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DEEN DAYAL UPADHYAY KAUSHAL KENDRA
BACHELOR OF VOCATION (SOFTWARE DEVELOPMENT)
SEMESTER – III

Subject		Course No.	Subject Title	T/P	Credit	WCH	Exam Duration	Marking Scheme		
								Internal	External	Total
Discipline Specific Course Core (Major)	Core Course-1	BVS03MAC01	Object Oriented Programming with C++	T	4	4	2	50/18	50/18	100/36
	Practical of Core Course-1	BVS03MAC02	Relational Database Management System	T	4	4	2	50/18	50/18	100/36
	Core Course-2	BVS03MAC03	Practical Lab of Object Oriented Programming with C++ and RDBMS	P	4	8	2	50/18	50/18	100/36
Multi - Disciplinary	Multi – Disciplinary Course-1	BVS03MDC04	Digital Electronics	T	4	4	2	50/18	50/18	100/36
Ability Enhancement Course		BVS03AEC05	Fundamentals of Operating System	T	2	2	1	25/09	25/09	50/18
Skill Enhancement Course/Internship/ Dissertation		BVS03SEC06	Data Structure	T	2	2	1	25/09	25/09	50/18
IKS/Value Added Course(Any One)		BVS03IKS07	Indian Knowledge System – II	T	2	2	1	25/09	25/09	50/18
Minimum Quantifying Credits					**22**					

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SEMESTER – III

Course Code	BVS03MAC01	Title of the Course	Object Oriented Programming with C++
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. To study the fundamental concepts and constructs of the C++ programming language 2. To learn the basic concepts of object-oriented programming using C++

Course Content		
Unit	Description	Weightage *(%)
1.	**Object Oriented Programming (OOP) Concepts and Introduction to C++:** – Structured programming vs. object oriented programming – Basic OOP concepts : objects , classes , encapsulation , data hiding , inheritance, polymorphism – Introduction to C++: structure of a C++ program , data types, variables, constants, expressions, statements and operators, Usage of header files – Basic I/O in C++	25%
2.	**Arrays and Working with Classes:** – Arrays in C++ : introduction, declaration, initialization of one , two and multidimensional arrays, operations on arrays – Working with strings : introduction, declaration, string manipulation and arrays of string – Classes and objects in C++ – Constructors : default, parameterized, copy, constructor overloading and destructor – Access specifier, implementing and accessing class members – Working with objects : constant objects, nameless objects, live objects, arrays of objects	25%

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3.	**Function Overloading and Inheritance:** − Functions overloading , inline functions, friend functions and virtual functions, functions, parameters passing, default arguments − Friend Function And Friend Class − Inheritance: Introduction , derived class declaration, forms of inheritance − Inheritance and member access ability, constructor and destructor in derived class, construction invocation and data member initialization	25%
4.	**Operator Overloading and File Handling:** − Operator overloading : Introduction, overloaded operators, unary operator overloading, binary operators overloading, overloading with and without friend function − File Handling with C++ − Virtual Function	25%

Teaching-Learning Methodology	Multiple teaching approaches: lecture and discussion, exploration and

Evaluation Pattern		
Sr. No	**Details of the Evaluation**	**Weightage *(%)**
1.	Internal Written/Practical Examination	50%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments.	
3.	External Examination	50%

Course Out comes: Having completed this course, the learner will be able to	
1.	Apply the knowledge of the fundamental concepts and constructs of the C++ programming language
2.	Carry out object-oriented programming using C++.

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Suggested References:	
Sr. No	**References**
1.	E Balagurusamy: Object Oriented Programming in C++, Tata McGraw-Hill Publishing Co. Ltd.
2.	Robert Lafore: Object Oriented Programming in Turbo C++, Guide, Galgotia Pub. (P) Ltd.
3.	Schaum's Outline of Programming with C++ by John Hubbard, McGraw-Hill Education; 2nd edition (June 6, 2000)
4.	Barkakati N.: Object Oriented Programming in C++, PHI. OOP's using C++ for Dummies.

