BPS Mahila Vishwavidyalaya Khanpur Kalan
Course Curriculum & Scheme of Examinations
For
Post Graduate Diploma in Computer Applications
(w.e.f Session 2024-25)

Semester -1

S. No.	Course Code	Course Title	Hours per week			Credits	Marks		Total
			L	T	P		Internal Marks	External Marks	
Theory									
1.	PGDCA -101	Computer Fundamentals and Programming in C	3	1	0	4	20	80	100
2	PGDCA -103	Computer Organization and Architecture	3	1	0	4	20	80	100
3.	PGDCA -105	Internet and Web Technology	3	1	0	4	20	80	100
4.	PGDCA -107	Operating System	3	1	0	4	20	80	100
5.	PGDCA -109	Computer Networks	3	1	0	4	20	80	100
Lab									
6.	PGDCA -111	C Programming Lab	0	0	2	1	10	40	50
7.	PGDCA -113	Operating System Lab	0	0	2	1	10	40	50
8	PGDCA -115	Internet and Web Technology Lab	0	0	2	1	10	40	50
		Total	15	5	6	23	130	520	650

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BPS Mahila Vishwavidyalaya,Khanpur Kalan, Sonepat (HR.)

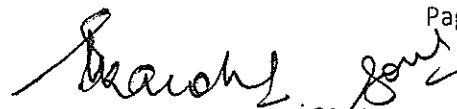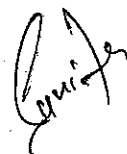# BPS Mahila Vishwavidyalaya Khanpur Kalan
Course Curriculum & Scheme of Examinations
For
Post Graduate Diploma in Computer Applications
(w.e.f Session 2024-25)

Semester -2

S. No.	Course Code	Course Title	Hours per week			Credits	Marks		Total
			L	T	P		Internal Marks	External Marks	
Theory									
1.	PGDCA -102	Software Engineering	3	1	0	4	20	80	100
2.	PGDCA -104	Data Base Management System	3	1	0	4	20	80	100
3.	PGDCA -106	Data Structures	3	1	0	4	20	80	100
4.	PGDCA -108	Object Oriented Programming with C++	3	1	0	4	20	80	100
5.	PGDCA -110	Artificial Intelligence	3	1	0	4	20	80	100
Lab									
6.	PGDCA -112	OOP with C++ Lab	0	0	2	1	10	40	50
7.	PGDCA -114	Data Structures Lab	0	0	2	1	10	40	50
8.	PGDCA -116	DBMS Lab	0	0	2	1	10	40	50
		Total	15	5	6	23	130	520	650

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Post Graduate Diploma in Computer Applications (PGDCA) Syllabus

SEMESTER-1

Computer Fundamentals and Programming in C

PGDCA-101

No. of Credits: 4

L T P

3 1 0

Internal Marks: 20

External Marks: 80

Total Marks: 100

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Computer Fundamentals: Generations of Computers, Definition, Block Diagram along with its components, characteristics & classification of computers, Limitations of Computers, Applications of computers in various fields. Memory: Concept of primary & secondary memory, RAM, ROM, types of ROM, Cache Memory, flash memory, Secondary storage devices: Sequential & direct access devices viz. magnetic tape, magnetic disk, optical disks i.e. CD, DVD, virtual memory.

UNIT-II

Computer hardware & software: I/O devices, definition of software, relationship between hardware and software, types of software. Overview of operating system: Definition, functions of operating system, concept of multiprogramming, multitasking, multithreading, multiprocessing, time-sharing, real time, single-user & multi-user operating system. Computer Virus: Definition, types of viruses, Characteristics of viruses.

UNIT-III

Overview of C: History of C, Importance of C, Elements of C: C character set, identifiers and keywords, Data types, Constants and Variables, Assignment statement, Structure of a C Program, printf(), scanf() Functions, Operators & Expression: Arithmetic, relational, logical, bitwise, unary, assignment, shorthand assignment operators, conditional operators, Arithmetic expressions, evaluation of arithmetic expression, type casting and conversion. Decision making with IF statement, IF-ELSE statement, Nested IF statement, ELSE-IF ladder, switch statement, goto statement

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UNIT-IV

Decision making & branching:. Decision making & looping: For, while, and do-while loop, jumps in loops, break, continue statement, Nested loops.

