Sardar Patel University Mandi
District Mandi -175001 (HP) India
www.spumandi.ac.in

(Established Under H.P. Legislative Assembly Act 03 of 2022)

Syllabus for
PGDCA 1 Year
Session 2022-23 Onwards

Department of Computer Science
Sardar Patel University Mandi (HP)

Sardar Patel University Mandi

Mandi (HP) -175001
"CONDUCT BRANCH"
[No. SPU/Mandi/Conduct/Curriculum Committee/13/2023-]

Scheme of Examinations for PGDCA
1st Semester

SN.	Course Code	Title of the Course	Paper Category		TH	IA	PR	Total	Credit
				Marks Obtained					
1	DCS-101	Fundamentals of Programming Using C	Major	MPM	30	10	0	**40**	-
				MM	75	25	0	**100**	
2	DCS-102	PC Software	Major	MPM	30	10	0	**40**	-
				MM	75	25	0	**100**	
3	DCS-103	Operating System	Major	MPM	30	10	0	**40**	-
				MM	75	25	0	**100**	
4	DCS-104	Computer Organization and Architecture	Major	MPM	30	10	0	**40**	-
				MM	75	25	0	**100**	
5	DCS-105	Practical - I (C Language)	Major Lab	MPM	0	20	20	**40**	-
				MM	0	50	50	**100**	
6	DCS-106	Practical - II (PC Software)	Major Lab	MPM	0	20	20	**40**	-
				MM	0	50	50	**100**	
		Total Marks						**600**	

2nd Semester

SN.	Course Code	Title of the Course	Paper Category		TH	IA	PR	Total	Credit
				Marks Obtained					
1	DCS-201	Data and File Structure	Major	MPM	30	10	0	**40**	-
				MM	75	25	0	**100**	
2	DCS-202	System Analysis and Design	Major	MPM	30	10	0	**40**	-
				MM	75	25	0	**100**	
3	DCS-203	Object Oriented Programming & C++	Major	MPM	30	10	0	**40**	-
				MM	75	25	0	**100**	
4	DCS-204	Data Base Management System	Major	MPM	30	10	0	**40**	-
				MM	75	25	0	**100**	
5	DCS-205	Practical-III (DFS Using C++)	Major Lab	MPM	0	20	20	**40**	-
				MM	0	50	50	**100**	
6	DCS-206	Practical-IV (Data base Management system)	Major Lab	MPM	0	20	20	**40**	-
				MM	0	50	50	**100**	
7	DCS-207	Project Work	-	MPM	0	0	80	**80**	-
				MM	0	0	200	**200**	
		Total Marks						**800**	

Grand Total (1st & 2nd Semester)	**1400**	

The project should be involve development of applications software for sum industry / Institute

MPM Minimum Passing Marks

MM   Maximum Marks

PRADESH UNIVERSITY
R HILL, SHIMLA-171005.

Out line of PGDCA. Course (1 year)- two semester and scheme of examination. (Effective from 2002 onwards)

SEMESTER –I

Course Code	Paper	Max. Marks Theory	Internal Assess.	Exams. Duration (Hrs.)
DCS-101	Fundamentals of Programming Using C	75	25	3
DCS-102	PC Software	75	25	3
DCS-103	Operating system	75	25	3
DCS-104	Computer Organization and Architecture	75	25	3
DCS-105	Practical-I (C Language)	50	50	3
DCS-106	Practical-I I (PC Software)	50	50	3

SEMESTER –II

DCS-201	Data and File Structure	75	25	3
DCS-202	System Analysis and Design	75	25	3
DCS-203	Object Oriented Programming & C ++	75	25	3
DCS-204	Data base Management system	75	25	3
DCS-205	Practical-III (DFS Using C ++	75	25	3
DCS-206	Practical-IV (Data base Management system)	75	25	3
DCS-207	Project Work	200	-	-

The project should be involve development of application software for some industry/ Institute

Programming Using C

PART-A

Programming Tools: Problem analysis, Program constructs (sequential, decision, loops), Algorithm, Flowchart, Pseudo code, Decision table, Modular programming, Top Down and Bottom up approaches, Concept of High Level Languages, Low Level Languages, Assembly Languages, Compiler, Interpreter, Type of errors.