On-line resources to be used if available as reference material	
On-line Resources	
1.	https://www.tutorialspoint.com/
2.	https://www.w3schools.com/
3.	https://www.javatpoint.com/

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BACHELOR OF VOCATION (SOFTWARE DEVELOPMENT)
SEMESTER – III

Course Code	BVS03MAC02	Title of the Course	Relational Database Management System
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. To study the basics of Relational database design, normalization and ER diagrams. 2. To study the basics of PL/SQL, cursors, stored procedures and functions

Course Content		
Unit	**Description**	**Weightage *(%)**
1.	**Relational Database and SQL:** – Database Management System (DBMS) – three schema architecture – Data models and examples of current RDBMS products – The relational data model: concepts and terminology, operations on data (DDL, DML), relationships and relationship types – Integrity constraints – Codd rules – Entity-relationship modeling (different types of entities, attributes, relationships and their representation in the E-R diagram) – E-R modeling case studies	25%
2.	**Structured Query Language:** – Introduction of SQL – advantages and disadvantages of SQL – Data types of SQL – Types of SQL Statements : DDL , DML , DCL , TCL – Working with SQL*Plus – overview and basic commands like ed, start, get, save, exit, connect, set linesize, set pagesize and host – Creating table and inserting data - CREATE TABLE, INSERT, retrieving data using query – SELECT, manipulating data DELETE and UPDATE modifying and removinarchatg table ALTER TABLE and DROP TABLE.	25%

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3.	**Concepts of Data Constraints and Functions** – Pseudo columns –ROWID, ROWNUM, USER, UID, SYSDATE – Null values, TAB table, DUAL table – Operators – arithmetic, relational, logical, range searching, pattern matching and set – Data constraints – Introduction, advantages and disadvantages - Type of data constraints – NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY and CHECK – Modifying constraints, working with data dictionary and use of USER_CONSTRAINTS Functions – introduction, merits and demerits, types of functions (scalar and aggregate) - Scalar – Numeric functions (ABS, FLOOR, MOD, POWER, ROUND, SIGN SQRT and TRUNC), Character functions (CHR, ASCII, CONCAT, INITCAP LOWER, SUBSTR,TRIM, UPPER), Date functions (ADD_MONTHS, LAST_DAY, NEXT_DAY, MONTHS_BETWEEN), Conversion functions (TO_NUMBER, TO_CHAR and TO_DATE) – Aggregate fun : AVG, COUNT, MAX, MIN, SUM – Miscellaneous functions –NVL, DECODE, COALESCE	25%
4.	**Query, Subquery, Joins, Transaction Management and Reporting through SQL*Plus** – Query and subquery, types of subquery – Creation and manipulation of database objects – indexes, views, sequences and synonym - Joining tables, types of joins (cross join, natural join, inner join, equijoin, outer joins, self join. - Data control language statements –GRANT and REVOKE Transaction control language statements –COMMIT, ROLLBACK and SAVEPOINT - Overview of SQL*Plus report - Building a simple report - Reporting commands – remark, setheadsep, ttitle, btitle, column, break on, compute, spool, set pause.	25%

Teaching-Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools.

Evaluation Pattern

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Sr. No	Details of the Evaluation	Weightage *(%)
1.	Internal Written/Practical Examination	50%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments.	
3.	External Examination	50%

Course Out comes: Having completed this course, the learner will be able to	
1.	Understand relational database design, normalization and ER diagrams.
2.	Work with PL/SQL, cursors, stored procedures and functions

Suggested References:	
Sr. No	**References**
1.	An introduction to Database Systems : Bipin C. Desai, Galgotia Poblications Pvt. Ltd.
2.	Ivan Bayross : SQL,PL/SQL The programming language of Oracle, 3rd revised edition, BPB Publications
3.	Kevin Loney, George Koch, Orale9i The Complete Reference , Oracle Press
4.	Understanding Database Management Systesm : S. Parthsarthy and B.W.Khalkar, First edition – 2007, Master Academy
5.	P. S. Deshpande : SQL/PLSQL for Oracle9i, dreamtech press, reprint edition 2009

On-line resources to be used if available as reference material	
On-line Resources	
1.	https://www.tutorialspoint.com/index.htm
2.	https://www.w3schools.com/
3.	https://www.javatpoint.com/

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DEEN DAYAL UPADHYAY KAUSHAL KENDRA
BACHELOR OF VOCATION (SOFTWARE DEVELOPMENT)
SEMESTER – III

Course Code	BVS03MAC03	Title of the Course	Practical Lab of Object Oriented Programming with C++ and RDBMS
Total Credits of the Course	4	Hours per Week	8

Course Objectives:	1. To study the fundamental concepts and constructs of the C++ programming language 2. To learn the basic concepts of object-oriented programming using C++ 3. To introduce the students to the relational data model and RDBMS. 4. To teach the SQL language for accessing an RDBMS.