Arrays (1-D, 2-D), Character arrays and Strings, example of iterative programs using arrays and use in matrix computations. Functions, parameters and return values, standard library functions, Pointers, relationship between arrays and pointers, Call by reference. Array of pointers, passing arrays as arguments. Character strings: processing strings using loops, and string library functions, Structures, Defining structures and Array of Structures

REFERENCES:

- Gottfried, Byron S., Programming with C, Tata McGraw Hill
- Balagurusamy, E., Programming in ANSI C, 4E, Tata McGraw-Hill
- Jeri R. Hanly& Elliot P. Koffman, Problem Solving and Program Design in C, Addison Wesley. YashwantKanetker, Let us C, BPB
- Balagurusamy E, Computing Fundamentals and C Programming, Tata McGraw Hill. 3 Norton, Peter, Introduction to Computer, McGraw-Hill
- Leon. Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World
- Rajaraman, V., Fundamentals of Computers, PHI
- Ram. B., Computer Fundamentals, Architecture & Organization, New Age International (P) Ltd.
- Chhillar, Rajender Singh: Application of IT to Business, Ramesh Publishers, Jaipur. 7. Gill, Nasib Singh: Essentials of Computer and Network Technology, Khanna Books Publishing Co., New Delhi

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Computer Organization and Architecture
PGDCA-103

No. of Credits: 4

L T P

3 1 0

Internal Marks: 20

External Marks: 80

Total Marks: 100

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT - I

STRUCTURE OF COMPUTERS: Computer types, Functional units, Basic operational concepts, Von Neumann Architecture, Bus Structures, Software, Performance, Multiprocessors and Multicomputer, Data representation, Fixed and Floating point, Error detection and correction codes.

COMPUTER ARITHMETIC: Addition and Subtraction, Multiplication and Division algorithms, Floating-point Arithmetic Operations, Decimal arithmetic operations.

UNIT - II

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction codes, Computer Registers, Computer Instructions and Instruction cycle. Timing and Control, Memory-Reference Instructions, Input-Output and interrupt. Central processing unit: Stack organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Complex Instruction Set Computer (CISC), Reduced Instruction Set Computer (RISC), CISC vs RISC.

UNIT - III

REGISTER TRANSFER AND MICRO-OPERATIONS: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro-Operations, Logic Micro-Operations, Shift Micro-Operations, Arithmetic logic shift unit.

MICRO-PROGRAMMED CONTROL: Control Memory, Address Sequencing, Micro-Program example, Design of Control Unit.

UNIT - IV

MEMORY SYSTEM: Memory Hierarchy, Semiconductor Memories, RAM(Random Access Memory), Read Only Memory (ROM), Types of ROM, Cache Memory, Performance considerations, Virtual memory, Paging, Secondary Storage, RAID.

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REFERENCES:

- Mano, M.M.: Computer System Architecture, Prentice-Hall of India.
- Stallings, William: Computer Organization & Architecture.
- Mano, M.M.: Digital Logic and Computer Design, Prentice-Hall of India.
- Kai Hwang: Advanced Computer Architecture, Mc Graw Hill International
- Any other book(s) covering the contents of the paper in more depth.

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Internet and Web Technology
PGDCA- 105

No. of Credits: 4	Internal Marks: 20
L T P	External Marks: 80
3 1 0	Total Marks: 100

Note: Examiner will be required to set NINE questions in all. Question Number1will consist total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I
Introduction to the Internet and the World Wide Web, Web Pages; Hyper Text Transfer Protocol (HTTP);File Transfer Protocol (FTP) Domain Names; URL; Website, Web browser, Web Servers; Web Hosting.HTML.

UNIT - II
Introduction, Objectives, Introduction to Universal Resource Identifier (URI) ,History of HTML, Structure of HTML Basic Tags of HTML, Planning for designing Web pages, Model and structure for a Website, Developing Websites, Tag; Creating Links: Link to other HTML documents and same HTML documents .List, Tables: Creating Tables, Frames, Forms.