Overview of C: General structure of C Program.

Data types, Operators and expressions: Constants and Variables, Data types, Declaring Variables, Storage Classes, Different types of expressions and their Evaluation, Conditional Expression, Assignment statement, Enumerated data type, Redefining/ Creating data types, Library functions, Type casting.

Input/Output: Unformatted and formatted I/O Functions (Character and strings I/O, *Scanf ( ), Printf ( )*)

Control Statements: Decision making using *if, if-else, elseif* and *switch* statements, Looping using *for*, *while* and *do-while* statements, Transferring Program controlling *break* and *continue* statements, Programming examples to illustrate the use of these control statements.

PART-B

Pointers: Definition, Need of pointers, declaring Pointers, Accessing Values via Pointers, Pointer arithmetic, Types of pointers.

Array & strings: Introduction to arrays, Declaring arrays, Initializing arrays, Processing arrays, Pointers to arrays, Passing arrays as arguments to functions, Introduction to strings, Pointers to strings, Passing strings and Arrays of strings as arguments to a function, Programming examples to illustrate the use of arrays and strings.

Functions: Defining a function, Local variables, *return* statement, invoking a Function, specifying and passing arguments to a function, Functions returning non Integer, External, static, and register variable, block structure, initialization and recursion.

Structures: Declaring a structure type, Declaring Variables of structure type, Initializing Structures, Accessing Elements of structures, arrays of structures, nested structures, Pointers to structures.

Text Books:

1. Mullis Cooper: Spirit of C: Jacob Publications
2. Yashwant Kanetkar: Let us C: BPB

Refrence Books:
1. Kerninghan B.W. & Ritchie D. M.: The C Programming Language: PHI
2. Yashwant Kanetkar: Pointers in C: BPB
3. Gotterfied B.: Programming in C: Tata McGraw Hill

Note:
1. Each theory paper shall be of 3 hours duration and shall carry 100 marks (75 marks for written semester examination and 25 for internal assessment).
2. In all 8 question will be set three from PART -A and four from PART - B of the syllabus. Question no. 8 will be compulsory covering the entire syllabus of at least 5 parts.
3. Examinees will attempt five questions in all. Two each from PART-A and PART-B. Question no. 8 will be compulsory.

ARE

Operating system concept: Duties, Responsibilities and functions of an Operating system, General understanding of different Operating System Environment (Single user system, Multi user system, Graphical user interface system, character based system).

Disk Operating System: Concept of Files and Directories, Internal commands, External commands, Batch Files, Filters, Redirection, Macros, Wild Card character

Booting Process, Configuration Files (Config.Sys)

General Understanding Of Facilities, Features Of Windows Explorer, Control Panel Setting, Accessories, Recycle Bin.

Computer Virus: Prevention, Detection, Cure.

PART-B

Word Processing Concepts: Definition, Benefits, Facilities & Features in general.
MS- Office 97:

MS-Word 97:Word processing using MS-WORD, File handling, Editing, Formatting, spell checking, Mail merge & Table handling & Insertion, importing, exporting & object linking embedding, printing operation.

Spreadsheet: features, uses & benefits in general.

MS-Excel 97: Entering data & selecting cells, editing worksheet data, formatting worksheet, creating Formulae, function & charts /graphs, multi operation, data base management.

Presentation Tools: features, uses & benefits in general.

MS Power Point: Creating & saving presentation templates & view (slide view, notes view, outline view, slide show) Formatting text, slides & graphs, animations, slides transition, multi operation.