Course Content	
Description	**Weightage *(%)**
Practical: o Arrays and Strings o Working with objects o Inheritance o constructor and destructor o CREATE TABLE o Practical on DDL DML, DCL , TCL o PL/SQL Block o Working with cursor o Triggers and Packages	100%

Teaching – Learning Methodology	Project-based learning in small groups and Hands on training through required ICT tools

Evaluation Pattern

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Sr. No	Details of the Evaluation	Weightage *(%)
1.	Internal Written/Practical Examination	50%
2.	Internal Continuo us Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance	
3.	External Examination	50%

Course Out comes : Having completed this course, the learner will be able to	
1.	Apply the knowledge of the fundamental concepts and constructs of the C++ programming language and the relational data model and RDBMS.
2.	Carry out object-oriented programming using C++.
3.	Use the SQL language for accessing an RDBMS

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BACHELOR OF VOCATION (SOFTWARE DEVELOPMENT)
SEMESTER – III

Course Code	BVS03MDC04	Title of the Course	Digital Electronics
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	To study 1. Different number systems and conversions. 2. Basic logic gates, Boolean algebra and truth tables. 3. Simplification of logic expression using laws of Boolean algebra. 4. Sequential and combinational circuits.

Course Content

Sr. No	Description	Weightage *(%)
1.	**Gates and Boolean Algebra** – Logic gates (NOT, AND, OR, NAND, NOR, XOR, XNOR) – Properties and Symbolic Representation - Truth Table (up to 3 input) – De-Morgan's theorems – Simplification of logic expressions using Laws of Boolean algebra – Circuit Equivalence	25%
2.	**Digital Logic Circuits-I** – Karnaugh Maps – Flip-Flop (RS, D Latch) – Decoder & Encoder	25%
3.	**Digital Logic Circuits-II** – Multiplexer & Demultiplexer – Half Adder & Full Adder – Comparator – Parity Bit Generator	25%
4.	**Digital Logic Circuits-III** – 4-bit binary Adder / Subtractor – Controlled Buffer Register	25%

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	– Shift Registers – Ring Counter	

Teaching – Learning Methodology	Project-based learning in small groups and Hands on training through required ICT tools.

Evaluation Pattern

Sr. No	Details of the Evaluation	Weightage *(%)
1.	Internal Written/Practical Examination	50%
2.	Internal Continuo us Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance	
3.	External Examination	50%

Course Outcomes : Having completed this course, the learner will be able to

1.	Different number systems and conversions.
2.	Basic logic gates, Boolean algebra and truth tables.
3.	Simplification of logic expression using laws of Boolean algebra.
4.	Sequential and combinational circuits.

Suggested References:

Sr. No	References
1.	Malvino and Leach: Digital Principles and Applications, 4th Edition.
2.	Rajaraman V: Computer Fundamentals Prentice – Hall of India Pvt. Ltd.
3.	Sinha P K: Computer Fundamentals BPB Publication (Second Edition).
4.	S K. Basandra: Computers Today Galgotia Publication
5.	Peter Norton: Introduction to Computers TMH.

On-line resources to be used if available as reference material
On-line Resources

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1.	https://www.tutorialspoint.com/index.htm
2.	https://www.geeksforgeeks.org/
3.	https://www.javatpoint.com/

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DEEN DAYAL UPADHYAY KAUSHAL KENDRA
BACHELOR OF VOCATION (SOFTWARE DEVELOPMENT)
SEMESTER – III

Course Code	BVS03AEC05	Title of the Course	Fundamentals of Operating System
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	1. To provide basic understanding of the role and functioning of an operating system. 2. To introduce the basic concepts related to processor management, memory management, process synchronization and deadlocks. 3. To impart fundamental knowledge on Linux shell environment and programming.