UNIT - III
Java Script Introduction to Scripting, JavaScript: Control Statements, JavaScript: Functions, JavaScript: Arrays JavaScript: Objects, CSS, External Style Sheets, Internal Style Sheets, Inline Style, The class selector, div & span tag.
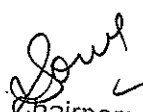
UNIT - IV
DOM HTML DOM, XML: Introduction; Features of XML, Dynamic HTML (DHTML), DHTML form, XML DOM. CGI/PERL, Introduction to CGI, Testing & Debugging Perl CGI Script.

REFERENCES:
- D. Comer, "The Internet Book", 5th edition , 2019, Pearson Education.
- Ivan Bayross, "HTML, DHTML, JavaScript, Perl CGI", 4th (Revised) edition, 2022, BPB Publications.
- Godbole AS & Kahate A, "Web Technologies", 3rd edition, 2017, Tata McGraw Hill.
- Greenlaw R and Hepp E "Fundamentals of Internet and www" 2nd edition, 2007, Tata McGraw Hill.
- Fundamentals of the Internet and the ·World Wide Web, Raymond Greenlaw and Ellen Hepp 2001, TMH
- Internet & World Wide Programming, Deitel,Deitel& Nieto, 2000, Pearson Education
- Complete idiots guide to java script,. Aron Weiss, QUE, 1997.

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Operating System
PGDCA-107

No. of Credits: 4

L T P

3 1 0

Internal Marks: 20
External Marks: 80
Total Marks: 100

Note: Examiner will be required to set NINE questions in all. Question Number1will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Operating Systems Overview: Introduction, operating system operations, process management, memory management, storage management, protection and security, distributed systems.

Operating Systems Structures: Operating system services and systems calls, system programs, operating system structure, operating systems generations.

UNIT – II

Process Management: Process concepts, process state, process control block, scheduling queues. process scheduling, multithreaded programming, threads in UNIX/LINUX, comparison of UNIX/LINUX and windows.

Concurrency and Synchronization: Process synchronization, critical section problem, Peterson's solution, synchronization hardware, semaphores, classic problems of synchronization, readers and writers problem, dining philosophers problem, monitors, synchronization examples(Solaris), atomic transactions, Comparison of UNIX/LINUX and windows.
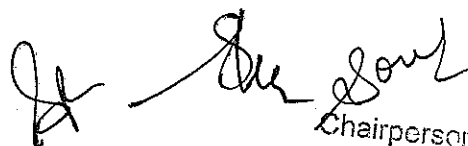
UNIT – III

Deadlocks: System model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock banker's algorithm.

Memory Management: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-replacement algorithms, allocation of frames, thrashing, case study – UNIX/LINUX.

UNIT IV

File System: Concept of a file, access methods, directory structure, file system mounting, file sharing, protection. File system implementation: file system structure, file system implementation, directory implementation, allocation methods, free-space management, efficiency and performance, comparison of UNIX/LINUX and windows.

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REFERENCES:

- Abraham Silberschatz, Peter Galvin, Greg Gagne, "Operating System Concepts Essentials‖, 9th Edition, Wiley Asia Student Edition. 2.
- William Stallings, ―Operating Systems: Internals and Design Principles‖, 5th Edition, Prentice Hall of India.
- Naresh Chauhan, ―Principles of operating systems‖. Oxford university Press.
- Charles Crowley, ―Operating System: A Design-oriented Approach‖, 1st Edition, Irwin Publishing.
- Gary J. Nutt, ―Operating Systems: A Modern Perspective‖, 2nd Edition, Addison-Wesley
- Maurice Bach, ―Design of the Unix Operating Systems‖, 8th Edition, PHI
- Daniel P. Bovet, Marco Cesati, ―Understanding the Linux Kernel‖, 3rd Edition, O'Reilly and Associates

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Computer Networks
PGDCA-109

No. of Credits: 4

L T P

3 1 0

Internal Marks: 20

External Marks: 80

Total Marks: 100

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UNIT - I

Data Communication Components: Representation of data and its flow Networks , Various Connection Topology, Protocols and Standards of ISO/OSI model, TCP/IP Model, Transmission Media, LAN: Wired LAN, Wireless LANs, Connecting LAN and Virtual LAN, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wavelength division, Concepts on spread spectrum.