Text Books:

1. A.L.STEVENS: Teach Yourself Windows.
2. A.L.STEVENS: Teach Yourself DOS.
3. JONATHAN KAMIN: DOS-7.
4. R.K.TAXALLI: Intro to software package, Galgotia publication.
5. RAJIV MATTUS: dos quick reference , Galgotia .
6. RAJIV MATTUS: Learning Word 97 for windows step by step BPB publication.
7. RAJIV MATTUS: Learning Excel 97 for windows step by step BPB publication
8. RAJIV MATTUS: Learning window 98 step by step BPB publication
9. LONNIE .E. MOSELEY& DAVID M.BOODEY: Mastering office 97.
10. MICRO SOFT OFFICE 97: Unleashed : Techmedia.
11. JOHN WALKEN BACH: Excel 97

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TEM

PART-A

Introduction: Definition Of The Operating System, Functions Of An Operating System, Different Types Of Systems - Simple Batch System, Multi-Programmed Batched System, Time Sharing System, Personal Computer Systems, Parallel Systems, Distributed Systems, Real Time Systems.

Process Management: Process- Process Concept, Process Scheduling, Operation On Processes, Cooperating Processes, Threads, Inter-Process Communication, CPU Scheduling—scheduling criteria, scheduling algorithms – FCFS, SJF, priority scheduling, round robin scheduling, multilevel queue scheduling, multilevel feedback queue scheduling, multiple processor scheduling, real time scheduling.

Deadlocks: Deadlock Characterization, Methods For Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery From Deadlock.

PART-B

Memory Management: Logical & physical address space, Swapping, Continuous Allocation (single partition, multiple partition), internal, external fragmentation, Paging, Segmentation, Segmentation With Paging, Virtual Memory, Demand Paging, Performance Of Demand Paging, Page Replacement, Page Replacement Algorithms– FIFO, optimal, LRU, LRU approximation algorithms, counting algorithms Thrashing, Demand Segmentation.

File System Interface: File Concept, Access Methods–sequential, direct, index, Directory Structure–single-level, two–level, tree-structured, acyclic-graph, general graph.

File System Implementation: File System Structure, Allocation Methods- contiguous allocation, linked allocation, indexed allocation, Secondary Storage Structure: Disk Structure, Disk Scheduling, FCFS, SSTF, SCAN, C-SCAN, Look Scheduling, Selection of A Scheduling Algorithm, Disk Management-disk formatting, boot block, bad blocks.

Text Books:

1. Silberschatz, Galvin "Operating System Concepts", Addison Wesley Publishing Company, 1989.

Reference Books:

1. William Stallings, "Operating Systems", Macmillan Publishing Company.
2. Deitel H.M., "An Introduction To Operating System", Addison Wesley Publishing Company, 1984.
3. Tanenbaum, A.S., "Modern Operating System", Prentice Hall of India Pvt. Ltd. 1995.

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...ANISATION and ARCHITECTURE

PART-A

Basics: Organization & Architecture, Structure & Function, A brief history, mechanical & electromechanical ancestors, First, Second, Third & later generations, Van-Neumann Machine, Block diagrams of computer system.

Register transfers & micro-operations: Register Transfer Language, Register transfer, Bus & memory transfers, Arithmetic loops, Logic loops, Shift loops, Arithmetic, logic, shift unit.

Basic computer organization & design: Instruction codes, Computer registers, Computer Instructions, Timing & Control, Instruction cycle, memory reference instruction, I-O interrupt, Design of basic computer, Design of accumulator logic.

Micro-programmed Control: Control Memory, Address sequencing, Design of control unit.

Central Processing Unit: General Register Organization, Stack organization, Instruction formats (zero, one, two, three), Address Instructions, Addressing Modes (direct, indirect, Immediate, relative, indexed), Data transfer & manipulation, Program control, RISC.

Computer Arithmetic: Addition & Subtraction, Multiplication algorithms, Division Algorithms, Floating point arithmetic operations,

PART -B

IO Organization: Peripheral devices, I/O interfaces, asynchronous data transfer, Modes of Data transfer, Priority Interrupts, DMA, I-O processors, Serial Communication.