Course Content

Unit	Description	Weightage *(%)
1.	**Introduction and Process Management:** – Introduction to Operating System, Functions of OS – **Different types of Operating Systems:** Real time(Hard real time system, Soft real time system), Multi-user, Time sharing/Multi-Tasking System, Distributed Operating System, Multiprogramming Operating System – **OS Structure**: Monolithic, Layered, Virtual Machine, Client-Server model – Process State, Process Control Block – **CPU Scheduling:** Introduction to process, process control block, FCFS Scheduling, SJF scheduling, Priority scheduling, Round Robin scheduling	50%

2.	**Virtual memory and demand paging:**
	 – Memory Management: Concept,
	 – Basic memory management techniques:
	    o Swapping,
	    o Demand Paging
		50%

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Multiple Partitions - Fixed-Sized Partition - Variable-Sized Partition **Page Replacement Algorithm**<ol type="a"> - The FIFO Page Replacement Algorithm - The Optimal Page Replacement Algorithm - The NRU Page Replacement Algorithm	

Teaching-Learning Methodology	Blended learning approach incorporating traditional classroom teaching and online /ICT-based teaching practices.

Evaluation Pattern

Sr. No	Details of the Evaluation	Weightage *(%)
1.	Internal Written/Practical Examination	50%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance.	
3.	External Examination	50%

Course Out comes: Having completed this course, the learner will be able to develop	
1.	Ability to describe the role and functioning of an operating system.
2.	Understanding of fundamental concepts related to memory management, Page Replacement Algorithm.

Suggested References:

Sr. No	References
1.	Andrew S. Tanenbaum: Operating System design & Implementation, Prentice Hall International.
2.	James Peterson and Abraham Silberschatz: Operating System Concept, Addition Wesley.
3.	Bryan Pfaffenberger - Linux Commands Instant reference, BPB Publication.
4.	Sumitabha Das - UNIX, Concepts and Applications – Tata McGraw-Hill

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	Publications.
5.	Advanced Linux Programming – Samuel, Techmedia Publications.

On-line resources to be used if available as reference material
On-line Resources

1.	https://www.tutorialspoint.com/
2.	https://www.w3schools.com/
3.	https://www.javatpoint.com/

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SEMESTER – III

Course Code	BVS03SEC06	Title of the Course	Data Structure
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	1. To study basic concepts related to tress and linked lists. 2. To learn the fundamentals of sorting and searching techniques. 3. To understand the concepts related to file organization

Course Content		
Unit	**Description**	**Weightage *(%)**
1.	**Introduction to Data Structures and Queue:** – Introduction to data structures, their usage, applications and advantages – Operations on data structure – Primitive and non-primitive data structures and operations on them – Hierarchical representation of data structure – Linear and non-linear data structures – Introduction to stacks, operations on stacks – Applications of stacks – Queues and their uses – Types of queues : Simple queues, Circular queues, Double ended queues	50%
2.	**Linked List, Tree, Sorting and Searching:** – Introduction to linked lists – Types of linked lists: Singly linked lists, Doubly linked lists – **Tree** Definition: Tree, Directed tree, Root, Leaf, Branch, Level, Root like node, Leaf like node, etc. – Operation on Binary tree: Insert, Delete, searching, Traversal (Inorder, Preorder, Postorder). – Storage representation of Binary tree	50%

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	– Sorting techniques (Bubble sort, Selection sort) – Searching technique (Sequential search, Binary search)	

Teaching-Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools

Evaluation Pattern

Sr. No	Details of the Evaluation	Weightage *(%)
1.	Internal Written/Practical Examination	50%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance.	
3.	External Examination	50%

Course Out comes: Having completed this course, the learner will be able to develop

1.	Understanding of the basic concepts related to tress and linked lists.
2.	Understanding of the fundamentals of sorting and searching techniques.
3.	Ability to understand the concepts related to file organization.