UNIT-II

Data Link Layer And Medium Access Sub Layer: Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols -Pure ALOHA, Slotted ALOHA, CSMA/CA .

UNIT-III

Network Layer: Switching, Logical addressing – IPV4, IPV6; Address mapping – ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routing protocols: link state, distance vector, etc.

UNIT-IV

Transport Layer: Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm. APPLICATION LAYER Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls, Basic concepts of Cryptography

REFERENCES:

- Data Communication and Networking, 4th Edition, Behrouz A. Forouzan, McGrawHill.
- Data and Computer Communication, 8th Edition, William Stallings, Pearson Prentice Hall India.
- Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition.
- Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall of India. TCP/IP Illustrated, Volume 1, W. Richard Stevens, Addison-Wesley, USA

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C Programming Lab
PGDCA- 111

No. of Credits:1
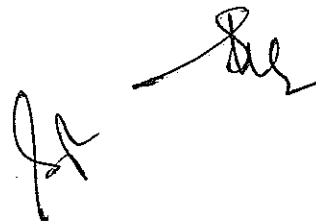
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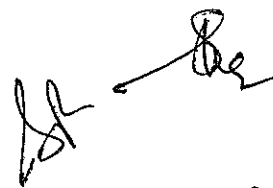
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Internal Marks: 10

External Marks: 40

Total Marks: 50

At least 10 to 15 experiments to be performed related to the subject.

Operating System Lab
PGDCA- 113

No. of Credits:1

L T P

0 0 2

Internal Marks: 10

External Marks: 40

Total Marks: 50

At least 10 to 15 experiments to be performed related UNIX/LINUX Commands, Shell Programming.

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Internet and Web Technology Lab
PGDCA- 115

No. of Credits:1
L   T   P
0   0   2

Internal Marks: 10
External Marks: 40
Total Marks: 50

At least 10 to 15 experiments to be performed related to the subject.

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SEMESTER-2

Software Engineering
PDGCA-102

No. of Credits: 4
L   T   P
3   1   0

Internal Marks: 20
External Marks: 80
Total Marks: 100

Note: Examiner will be required to set NINE questions in all. Question Number1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I
Introduction: Evolving role of software, Software Characteristics, Software crisis, Silver bullet, Software myths, Software process, Personal Software Process (PSP), Team Software Process (TSP), emergence of software engineering, Software process, project and product, Software Process Models: Waterfall Model, Prototype Model, Spiral, Model, RAD Model, Iterative Model, Incremental Model, Agile Model.

UNIT-II
Software Project Management : Project management concepts, Planning the software project, Estimation—LOC based, FP based, Use-case based, empirical estimation COCOMO- A Heuristic estimation techniques, team structures, staffing, risk analysis and management.

UNIT-III
Requirements, Analysis And Specification: Software Requirements engineering, Requirement engineering process, Types of requirements, SRS. System modeling: Data Modeling, Functional modeling and information flow: Data flow diagrams, Behavioral Modeling, The mechanics of structured analysis: Creating entity/ relationship diagram, data flow model, control flow model.
SYSTEM DESIGN: Design principles, the design process; Design concepts: Abstraction, refinement, modularity, software architecture, data structure, software procedure, information hiding; Effective modular design: Functional independence, Cohesion, Coupling.
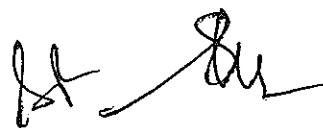
UNIT-IV
Software Testing And Maintenance: Testing terminology- error, bug/defect/fault, failure, Verification and validation, Test case design, Static testing ,Dynamic testing--- Black box testing—Boundary value analysis, White box testing-- basis path testing, Unit testing, Integration testing, Acceptance Testing.
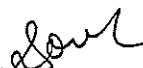
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REFERENCES:
- Software Engineering – A Practitioner's Approach, Roger S. Pressman, 1996, MGH.
- Fundamentals of software Engineering,Rajib Mall, PHI
- Software Engineering by Ian sommerville, Pearson Edu, 5th edition, 1999, AW,
- Software Engineering – David Gustafson, 2002, T.M.H