Memory Organization: Memory Hierarchy, Main Memory, Associative Memory, Cache Memory, Virtual Memory, Memory management hardware.

Multiprocessors: Characteristics, Interconnection structures: Time shared, Common bus, Multi-port, Crossbar switch, Multistage, Inter-processor arbitration, Inter-processor communication & synchronization, cache coherence, multiprocessing, vector computation, Fault tolerant systems.

RISC: Instruction execution characteristics, Use of large register files, Computer based Register optimization, Reduced instruction set architecture, RISC pipeline.
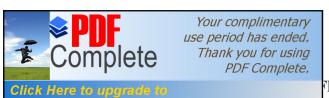
Text Books:
1. Morris M. Mano: Computer System & Architecture: PHI.
2. Stallings & Williams: Computer Organization & Architecture: Maxwell Macmillan.

Reference Books:
1. V.Rajaraman & Radhakrishnan: Introduction to Digital Computer Design: PHI
2. P.Pal Chowdhary: Computer Organization & Design: PHI

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FILE STRUCTURE

Preliminaries: Concept & notation, common operation on data structures, algorithm complexity, time-space trade off between algorithm, physical & logical representation of different data structures.

Arrays: Arrays defined, representing arrays in memory, Various operation (traversal, insertion, deletion), Multidimensional arrays, Sequential allocation, Address calculation, Sparse arrays.

Linked List: Definition, type (linear, circular, doubly linked, inverted), representing linked lists in memory, advantages of using linked list over arrays, various operations on Linked list (traversal, insertion, deletion).

Stacks: Definition & concepts of stack structure, Implementation of stacks, Operation on stacks (push & pop), Application of stacks (converting arithmetic expression from infix notation to polish and their subsequent evaluation), quick sort technique to sort an array, recursion).

PART – B

Queue: Definition & concept of queues, implementation of queue, operation on queues (insert & delete), Type of queues (circular queue, priority queue).
Trees Structures: Tree, Binary Trees, Tree Traversal Algorithms (Pre-Order, In-Order, Post-Order), Threaded Trees, Trees in various Sorting & Searching Algorithms & their Complexity (Heap Sort, Binary Search Trees).

Sorting & Searching: Selection sort, Bubble sort, Merge sort, Radix sort, Quick sort, Sequential search, Linear search and their complexity.

Text Books:
1. Jean Paul Tremblay & Paul G. Sorenson: An Introduction to Data Structures with Applications: Tata McGraw Hill.
2. Aaron M. Tenenbaum, Yedidyah Langsam, Moshe J. Augenstein: Data Structures using C: PHI

Refrence Books:
1. Robert L. Kruse: Data Structures & Program Design: PHI
2. Aho, Hopcroft & Ullman: Data Structures and Algorithms: Addison Wesley.
3. T.A. Standish: Introduction to Data Structures.
4. Nell Dale & Susan C. Lilly: Pascal Plus Data Structures, Algorithms and Advanced Programming: Galgotia.

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IS AND DESIGN

PART-A

Overview of system analysis and design, Business systems concepts, systems development life cycle, project selection, feasibility analysis, design, implementation, testing and evaluation.

Project Selection: Source of project requests, managing project review and selection, preliminary investigation.

Feasibility Study: Technical and economic feasibilities, cost and benefit analysis.

System requirement specification and analysis: Fact finding techniques, Data flow diagrams, data dictionaries, process organisation and interactions, Decision analysis, decision trees and tables.

PART-B

Detailed Design: Modularisation, Module Specification, File Design, System Development Involving Data Basis.

Systems control and Quality Assurance: Design objectives, reliability and maintenance, software design and documentation tools, topdown, bottomup and variants. Units and integration testing, testing practices and plans. System controls, Audit trails.

System Administration and Training, conversion and Operating Plans.

Hardware and software selection, Hardware acquisition, memory, processes, peripherals, bench-marking, vendor selection, software selection, operating systems, languages processes, performance and acceptance criteria.