Suggested References:

Sr. No	References
1.	Tremblay J. & Sorenson P. G.: An Introduction to Data Structures with Applications, 2nd Edition, Tata McGraw-Hill Edition, 1991.
2.	Singh Bhagat& Naps Thomas: Introduction to Data Structures, Tata McGraw-Hill Publishing Co.Ltd.,1985.
3.	R. B. Patel: Data Structure using C – Khanna Publications. ISBN: 81-87522-41-0.
4.	D. Samanta - Classis Data Structures, 2nd Edition – PHI Publication.
5.	G. S. Baluja - Data Structures through C, 4th Edition – Dhanpat Rai & Co

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Syllabus as per NEP 2020 with effect from the Academic Year 2024-2025

On-line resources to be used if available as reference material	
Sr. No	On-line Resources
1.	https://www.tutorialspoint.com/
2.	https://www.w3schools.com/
3.	https://www.javatpoint.com/

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DEEN DAYAL UPADHYAY KAUSHAL KENDRA
BACHELOR OF VOCATION (SOFTWARE DEVELOPMENT)
SEMESTER – III

Course Code	BVS03IKS07	Title of the Course	**Indian Knowledge System – II**
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	– The course will enable the learners to… – To analyse the etymology and meaning of the word "Dharma" and its significance in various cultures and religions. – To explore the characteristics of Dharma and how it manifests in different contexts. – To examine the explanations of the concept of Dharma by renowned scholars and thinkers throughout history. – To recognize the importance of Dharma in shaping human life, ethics, and societal values. – To identify the different forms of Dharma present in contemporary society and specifically in the context of Kaliyug (the current age according to Hindu cosmology). – To appreciate the significance of Aacharn dharma (ethical conduct and righteous behavior) in upholding Dharma. – To analyze examples of various characteristics of Dharma in the lives of notable scholars, philosophers, and religious figures. – To introduce and gain an overview of the major Dharma shastras (ancient Indian texts that discuss laws, duties, and ethical principles). – To foster critical thinking and open discussion regarding the interpretation and application of Dharma in modern times. – To develop deeper understanding of the cultural, ethical, and spiritual dimensions of Dharma and its relevance in contemporary society.

Course Content		
Unit	**Description**	**Weightage**

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		*(%)
1.	**Introduction of Dharma** 1. Etymology and meaning of the word Dharma. 2. Characteristics of word Dharma. 3. Explanation of the word Dharma by great scholars. 4. The importance of Dharmainhuman life.	50%
2.	**Importance of Dharma Shastras** 1. Forms of Dharma at present and kaliyug. 2. Importance of Aacharn dharma. 3. Examples of various characteristics of Dharma in the life of scholars. 4. Introduction to the major Dharma shastras	50%

Teaching-Learning Methodology	**Learner-centered Instructional methods** Direct method, quiz, assignments, interactive sessions, seminars, visual presentations, group discussions, project based learning and use of e-resources, including films

Evaluation Pattern		
Sr. No	**Details of the Evaluation**	**Weightage *(%)**
1.	Internal Written/Practical Examination	50%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance.	
3.	External Examination	50%

Course Out comes: Having completed this course, the learner will be able to develop	
1.	Identify the historical and cultural context of the word "Dharma" and explain its etymology and core meaning.
2.	Analyze the characteristics of Dharma and its manifestations in various aspects of human life, including personal ethics, social responsibilities, and spiritual practices.
3.	Evaluate the explanations of Dharma provided by eminent scholars and thinkers,

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	and critically examine different perspectives on its interpretation and application.
4.	Recognize the importance of Dharma in guiding ethical decision-making, promoting harmony in relationships and communities, and fostering a just and compassionate society.
5.	Apply the concepts of Dharma to contemporary issues and challenges, demonstrating an understanding of the different forms of Dharma in present times, the significance of Aacharndharma, and the in fluence of Dharma in the lives of scholars and individuals who exemplify its principles.

References
"Dharma: Its Early History in Law, Religion and Narrative" by Alf Hiltebeitel "Dharma: The Hindu, Jain, Buddhist and Sikh Traditions of India "by Veena R. Howard." The Concept of Dharma in Valmiki Ramayana" by Dr. Nityanand Mishra "Dharma in Hinduism: A Historical and Philosophical Perspective" by Arvind Sharma
"Dharma and Ecology of Hindu Communities: Sustenance and Sustainability" edited by Pankaj Jain
"Understanding Dharma: The Four Authentic Sources" by Pradip Gangopadhyay