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Data Base Management System
PDGCA-104

No. of Credits: 4

L T P

3 1 0

Internal Marks: 20

External Marks: 80

Total Marks: 100

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Introduction: Limitations of Manual Data Processing – Advantages of databases- Basic DBMS Terminology – Role of DBA, Data Manager, File Manager and Disk Manager.

Database system architecture: Three Level Architecture of DBMS- Physical and Logical Data Independence, Data Base languages and Interfaces, DBMS functions and component modules, Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML).

Data models: Entity-relationship model, network model, relational and object oriented data models. integrity constraints, data manipulation operations.

UNIT-II

Entity Relationship Model: Concepts, Relationships, Constraints, Keys- Primary, Secondary, Composite & Foreign Key etc. E-R Diagrams, Mapping ER- diagrams to Relational Tables. Introduction to Data Models, Comparison between Hierarchical, Network and Relational models.

UNIT-III

Relational Algebra: Query Language, Basic Set Operations, Special Relational Operations, Introduction to SQL: DDL, DML, and DCL Commands, Views& Queries in SQL, Specifying Constraints & Indexes in SQL. Functional Dependencies, Normalization Normal forms based on primary keys (1 NF, 2 NF, 3 NF, & BCNF)

UNIT-IV

Transaction processing: Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery.

REFERENCES:

- Elmasri & Navathe, Fundamentals of Database systems, 5th edition, Pearson Education.
- Taxali, R. K., "PC Software for Windows made simple", Tata McGraw Hill.
- Ivan Bayross, "SQL, PL/SQL The Programming Language of Oracle", BPB Publications. Korth & Silberschatz, Database System Concept, 4th Edition, McGraw Hill International Edition.
- Bipin C. Desai, An Introduction to Database System, Galgotia Publication, N. Delhi. 6. Windows XP Complete Reference. BPB Publications.

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Data Structures
PGDCA: 106

No. of Credits: 4
L T P
3 1 0

Internal Marks: 20
External Marks: 80
Total Marks: 100

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Introduction: Basic Terminologies: Elementary Data Organizations, Data Structure Operations: insertion, deletion, traversal etc.; Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off.

Searching: Linear Search and Binary Search Techniques and their complexity analysis.

UNIT-II

Stacks and Queues: ADT Stack and its operations: Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms and complexity analysis. ADT queue, Types of Queue: Simple Queue, Circular Queue, Priority Queue; Operations on each types of Queues: Algorithms and their analysis.

UNIT-III

Linked lists: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue, Header nodes, Doubly linked list: operations on it and algorithmic analysis; Circular Linked Lists: all operations their algorithms and the complexity analysis.
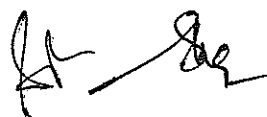
Trees: Basic Tree Terminologies, Different types of Trees: Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree; Tree operations on each of the trees and their algorithms with complexity analysis. Applications of Binary Trees, B Tree, B+ Tree: definitions, algorithms and analysis.

UNIT-IV

Sorting and Hashing: Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort; Performance and Comparison among all the methods. Hashing and collision resolution.

Graph: Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis.

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REFERENCE

1. M. Tenenbaum, Langsam, Moshe J. Augentem , "Data Structures using C," PHI Pub.
2. K. Sharma, "Data Structures using C" Pearson Pub
3. A.V. Aho, J.E. Hopcroft and T.D. Ullman, "Data Structures and Algorithms" Original edition, Addison-Wesley, 1999, Low Priced Edition.
4. Ellis Horowitz &SartajSahni, "Fundamentals of Data structures" Pub, 1983,AW

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Object Oriented Programming in C++
PDGCA-108

No. of Credits: 4

L T P

3 1 0

Internal Marks: 20

External Marks: 80

Total Marks: 100

Note: Examiner will be required to set NINE questions in all. Question Number1will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I
Object Oriented Programming Concepts: Procedural Language and Object Oriented approach, Characteristics of OOPS. Getting started with C++: syntax, data types, variables, string, function, namespace and exception, operators, flow control, recursion, array and pointer, structure .