Reference Books:
1. James, A.S. : Analysis and Design of Information Systems, McGraw Hill, 1986.
2. Ludeberg, M., Gulkoh1, G. & Hilsson, A.: Information Systems Development: A Systematic Approach, Prentice Hall Intern. 1981.
3. Lesson, M.: Systems Analysis and Design, Science research Associates, 1985.
4. Semprive, P.C. : System Analysis: Definition, Process and Design, 1982.

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PART-A

Object oriented programming: Need for OOP, the project oriented approach, characterstics of OOP language-objects, classes, Inheritance, Reusability, Polymorphism, overloading advantage of OOP, the relationship between C and C++.

Programming Basic- Basic program construction, output using cout, preprocessor directive, comments, integer variables, character variables, input with cin type float manipulator, type conversion, arithmetic operators, relational operators, loops and decision: loop- for, while, do, decision-if, if- else, switch, conditional operator, logical operator-AND, OR, NOT, other control statements-break, continue, goto.

Structures and functions: structures, Accessing structure members, structure within a structure, Enumerated Data type, simple functions, passing arguments to functions, Returning values from functions, reference arguments, overloaded functions, variable and storage class.

PART-B

Objects and classes: A simple class, classes and objects, specifying a class, using a class, C++ objects as physical objects, C++ objects as data types. Constructors, objects as function arguments, returning objects from functions.

Arrays: Array fundamental-defining array, array elements, Accessing array elements, Initializing arrays, multidimensional arrays, passing arrays to functions, array of objects, strings-string variables, Avoiding Buffer overflow, string constants, array of strings string as class members.

Operator overloading: Overloading unary operators-the operator keyboard, operator arguments, operator return values nameless temporary objects, limitation of increment operators, overloading Binary operators, data conversion, Pitfalls of operator overloading and conversion.

Inheritance: Derived class and base class, specifying the derived class, accessing base class, members, derived class constructors, overriding member functions, class hierarchies, public and private Inheritance, levels of inheritance, multiple inheritance.

Text Book:

1. Robert Lafore, õObject oriented programming in Turbo C++.ö Galgotia Publications.

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...AGEMENT SYSTEMS

Basic Concepts, Data Modeling for a Database, Records and Files, Abstraction and Data Integration, The Three-Level Architecture Proposal for DBMS, Components of a DBMS, Advantages and Disadvantages of a DBMS.

Data Models, Data Associations, Data Models Classification, Entity Relationship Model, Relational Data Model, Network Data Model, Hierarchical Model.

The Relational Model, Relational Database, Relational Algebra, Relational Calculus.

Relational Database Manipulation, SQL, Data Manipulation, Basic Data Retrieval, Condition Specification, Arithmetic and Aggregate Operators, SQL Join: Multiple Tables Queries, Set Manipulation, Categorization, Updates, Views: SQL, QUEL, Data Definition, Data Manipulation; QUEL, Condition Specification, Renaming, Arithmetic Operators, Multiple Variable Queries, Aggregation Operators in QUEL, Retrieve into Temporary Relation, Updates, Views.

PART-B

Relational Database Design, Relational Scheme and Relational Design, Anomalies in a Database: A Consequence of Bad Design, Universal Relation, Functional Dependency, Relational Database Design.

Concurrency Management, Serializability, Concurrency Control, Locking Scheme, Timestamp-Based Order, Optimistic Scheduling, Multiversion Techniques, Deadlock and Its Resolution.

Database Security, Integrity, and Control, Security and Integrity, Threats, Defense Mechanisms, Integrity .

Text Books:

1. Desai, B., õAn Introduction To Database Concepts.ö Galgotia Publications, New Delhi.

Refrence Books:

1. Date C.J., õAn Introduction to Database Systemsö, Narosa Publishing House, New Delhi.
2. Elimsari And Navathe, õFundamentals of Database Systemsö, Addison Wesley, New York.
3. Ullman, J.D , õPrincipals Of Database Systemsö, Galgotia Publications, New Delhi.

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