Multiple Stack, Stacks application: Infix, post fix, Prefix and Recursion, Introduction to queues, Primitive Operations on the Queues, Queue as an abstract data type, Circular queue, Dequeue, Priority queue, Applications of queue

UNIT-III: Introduction to the Linked List

Introduction to the Linked List of Stacks, Basic operations on linked list, Stacks and queues as a circular linked list, Header nodes, Doubly Linked List, Circular Linked List, Implementation of Stacks & Queues using Singly Linked List, Application of Linked List.

UNIT-IV: TREES

TREES - Basic Terminology, Binary Trees, Tree Representations as Array & Linked List, Basic operation on Binary tree, Traversal of binary trees: - In order, Preorder & post order, Application of Binary tree, B-tree & Height balanced tree, B+

UNIT-V: Searching and Sorting Techniques

Sequential Searching, Binary search, Insertion sort, Selection sort, Quick sort, Bubble sort, Heap sort, Introduction to graphs, Definition, Terminology, Directed, Undirected & Weighted graph, Representation of graphs, Graph Traversal-Depth first & Breadth first search, Spanning Trees, minimum spanning Tree, Shortest path algorithm

Term Work:

- Implement stack. Write functions like push, pop, Initialize, Empty or Full.
- Implement concept of queues
- Implement queues in a circular array.
- Implement queues and stacks using linked list
- Implementing doubly linked list
- Binary search tree to sort an array

Reference Books:

[Data Structures, R.S. Salaria, Khanna Publishing House](#)

(5.GV.06) Concepts of Data Mining

Teaching Scheme
Lectures– 3 Hours/week, 3 Credits

Examination Scheme
ISE –20 Marks
ESE –30 Marks

Unit-I: Introduction to Data warehousing

Introduction to Data warehousing, needs for developing data Warehouse, Datawarehouse systems and its Components, Design of Data Warehouse, Dimension and Measures, Data Marts:-Dependent Data Marts, Independents Data Marts & Distributed Data Marts, Conceptual Modeling of Data Warehouses: -Star Schema, Snow flake Schema, Fact Constellations, Multidimensional Data Model & Aggregates.

Unit-II: OLAP

OLAP, Characteristics of OLAP System, Motivation for using OLAP, Multidimensional View and Data Cube, Data Cube Implementations, Data Cube Operations, Guidelines for OLAP Implementation, Difference between OLAP & OLTP, OLAP Servers: -ROLAP, MOLAP, HOLAPQueries.

UNIT-III: Introduction to Data Mining

Introduction to Data Mining, Knowledge Discovery, Data Mining Functionalities, Data Mining System categorization and its Issues. Data Processing:-Data Cleaning, Data Integration and Transformation. Data Reduction, Data Mining Statistics. Guidelines for Successful Data Mining.

Unit-IV: Association Rule Mining

Association Rule Mining:-Introduction, Basic, The Task and a Naïve Algorithm, Apriori Algorithms, Improving the efficiency of the Apriori Algorithm, Apriori - Tid, Direct Hasing and Pruning (DHP), Dynamic Item set Counting (DIC), Mining Frequent Patterns without Candidate Generation (FP-Growth), Performance Evaluation of Algorithms,

Unit-V: Classification

Classification:-Introduction, Decision Tree, The Tree Induction Algorithm, Split Algorithms Basedon Information Theory, Split Algorithm Based on the Gini Index, Over fitting and Pruning, Decision Trees Rules, Naïve Bayes Method.

Cluster Analysis: -Introduction, Desired Features of Cluster Analysis, Types of Cluster Analysis Methods: -Partitioned Methods, Hierarchical Methods, Density-Based Methods, Dealing with Large Databases. Quality and Validity of Cluster Analysis Methods.

Reference Books:

1. Data Mining and Warehousing, Ikvinderpal Singh, Khanna Publishing House

(5.GV.07) Object Oriented Programming with JAVA

Teaching Scheme

Lectures– 3 Hours/week, (3 Credits)

Practical – 3 Hours/week, (1.5 Credits)

Examination Scheme

ISE –20 Marks

ESE –30 Marks

ICA – 50 Marks

UNIT-I: Introduction

C++ vs JAVA, JAVA and Internet and WWW, JAVA support systems, JAVA environment.

JAVA program structure, Tokens, Statements, JAVA virtual machine, Constant & Variables, Data Types, Declaration of Variables, Scope of Variables, Symbolic Constants, Type Casting.

Operators: Arithmetic, Relational, Logical Assignments, Increment and Decrement, Conditional, Bitwise, Special, Expressions & its evaluation.

If statement, if...else... statement, Nesting of if...else... statements, else...if Ladder, Switch, ?operators, Loops – While, Do, For, Jumps in Loops, Labelled Loops.

UNIT-II: Java as Object Oriented Language

Defining a Class, Adding Variables and Methods, Creating Objects, Accessing class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods.

Inheritance: Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Finalize Methods, Abstract methods and Classes, Visibility Control.

UNIT-III: Introduction to Arrays

Arrays: One Dimensional & two Dimensional, strings, Vectors, wrapper Classes, Defining Interface Extending Interface, Implementing Interface, Accessing Interface Variable, System Packages, Using System Package, Adding a Class to a Packages, Hiding Classes.

UNIT-IV: Thread Life Cycle

Creating Threads, Extending the Threads Class, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the Runnable Interface.

UNIT-V: Network Programming

Local and Remote Applets Vs Applications, Writing Applets, Applets Life Cycle, Creating an Executable Applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet, Passing Parameters to Applets, Aligning the Display, HTML Tags & Applets, Getting Input from the User.

Term Work:

Programming problems based on all concepts covered in theory such as Arrays, Classes, Threads, Methods, Applets etc.

Reference Books:

- [1. Object Oriented Systems with Java, TanweerAlam, Khanna Publishing House](#)
- [2. Core Java, TanweerAlam, Khanna Publishing House](#)

(5.GV.08) Operating System (OS)

Teaching Scheme

Lectures– 3 Hours/week, (3 Credits)

Examination Scheme

ISE –20 Marks

ESE –30 Marks

Unit I: System Software

Operating System, Compiler, Interpreter and Assembler;

Unit II: Operating System

Need for Operating System, Functions of Operating System (Processor Management, Memory Management, File Management and Device Management), Types of Operating System-Interactive (GUI based), Time Sharing, Real Time and Distributed, commonly used Operating System: UNIX, LINUX, Windows, Solaris, BOSS (Bharat Operating System Solutions); Mobile OS – Android, Symbian, IOS.

Unit III: Utility Software

Anti-Virus, File Management tools, Compression tools and Disk Management tools (Disk Cleanup, Disk Defragmenter, Backup).

Reference Books:

1. Operating Systems, EktaWalia, Khanna Publishing House