UNIT-II
Features of Object Oriented Programming: Encapsulation, object identity, polymorphism – Inheritance in OO design. Implementing OO language features.- Classes, Objects and variables, Type Checking.

UNIT-III
Procedures: Commands as methods and as objects, Exceptions, Polymorphic procedures, Templates, Memory management.,

Inheritance and Polymorphism: : Derived Class and Base Class, Different types of Inheritance, Overriding member function, Abstract Class, Virtual function, Friend function, Static function.
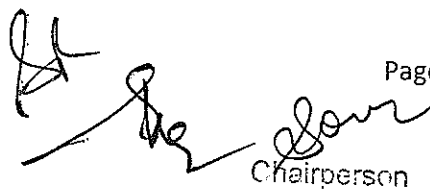
UNIT-IV
Exception Handling: Exception hierarchy, throwing and catching exceptions, built-in exceptions, creating own exceptions, Stack Trace Elements. Input / Output Basics ,Streams , Byte streams and Character streams , Reading and Writing Console , Reading and Writing Files.

REFERENCES:
- Herbert Schildts : C++ -'The Complete Reference, Tata McGraw Hill Publications.
- BalaguruSwamy : C++, Tata McGraw Hill Publications.
- Object Oriented Programming in C++ by Robert Lafore Techmedia Publication.
- The complete reference C – by Herbert shieldt Tata McGraw Hill Publication.

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Artificial Intelligence
PDGCA-110

No. of Credits: 4	Internal Marks: 20
L T P	External Marks: 80
3 1 0	Total Marks: 100

Note: Examiner will be required to set NINE questions in all. Question Number1will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I
Introduction: Definition and application of artificial intelligent, Problem solving: defining the problem as space state search, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search), Hill climbing, A*, AO* Algorithms.

UNIT-II
First order logic. Inference in first order logic, propositional vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution, Learning from observation Inductive learning, Decision trees, Reinforcement Learning

UNIT-III
Knowledge representation issues, predicate logic- logic programming, semantic nets- frames and inheritance, constraint propagation, representing knowledge using rules, rules based deduction systems.

UNIT-IV
Expert systems: Introduction, basic concepts, structure of expert systems, the human element in expert systems, how expert systems works, problem areas addressed by expert systems, expert systems success factors, types of expert systems.

REFERENCES:

- Luger G.F. and Stubblefield W.A. (2008) ―Artificial Intelligence: Structures and strategies for Complex Problem Solvingǁ. Addison Wesley, 6th edition.
- Russell S. and Norvig P. (2009) ―Artificial Intelligence: A Modern Approachǁ, Prentice- Hall, 3rd edition.

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OOP with C++ Lab
PDGCA-112

No. of Credits:1

L   T   P
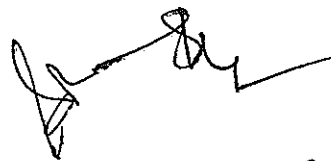
0   0   2

Internal Marks: 10

External Marks: 40

Total Marks: 50

At least 10 to 15 experiments to be performed related to the subject.

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Data Structures Lab
PDGCA-114

No. of Credits:1
L   T   P
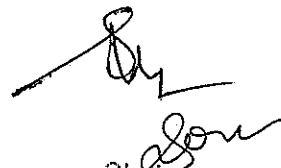0   0   2

Internal Marks: 10
External Marks: 40
Total Marks: 50

At least 10 to 15 experiments to be performed related to the subject.

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DBMS Lab
PDGCA-116

No. of Credits:1

L T P

0 0 2

Internal Marks: 10

External Marks: 40

Total Marks: 50

At least 10 to 15 experiments to be performed related to the subject.

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